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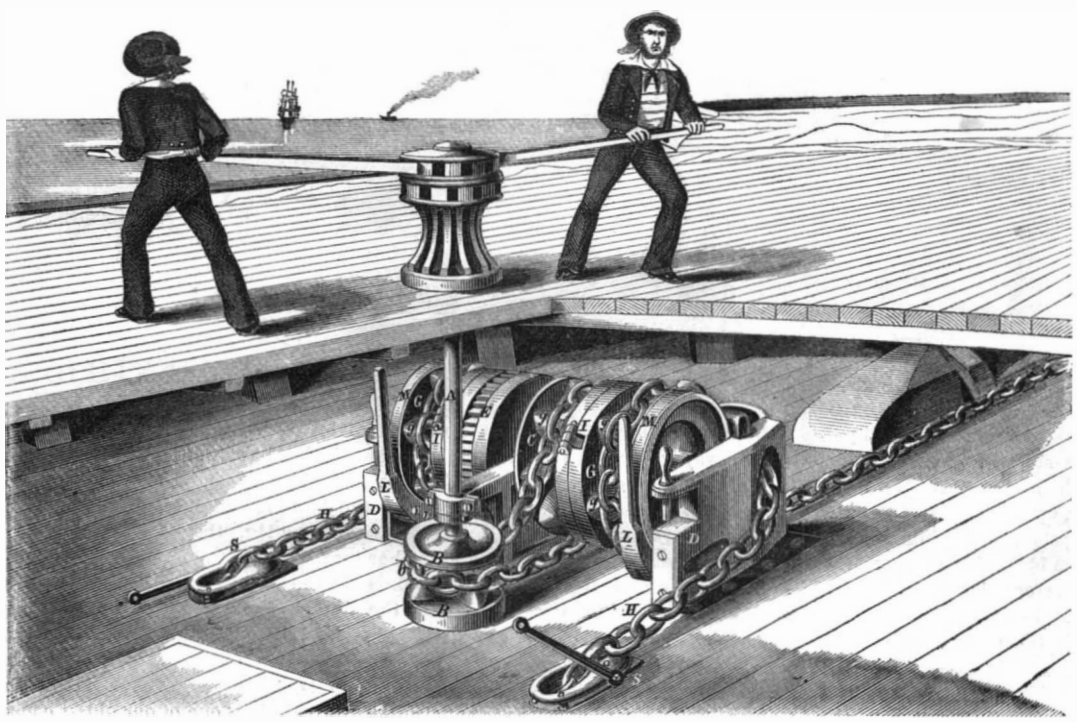
Ships' Windlasses, Capstans and Anchor Gearing.

The gearing of vessels by which the anchors are hoisted and let go, constitutes very important mechanism for the safety and working of every ship that goes upon the "mighty waters." This gearing usually embraces several parts, and the accompanying engravings represent it in different and improved forms, combinations and applications, the peculiarities and advantages of which will be referred to in the general description.

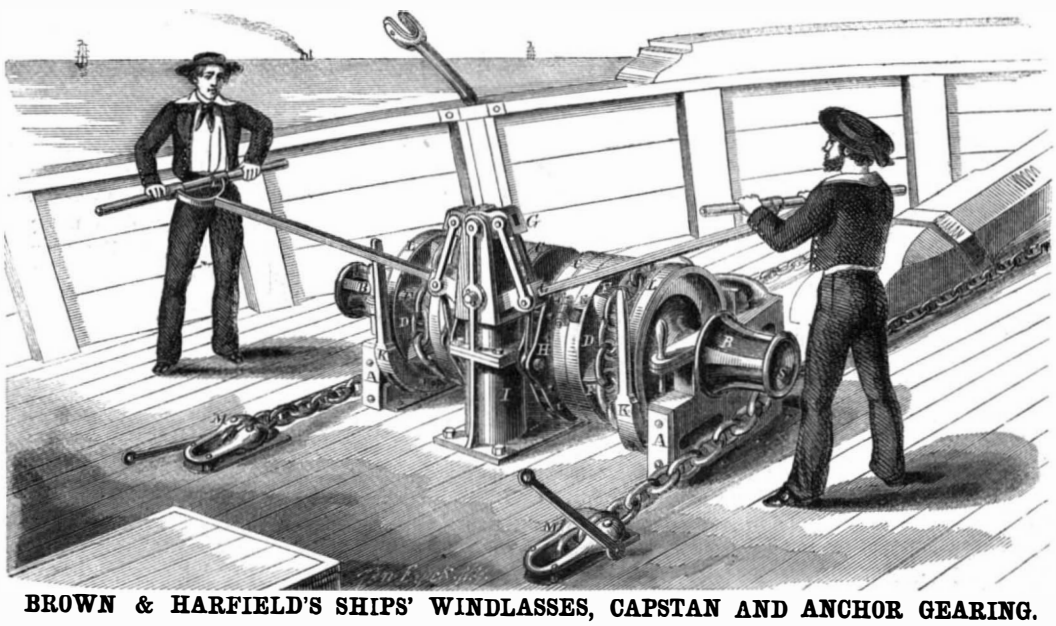
Fig. 1 is a perspective view, which consists of a capstan and improved windlass, the capstan being operated from the forecastle deck. The wrought-iron shaft, A, of the capstan passes down into a socket step in the main deck, and it has an improved chain wheel, B, on its lower part. This wheel is cast with two disk-plates which have upon them radial horned projections, and an endless short stud chain, *b*, passes around this wheel, also round a similar chain wheel, C, secured on the shaft of the windlass. As the capstan is rotated by the handspikes it will be observed that the stud chain will also rotate the windlass. This is the mode by which the latter is operated. The formation of this windlass is peculiar. Its shaft is supported in bearings in the bit blocks, D D, and it has the chain wheel, C, and the ratchet wheel, E, keyed fast to it. It has two barrels, G G, round which the larboard and starboard cables, H H, pass. These barrels are cast on a collar or boss, which fits loosely on the shaft of the windlass, and each barrel has two disk-flanged plates that have an open space between for the reception of the cable. A series of radial flaring horned projections, *g g*, are cast on the plates of the barrel. These hold fast the links of the cable in hoisting and prevent them from slipping, and as they are flaring in form they are suitable for operating links of different sizes. This is an advantage over the old capstans, each barrel of which required a chain of a certain size. Captains of vessels that had lost their anchors and cables were frequently placed at a great disadvantage in obtaining chains of the requisite size in foreign ports. The barrels, G G, are connected with the windlass shaft by hinged clutches, I I, which are fastened to the flanges of the wheels, C E. There are a series of recesses in the plates of the two barrels, and when it is required to gear any of the barrels to the shaft, the clutch, I, is pushed into a recess and fastened with a pin, as represented, when the barrel rotates with the shaft to take in the cable. When the cable is running out the shaft of the windlass is then stationary and the barrel rotates freely. If the barrel is revolving with too great speed its progress is arrested by a friction lever brake, L, which is secured to a friction strap, M, passing around the flange of the barrel. A pawl situated under the ratchet wheel, E, prevents the windlass from turning backward.

Fig. 1.



The cables pass up through the hauser holes of the spar deck to the forward side of the windlass through a guide hole in the bit-block, thence over the barrel of the windlass and straight out on the deck. This is a more convenient arrangement than on the old windlass, from which the chain passes out to the anchor from the top instead of the bottom of the windlass. The cables pass over patent lever chain stoppers, S S, which will be described in connection with another illustration.

Fig. 2



BROWN & HARFIELD'S SHIPS' WINDLASSES, CAPSTAN AND ANCHOR GEARING.

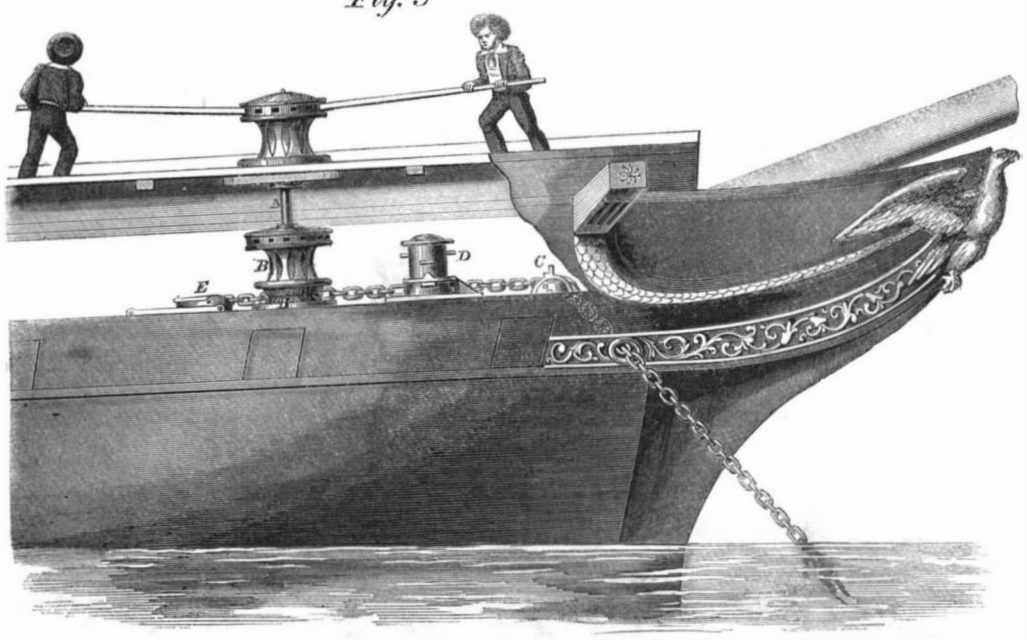
Fig. 2 is an illustration of an improved lever windlass. Its construction is nearly similar to windlass Fig. 1, but instead of being operated by the continuous motion of the capstan it is worked by the two reciprocating levers which operate clutches and give the windlass an intermittent rotary motion. The shaft, S, of the windlass is supported in the bit blocks, A A, and a winch head, B, is secured on each end for the purpose of hoisting sail, &c., occasionally. Each windlass has its two barrels for working the two anchors. C C are box plates with a ratchet on the circumference of each. They are keyed to the shaft, S, and have hinged clutches, E E, for fastening the barrels to them as has been described previously. F F are the radial flaring projections of the barrels. The levers have each two sockets, G G, for a fast or a slow motion as may be required. These sockets are secured in the iron standard or post, I, and as the levers are moved up and down they operate the ratchet clutches, H H, and these turn the barrels of

the windlass. The ratchet clutches are also secured to the straps, which pass around the faces of the ratchets. The friction brake levers, K K, are for the same object as those on Fig. 1, and the chains pass over the stoppers, M, and around the windlass in the same manner; L L are friction straps.

Every part of this windlass is made of iron, and it is more compact and efficient than the old kind. Thus, for example, the barrel of only 7 inches wide on this windlass will operate a chain, which will require a barrel 30 inches in width on a common windlass. Being also adapted for chains of various sizes, it is very convenient, and, not having any cog gearing on it, like other iron windlasses, it is more durable and reliable.

Fig. 3 is an elevation representing the improved capstan, chain stoppers, and also showing the mode of hoisting and retaining the anchor and cable. The capstan is capable of being worked on the two decks, as shown, as the shaft, A, extends from the forecastle deck to the spar deck. It is formed like the common capstan with the exception of the chain barrel, B, which has radial flaring projecting horns cast on its plates for griping the links of the chain, and by which it is adapted for working cables of different dimensions. The ship is represented as being about to weigh anchor, and the chain is shown coming through the bow hauser hole on to the main deck, and passing over the forward chain stopper, C, thence around the rider bit, D, to the chain barrel, B, of the capstan, then around a roller, upon which it takes a bite, on the other side of the capstan, then behind the capstan and down through the back pipe stopper, E, to the deck below. The front stopper is of cast iron and is fastened to the deck. It has a deep longitudinal groove in it through which the chain passes to the rider bit, D. Each link drops into the groove of the stopper when the cable is being taken in, and it is so held that it cannot slip forward, hence it acts as a hold fast or stopper. The back stopper, E, has a channel in its front lip, and each link of the chain, as it is drawn through it, in heaving, is held fast. In the middle of the fore stopper, C, and just behind the lip of the back stopper, E, there is a movable cam —as shown in the side and plan views, Fig. 4—which is capable of being raised and depressed by the levers, L L, to raise the links of the chain out of the grooves and permit the cable to run freely, and *vice versa* allow the stoppers to hold the chain in place by lowering the levers. The rider bit, D, has section flange projections upon it, as shown, to prevent the chain from slipping, and they also keep the turns of the chain around it apart. By the use of these stoppers the chain can be run out link by link if required. The bow cable stopper, C, acts as a continuous fore bit in heaving in; the pipe cable stopper, E, is used for checking the cable and "bringing the ship to," also for riding at anchor.

Fig. 3



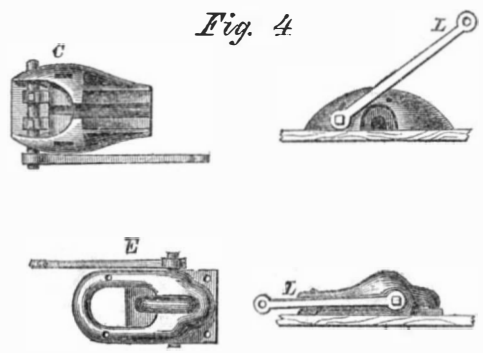
Getting the Ship Under Way.—A key of T-iron is placed in the front stopper, C, to keep up the cable when the anchor is running out, and also when the ship is riding at anchor. To get under way this key is first taken out of the stopper, and the lever, L, of the fore stopper is dropped. The cable is then to be unbit and a bight of it taken half round the capstan flange, B, and over the rollers which have been described. By the common anchor gearing the cable requires several hands to haul it back, but in this case it "pays down;" and takes itself off deck passing down through the back pipe stopper by its own weight. When the anchor has been raised and is at the bow, the pawls of the capstan are raised and the capstan turned back till the bow stopper takes the cable; the chain rollers are then unshipped, the chain taken off the capstan, and the cat which holds the anchor at the bow is made fast to it. The cable is now dowsed from the fore stopper and taken round the rider bit, D, again, and the lever of the bow stopper is raised and the cam keyed with its T-iron.

Letting Go the Anchor.—The cable is given from the back pipe stopper, E, by raising the lever, L, and the run of the anchor is checked by raising and lowering the lever alternately until the required length of cable is given out. The lever is then dropped and the ship rides by this stopper.

When the ship is riding heavily in a gale, in order to give more cable and avoid starting the anchor, the levers of both the fore and back stoppers, C E, are manned, and they are raised and lowered alternately, and thus link by link the exact length of cable to "veer away" is given out. The stopper should be kept clean and well greased, and the vessel should be "brought up" by the after and not the bow stopper.

The improvements embraced in this anchor gearing are covered by several patents, the last three for the combination windlass were issued on the 5th of August last, and the claims published on page 125 this volume Scientific American. This ships' gearing, consisting of windlasses, capstans, rider bits, stoppers, rollers, &c., are manufactured at the Marine Iron works of James R. Taylor, No. 61, 63 and 65 Goerck street, this city. The establishment is extensive for this specialty of marine mechanism, and a number of very large capstans, with their gearing intended for new war frigates and several vessels of our merchant marine, may now be seen in different stages of progress at these Works. Two sets of gearing are being made for the iron-clad frigate *Roanoke*, which is now at the Novelty Works getting on her plates, also one very large capstan for the frigate *Ironsides* at Philadelphia. It is 4½ feet high and 4 feet 8 inches in diameter at the broadest part. A set of anchor gear of the same kind that weighed 36,000 pounds was made here for the Russian frigate *General Admiral*. The capstan with its gearing, Figs. 3 and 4, it will be understood, is employed for the very largest steamers without a windlass. It is entirely different from an old-fashioned messenger capstan, by which the cable was taken in by a messenger chain to which the cable was hitched by nippers. They required quite a number of hands to be taking new catches while the slack was drawn back by hand. With this improved capstan we have been assured that an anchor may be hoisted from a depth of 40 fathoms in about 20 minutes, which would have required about two hours labor by the old-fashioned messenger capstan. An incident occurred at Vera Cruz about two years ago, which demonstrated this. The American steam frigate *Brooklyn*, and the old British steam frigate *Diadem* were lying in that port at the same time. The latter was furnished with the old kind of anchor gearing, the *Brooklyn* with this new capstan and gearing. Both vessels in preparing to leave port commenced weighing anchor at the same time, but before the *Diadem*, with 300 men employed, had her anchor up, the American frigate with 50 men had weighed her anchor, had sails set and was under way. Such gearing has now been applied to most vessels in the American and British navies. It has been ordered for the two Italian iron clad frigates building by W. H. Webb, also sets for the new steam frigates *Ticonderago* and *Lackawana* building at Brooklyn, and the *Monongahela* and *Juniata* at Philadelphia.

Fig. 4



Not very many years ago nautical men were considered to be a stubborn conservative class. They looked upon all proposed improvements as objectionable innovations, and they were decidedly opposed to changes in general. These were the days when bluff bows were held to be the best form for sailing vessels, and nautical men found arguments in favor of this idea, by the greater ease with which a tapering log, they said, could be drawn through the water butt-end foremost. But all these notions have been set aside and an entire revolution has been effected in the form, rigging, propelling and gearing of vessels. Perhaps no person deserves an equal amount of credit in our country for the introduction of marine improvements as Captain Wm. Skiddy of this city. He is one of our oldest commanders and most skillful designers. His name is associated with the designing of our first American ocean steamers, and he has planned quite a number of the steamships which have been built in New York. He is also the introducer of this improved anchor gearing and several other improvements which have been of immense benefit to our merchant marine.

What Iron-Clad Ships Have Done.

The Liverpool *Post* says:—In a short time, the war continuing, America will have the largest and most effective navy in the world. The Government at Washington does not yet feel quite secure against the chance of European interference. Possibly the alarm of intervention is encouraged to sustain the military ardor of the nation under present circumstances; for it is difficult to suppose that any sane man could believe for a moment that England would interfere in the present quarrel otherwise than in a friendly spirit. Hereafter there can be no war between an European Power and the United States. Iron-clad steamers forbid it.

Brilliant Idea.—A gentleman who has spent some days in the region of the coal oil wells, in Pennsylvania, says that in his opinion the Government of the United States ought to interfere at once, and put a stop to further pumping and boring for oil on this continent. He is quite certain the oil is being drawn through these wells from the bearings of the earth's axis, and that the earth will cease to turn when the lubrication ceases! Such a suspension would beat anything that ever agitated Wall street, and the consequences be too great for ordinary minds to conceive or comprehend. It should be attended to at once.

NOTES ON NAVAL AND MILITARY AFFAIRS.

After the great events which filled our brief summary of the last week and the week before, there is a comparative lull in military affairs.

ALL QUIET ON THE POTOMAC.

The two great armies are facing each other with the Potomac river between them; though we have several corps on the South side of the stream. Since our last no movements of importance have been made.

OPERATIONS IN KENTUCKY.

The great event of the week is the long and rapid march of General Buell's great army, from the middle of Tennessee to the northern borders of Kentucky, in order to protect Louisville from the attack of the rebel army under General Bragg. It seems that General Bragg, after maneuvering a short time in Southern Tennessee, started by forced marches for Louisville, and that Gen. Buell, as soon as he perceived the movement, put his heavy columns in motion for the same point. General Bragg moved round to the north and east of Buell, and struck the railroad which leads north to Louisville at Munfordsville, 72 miles South from Louisville. His army enveloped the Union forces at that place, and captured them on the 17th of September, as we have already stated. He then continued his march to the northward, but General Buell was close in his rear. On Saturday the 21st, four days after the surrender, General McCook's cavalry dashed into Munfordsville, and drove out the rebel cavalry which formed the extreme rear of Bragg's forces, and from this time during the remainder of the march, Bragg's rear was harassed by Buell's cavalry. At midnight of the 24th General Buell arrived in Louisville, and announced that seven divisions of his army were in the vicinity; immediately restoring confidence to the citizens of that place. It seams that Bragg drew his army to the eastward, and allowed Buell to pass by him to Louisville.

SHOOTING OF GENERAL NELSON.

Before the arrival of Gen. Buell the defence of Louisville was under the command of Major General William Nelson. On the morning of the 29th of September this officer was shot by Brigadier General Jefferson C. Davis. It seems that there had been a quarrel between the two men for some time. General Nelson had deprived General Davis of his command, and the latter went to Cincinnati and laid the case before Gen. Wright with complaints against General Nelson, when General Wright restored Davis to his command. Between 8 and 9 o'clock on the morning of the 29th Gen. Davis met Gen. Nelson in the hall of the Galt House at Louisville, and attempted to speak to him. General Nelson refused to listen, and turned away. Davis followed him to the other end of the hall, and again addressed him. Nelson now turned to him, saying, "Do you wish to insult me, you cowardly puppy?" and struck him at the same time on the head. Davis did not retaliate on the spot, but made through the crowd of guests until he met an officer of his acquaintance, borrowed a pistol of him, and then pushed to the west door of the hall, where Nelson was conversing with some gentlemen. When within a few feet of him, he cocked the revolver and fired instantly. The ball entered Nelson's left breast, inflicting a mortal wound. He managed to walk up stairs to General Buell's room, where he fell on the floor. Surgical attendance was immediately called, but the General expired about thirty minutes after he was shot.

CAPTURE OF AUGUSTA.

On the 27th of September, the town of Augusta, Ky., situated on the Ohio river 40 miles above Cincinnati, was attacked by 640 mounted rebels, with two cannon, under the command of a brother of the guerrilla John Morgan. The Union forces, under Col. Bradford, numbering 120 men, took refuge in houses and fired from windows, killing and wounding ninety of the rebels. Among the killed were three captains —one of them a younger brother of John Morgan. Among the mortally wounded was Lieutenant Colonel Prentice, a son of George D. Prentice, editor and proprietor of the Louisville *Journal*. The rebels were so exasperated at their loss that they set fire to the houses in the place, and two squares of the town were burned. Our loss was nine killed and fifteen wounded. The balance of our forces were taken prisoners. Subsequently a Union force from Maysville intercepted and attacked the rebels, when they fled in a perfect panic.

EVACUATION OF CUMBERLAND GAP.

One of the most important military positions in the country is Cumberland Gap, a narrow passage through the mountains, situated on the northern boundary of Tennessee, just where this boundary is met by the dividing line between Virginia and Kentucky. To hold this important passage, a Union force under General Morgan was stationed at the Gap, but when the rebel General, Kirby Smith, advanced into Kentucky, Morgan's communications were cut off, and fears have been felt that he would be starved out and forced to surrender. It is now announced that some two weeks since Morgan blasted the rocks upon the sides of the gap, throwing down great masses into the road to block up the passage, and then started with his forces in a northeasterly direction for the Ohio river. It is thought that the armies of Kirby Smith and Humphrey Marshall are marching to intercept Morgan, and a battle between the contending forces is anticipated.

THE LOSSES AT SHARPSBURG.

General McClellan has made the following official report of the losses at the battles of South Mountain and Sharpsburg.

NEAR SHARPSBURG, Sept. 29—1 30 P. M.

Major-General H. W. Halleck, General-in-Chief of the United States Army:

GENERAL—I have the honor to report the following as some of the results of the battles of South Mountain and Antietam:—

At South Mountain our loss was 443 dead, 1,806 wounded, and 76 missing. Total, 2,325.

At Antietam our loss was 2,010 killed, 9,416 wounded, and 1,043 missing. Total 12,469.

Total loss in the two battles, 14,794.

The loss of the rebels in the two battles, as near as can be ascertained from the number of their dead found upon the field, and from other data, will not fall short of the following estimate:—

Major Davis, Assistant Inspector General, who superintended the burial of the dead, reports about 3,000 rebels buried upon the field of Antietam by our troops. Previous to this, however, the rebels had buried many of their own dead upon the distant portion of the battle field, which they occupied after the battle—probably at least 500.

The loss of the rebels at South Mountain cannot be ascertained with accuracy; but as our troops continually drove them from the commencement of the action, and as a much greater number of their dead were seen on the field than of our own, it is not unreasonable to suppose that their loss was greater than ours. Estimating their killed at 500, the total rebels killed in the two battles would be 4,000. According to the ratio of our own killed and wounded, this would make their loss in wounded 18,742.

As nearly as can be determined at this time, the number of prisoners taken by our troops in the two battles will, at the lowest estimate, amount to 5,000. The full returns will no doubt show a larger number. Of these about 1,200 are wounded. This gives us a rebel loss in killed, wounded and prisoners of 25,542. It will be observed that this does not include their stragglers, the number of whom is said by persons here to be large. It may be safely concluded, therefore, that the rebel army lost at least 30,000 of their best troops.

From the time our troops first encountered the enemy in Maryland, until he was driven back into Virginia, we captured 13 guns, 7 caissons, 9 limbers, 2 field forges, 2 caisson bodies, 39 colors and 1 signal flag. We have not lost a single gun or a color.

On the battle field of Antietam 14,000 small arms were collected, besides the large number carried off by citizens and those distributed on the ground to recruits and other unarmed men arriving immediately after the battle.

At South Mountain no collection of small arms was made; but, owing to the haste of the pursuit from that point, 400 were taken on the opposite side of the Potomac.

GEORGE B. MCCLELLAN,
Major-General Commanding.

CAPTURED ENGLISH STEAMERS TRANSFERRED TO THE NAVY.

The following English steamers, captured by our navy, have been taken by the Navy Department, to be fitted up as Union cruisers—namely, the *Circassian*, *Memphis*, *Bermuda*, *Stellin* and *Columbia*.

PROMOTION FROM THE RANKS.

General Halleck has issued a circular to the Governors of the several States, urging them to fill up the vacancies of commissioned officers who have fallen in battles in such large numbers recently, by appointing deserving non-commissioned officers and privates who have distinguished themselves in battle and have evinced a capacity to command to the vacant places.

This is a very important measure, not merely from its immediate effect in stimulating the courage of the soldiers, but as the first step in eradicating from our army that aristocratic spirit among the officers which has led them to sympathize so much with the leaders of this rebellion, and has thus been the principal cause of the feebleness with which our military operations have been conducted. Let the brave of all ranks be honored or promoted, and let all drunken and incompetent officers be promptly removed, and the great military power of the nation will be more efficiently directed.

Lord Byron's Grandson a Mechanic—His Death.

Lord Byron's grandson, who led the life of a mechanic, died recently at Wimbledon Hill, near London, at the age of twenty-seven—death being caused by the rupture of a blood vessel. This young nobleman, Byron Noel, Viscount Ockham, was the elder of the two sons of the late Lord Lovelace, by Ada Byron, whom her unhappy father addressed in *Childe Harold* in the passionate strains—

> "Is thy face like thy mother's, my dear child,
> Ada, sole daughter of my house and heart?"

The London *Morning Post*, speaking of this event, has the following interesting and romantic biography of the late young peer by birth, and mechanic by profession:—

The heiress of the Noels was not happy in her union with George Gordon, Lord Byron, as all the world is aware; and perhaps the world at large, far beyond the borders of Surrey, knows that the inheritance to which the Lovelaces succeeded has been less happy than most in respect of domestic concord. At all events, those who have sojourned in the neighborhood of Ripley and Guildford, are aware that since the death of Ada, Countess of Lovelace, the proud towers of East Horseley have not held the heir apparent to the titles of his father and of his grandmother; but, it is said, that the latter has been well contented to earn his daily bread as an artisan by the sweat of his brow in a dockyard not a hundred miles from Blackwall. Young Lord Ockham at an early age entered the royal navy, but left it after a few months' service. The next that we hear of him is as a common sailor; for it is a fact that, though the eldest son of a peer of the realm, he went out to America in a merchant vessel, working his way before the mast. Tired of his newly-adopted profession, the young lord assumes a new character, and next turns up as a common workman in the shipyard of Mr. Scott Russell in the Isle of Dogs, where he took his wages week by week along with his plebian brethren. It was rumored—and we know not whether the rumor be true or false—that whilst working in the dockyard he had linked his fortunes with those of a young woman of the humbler classes, but of most respectable character. If this be so, the lass from Blackwall, or Stepney or Poplar, is now a peeress of England. Be this as it may—and we suppose that in a few days we shall learn whether his lordship has left a widow or not, and whether he has a child to succeed him in his title—should such not prove to be the case, then the heirship to the earldom of Lovelace will pass to his youthful brother, now the only surviving male descendant of the poet. The late millwright of Blackwall was not only the eldest son of a peer, but had been for the last two years a peer of the realm in his own right, having succeeded to the barony of Wentworth on the death of his amiable but unfortunate grandmother (Lord Byron's widow), in the summer of 1860.

Canadian Petroleum---Its Origin.

The Canadian *Journal of Art* asserts that Canadian petroleum is not derived from coal, nor is it of recent origin. It says:—

Petroleum was formed long before the coal, and is the result of the decomposition, under pressure of an infinite number of oil-yielding animals which swarmed in the seas of the Devonian period, long anterior to the coal. The decomposition of marine plants may have given some oil to the rocks of Canada and the United States, which are saturated with this curious substance. The shale beds of Collingwood furnish an answer to those who object to the infinite number of animals it would require to produce the oil locked up in the earth. Those shale beds are composed altogether of the remains of Trilobites—they extend from Lake Huron to Lake Ontario, and far west and east of these lakes. The oil-bearing rocks of Canada were once a vast coral reef, extending from the Gulf of Mexico to Lake Superior. There is the best ground for belief that the supply of oil will last for a long period, and that new discoveries will be made in different localities.

PRESIDENT LINCOLN has, on his own private account, recently presented a pair of Colt's revolvers to the King of Denmark. All the iron and steel is completely covered with gold inlaid in beautiful arabesque, with representations of the mechanic arts, agriculture and commerce elegantly designed.

CONSTRUCTING WATER CISTERNS FOR HOUSES IN CITIES.

The London *Ironmonger* states that wooden cisterns lined with lead, which were formerly very common in the houses of the British metropolis, are being fast superseded by cisterns made with slate and cement, and others made of wrought, cast and galvanized iron. It also states that slate and galvanized-iron cisterns are very cleanly and durable, and the latter has the advantage as compared with capacity, over the others. The following are interesting extracts from our cotemporary on the manner of connnecting the pipes and constructing cisterns in London :—

A cistern to contain water for the general uses of a household is usually fixed in the roof, or some convenient place near the top of the house, and the water is supplied to it either from water mains or lift pumps. In the former case, of course, the first thing to be done is to make the connection with the main pipe (or rather that is the last thing to be actually done, but the first to be prepared for).

Some of the water companies, who have a high rate of pressure, lay down regulations to be observed by the plumbers as to the size and weight of pipe to be used, and will not connect unless these conditions are complied with; but as these can be obtained when required, it is not necessary to give them here. The pipes are in most cases connected with the iron mains by means of what is termed a driving ferrule, which is a cast tube of brass, bent to a slight angle, with a projection left at the elbow for the purpose of driving; one end of the ferrule being tinned is soldered to the lead pipe, and a piece of leather wrapped round the other, it is driven into a hole drilled of the required size into the side or top of the main. In some districts the connection is made by what is called a Cobourg, which is a short piece of stout cast-lead pipe, with a flat flange left at one end for the purpose of being secured to the main by means of screw bolts; in other cases screw ferrules are used. The lead pipe is then carried by the readiest and most convenient road to the cistern. Some judgment and care is required in determining the course and direction of pipes through a house; they are liable to be frozen, and consequently to burst, if carried outside, and are very disfiguring to rooms, stair cases, &c., if carried inside without being concealed. The best plan is to have casings of wood prepared in the walls, with the fronts made to fit into rebates, and secured with a few small screws; the pipes can then be, at all times, readily got at in case of alterations or repairs being required; and this leads us to mention that in all cases of laying on water, to a dwelling house especially, the service pipe should be furnished with a stopcock, just at the point where the pipe first enters the premises; thus, in the case of the pipe bursting, or ballcock getting out of order, the water can, by simply turning the stopcock, be kept from flowing over the premises, as is often the case, to the great destruction of ceilings, walls, paper, furniture, &c., when this precaution is neglected. The end of the pipe at the cistern is fitted with a self-acting ballcock or valve, which is so adjusted as to shut off the supply without allowing the cistern to get quite full. There have been, during the last few years, a number of different cocks and valves invented and patented, all possessing various degrees of excellence, such as absence of friction, increased water way, non-liability to get out of repairs, &c. Under all circumstances cheap, and consequently inferior cocks, taps or valves of every description should be avoided, as nothing is more vexing or likely to cause dissatisfaction and annoyance than to find a cock leaking, and have to be taken out again after work is finished. Two or more cisterns may be supplied from one service pipe, by either branch pipes from the principal service or from the first cistern, always fitting a separate ballcock to each.

Separate cisterns for the supply of water closets should always be provided. Cisterns in all situations should be provided with covers of wood or some other suitable material, as, in addition to the advantage of keeping out dust, dirt, leaves, rats and mice, &c., which will sometimes obtrude themselves, the water itself is better for being kept from the effects of too much light, which encourages the spontaneous vegetation and confervoid growth which plumbers often find on the sides and bottoms of cisterns which are much exposed to light and air. The water being in the cistern, our next business is to distribute it throughout the premises wherever required, which is done by again carrying pipes in any direction from the cistern to washstands, sinks, boilers, &c., as the case may be. We have described the mode of attaching these pipes to lead cisterns by means of soldering, but the slate and iron cisterns require a different mode of connection, which is effected by means of screw ferrules of various lengths; these being soldered to the end of the pipe, the screw end is passed through a hole drilled in the bottom or side of the cistern, a lead washer is then placed over the screw on the inside, a little cement of red and white lead added, and the fly nut screwed home. Formerly cast cisterns of solid lead were used, and plumbers frequently meet with them now in large old houses, many of them curiously ornamented on the fronts with quaint devices and figures in relief, and often the date of casting and the plumber's initials included therein but these are not now in use.

THE WAY TO KEEP MILK.

From a treatise on the Consumption of Milk, by Silas S. Loomis, A. M., M. D., in the volume of the Patent Office Report devoted to Agriculture, we extract the following remarks on the Preservation of Milk :—

There are three methods of preserving milk. 1. By heat. 2. By evaporation or condensation. 3. By cold and quiet.

1. Heat.—There are two methods of preserving milk by heat. First, by heating it in the open air. This is very commonly resorted to under the name of scalding the milk. Several years since Gay Lussac demonstrated that if milk be heated gradually to boiling point two days in succession in the winter, and three in the summer, it would keep two months without souring. Second, the milk is first bottled up tightly with wired corks and placed in kettles of cold water. The water is now gradually heated to boiling point when the kettles are removed from the fire and allowed to cool. The bottles are then taken out and packed for future use. Milk treated in this manner will keep for six months. It has been claimed that the addition of soda or hedge mustard has a good effect, but it is believed that the real preservative power is the heat. By these methods the milk loses its primitive taste, and is not suitable for many purposes, nor can they be practically employed by dairymen supplying our cities.

2. Evaporation or condensation.—This process was patented a few years since, and consists in evaporating the watery portions of the milk till it solidifies. It is then put up in sealed tin cans and can be carried to all parts of the world. It keeps sweet a great length of time, and is used most extensively by people at sea. There are several large manufactories in Connecticut and New York which have been in operation for several years. The particulars of the process are not known to the public.

3. Preservation by cold and quiet.—This is the process practiced by dairymen generally, who are compelled to send their milk to market by the cars. The process consists in cooling the milk to about 40° Fahrenheit, as soon as possible after milking, and in keeping it at that temperature, in perfect quiet, till it is ready to be carried to the cars.

The essential requisite is a spring of cold water. The quantity of water is not of so much consequence as its degree of coldness and its permanency. The The water should be conducted underground the shortest possible distance to a suitable place for the location of the milk house. This place, if possible, should be on the north side of a hill, well shaded, and so situated that the water from the tank will readily flow off. The house should be of such size and form as to admit of a tank two feet wide, and of sufficient length to hold all the milk cans. The depth of the tank should be about four inches less than the depth of the can. Each can should have a separate division, and the divisions so arranged that the water may pass from one to another.

The water from the spring should enter at the bottom of the first division, and from the top of the first enter the second, then from the bottom of the second enter the third, and so on, alternately entering at or near the top of one and the bottom of the next division. This secures a perfect current around each can, particularly if the top entrances are at the back side of each alternate division and the bottom entrances at the front side of the tank.

The tank should be so arranged as to be out of the way of any currents of air. The ventilation of the house should be only sufficient to keep the air pure. Most milk houses admit altogether too much air. In all cases, all ingress of air to the house should be prevented as soon as a thunder shower is seen rising, and no admittance allowed till the milk is to be removed. In clear or in rainy weather the ventilator may be open, but never in showery weather.

Ozone, which is freely generated by electricity, acts energetically on milk, souring it in a few minutes, many times destroying the milk before the shower has passed over. Therefore, all air from the vicinity of thunder showers, which always contains ozone, should be carefully excluded from the milk house.

Having prepared a place for the reception of the milk, its treatment remains to be considered. The cows are milked in the cool of the evening, just after sunset, and the milk is strained into the cans which are to convey it to market. These cans hold about forty quarts, and when filled weigh about one hundred and twenty pounds. They are made of strong tin, and are well bound. As fast as the cans are filled they are placed in the tank, beginning at division No. 1. The cans remain uncovered, and the milk is not allowed to be stirred or even jarred.

The tank should be so constructed as to be disconnected with the building. It should rest flat on the ground, so that any jar of the building cannot disturb the milk in the cans.

In the morning the cows are milked before sunrise, and the milk placed in the cans as before. If there is a can partly full of night's milk, it must remain so; the warm morning's milk must not be mixed with the cold night's, but kept separate. In no case must a can of morning's milk stand in the tank above a night's can, for in that case the warmth of the morning's can will be distributed over the night's milk, and the process of souring initiated.

At about 3 or 4 o'clock in the afternoon the milk is to be carried to the cars. The cans are then to be filled if necessary. The milk being all cool can be mixed; in fact, there is no difference between the night's and morning's milk. No parts of cans are to be sent to market, but to be kept over twenty-four hours longer.

The cans are then placed in a wagon and a wet covering spread over them, over which are thrown buffalo robes or other covering. At the railroad station the cans are closely packed in a closed car without anything being thrown over them, and during the night reach New York. "The rate of a night milk train when in motion is twenty miles per hour."

The cans are then taken by milk carts, and the milk is distributed to consumers. The milk, therefore, does not leave the cans till it is sold, and generally it is disposed of at a temperature nearly as low as it left the milk house. In this condition it will keep sweet twenty-four or even thirty-six hours, and is a pure country milk, quite different in value from that peddled at a smoking temperature of 70 or 80°

A similar process of cooling milk has been practiced several years. It has been thought necessary to stir it several times while in the tank to aid in cooling, but it is now, however, found that this treatment is highly injurious. The milk should be kept as still as possible till cooled to about 40° Fahrenheit, or below, when it may be stirred or transported to a great distance without injury, provided the temperature is not elevated.

The above process is that practiced on the Harlem railroad during the hot months. Not so much care is necessary during cool weather. The water, however, is always kept running, and the milk houses kept patterns of neatness. The cans are cleansed with boiling water and sand after returning from the trip. The cost of transportation averages one cent per quart; the producers sell it, delivered at the station, for two cents; therefore it costs, ready for delivery in New York city, three cents per quart. Usual retail price six cents.

This process is available and practicable for all milkmen. The milk should be cool in all cases before carting it. Milk that is not cooled commences decay in a few hours after milking, and is not a healthy diet. Sour milk is not so injurious. It is milk that is in a state of change that is unhealthy.

No food should be eaten while a chemical change is going on among its constituents.

The plan suggestion, then, is to have milk cooled before it is offered for sale. Milk in the evening and peddle it in the morning, and sell the morning's milk in the afternoon.

In this manner the territory around our large towns and cities for producing milk will be greatly enlarged, and milk may become an important article of food.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The regular weekly meeting of the Association was held at their room at the Cooper Institute on Thursday evening, Sept. 25th, Dr. Stevens in the chair, and Mr. Stevens acting as Secretary *pro tem*. After a long discussion of miscellaneous matters, the Association took up the regular subject of the evening—

FUEL IN THE ARTS.

Prof. SEELY—The cost of power, of iron, and of many of our most important materials is almost exactly measured and controlled by the cost of fuel. Indeed the cost of fuel is an element in the cost of everything we manufacture. Now the fact that in our very best regulated plans of using fuel we seldom realize more than one-twentieth of its actual value, and in our ordinary operations not one-hundreth, shows how much improvement is to be desired and to be striven for. These truths are well known, and the question of fuel is discussed everywhere. In our club it is quite threadbare, so that I need to make the explanation that I introduced it only to bring out opinions on the new system of using fuel illustrated by Siemens's Regenerator Furnace, and the new material for fuel, rock oil. (A brief description of Sieman's invention was here given). In this furnace it is to be observed that the coal produces no more heat than in other furnaces where the combustion is equally perfect. Also by the use of water and the water gases (hydrogen and carbonic oxide) the total heat is not increased; the coal is, in effect, partly converted into water gases, which burn and give the heat which otherwise would come directly from the coal. Coal and water are fed at the stoking place, and the solid coal and liquid water expand into the combustible gases carbureted hydrogen, hydrogen and carbonic oxide and pass on to the spot where they are to be completely burnt. The advantage of this transportation of the coal lies in the fact that the burning of the gaseous products can be more easily controlled, the heat can be more directly and completely arried to the point where it is useful. The novelty of Sieman's furnace is, however, his regenerator, by which the heat from the otherwise waste products is preserved and brought again to the working point. It is also evident that this waste heat of the regenerator is so added to that of the gaseous fuel that the intensity of the working heat is greatly increased, a fact of great consequence in many industrial operations.

With reference to rock oil I will only remark that although its cost by weight must always be much greater than that of coal, yet for many purposes it will be much cheaper for the reason that the heat it gives can be more completely utilized. Although it costs 50 times more than coal, yet if it does 51 times more work, it is plain that it is cheaper. Later in the discussion I will present some new methods of burning it.

Mr. FISHER—I have made here on the blackboard a rough sketch of the apparatus invented by Mr. Clark for burning the smoke in locomotives in which bituminous coal is used. A number of small openings—usually 14—are made into the furnace, and small jets of steam are blown through these openings, carrying currents of air with them. This air mingles with the gaseous products of combustion, and burns them. It was found that this plan worked very well on locomotives where steam is usually carried at a pressure of 100 lbs. or more to the inch, but when the attempt was made to apply it to marine engines where the pressure is only 30 lbs. to the inch it did not answer so well; there was too much steam in proportion to the air. Even in the locomotive engine the steam must tend to reduce the temperature, as it enters the firebox at some 300° while the burning gases are not less, probably, than 2,500°.

It has occurred to me that the vapor of petroleum might be blown into the furnace in place of steam, and thus the heat might be considerably increased. A separate boiler might be used for evaporating the petroleum, and the jets arranged in the manner adopted by Mr. Clark. Where petroleum is to be employed as fuel, I suggest this as a good plan for using it.

Prof. SEELY—I would ask Mr. Fisher what he expects to gain by this arrangement.

Mr. FISHER—I expect to avoid the reduction of temperature which results from the use of steam. I suppose the combustion of the smoke will be quite as perfect—or perhaps more so—and that the heat will be greater. It is known that the temperature in the boiler flues is much lower than in the fire box. Experiments have shown that a foot of heating surface in the flues is worth only about a third as much as the same surface in the firebox. If a higher heat can be imparted to the gaseous products of combustion before they enter the flues, a larger quantity of steam can be generated.

Mr. DIBBEN—I think that Mr. Fisher is right and that his explanation might be made more full. If the temperature of combustible gases, however thoroughly they may be mixed with air or even with pure oxygen gas, is reduced below the burning point, combustion ceases. It has accordingly been found that the old plan of lining fireboxes with fire brick is better than leaving the iron walls exposed. Whenever the gases come in contact with the comparatiuely cold iron they cease to burn. Anything, therefore, which tends to reduce the temperature in the firebox, tends to prevent a perfect combustion.

(The speaker then made a drawing on the blackboard and described Siemens's gas furnace, the same that was explained so fully by Professor Faraday in his lecture, an abstract of which was published on page 148 of our current volume.) Mr. Dibben concluded by expressing an opinion of the very great value of this invention, saying that Mr. Siemens deserved the highest credit for pushing it through to practical success; and that it was satisfactory to learn that this inventor is at least enjoying a reward for his inventions.

Prof. SEELY—I indorse what Mr. Dibben has said in relation to the value of Mr. Siemens's furnace, and I have no doubt that it will come into very extensive use throughout the civilized world. I regard it as a very great invention.

The same subject was continued for the next Thursday evening, and the Association adjourned.

SORGHUM AND IMPHEE CULTURE.

From the able treatise on sorghum culture and sugar making by Isaac A. Hedges, published in the agricultural volume of the Patent Office Reports for 1861, we take the following extracts:—

THE TWO VARIETIES OF CANE.

There are really but two varieties of the sugar-cane, commonly called Sorghum, in cultivation in the northern States of this Union, viz., the Chinese and the African. Although of the latter variety, introduced by Mr. Leonard Wray, of England, there were originally several sub-varieties, they are now fast becoming merged into each other, and their various shades of difference are becoming obliterated by hybridization, consequent on contiguous cultivation.

Since the first introduction of these plants into the United States I have been a careful observer of their habits and tendencies, with a view to arriving at a proper estimate of their relative values. As a result of these observations, I shall here state what I conceive to be the chief differences between the two varieties, in a practical sense; that is to say, those differences which render one or other preferable as an article of cultivation to the sugar or sirup manufacturer. The Chinese cane seems more closely related to broom corn than the African, and manifests a greater tendency to "crossing" and deterioration from contiguous crops of the broom; it is also very liable to be thrown down by the winds, and to the production of large, gummy joints, which exercise a detrimental influence on the production of either sirup or sugar. The plant, too, when thrown down by winds or rain, in its efforts to regain the upright position becomes so crooked as to give great trouble to the workmen employed in handling the stalks. The African variety or *imphee*, on the contrary, is much more vigorous in the stalk, and seldom falls before the wind; its joints are much smaller relatively to the size of the stalk, and its juices are more limpid and rich, generally showing about one degree richer in sugar, by the saccharometer, than the juice of the Chinese cane. Upon a deep, rich soil I have generally found the Chinese cane to be rank in growth, and yielding juice of inferior quality, which is difficult of defecation. Upon a similar soil, however, the African cane (several lots of which I have worked during the last fall) yields a uniform crop of large plants, which, although not perhaps as sweet as those grown on poorer soil, yield in the aggregate more sugar or sirup to the acre. Upon the whole, therefore, it will be perceived I give a decided preference to the African cane or *imphee*.

WILL THE SORGHUM SUPERSEDE THE BEET?

It has been supposed by many that the introduction of these sugar canes into France would lead to the abandonment of the cultivation of the sugar beet in that country; but from a letter I have received from a well known house in Paris, it would appear that no expectations may be entertained that the cane will supersede the beet.

THE MODE OF PREPARING THE SEED.

For preparing seed I would recommend the use of a simple revolving cylindrical hackle, such as is used for cleaning the broom seed from the wisp; this will not fully prepare the seed for planting, but will make it ready to be freed from the twigs or clusters which adhere, so that greater uniformity in planting may be attained. For this latter purpose I use a machine consisting of two vertical wooden plates, one of which is stationary, and provided with an opening in the back, communicating with a hopper, and the other revolving by means of a crank turned by hand. The revolving plate is held up against the stationary one by a spring of just sufficient strength to cause the seed to roll between without injuring it, and thus separating all the twigs and much of the hull. This separation of the hull from the seed of the *imphee* is rather a benefit than otherwise, as it enables the moisture of the earth to penetrate sooner, and thus hastens germination.

PLANTING THE SEED.

I would specially caution farmers against planting seed without first having tested its capability of germination; then, having satisfied themselves on that point, let care be taken not to plant too thickly. If planted in rows, they should be fully four feet apart; and if planted in drills, about four or six inches between each seed. A reliable planter will pay his extra cost in the end; but, however planted, and by whomsoever, I repeat, plant shallow—not exceeding one inch deep, and half of that depth would be still better.

Plant as early as the ground, by being dry and warm, seems fitted for the seed, and then plant shallow—very shallow.

The seed should, previous to planting, be soaked in warm water until an appearance of germination is perceived. This in the *imphee* will require about two days; in the sorghum, nearly six.

CULTIVATION.

The young cane plant is exceedingly diminutive, and is hardly distinguishable from the fox tail or summer grass; hence the importance of having clean ground wherever practicable. The plants require no other or greater attention in the way of hoeing or dressing than is bestowed upon Indian corn or broom corn. In some soils the cane is liable to "tiller," or, as it is sometimes called, "sucker." It will therefore be advisable to remove the young suckers, in order to permit the main plants to mature uniformly and vigorously, and also to facilitate the stripping and gathering.

CUTTING AND HANDLING.

As has already been intimated, in reference to the time for planting, the time for commencing cutting depends greatly on the season, varying as the weather has been more or less favorable for maturing the plant. Of one thing we are, however, certain, viz.,

that as soon as frost shall have killed the foliage and seed tufts, the cane will gain nothing by standing out in the hill; on the contrary, if the stalk has been frosted, and is left exposed to the warm sun, it will commence much sooner to ferment in its juices than if cut and stacked, or housed.

Previous to cutting, the leaves should be stripped off by hand, if desired for fodder, or, if they are designed to be left on the ground, by a smart stroke of a stick about four feet long. The seed heads, together with about four feet of the cane, should be cut off and tied into small bundles with the leaves; they are far better as food for every kind of stock than sheaf oats, and are richly worth saving. I am aware of a rumor which has gone abroad to the effect that they are injurious; and although the statement has a thousand times been refuted, I am still asked whether the seed will not kill cattle and horses. I once lost a valuable horse by feeding to him imprudently a mess of oats, and so, but only so, it may be with this seed; yet, according to the proverb, "A lie once started, the truth seldom overtakes it."

After the canes have been stripped and cut, as above directed, they should be cut off near to the ground, and tied in bundles of twenty or thirty stalks, with the wilted leaves. Each bundle should be tied in two places, which will greatly facilitate the subsequent handling. In this condition the cane may be set up in ricks in the open air, or, preferably, under shelter, and kept for some weeks. Such keeping improves the juice not only in flavor, but also in saccharine richness, from one to three degrees. This improvement takes place upon the same principle and from similar causes which determine the sweetening of acid fruit after pulling, viz., the change of the gum and starch into sugar.

If, at any time while the cane is standing, a sharp freeze should occur, the whole crop should be slashed down and thrown into windrows, with the tops uppermost. If much difficulty should then arise in stripping off the leaves, the canes may be ground with the leaves adhering, but the tops should be freely cut off. All possible dispatch should be used after freezing in getting the canes through the mill, lest a warm sun should come out, and fermentation and souring commence. The frost does no harm of itself, but when warm weather follows the mischief is done.

In handling an extensive crop a dumping wagon will be found highly convenient. In the Southern States they are in common use for the purpose.

Our Teeth.

They decay. Hence unseemly mouths, bad breath, imperfect mastication. Every body regrets it. What is the cause? I reply, want of cleanliness. A clean tooth never decays. The mouth is a warm place—98°. Particles of meat between the teeth soon decompose. Gums and teeth must suffer. Perfect cleanliness will preserve the teeth to old age. How shall it be secured? Use a quill pick, and rinse the mouth after eating. Brush and castile soap every morning; the brush and simple water on going to bed. Bestow this trifling care upon your precious teeth, and you will keep them and ruin the dentists. Neglect it, and you will be sorry all your lives. Children forget. Watch them. The first teeth determine the character of the second set. Give them equal care. Sugar, acids, saleratus, and hot things, are nothing when compared with food decomposing between the teeth. Mercurialization may loosen the teeth, long use may wear them out, but keep them clean and they will never decay. This advice is worth more than thousands of dollars to every boy and girl.—*Dr. Lewis.*

Manufacture of Shot.—The Dubuque shot tower having been purchased and closed up by a St. Louis house, in order to remove its competition, the citizens of Dubuque became indignant, and commenced experimenting to make shot by dropping metal down the deserted lead mine shafts, and with the most satisfactory results. They are now going into the business quite strongly, having decided that there is no necessity for building fifteen thousand dollar towers, when a hole in the ground, with an expenditure of $500, will do as well.

The average daily supply of water in the City of Brooklyn is 5,461,813 gallons.

Correspondence

Speculations on Projectiles.

Messrs. Editors:—I noticed in No. 9 Vol. VII. a description of a new non-glancing projectile, and, being a practical gunsmith, it took my attention. Now I wish to explain my views on the subject, which may be of some use to the inventor, as well as to our Government, in which I feel a great interest. The point of the projectile, I think, is all right, also the wings, excepting they should be on a slight twist, as they would not only catch the air more, and thereby serve to keep the point foremost, but a rotary motion would make it still more accurate. But as for the projectile striking with more force, or making a greater breachby being in two parts, it is erroneous in my view of it. It would be like using a light hammer instead of a trip hammer, or a light weight instead of a heavy one for a pile driver. You cannot do as much toward breaking a rock or a piece of iron with a light hammer as with a heavy one. Now, suppose you strike two blows with a hammer that weighs one pound, and then one blow with a two pound hammer, and see which will break or do the most damage to the substance encountered. I think those wings a good inventlon, as it will save rifling, and the guns will last longer and be less liable to burst. There is one thing I wish to say in regard to rifled cannon. I suppose, by what I can find out, that the twist is the same at the breech as it is at the muzzle, and that the great trouble is to make the balls follow the twist, and not cause so much strain on the gun. Now, suppose you have a gain twist, which must be of still more use in a large gun than in a common rifle, for it takes more to set a large body in motion than a small one, the grooves or hexigon should start at the breech nearly or quite straight, and then increase to whatever rotary motion is required to keep the projectile point first, as I have found by experiment that it takes more twist for a long conical ball than a short one. By this plan you can get any required rotary motion at the muzzle that you wish, without any extra strain on the gun, which is always at the start at the breech.

M. L. R.

Denver City, Sept. 13, 1862.

[We agree with our correspondent perfectly in regard to a projectile striking with less force if formed in two pieces, but we do not agree with him in thinking that accuracy can be obtained by means of spiral wings formed on the surface of a shot. The rotary motion, we think, must be imparted before the projectile leaves the gun. There is, however, no novelty in having wings of spiral form. In relation to increasing or uniform twist there is much difference of opinion, and the point can be settled only by experiment. Even when the twist is uniform, the rotary motion is imparted gradually, inasmuch as the projectile moves with constantly accelerated velocity during its passage out of the gun.—Eds.]

Information Wanted Respecting Hydraulic Engines.

Messrs. Editors:—I am desirous of ascertaining the cost of the most approved description of a water wheel, to be worked by being connected with the company's water pipes, where there is a direct head of 490 feet giving a pressure of about 240 pounds on the square inch. The wheel to be of a suitable size and power for discharging ship's cargoes of coal, salt, &c.—probably the weightiest articles would be puncheons and hogsheads of molasses and sugar. Also, the cost of the necessary hoisting gear, &c., complete in every respect. State whether the power could be placed for discharging cargoes and hoisting in warehouses on same establishments. The distance in most cases between the warehouses and piers of discharging from is 150 to 200 feet. State the size of the feed pipes and power of a suitable wheel for this purpose, also the prices of greater and lesser power for different purposes, and the discount, if any, from one to one dozen or more wheels for different purposes. If on hand I would like to have a plan of the wheel and general arrangements of the hoisting gear, crane, &c.

S. G. Archibald.

St. Johns, Newfoundland, Aug. 26, 1862.

Coal Oil in Drilling Glass.

Messrs. Editors.—The best plan that I have yet found to drill glass or very hard steel is to take an ordinary bow-drill and lubricate or rather wet the point of the drill-bit with coal oil, which will give it a better bite than camphene or anything else that I have heard of. I have in my possession specimens of glass drilled full of holes large and small and without a scale or flaw. I have thus drilled into common window glass edgewise, to the depth of an inch, the drill forty-eighth of an inch in thickness.

J. J. B. Hatfield.

Indianapolis, Ind., Sept. 24, 1862.

PAPER AND BREAD FROM THE HUSKS AND STALKS OF INDIAN CORN.

We are informed by Mr. Loosey, the Austrian Consul General in New York city, that Mr. Auer the Director of the Imperial Printing Establishment at Vienna has made a most important invention, which is calculated to create quite a change in the manufacture of paper.

Mr. Auer obtains, by his process, from the leaves of the indian corn plant, a spinning and weaving material, and from the residue two other substances, one of which contains all the elements of cereals, such as flour, sugar, &c., while the other furnishes a paper and gum material which surpasses the rag stuffs in quality and durability.

Mr. Auer's invention also comprises a process for producing the spinning and weaving material, termed the "Maisfilament Paper." Mr. Loosey sends us the following circular, which we print verbatim:—

The imperial paper mill "Schlögelmühle," near Gloggnitz, has succeeded to make, out of the maize plant, particularly out of the shucks (that is to say out of the leaves which envelop the corn ear) excellent paper. Besides, there was imagined a process by means of which the fibers of the maize plant can be used for spinning and weaving, and another process by means of which the nutritive substance contained in the maize plant, if mixed with common flour, can be converted into agreeable tasting bread.

In order to give the public an opportunity to inform themselves not only of the results obtained till now, but also of the processes of fabrication, exhibitions of maize plant products will be arranged, first in the imperial printing establishment in Vienna and afterward in other large cities of the empire.

The extracting of the useful substances contained in the maize plant, is previously effectuated in the imperial paper mill Schlögelmühle and in the localities of the imperial printing establishment in Vienna.

Private individuals, who, in their proper interest, wish to make use of the said inventions, under the protection of the imperial patents granted to Counsellor Auer, will find the latter ready to give any necessary information.

In order to profit in a proper way of this year's maize crop and to obtain shucks of the convenient quality and in the greatest possible quantity, the producers ought to proceed in the following way.

The maize corn having attained its full ripeness and the ears having been twisted off, the shucks which envelop the latter, are torn off, for the purpose of being dried either on the earth, or, if the latter should be moist, on mats, after which they are packed up into bags and prepared for being forwarded to the respective places. The drier the shucks are, and the more carefully they are preserved from the natural putrefaction, the more they will be useful. It is therefore a matter of interest for the producers, to proceed with convenient care in cropping the shucks, that the latter may get to the manufactory in the cleanest and driest possible state. The shucks being only the least part of the maize plant, there is straw enough remaining to the planters to be used for agricultural purposes, and the money got for the shucks appears as an extraordinary profit they obtain of their maize crop. It is therefore to be hoped that a great many of producers will proceed according to this invitation in gathering the shucks.

This is the more to be expected, as it influences the promotion of a new branch of industry, which, duly deve loped, is likely to become a matter of importance for the national economy of this country.

Vienna in the month of August 1862.

A. Auer von Welsbach.

The reliable authority from which we received the above information, and the high position the author of the invention enjoys in the mechanical world, incline us to the conclusion that it would be to the interest of our paper manufacturers to put themselves in connection with Mr. Auer, and we have no doubt that Mr. Loosey will be very happy to render any assistance to effect that object.

A Prize of twenty thousand francs is offered at Paris for the best essay on the "regeneration of bone," in the hope that, eventually, medical science will no longer have to resort to amputation. The next step will be to regenerate the dead body, and we have no doubt that under the stimulus of a liberal prize, French *savans* will endeavor to do it.

An explosion took place at the arsenal at Columbus, Ky., on the 25th ult. The property destroyed is valued at $200,000; fortunately no lives were lost.

Albuminate of Iron and Soda as a Therapeutic Agent.

The following interesting article is from the *Journal of Rational Medicine*, by Angelico Fabri :—

Simple contact, at the ordinary temperature of the atmosphere, of white of egg with a salt of iron and soda, is capable of instantly producing a soluble albuminate of iron and soda, or an albuminferrate of the alkaline base. The chemical combination of this compound is such that it is not altered by the yellow ferrocyanide of potassium, the most delicate test of the salts of iron, unless a few drops of acid—as, for example, hydrocholic—be previously added to the soluble albuminate, thus proving that this decomposition cannot be effected by the agency of the alkalies, but only by some acids, since the potassium of the cyanide is not able to displace the oxide of iron, becoming oxidized at its expense, and setting the metal free, as occurs with the other ferruginous preparations. Considering that we find in the blood albumen, soda in excess, and iron, and having shown how these three bodies, by simple direct contact, form a soluble salt, the chemical combination of which is so powerful that it is not destroyed by the most delicate re-agent, may we not fairly infer that the iron exists in the blood as an albuminate of iron and soda? and would it not, therefore, be reasonable to administer iron in the various diseases in which it is prescribed, principally in reference to the state of the sanguineous system, in the form of albuminate, as that in which nature itself has placed it within our organism—one of the products, so to speak, on which our life depends ? When I read in works of chemistry that the yellow ferrocyanide of potassium is not capable of demonstrating the presence of iron in the blood until a stream of chlorine has first been passed through the latter to destroy its coloring matter, I am confirmed in the opinion that the iron exists in that fluid as an albuminate of iron and soda, because this salt, requiring the addition of an acid to render it capable of detection by the cyanide, is supplied with it by the chlorine, which, in destroying the organic coloring matter, becomes converted into hydrochloric acid by uniting with their hydrogen. Physicians have been long puzzled, and are still at a loss how to administer iron, a valuable remedy, in the manner most suitable to the internal organism; hence the great number of preparations of this metal. Some object to its saline combination with mineral acids on the ground that these are inorganic, and they prefer giving it in the metallic or oxidized state, leaving the acids of the stomach to form with it compounds which may be carried into the circulation. Others, unwilling to run the risk of having the greater part of the iron—little or not at all acted upon—expelled with the fæces, prescribe it in the saline state, but combined with organic vegetable acids; hence we have the malate, tannate, citrate, &c., of iron. Others, still more scrupulous, wish to have it united to acids of an animal nature, and prefer the lactate, the cyanide, &c.; and I, going still further, would recommend its employment in the state of albuminate of iron and soda, requesting physicians to take into consideration what I have advanced, and to ascertain if practice will in this instance corroborate theory.

In preparing the albuminate of iron and soda I employed the following process :—Take 112 grains of caustic soda, and 104 of sulphate of iron. Having dissolved both in a sufficient quantity of distilled water, let the solutions be poured on the whites of four eggs previously beaten up ; let all now be shaken together and poured upon a filter to separate the hydrated oxide of iron which has precipitated, since all the iron is not in this case converted into albuminate. To the filtered liquid, which now contains, in addition to the albuminate, sulphate of soda, formed by the decomposition of sulphate of iron by the soda present in excess, lime water is to be added to decompose the sulphate of soda, by which an insoluble sulphate of lime is precipitated. To separate the latter, the mixture is to be again filtered ; and as the filtered fluid will contain an excess of lime, it is to be subjected to the action of a stream of carbonic acid, care being taken to avoid using an excess of the latter, and again filter to get rid of the insoluble carbonate of lime thus formed. The filtered fluid is now to be allowed to evaporate in a wide, shallow vessel, and with the aid of the heat of a stove until it is reduced to a pint. A clear orange yellow, slightly saltish, chalybeate solution is thus obtained, which, as already mentioned, does not give a precipitate with ferrocyanide of potassium without the addition of an acid. Each ounce of this liquid contains, approximately, four grains of the albuminate, plus an excess of albumen and soda, as may be seen by referring to the process employed ; the solution, consequently, has a slightly alkaline reaction. It is desirable that the soda should thus be present in excess, in order that the compound shall be conformable to the state in which it exists in the blood, where we find the albumen rendered alkaline by an excess of soda.

Heat of the Human Body.

One of the most useful instruments which the ingenuity of man has devised is the thermometer. This instrument does not enable us to estimate the actual quantity of heat contained in a substance, but it indicates the proportion of that subtle element which is sensible—that is recognizable by the sense of touch. The dusky Hindu, clad in his solitary cotton garment, and the Laplander in his suit of fur, are placed under the most opposite conditions in relation to the heat of the sun ; the Indian is exposed during the whole year to sol's most ardent beams, whilst but a scant share of its genial rays goes to warm the body of the Laplander. But, if we placed the bulb of a thermometer beneath the tongue of a Hindu we would find the mercury to stand at 98° of Fahrenheit's scale, and if we repeated the experiment on a Laplander we would obtain an identical result. Numerous experiments of this nature have been made on individuals in most parts of the world, and the results have proved that the temperature of the blood of a man is 98° Fah., whether he be in India or at Nova Zembla, on the steppes of Russia, or the elevated plateaus of America. This invariability of the temperature of the bodies of men appears the more wonderful when it is considered that the range of the temperature of the medium in which they exist exceeds 160° Fah.

The human body resembles, in some degree, a steam boiler with innumerable safety valves in the form of pores in the skin. Perspiration is caused by the heat of the body converting the water in the animal frame into vapor, which escapes through millions of pores in the cuticle. The expansion of this vapor over the whole surface of the body exerts a refrigerating action for the removal of surplus heat from the animal system. When the pores of the skin are closed and perspiration prevented the surplus heat generated in the body is prevented from escaping and fever ensues. A clean cuticle is as necessary to health as good food and pure water.

Small Pox.

[From Hall's Journal of Health.]

It should be distinctly kept before the minds of the people that vaccination is an almost perfect preventive of small pox until the age of puberty (say fifteen), but that after that time it becomes less and less efficacious until twenty-five, when the system becomes less susceptible to the disease up to thirty-five, when the predisposition to small pox seems to die out altogether. The specific inference is, that every child ought to be re-vaccinated on entering the fifteenth year.

To show the preventive power of vaccination, statistics prove that before vaccination, or even inoculation, was practiced or known in Boston, to wit, 1721 (the year of its first trial in England by Lady Mary Wortley Montague on her own daughter), one half of the entire population lay sick of the disease at the same time, and one out of every twenty-seven died of it—which, at the same rate, would kill over thirty thousand persons in New York City alone—while the total deaths from all causes in a single year was less than twenty-three thousand. In 1792, forty-six per cent—forty-six persons out of every hundred, in Boston, had small pox at the same time. But a few years later, when vaccination was generally practiced, many city physicians did not see a single case of small pox in a period of twenty months, and during a period of twenty-eight years less than three persons a year died of small pox in Boston.

ANOTHER ASTEROID.—A new asteroid was discovered on Sept. 25th, by Henry M. Parkhurst, of this city. It is in the constellation *Pisces*, and is of the eleventh magnitude.

Effect of the American War Upon England.

The loss which England already sustains by the blockade of the secession ports can hardly be stated at less than a quarter of a million per week, including the cessation of employment and wages for the operatives, and the waste and loss of interest on capital sustained by the employers, in the staple manufacture of Lancashire. The localization of the interrupted industry adds terrible weight to the severity of the blow. Two hundred thousand hands suddenly thrown out of work, in a population of twenty millions, might easily be fed and kept from severe suffering by the care and assistance of their immediate neighbors. But that number deprived of their means of subsistence, in the midst of a population of some two millions, all impoverished by the same calamity, and most of them actually dependent on the wages of those who are now unemployed, are in danger of actual starvation.

Some idea of the state of affairs in the manufacturing districts may be obtained from the report of a deputation sent from Birmingham into the cotton districts to make inquiries. In Manchester, the subscriptions to the general fund amount to £25,000, and £10,000 has been given to the Provident Society ; while Liverpool, which merely imports cotton, and where only 1,000 or 2,000 cotton porters are dependent for a living by removing it from the ships into the warehouses, has already contributed £32,000. Exceptional cases are, however, mentioned by the Birmingham deputation. A large mill owner is stated to have lent his workpeople £3,000 to "tide over the evil hour ;" and another has spent £1,000 in unproductive labor. The Birmingham deputation calculate that the diminution of wages in the distressed districts during the coming winter months will be at least £150,000 a week, and the same authorities state that, when the distress has reached its hight, it will require advances at the rate of £100,000 ($500,000) a week to keep the population from starving.

Expenditures for the British Navy.

The London *Herald* criticizes the British Admiralty as follows :—The experiments with iron targets appear to be interminable. This is why in England three or four years is the supposed time necessary to construct an iron ship, while as many months are only deemed requisite in the United States. To be sure the American iron ships are not to be compared with the *Warrior* and the *Black Prince*, so, neither, let us add, is the British with the American Admiralty. The American navy is directed by men responsible for all they do, and whose efforts are directed to the one object of supplying ships which, with speed and armor, may, with as much success as possible, resist the smooth bore and rifled guns of modern war; the British navy, on the other hand, is governed by the irresponsible and the undecided. Really valuable inventions, like the cupolas of Captain Coles, or the interior fittings to prevent the flow of water from one part of a ship to another, which France and America both employ, are ungraciously accepted or scornfully declined ; and the *Warrior*, in an attempt at improvement, had her sailing qualities seriously impaired. Money is squandered as if it cost the taxpayer nothing, and as if it were a matter of indifference whether England in iron ships is what it always was in wooden ships—the foremost among the nations. Other views will, we hope, before long prevail at the Admiralty, or our first naval campaign will assuredly not sustain our reputation or preserve our supremacy.

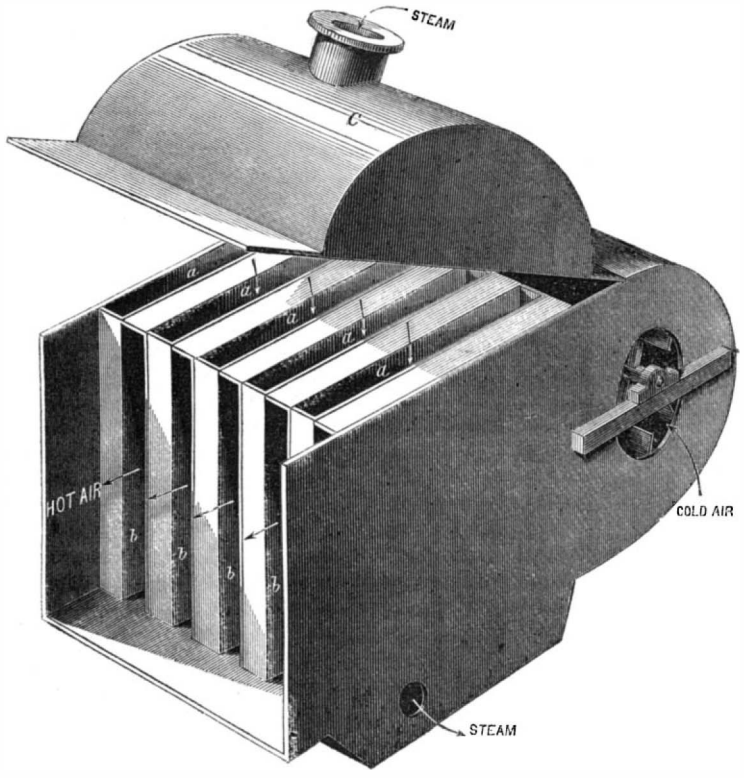
WEIGHT OF CATTLE BY MEASUREMENT.—*The Irish Farmer's Gazette* gives the following as an approximate rule for obtaining by measurement the dead weight of cattle : "Take the girth in inches behind the fore arm, square it, by multiplying it by itself; multiply that product by the length, taken in inches, from the top of the shoulder to a line perpendicular to the buttocks ; multiply that product by the decimal ·07958, and divide it by 576, which reduces it to stones of 14 lbs. each, 8 of which make 1 cwt."

THE chlorate of potash has now come into extensive use for the removal of feted breath. It is chiefly used, diluted with water and alcohol, to rinse the mouth. It may be made by condensing chlorine gas in a solution of potash. A solution of soda will answer nearly as well.

Improved Air Heater.

In the steam engine nearly the whole of the power of the heat is wasted; the loss in the best engines being $\frac{19}{20}$ths of the whole power which is generated by the burning of the fuel. The principal portion of this waste is in the heat which is carried away by the exhaust steam, and the saving of this loss is consequently one of the most promising fields of study for inventors. The annexed engraving illustrates a very simple invention in this department, by which it is claimed that a saving of 25 per cent of fuel is effected.

It consists in a device for heating, by means of the exhaust steam, the air before it enters the furnace. A series of thin metal plates of galvanized iron, copper or other suitable metal, are connected alternately at the ends and sides so as to form passages for the steam upon one side of the thin metal, and passages for the air upon the opposite side. The arrangement is clearly shown in the cut; the cover, C, being raised from its position to show the interior of the apparatus.



The exhaust steam enters through the opening, as indicated, passing downward through the several passages, *a a a a*, and out at the bottom.

The cold air is forced by a blower through the several passages, *b b b b*, taking the heat which is given up by the steam, and which is transmitted through the thin metal sheets that separate the steam from the air passages.

When cold air is employed in burning fuel a portion of the heat generated is consumed in heating the air, but if the air is already heated from other sources this portion of the heat is left free to be used in generating steam. By using hot air in the blast there is also effected a more complete combustion of the coal. By the apparatus here described the air is not heated to the combustion temperature, which is 1,000° or more, but it is sufficiently heated to effect considerable economy, and to produce a more rapid and perfect combustion.

This apparatus is applicable to the purpose of heating rooms, for which it has been used with most satisfactory results.

The patent for this invention was granted, through the Scientific American Patent Agency, November 26, 1861, and further information in relation to it may be obtained by addressing Shotwell, Zettelmeyer & Co., at Rahway, N. J.

PATENT MEDICINES.

The term "patent medicine" is applied to all kinds of medicine that are sold by druggists and others under certain names like "Brandreth's Pills," "Davis's Pain-killer," &c., whether a patent exists on them or not. Since about 1840, until within the last two years, the United States Patent Office refused to grant patents on medicines; but in 1860 a change in this respect was adopted, and patents have been granted as follows:—

No. 28,904.—J. J. Reeves, of Sulphur Springs, Texas.—*Improved Medical Compound.*—Patent dated June 26, 1860. The following is the recipe for compounding this medicine: "Take one pound of leptandra Virginica, pulverized; one pound of asclepias tuberosa, pulverized; one pound of the seeds of lobelia inflata, pulverized; one pound of ground African ginger; one-fourth of a pound of capsicum or African cayenne pepper; one-fourth of a pound of cinnamon bark, pulverized; one-half of a pound of cimicifuga or the root of black cohosh, pulverized; mix all thoroughly together, and put the mixture up in four-ounce bottles and seal them air-tight."

No. 30,050.—Augustin J. Despinoy, of Lille, France.—*Improvement in the Preparation of Medicinal Extracts.*—Patent dated Sept. 18, 1860. This invention is the production of a concentrated extract from the liver of fishes living in salt water. The claim reads thus: "The new substance produced substantially in the manner described, the same being extracted from the mother-liquid of the liver of the sea-fish."

No. 30,396.—E. W. Ferris, of Macon, Miss.—*Improvement in Astringent Medicines.*—Patent dated Oct. 16, 1860. Recipe No. 1 (referred to in the claim) is as follows: "Bark of wild cherry, pulverized, one ounce and a half; poplar bark, pulverized, one ounce and a half; refined loaf sugar, eight ounces; pure French brandy or alcohol, eight ounces; with an addition of pure water." Recipe No. 2: "Carbonate potasse, two ounces; compound spirits of lavender, one ounce; spirit of hartshorn, one ounce; essence of peppermint, one ounce; tincture of opium, one ounce; and sulphuric ether, half an ounce." The inventor claims "The combination of recipes, No. 1 and No. 2, substantially as stated."

SHOTWELL'S AIR HEATER.

REBBECK AND DAVIES'S LAMP BURNER.

Fig. 1.

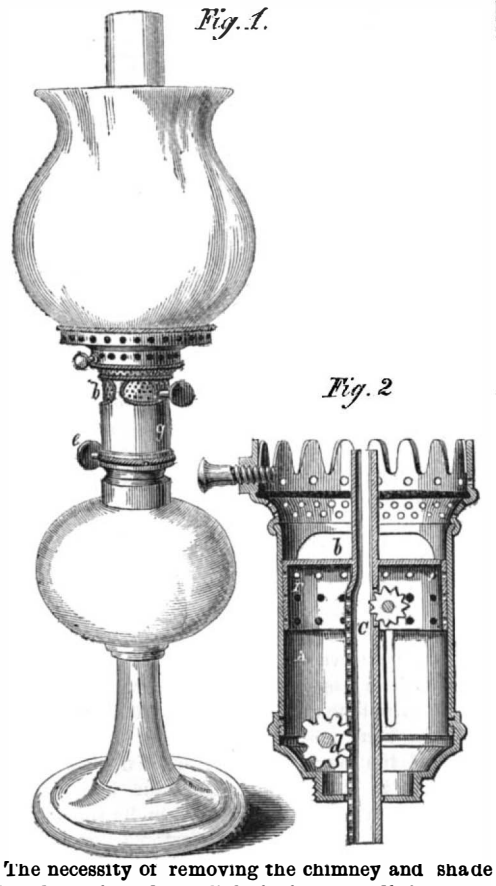


Fig. 2

The necessity of removing the chimney and shade of a lamp in order to light it is no small inconvenience, and a simple plan has been invented by F. J. Rebbeck and E. M. Davies, of Pittsburgh, Pa., by which a lamp may be lighted or trimmed without the removal of the chimney or shade.

This is effected by mounting the burner upon a supporting cylinder, and arranging the wick tube so that it may be readily lowered to bring its upper end on a level with openings in the walls of the cylinder, through which a match or the points of scissors may be introduced.

The arrangement will be readily understood from the engravings, of which Fig. 1 is a perspective view of a lamp with this burner, and Fig. 2 is an enlarged section of the burner.

The supporting cylinder, A, has two openings, *b b*, in its walls opposite each other, and the wick tube, C, is fitted to be moved up and down by the pinion, *d*, which has a milled head, *e*, upon the outer end of its shaft. A perforated cylinder, F, is attached to the wick tube, and travels up and down with it, to close the openings, *b b*, when the wick tube is raised to the proper position for burning. To enable the pinion by which the wick is raised and lowered in the tube, to move up and down with the tube a slit, *g*, is cut for its shaft in the wall of the supporting cylinder, A.

Besides the convenience secured by this improvement, the inventors claim that a better draft results from the increased length of the burner.

The patent for this invention was granted through the Scientific American Patent Agency, Sept. 2, 1862, and for the purchase of rights or for any further information, address F. J. Rebbeck, care of Olnhausen, Crawford & Co., at Pittsburgh, Pa.

Mechanics aiding Farmers.

Of the facilities for increasing agricultural production in the United States, the report of the Superintendent of the Census for 1860 says:—

Whether the superior agricultural advantages and the demand for improved implements and machinery in the United States have stimulated the facile ingenuity of our mechanics, or have only been seconded by its ready contributions to industry, we shall not stop to inquire. The greatest triumphs of mechanical skill, in its applications to agriculture, are witnessed in the instruments adapted to the tillage, harvesting and subsequent handling of the immense grain crops of the country, and particularly upon the Western prairies. Without the improvements in plows and other implements of tillage, which have been multiplied to an incredible extent, and are now apparently about to culminate in the steam plow, the wheat and corn crops of those fertile plains could not probably be raised. But were it possible to produce wheat upon the scale that it is now raised, much of the profits, and not a little of the product, would be lost were the farmer compelled to wait upon the slow process of the sickle, the cradle and the hand rake, for securing it when ripe. The reaping machine, the harvester and machines for thrashing, winnowing and cleaning his wheat for the market, have become quite indispensable to every large grain grower. The commercial importance of the wheat crop and its various relations to the subject of domestic and foreign supply, to markets, the means of transportation, storage, &c., make it highly important that the producer shall have the means of putting his crop in the market at the earliest or most favorable time, and with the greatest precision.

THERE are now twenty-four steamers, English and American, plying on the great Chinese river, Yang-tse-Kiang, which was lately opened to the commerce of the world.

THERE are at present 4,000 men engaged in the Brooklyn Navy Yard. Some of them are employed in night gangs. The keel of a new large iron-clad frigate has been laid at this navy yard.

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VOL. VII. NO. 15.....[NEW SERIES.]....*Eighteenth Year.*

NEW YORK, SATURDAY, OCTOBER 11, 1862.

THE COTTON FAMINE—JUTE AND OTHER SUBSTITUTES FOR COTTON.

A great question involving most serious and momentous consequences to many millions of people, is now agitating all the manufacturing communities of America and Europe. The question is the obtaining of a suitable substitute for cotton to manufacture thread, yarn and cloth. A painful state of affairs now exists in several manufacturing districts of Europe, especially in England, for the want of a supply of cotton. The Southern States of America supplied our Northern States with all the cotton they required, and England with seven-tenths of all that was used there. This supply has been cut off for over a year, and the old stock is nearly exhausted. In America we can scarcely realize the deplorable consequences that have been experienced in Great Britain for want of cotton. Several cities and a large number of villages in that country, were exclusively devoted to the manufacture of cotton goods, and one year ago, the cheerful whir of the spindle, and click of the shuttle were heard from morn till eve in all of these. Now, hundreds of their factories are silent as the tomb, lonely as the habitations of a deserted city, and tens of thousands of idle operatives are on the verge of starvation. Some idea of the extent of these calamities may be obtained from a few statistics.

In the spring of 1861, there were 3,040 cotton factories in operation in England, and in one county alone—Lancashire—1,840 of these were located. This English county had an invested capital in factory buildings, machinery and stock of $262,000,000; and there were paid weekly in wages, to about 400,000 operatives, $1,029,000. There were 28,000,000 spindles, and 300,000 looms in operation. When we, therefore, state that one-half of the cotton manufactories in England have ceased operations, some idea of the magnitude of the cotton famine will be obtained. It must be remembered that not only those engaged in the cotton factories have become sufferers, but a vast number of operatives in calico print works, dye works and bleach works also. The number of persons thus affected, and who are now suffering in Great Britain, is said to be no less than two and a half millions. This is the more to be regretted as the factory operatives had greatly progressed in comfort, health and intelligence during the past twenty years. Their wages had increased thirty per cent, while their hours of labor had been reduced from twelve to ten daily, with Saturday afternoon for a half holiday.

The quantity of American cotton which was supplied to England annually, was 973,800,000 lbs., the quantity consumed in America was 382,500,000 lbs. All this supply being nearly cut off for the present, the great question comes up, "Cannot a substitute be obtained to set in motion again those millions of idle spindles, and give employment to those masses of operatives who are now subsisting on charity."

On page 249 of our last volume we specially directed attention to this subject, and said "some fortunate inventor may yet prepare flax so as to render it fit for spinning on cotton machinery, or the present machinery may be modified at a small cost to accomplish the desired result." Since that period several substitutes have been proposed, and quite recently a number of our daily and weekly cotemporaries, at home and abroad have directed attention to the subject. Most of the substitutes proposed for cotton have been by persons not sufficiently acquainted with the nature of the article required. As paper can be made of almost every vegetable substance, from the grass on the sea shore, to the wood of the pines in our ever-green forests, so may fibrous materials be made into yarn and cloth from almost every stalk of grass that grows. The question, however, is not simply the obtaining of a new fibrous material, but an abundant cheap material of peculiar qualities, capable of being worked on cotton machinery, or such machinery modified, and also capable of undergoing the other operations to which cotton, yarn and cloth are subjected in bleaching, dyeing and subsequent washing. At the present high prices of cotton, flax could be profitably cultivated as a substitute for it, were the raw material abundant, but we understand that there has been but a small increase of flax cultivated this year in any part of the world. More than 1,000,000,000 lbs. of a substitute is required to make up for the deficiencies of the cotton. It has been announced in the London *Times*, and several other English papers, and also noticed in our city papers, that Messrs. Thomson & Co., of Dundee, Scotland, have made a discovery, whereby, jute—an Indian hemp—can be successfully spun and made into cloth with cotton machinery. This material has been hailed as a substitute for cotton. This is a hasty conclusion. From its very nature, we judge, that jute never can take the place of cotton. This fibrous substance, obtained from a grass which grows abundantly in the East Indies, is very long in the fiber, and in appearance is something like manilla hemp. Its prices have ranged from four and a half to five cents per pound, so that it has been much cheaper than cotton ever was. It is used by several of our rope manufacturers for making bed cord; and in Dundee, Scotland, there are seventy-six factories engaged in making jute cloth and yarn for bagging and other purposes. Thomson & Co., the parties who are said to have made the new discovery, are carpet manufacturers, and for several years they have used jute warp in their cheap carpets. To prepare jute for carding, it requires to be treated with a saponaceous compound, consisting of oil and an alkaline lye. Cotton requires no such preparation. And supposing that jute were rendered capable of being spun and woven on cotton machinery, the cloth made of it cannot take the place of cotton cloth, because jute is of such a nature that when it is submitted to boiling in hot water, or alkaline lye, it loses its strength, and becomes like a rotten fabric. Cotton on the other hand is a very strong material. It can undergo, and does undergo, repeated boiling in alkaline lye and colored solutions, when being bleached and dyed; and white muslin is usually boiled in a solution of soap, every time it is washed. One such boiling will permanently injure the strength of the jute fiber, therefore it can never take the place of cotton as a suitable substitute. For many fabrics which do not require ever to be made wet, jute is now employed in place of cotton, but thus far, no suitable substance, as a whole, has yet been brought before the public as a substitute for cotton. This serious and momentous question, upon which the wealth and livelihood of so many persons are now dependent, is still before the public for solution.

NATURE'S GUIDE IN TAKING FOOD.

Of all the evidences of creative wisdom that are furnished by the structure of the human system there is none more impressive than the wonderful adaptation of the several organs to each other. If a man wishes to throw a stone so as to hit any small object, he will strive in vain to accomplish his purpose by considering the proper motion to give his hand, and his best course is to fix his eye upon the object and then let his hand adjust its motions to the line of vision. If the nervous energies are exhausted, the eyelids drop to shut out the light and thus aid in bringing on that strange state of sleep by which the vital powers are so mysteriously restored. If by violent exercise the slow fire that supplies heat to the system is urged to too rapid combustion, the pores of the skin fall open, and a copious perspiration carries off the superabundant caloric. When the bag, that is placed in the center of the system to hold the nourishment which is constantly required to keep the several organs in action, becomes empty, a craving of hunger urges a renewal of the supply. And the sensation of thirst is the efficient means provided by Nature for continuing the proper quantity of that liquid in which the various viscera are constructed to operate.

This adaptation of the sensations of hunger and thirst to the needs of the system is also shown in the craving for particular kinds of food in particular circumstances. In the Arctic regions it is necessary that a large amount of heat should be generated in the system, and, consequently, a large supply of fuel must be taken into the stomach. Nature makes provision for this need by causing the appetite to crave enormous quantities of fat. We recently published the account of an Esquimaux belle who ate a tallow candle for desert, and Dr. Kane while in the Arctic regions found that he and all his men preferred Walrus blubber to any less greasy diet. In the tropics, on the other hand, the system requires the generation of little heat internally, and here the appetite loathes all greasy food, and craves simply grains and fruits.

A few years ago it was the universal practice of physicians to deny fever patients a cup of cold water to cool their parched tongues, but larger experience and more careful observation has taught that here also the indications of Nature are more to be trusted than the teachings of the schools, and the inexpressibly grateful administering of ice has superseded that cruel deprivation from moisture by which many helpless invalids have been tortured to death.

It is true that the cravings of the appetite are to be controlled by the lessons of experience. There are fatal poisons which have an agreeable taste. We have intellects as well as palates, and if experiment proves that any agreeable food is injurious we must abstain from its use. But until we have made the trial, we can have no safer guide in the selection of our food and drink than the natural demand of our appetites.

INVENTORS IN NEW ORLEANS THAWING OUT.

The last two steamers from New Orleans bring us evidence that our old friends in New Orleans are not all dead or in the rebel army.

We are preparing several sets of papers for the Patent Office on inventions made by persons from New Orleans who did business with us at a time when we were at peace with ourselves and the rest of the world. Wherever the old flag of the Union is re-instated we have observed that inventors soon spring forth to secure some invention which they have conceived since their isolation from us. We are more and more convinced from what is daily developing that there is no class of people North or South, so loyal to the Union as that most useful class of the community, the INVENTORS.

DEATH OF A PATENT OFFICE EXAMINER.

A. B. Little, for a number of years connected with the Patent Office, and known to a great number of our readers, committed suicide on the evening of the 30th ult., at the National Hotel, Washington, while in a fit of temporary insanity. During the administration of James Buchanan, Mr. Little comprised one of the Board of Appeals in the Patent Office, which position he occupied with credit to himself and to the satisfaction of those who had business to transact in his department. For the last two years Mr. Little has acted as Solicitor of Patents and Attorney for Patentees, in Washington. We regret the loss of so good and useful a man from our profession.

A GOOD DEMAND FOR MACHINERY.

The Patent Office at Washington is in its usual working order, and applications are examined and patents granted without half the delay that attends cases when the Office is pressed with business.

There was never a better time to secure patents than the present, and improved machines and implements, in consequence of the scarcity of laborers, are in more requisition now than ever before in this country.

NIEPCE DE ST. VICTOR is now in Paris devoting his energies in making experiments for the purpose of solving the great problem of taking photographic pictures in their natural colors.

PROGRESS OF OUR IRON CLADS—FOREIGN ARMOR FRIGATES.

The new iron-clad gunboat *Fort Henry* was launched at Corondelet, about three miles below St. Louis, Mo., on the 24th ult. She is 280 feet in length and 40 in breadth. She was designed by Commodore Porter and is similar to the gunboat *Essex*, which is described on page 154 this Vol. Scientific American. The *Choctaw*, another river gunboat, was launched on the 27th ult., from the same yard as the *Essex*, and she has been towed to St. Louis to have her armor plates put on. She is 225 feet in length and is designed to carry a turret with two heavy guns. The *Fort Henry* will carry six heavy guns. Both of these vessels are to be furnished with solid metal bows several feet in length, to enable them to be used for rams as well as gunboats. They are to be lined under the iron plates with prepared india rubber. The experience of the English Naval Commission with iron targets lined with india rubber, has been reported to be very unfavorable to the use of this material. Some defect must have existed in the method of applying the rubber to the targets in England or the rubber used was not properly prepared. The testimony as to the beneficial results of india rubber lining in the gunboat *Essex* appear to be unquestionable. In proportion to the thickness of her plates, judging from the report of Commodore Porter himself, published on page 210 this Vol. Scientific American, she is the best shot-resisting vessel afloat.

A new iron clad of the *Monitor* class was launched at Wilmington, Delaware, on the 27th ult. She is constructed on the designs of Captain Ericsson; will have a revolving turret and carry two 15-inch Dahlgren guns.

There are about 2,000 persons employed on iron clads at the Rowland's Works, Green Point, L. I.; 1,000 at Delamater's Works, this city, and 1,200 at Colwell's Works, Jersey City. The great iron-clad ram of 7,000 tuns burden to be built by W. H. Webb, has been commenced, and Whitney's ram—the *Moodna*—building at the Dry Dock is being pushed forward rapidly. When all the iron clad vessels now building for our navy are completed, we shall have a large and powerful mail-clad fleet. A correspondent of the New York *Tribune* of the 30th ult., states that when all these iron clads are finished we shall have 40, which will probably be a greater number than all the iron clads of the rest of the world.

This may be true, as it covers our river and sea armor vessels. But from statements made in foreign papers we understand that France alone will have 36 iron-clad frigates completed by the end of 1863. England has only four finished at present, namely, the *Warrior*, *Black Prince*, *Resistance* and *Defence;* and there will not be more than six or eight others finished next year. We must not overlook the fact, however, that England, in her great engineering establishments, has the capacity to finish an iron-plated wooden vessel every week. A French writer on naval vessels asserts that the British Admiralty is a sort of fossil institution far behind the age, and unlike the genius of the people.

It seems to us that the designers and constructors of iron-clad vessels in England have committed a great mistake in building their frigates with too great a draft of water. The *Warrior* and *Black Prince* draw no less than 26 feet forward and 27½ feet aft. There are very few ports in the world where such vessels are capable of entering, and very few places where they could be employed for bombardment. They are only fit for deep-sea sailing, and for encounters with other frigates on the ocean. A recent trial of the *Black Prince* was unfortunate in point of speed. She made only 13½ knots per hour, whereas she was expected to make 14½. This is much less than the *Warrior*, yet she is built on the same model, is the same size, and has engines of the same power. The English engineers are puzzled to account for the difference in speed. The *Royal Oak*, a new armor-clad frigate, was launched at Chatham on the 9th ult. She had only three tier of 4½-inch plates (seventy in number) on her larboard and starboard sides, yet she drew 19½ feet aft and 13½ feet forward. When her armor (which requires 230 more plates) is all on, and her armament in, she will draw 24 feet at least, and will also be almost useless except for deep-sea operations.

VALUABLE RECEIPTS.

Lotion for Restoring the Color of Gray Hair.—Take half an ounce of sulphur steeped in alcohol and quarter of an ounce of sugar of lead, mixed with ten ounces of rose water in a phial. The phial should be shaken every time the liquid is applied, which should be every evening with a sponge for about a week at first, then twice a week after the color of the hair is restored. The head should be covered with a close glazed linen cap after this lotion is put on.

Milk of Almonds for the Complexion.—This much admired and harmless cosmetic may be prepared thus: Procure a quarter of a pound of the best Jordan almonds, which blanch by putting them into boiling water for three minutes, and afterward into cold water for the same time, the skin or pellicle will then slip off by pressure between the thumb and finger. The almonds are now to be crushed in a mortar, and rubbed with a quarter of an ounce of the best white or curd soap. Continue the rubbing for a quarter of an hour, during which period gradually add one quart of rose water. When the whole resembles milk strain through fine muslin. It is then fit for use, and may be applied to the skin with the corner of a soft towel after washing. Those who are without a mortar must grate the almonds on a bread grater and rub the ingredients together with clean hands. Fresh rain water, or plain distilled water, will answer in lieu of rose water where economy is studied.

Powder for Chafed Skin.—This preparation is universally applied for drying the skin after washing, especially at the joints, which if left even damp at certain seasons produces chaps and chafing, often followed, if neglected, by inflammation. Violet powder is best prepared by mixing three parts of the best wheat starch with one of finely ground orris root: the latter adds to the drying power of the starch, and imparts at the same time an agreeable odor like that of the violet, hence the name of the mixture. It is also prepared by perfuming starch with essential oils without the addition of orris root; but though the scent of the powder is stronger and, to some, more tempting to use, it is far less beneficial in its application. The scent, acting as a stimulant to the skin, increases rather than abates any tendency to redness. Unperfumed powder is therefore best to use, dusted over the part with a little swan's down, commonly called a puff.

CONTINUED PROGRESS OF AMERICAN INVENTIONS IN EUROPE.

The following inventions have been recently patented in England, through the Scientific American Patent Agency. The popularity of American inventions in Europe, is fully portrayed by the jurors' flattering report on the products exhibited at the great National Fair now holding in London:—

Improvement in the Construction of Reversible Seats.—Patentee, Dr. Thomas Rainey, formerly of the city of New York, but now residing at Rio de Janeiro, Brazil. This invention relates to a mode of constructing seats suitable for carriages, steam vessels and other uses, so that the inclination of the back may be reversed at pleasure. The seat has a rocking motion, and as the back is reversed, the inclination of the seat is also changed, inclining backward, suitable for lounging; or it may be brought to a level position for use at table.

Improvement in the Construction of Boots and Shoes.—Patentee, Edward Heaton, of New Haven, Conn. A metal shank is attached directly to the insole, and the shank portion of the outsole is dispensed with; thus effecting considerable economy of leather, and making the boot or shoe more durable and easy to the foot.

Improvement in the Condensing Apparatus of Steam Engines.—Patentee, Francis B. Stevens, of Weehawken, N. J. The essential feature of this invention is the combination of a surface or external condenser, placed between the side pipes and the ordinary condenser of a steam engine, with a cooler for cooling the water from the hot well, this cooler being placed between the hot well and the ordinary condenser; so that the steam, after being partially condensed by the ordinary condenser, is then further condensed by means of the injection of the cooled water from the hot well into the ordinary condenser.

Improvements in the Construction of Grain and Grass Harvesters.—Patentees, Edwin P. Russell and Porter Tremain, of Manlius, N. Y. This invention relates to an improvement in the sickle-driving mechanism, which permits the sickle and finger bar to conform to the inequalities of the ground; the seat and reel being also adapted to the modification.

Improvements in Rotary Engines.—Patentee, John B. Root, of New York city. Engravings would be required to give any idea of this invention. The engine is in practical operation in this city, and works to the satisfaction of its owners, and is said to effect great saving in fuel. We shall publish engravings of this invention before many weeks.

Improvements in Artificial Teeth.—Patentee, Samuel S. White, of Philadelphia. This invention consists in fixing teeth in vulcanite by means of metal pins, having heads in those ends which project from the teeth before they are fixed in their place.

Improvements in Pumps.—Patentees, Calvin and George M. Woodward, of New York city. The body of the pump is bored through transversely to receive cylindrical valve chambers, in which the valves are fitted; thus allowing the valves to be easily introduced and taken out.

Improved Arrangement of Fire Escape.—Patentee, Aaron Shute, of Flushing, L. I. A flexible ladder is attached to a balcony in front of the house, and folded into a box in such a manner that it may be readily dropped before the windows by pulling a rod which passes through all the floors. This invention is coming into use in this city.

Improved Hoisting Apparatus.—Patentees, James Doyle and James Christison, both of New York City. This is a novel arrangement of a chain pulley and winch, which would require engravings for its explanation. But it is one of the best inventions which has come to our knowledge for some time.

MISCELLANEOUS SUMMARY.

A Wonderful Specimen of art in Jewelry.—A jeweler exhibits in the World's Fair at London, a most accurate miniature portrait of the Queen, composed of distinct brilliants almost as fine as diamond dust, and of which more than 2,000 are required to complete the likeness, small as it is. Another jeweler contributes a necklace of diamonds, worth nearly half a million of dollars.

Value of a Candle Box of Dirt.—The Masonic and Highland mining companies, at West Ravine, Cal., according to the *Democrat*, took from their claims in one week, over 800 ounces. From a candle box full of dirt, they washed out $120. The Primrose Quartz company's mill, at Hog Canon, took out $10,000 in 30 days' run.

Commodore Goldsborough has on board his flagship, the *Minnesota*, a complete printing press and apparatus, by means of which he strikes off copies of all his orders, letters and dispatches for the seventy vessels of his fleet, thereby economizing time and labor, and avoiding errors.

The University of Michigan, at Ann Arbor, has an annual income of $40,000, from funds accruing from the sale of lands granted by the United States Government. The catalogue of this Institution, for the last year, showed an attendance of 500 students.

There are no less than 384 vessels built and being built for our navy. Their total tunnage is 371,665 tuns; guns 434. Of these there are 13 iron-cased gunboats built, and 40 new river and sea gunboats of different sizes in different stages of progress.

It is said that when a Frenchman has to wait, he smokes; a German meditates; an Italian sleeps; an Englishman takes a walk; an American invents some new contortion of the limbs, and tries to put his feet higher than ever.

There are no less than eight hundred persons, men, women and children, employed at the United States Arsenal at Watertown, Mass., in the preparation of cartridges, and in the manufacture of other munitions of war.

Coal which could have been bought in this city three months ago for $4 50 per tun, is now selling at $7 50. The chief cause of this great rise in its price is said to be a combination of the Pennsylvania coal companies.

During the present season 691 boats left Cumberland, Md., carrying 74,235 tuns of coal.

ON THE MANAGEMENT OF TELEGRAPHS.

On page 217 of our last volume we published an article on the "Management of Telegraphs," which had reference to an important suit growing out of what was deemed a laxity on the part of the American Telegraph Company in the delivery of a message. That article has attracted considerable attention and has at last elicited a reply from Hon. J. D. Caton, Chief Justice of Illinois, who has had much experience in connection with the management of telegraphs.

The following is Judge Caton's reply to us :—

You say : "The truth is that the present system of telegraphing is just as plain and simple as any of the arts which men practice. There is no more difficulty in writing messages correctly than there is in penning an account or copying a letter properly. If the message is written correctly by the operator at the start it cannot possibly go wrong over the wires. The skill required in telegraphing is of a very ordinary nature —it is a labor analogous to writing with a common pen."

Admitting for the present that, theoretically and in the laboratory, every one of these statements may be true, yet practically on long telegraph lines every one is incorrect, as every practical telegrapher will testify. This you will appreciate by a little reflection upon well-established facts with which you are familiar. The telegraphic alphabet is formed of dots, lines and spaces. If from any cause two or more of these dots are run together a line is made, or, if one is omitted, a space is left and a different letter is formed than the one intended. For instance, the letter *s* consists of three dots. If two of these dots are run together an *a* or an *n* is made, or if one is omitted, we have an *i* or an *o*, and so I might illustrate throughout the alphabet. Now, it is liable to occur and does often happen, that one letter may be substituted for another, which will still make sense in a message but of an entirely different meaning. Hence, I say with the Kentucky Judge, whose ignorance you reprove, but for whom I am inclined to break a lance, that there is no absolute security against mistakes but to repeat the message back. In his defence allow me to say that I understand that charge was founded upon the testimony of a great many of the most experienced and intelligent telegraphers. He should be excused then, for telling the jury that safety requires that the message should be repeated back to guard against all chance of mistakes. And I submit that you were a little hasty and a little harsh when you said : —"This repetition business has always appeared to us like a dodge to extort money on the one hand ; while on the other it seems intended to serve as a screen behind which the company may run to hide itself from the consequences of its own gross neglect." Now, it seems to me that good faith to the public and justice to the telegraph companies, demand the truth on this as on all other subjects. I will therefore state, in as few words as I may, how it is that such errors must inevitably sometimes occur.

You are aware that upon the accurate operations of the relay magnet, and especially that portion of it where the connection is made in the local circuit, everything depends. This connection is formed by two blunt platinum points being brought together by the influence of the magnet, and again separated by the force of an opposing spring. Every time these points are separated a particle of the metal is fused or is burned by the electricity with which it is charged. When a particle of platinum is simply fused it is liable to span the space separating the two points and prevent the circuit from being broken. This would necessarily run two or more dots into a line. When however, the intensity of the current exceeds the fusing point, which is usually the case, the metal is burned, leaving a residuum, which is an insulating substance, and this may, and frequently does, accumulate in such a quantity as to prevent the circuit from being closed when the points are brought together, in which case a dot is lost and a space left, making another wrong letter. If this does not often occur, it is liable to occur, and thus materially change the sense of a message.

But there are other and much more serious difficulties in the way of attaining that degree of perfection which you state does actually exist. No line is or can be perfectly insulated unless indeed the whole length of the wire is covered with an insulating substance. On a damp day, not only does more or less electricity find its way to the ground at every pole even with the best insulation, but as the humid atmosphere is itself a conductor, from every yard of the wire some portion of the electricity is discharged to the earth, thus forming a ground circuit stronger and stronger as you recede from the main battery. Hence, if the circuit is broken at a distant office, your magnet remains partially charged, and when the circuit is again closed the magnet attains its full strength quicker than if it had been entirely neutral ; hence, the necessity that your adjusting spring be drawn further back when working with a distant office on a damp day than with one near. This could be at least partially remedied by careful adjustment if the loss of electricity were uniform ; but it is not. As the humidity and temperature of the atmosphere are constantly changing so is the amount of electricity conducted to the ground in the mode stated constantly changing, and hence the constant variation of the strength of this ground circuit, and as this controls the strength of the magnet dots may be run into lines or they may be omitted by these instantaneous changes in this inevitable ground circuit.

But there is another practical difficulty which you will readily appreciate as its cause must be familiar to you : That is the electrical currents which are constantly coursing their way through the atmosphere. These act through the wire and operate upon the magnets precisely the same as the electricity, generated in the battery. Ordinarily, these are so slight as to occasion no practical inconvenience to the telegrapher ; but sometimes they are so strong and constant as to work the telegraph wire without any battery. These atmospheric currents, when flowing in the same direction as the battery currents, increase it, or if in an opposite direction neutralize it in proportion to their strength, again rendering it possible to change one letter to another as above described.

I have thus pointed out some of the most prominent and patent difficulties with which the telegrapher has to contend in order to avoid errors. They are all well established facts attested to by the experience of every practical telegrapher. Necessarily they must sometimes lead to mistakes which the highest possible care cannot avoid, and which can only be detected by repeating the message back. This with ordinary care must detect the mistake ; for it is hardly possible that the same interruption should occur from any of these causes to produce the identical error in the repetition.

These are not theoretical difficulties—they are practical. If all operators do not understand the cause, all experience the difficulties. With so much to contend with it is indeed wonderful that so few mistakes are made, and I think the telegraph companies are entitled to the highest credit for that degree of perfection to which they have trained their numerous operators.

You were in error then when you said that "this repetition business" is a dodge to extort money or excuse gross neglect. The truth is it is necessary to insure accuracy, and you can do the public no higher service than to impress this fact upon them. But this liability to mistake is slight and very few mistakes are made considering the number of messages sent. Yet it does exist and should be guarded against in all important messages.

J. D. Caton.

Ottawa, Ill., Sept. 11, 1862.

Curious Submarine Ram.

An odd relic was found not long since at the terminus of the Port Chartrain railroad near New Orleans. It was discovered and raised by Col. Charles C. G. Thornton, commanding the guard at that point, and Capt. George Wiggin, late of New London, at present Captain of the post at the lake. The relic is a submarine ram of cigar shape, made of iron, hollowed so that a number of men can inclose themselves in it. It is 24 feet long, and has a propeller which can be worked by hand. On each side of the ram there is a sort of fin made of iron 3 feet long and a foot and a half wide. By raising these wings or fins the ram rises to the surface and sinks by their depression. The bow is sharply pointed, and when run against any ordinary vessel below the water mark would be able to sink it in a very short time. This little arrangement now lies at the lake shore—a curiosity to the visitors at that place. Captain Thornton is doing good service at the lake in intercepting contraband letters and arresting spies.

RECENT FOREIGN INVENTIONS.

Preparing Flax and Hemp.—W. Lyall, of Amiens, France, has taken out a patent for improvements of a twofold character, in treating the fibrous substances above named for making yarn. First, he places an additional gil-carriage immediately above the gil-carriages now used, to economize floor space. Second, he wets the slivers of flax while passing through the gil-drawing frame. The damping of the silvers is effected by a moistened sponge, which is pressed gently on the sliver betwixt the drawing and delivery rollers while the machine is in operation, but this sponge is withdrawn when the machine stops, by a self-acting lever.

Improvement in Shawls.—To add to the ornamental usefulness of shawls, G. Smith, of North Brixton, England, adds what he terms "a leaf" or several leaves to either square or long shawls, by which he states they are rendered more warm and elegant. This leaf is united to the shawl either by weaving or careful sewing, in such a manner that when the shawl is worn, it may present at the back, two or if required, any number of leaves, each falling within the other.

Armor Plates.—R. Sholtredge, of Brighton, England, proposed to make plates for mail-clad vessels, solid in their defensive front. They are to be made with flanges all round their inner edges, whereby they are adapted to be riveted together through the flanges and form, as it were, a continuous plate.

Reviving Colors on Woolen Goods.—E. E. Pereau, of London, has taken out a patent for a composition, which he states will remove stains and revive the colors of woolen cloth. It is composed of citric acid, carbonate of potash, alum, alcohol and water, in the following proportions :—Citric acid, four parts by weight; carbonate of potash, eight parts ; alum, one part ; alcohol, one part ; water, one hundred parts. The patentee calls it *eau écarlate*, and he adds a little cochineal to it, when it is designed for cleaning scarlet-colored woolen goods.

Rosin Soap for Sizing Paper.—An anhydrous rosin soap is prepared by H. D. Pochin, of Salford, England, as follows :—Ordinary rosin of commerce is ground into fine powder, and mixed intimately with soda ash, then heated in a pan until the two are combined. It is then cooled and ground into powder. Rosin and alkali in proper proportions ground together, and allowed to remain in a heap for several days, will combine and form an anhydrous rosin soap without artificial heat, but the heat hastens the combination. Rosin soap is used for sizing paper, and is made by Mr. Pochin from the anhydrous rosin soap as follows :—Take one hundred and fifty parts by weight of rosin, seventy-five of soda ash, such as contains forty-six per cent of alkali, and make the rosin soap by heating and grinding. Now take ten parts of such rosin soap, and eighteen of the ammoniate of alum, and form a solution of such a strength as may be required for paper of a common class. For fine paper, a rosin soap is made with one hundred and sixty-five parts of rosin, and one hundred and sixty-five parts of soda ash.

Railroad Iron-Clad Battery.

A locomotive mail-clad battery has been constructed at Jackson, Tennessee. It is constructed upon a platform car thirty feet long by eight wide. The sides and ends are of 2½-inch oak plank, upon which boiler iron is riveted. The sides lean inward sufficient to glance a ball upward ; one end is perpendicular, and the other pitched to a sharp angle. In the center of the car is the circle upon which the gun carriage revolves, and the whole arrangements of the gun are designed with reference to counteracting the recoil at the firing. A six-inch James rifle cannon is mounted so as to sweep in every direction, and it has been tested with shell. It is designed to protect trains against guerrillas.

Fifty pounds of oats are more nourishing, as food for cattle, than one hundred pounds of hay, and twenty-five pounds of peas are equal to double the weight of oats.

RECENT AMERICAN INVENTIONS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list :—

Power Looms.—This invention is applicable to the let-off motion which constitutes the subject matter of Letters Patent issued May 21, 1861, and to all let-off motions in which an oscillating whip roll, or its equivalent, is employed. In the ordinary application of the oscillating whip roll, the yarn passing directly from the beam over the said roll, passes over the said roll at different angles according to the quantity of yarn on the beam, the angle being much greater when the beam is full and diminishes as the quantity of yarn on the beam diminishes. This causes the forward movement of the whip roll by which the letting off of the yarn is effected, to be produced with a less tension of the warp as the quantity of yarn diminishes, and produces a tendency to let off faster. The object of this invention is to make the angle which the yarn forms in passing over the oscillating whip roll, or its equivalent, always the same, irrespective of the quantity of yarn on the beam, and to this end it consists in the employment of a roll arranged in fixed bearings in a position below and in rear of the whip roll or its equivalent, where the yarn will pass over it on its way to the latter roll, or equivalent, from the beam. The inventor of this improvement is Rensselaer Reynolds, of Stockport, N. Y.

Saccharine Evaporator.—The object of this invention is to produce an apparatus for evaporating saccharine liquids, which will admit of carrying on the operation of evaporating with a comparatively small quantity of fuel, with no danger of burning or scorching, and without interruption. It consists in the arrangement of a cold-air channel, which can be opened and closed by suitable dampers in combination with the first heating pans, in such a manner that a current of cold air can be passed through under said pans and that by these means the pans be cooled off whenever desired ; it consists, further, in the arrangement of two flues, one under each of the finishing pans, in combination with three dampers, two in front of the flues, and one in the chimney, in such a manner that by adjusting said dampers the heat can be made to pass through either flue at pleasure ; it consists, also, in the arrangement of a shelf under the first pan for the purpose of facilitating the operation of skimming. The inventor of this apparatus is N. Z. Potter, of Union Town, Ill.

Rotary Pump.—This invention relates to certain improvements in that class of rotary pumps in which a piston wheel, containing a series of sliding spring pistons, moves in the interior of an eccentric case or cylinder, the eccentricity being produced by inserting on one side of said cylinder an inner case of such a shape that on rotating the piston wheel one portion after the other is gradually forced in and gradually let out. The invention consists in the application of keys with dovetailed edges in combination with the cylinders and with the inner case, in such a manner that said keys catch over the edges of the inner case and hold it firmly in its place, leaving the outer surface of said case perfectly smooth and in such a condition that it can be turned on a lathe to a true circle and fitted into the cylinder with perfect accuracy ; it consists further in the arrangement of two spring pistons in such a manner that by said valves a perfect and yielding joint on the heads of the cylinder is produced ; it consists, finally, in the combination of rollers, slides and spring valves, for the purpose of producing tight and easy-moving pistons. Joseph Banks, of New York city, is the inventor of this improvement, and his address is corner of Twenty-second street and Second avenue.

Machine for Cutting Crystals.—This invention consists in the arrangement of an adjustable inclined revolving shaft carrying a suitable clamp for the crystals in combination with a grindstone revolving on a horizontal shaft, in such a manner that by changing the inclination of the clamp shaft the position of the clamp is adjusted according to the size of the stone and the size and shape of the crystal to be cut, and that each stone can be used up down to the very flanges which secure it to the shaft. Second, in the arrangement of a gaging screw in combination with the frame which forms the bearings for the clamp shaft and to which a sliding motion can be imparted toward and from the grindstone, in such a manner that by means of said set screws the clamp can be adjusted to different sizes of crystals. Third, in the arrangement of an adjustable head provided with two or more set screws and with a guide way for the frame of the clamp shaft in such a manner, that by raising or lowering the rear end of said head the clamp is moved toward or from the grindstone, and that the crystal can be made to bear on the grindstone under the most desirable angle. Fourth, in the arrangement of two globe-shaped elastic pads, one of which is firmly secured to the upper end of the inclined clamp shaft, while the second pad is attached to a longitudinally sliding pivot opposite the first pad, in such a manner that by forcing the second toward the first pad, a crystal placed between them is firmly clamped, and at the same time, by the peculiar shape of said pads and by their elasticity, the danger of breaking the crystals is obviated. Fifth, in the employment of a curved flat spring, in combination with said elastic pads in such a manner, that by the aid of said curved spring the correct position of each crystal between the two pads is determined. P. Pryibil, of New York city, is the inventor of this device, and for further information address the assignee, Geo. Scheiffele, 195 Tenth avenue, New York city.

Water Wheel.—This invention relates to an improvement in that class of water wheels which are encompassed by a scroll and in which the water, after acting upon the buckets, is discharged at both sides of it, or, when the wheel is used in a horizontal position, discharged both at the top and bottom. The object of the invention is to obtain a wheel of the class specified, which will admit of the water being discharged immediately after it has acted upon or against the buckets, and without coming in contact with any part of the wheel which will detract from the effect or power of the water obtained by its first impact with the buckets. H. N. Gallagher, of Geneva, N. Y., is the inventor of this device.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING SEPTEMBER 23, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

36,498.—G. M. Alsop, of Philadelphia, Pa., for Improvement in Air Springs :

I claim, first, Combining and arranging the air vessel, E, and diaphragm, F, with the box, A, diaphragm, B, and piston, D, the whole being constructed and arranged and operating substantially in the manner and for the purposes set forth.

Second, The combination and arrangement of the buffer, H, with the air vessel, E, and plate, J, or its equivalent, substantially as described for the purpose specified.

Third, The air vessel, I, in combination with the buffer, H, and air vessel, E, substantially as described for the purpose set forth.

Fourth, The annular projection, c, and corresponding depression, d, in combination with the flanch, a, and ring, C, substantially as and for the purpose set forth.

36,499.—Benjamin Arnold, of East Greenwich, R. I., for Improvement in Machines for Making Seine Nets :

I claim, first, The arrangement and combination, substantially as described, of the various implements employed to form a loop, viz., the bar, M′, with its row of guides, c c c, and the bars, l and o, with their pins.

Second, I claim the bar, Y, with its double row of pins, for the purpose of holding the netting, as set forth, and when constructed substantially as described.

Third, I claim the combination of the regulating screw or screws, i″, with the levers, d″, and V′, for the purpose set forth, when arranged substantially as described.

Fourth, I claim the carriage, j, with its row of bars, a a, in combination with the raceways, S S′, and the thread carrier, a′, when arranged substantially as described, for the purpose set forth.

Fifth, I claim a machine constructed and operating substantially as described, for making a net, whether the knot used in tying the meshes be the " seine " or " weaver's " knot so called, or the knot commonly known as the " square knot."

36,500.—Joseph Banks, of New York City, for Improvement in Rotary Pumps :

I claim, first, The application of the keys, c, provided with dovetailed edges, d, in combination with the inner case, E, and cylinder, A, constructed and operating substantially as and for the purpose shown and described.

Second, The arrangement of the laterally sliding spring valves, h, in combination with the pistons, F, as and for the purpose specified.

Third, The arrangement and combination of the slides, f, springs, e, rollers, g, valve, h, and piston wheel, D, all constructed and operating as and for the purpose set forth.

36,501.—G. C. Bidwell, of Philadelphia, Pa., for Improvement in Boilers :

I claim the above-described portable steam kettle as a new article of manufacture, the same being a steam generating double bottomed kettle provided with a safety valve, substantially in the manner and for the purposes set forth.

36,502.—Samuel Blood, of Manchester, N. H., for Improvement in Spinning Fliers :

I claim, first, The revolving hinge joint in the arm of a presser, for the purposes described.

Second, I claim the guides, S′ S, for the arm, x, constructed substantially as described, whether x is used with or without the spring and jointed arm.

Third, I claim the combination of the jointed presser arm, x, the guides, S′ S, the spring, i, with its adjustments, and the construction and application of the presser to its flier, so that the pressershall always be equipoised in the act of winding, substantially and for the purpose herein set forth.

36,503.—O. G. Brady, of New York City, for Improvement in Skates :

I claim the arrangement of the shank piece, D, and heel plate, B, with the shank of the boot, runner, A, and adjustable tightening hook, E, as herein shown and described.

[This invention relates to certain improvements in securing skates to boots without using straps. It consists, first, in securing the heel part of the skate to the shank of the boot by means of a hooked screw portion which receives an adjusting nut on one end, and a shank plate which is suitably secured to the shank of the boot for receiving the hooked end of the screw portion aforesaid. Second, in the employment of two laterally adjustable clamps for securing the skate to the sole of the boot at the former part thereof, said clamps being so applied to the sole plate of the skate that they could be adjusted and adapted to soles of different widths and shapes. An engraving of this invention will soon be published in our columns.]

36,504.—John M. Brahn, of Red Bank, N. J., for Improvement in Machines for Upsetting Tires :

I claim the bed plate, A, provided with parallel recesses or slats, a a, in combination with the bar, F, screw rod, D, and nut, E, or an equivalent means to operate said bar, as and for the purpose herein set forth.

[This invention consists in the employment of a clamp and bed plate arranged in such a manner that the heated portion of the tire may, by a single manipulation, be firmly secured in position over the bed-plate so that the former may be hammered down upon the bed plate and contracted as desired.]

36,505.—C. C. Brandt, of Norwich, Conn., for Improvement in Revolving Firearms :

I claim the combination of a cylinder shorter than the cartridges with the barrel by mechanism, in such manner that the cylinder is drawn from the butt of the barrel prior to its rotation and is moved toward the barrel to insert the front end of the cartridge therein prior to firing, substantially as set forth.

I also claim the combination of a cylinder shorter than the cartridges with a stationary casing to protect their protruding front ends, substantially as set forth.

I also claim the combination of a turning cylinder with a lever by mechanism, in such manner that the said cylinder is both turned and moved toward and from the butt of the barrel by the said lever, substantially as set forth.

I also claim the combination of a discharge punch with the lever for moving the cylinder toward and from the butt of the barrel so that the cartridge case is loosened from the chamber by the working or said lever, substantially as set forth.

I also claim the construction and combination of the discharge punch with the other members of the firearm, in such a manner that said punch performs the double function of discharging the cartridge cases and of locking the cylinder in its proper position, substantially as set forth.

36,506.—John Bruce, of Brooklyn, N.Y., for Improvement in Motive Power :

I claim, first, The loose pulleys, C c C′ c′, thrown automatically into and out of gear with the flanges, D D′, upon the shafts, E E′, so as to receive intermittent motion by the continuous rotation of the said shafts, as explained.

Second, The combination of the shafts, E, clutch gearing, m N C c D, cords or chains, G G′, and lever, H, operating substantially as and for the purposes specified.

[This invention consists in a combination of mechanical devices employed to communicate continuous or reciprocating motion at any desired speed from a continuously-rotating shaft.]

36,507.—G. H. Christian, of New York City, for a Penholder :

I claim, first, The arrangement and combination of the tubular case, A, sliding weight, B, and spring, D, constructed and operating substantially as and for the purpose described.

Second, The arrangement of the neck, g, with inclined shoulders, h h′, on the connecting rod, C, in combination with the guide ring, E, in the interior of the tubular case, A, substantially as and for the purpose herein specified.

Third, The arrangement of the inclined plane, e, and recess, f, in combination with the pin, b, the sliding weight, B, and tubular case, A, substantially as and for the purpose set forth.

[The object of this invention is to provide a protection to the point of the pen when, with the holder, it accidentally drops down. The invention consists in the arrangement of a sliding weight furnished at one end with a socket, to receive the pen, in combination with a weak spring connecting said weight with the tubular case in such a manner that when the case is held in an upright position, the weight overcomes the power of the spring, and the pen protrudes beyond said case ready for use; but if the holder drops down the action of the spring on the weight and on the case, is such that the weight recedes, and the point of the pen is protected from injury Mr. Christian's residence at present is Chicago, Ill.]

36,508.—T. S. Cox, of Lafayette, Ind., for Improvement in Sugar Mills :

First, I claim the combination of the knife in the upright pillar, Ee, with tubes, E, and their interior springs for conducting the cane upon the knife, so as to divide the same as near the center as possible, as and for the purpose herein described.

Second, Also in combination with the above first claim, the semi-tubes, F, and the springs thereto attached back of the splitting knife, as and for the purpose herein described.

Third, Also the combination in a sugar mill of corrugated rollers with the devices specified in the above first and second claims, as and for the purpose herein described.

36,509.—G. Danielson, of Boston, Mass., for Improvement in Machines for Upsetting Tires :

I claim, first, The attaching of the jaws, D J, to vertical bars, E K, one of which passes through the platform, B, and the other through the neck piece of the plates, L h.

Second, The arrangement of the jaws, D J, bars, E K, levers, F M, spring, I, and pawls, G N, in combination with the stationary ledge, C, on the platform, B, the spring, P, lever, Q, and the sliding neck piece, f, provided with the plates, L h, through which the bar, K, passes and to which the lever, M, is connected, substantially as and for the purpose herein set forth.

[The object of this invention is to obtain a simple machine and one which may be very readily manipulated or operated for shrinking or upsetting tires for the wheels of vehicles, whereby the tires may, without being cut and rewelded, be adapted to suit the diameters of the wheels to which they are to be applied.]

36,510.—Linson De Forest (assignor to himself and T. B. De Forest), of Birmingham, Conn., for Improvement in Fastening Hoop Ends in Tabs of Bustles :

I claim fastening the ends of the bustle hoop, in the tabs, D′, by means of eyelets and eyelet clasps, substantially as and for the purpose hereinbefore described.

36,511.—Oscar Doolittle, of Danville, N. Y., for Improvement in Ditching Machines :

I claim, first, The combination of the articulating frame, M, with the elevator, I, and scoop, D, as set forth.

Second, The combination of the elevators, Q and I, constructed and arranged as and for the purpose herein described.

Third, The gage rods, N N′, in combination with the sliding frame, D′, rotating fingers, H, and scoop, D, as and for the purpose herein described.

36,512.—John Du Bois, of Williamsport, Pa., for Improvement in Mode of Building Piers for Bridges, &c.:

I claim, first, Building and setting piers by means of a floating cofferdam, substantially as set forth.

Second, The use of the tube, which constitutes the dam, for incasing and strengthening the pier, substantially as set forth.

Third, The guide piles, A A, in combination with a floating cofferdam, substantially as and for the purpose set forth.

36,513.—B. W. Franklin, of New York City, for Improvement in Securing Teeth to Artificial Base:

I claim block and single teeth provided with the dovetailed nick or indentation, A, in the sides of the single or ends of the block teeth, with or without the pin, B, substantially as set forth, and for the purpose specified.

36,514.—H. N. Gallagher, of Geneva, N. Y., for Improvement in Water Wheels:

I claim the wheel, A, composed of two rims, a a, placed at a suitable distance apart and provided with buckets formed of radial plates, B, and longitudinal halves, C, of hollow cones connected with the rims, a a, and a circular plate, D, on the shaft, C′, of the wheel, as shown, in connection with the scroll, D′, all arranged substantially as herein set forth.

36,515.—Cornelius Godfrey, of Brooklyn, N. Y., for Improvement in Extinguishing Fire in the Holds of Ships, Vessels, &c.:

I claim the application of a pipe or pipes, with a jet or jets, or perforations placed in the hold or other parts of a vessel, in connection or combination with steam generated by or from the use of a galley stove, for the purpose as set forth.

36,516.—Ralph Grow, of Galesburg, Ill., for Improvement in the Manufacture of Soap:

I claim the use of hydro-carbons, in the manner and for the purpose substantially as described.

36,517.—Elander Heath, of San Francisco, Cal., for Improved Spice Mill:

I claim the construction and combination of the cylinder, A, describing a spiral movement, together with the balls and bodies, b c, operating substantially and for the purposes herein set forth.

36,518.—F. C. Heberhart, of Madison, Ind., for Improved Meat Chopper:

I claim the combination and arrangement of the knives, e, rotating block, B, pipe, P, hoop, L, cone, K, wheel, F, and helical wheel, N, substantially as described and for the purpose set forth.

36,519.—John Henfrey, of United States Army, for Improved Bedstead:

I claim, first, The side rails of a beadstead, so constructed as to receive the end rails and legs, substantially as described for the purpose of economizing space during transportation.

Second, The end rails of a bedstead, constructed with right and left hand screws at opposite ends, in combination with a sacking bottom or its equivalent, substantially as and for the purpose above set forth.

36,520.—W. W. Huse, of Brooklyn, N. Y., for Improvement in the Manufacture of Tobacco:

I claim in the process of impregnating tobacco with the preparation of licorice, subjecting the tobacco after it has been dipped in the liquid preparation of licorice, to the pressure of elastic rollers to force the liquor into the tobacco, and to discharge the surplus liquor, substantially as described.

36,521.—Alfred Ingalls, of Independence, Iowa, for Improvement in Seeding Machines:

I claim the revolving axletrees, B B, and pins, E, in combination with the hopper, C, slider, F, distributing apron, G, and grooves, H, when these parts are arranged and operated as and for the purpose specified.

36,522.—Allen Lapham, of Brooklyn, N. Y., for Improved Steam Trap:

I claim the combination with a steam-engine cylinder of a double trap, constructed and operating substantially as described and for the purpose set forth.

36,523.—T. R. Markillie, of Winchester, Ill., for Improved Washing Machine:

claim the combination of the swinging squeezer, C, with the adjustable squeezer, F, both being arranged, constructed and operated in the manner and for the purposes set forth.

I also claim the method herein described of adjusting the squeezer, F, and of operating the same so as to adapt the machine to wash a large or small quantity of clothes, as set forth.

I further claim the arrangement and combination of the grooved roll, M, and spring, O, the whole operating in the manner and for the purposes substantially as herein set forth.

36,524.—J. A. Minor, of Hartford, Conn., for Improvement in Sash Fasteners:

I claim the cam, A, having a serrated face, b, square end, c, and protuberance, e, in combination with the spring, d, and notch, f, when the whole is constructed and arranged to operate in the manner specified.

[This invention consists in the employment or use of a cam, which is furnished partly with a serrated, and partly with a smooth face, and is confined within a suitable case, and attached to the window casing by a screw, upon which it vibrates, and is retained in one of two positions for locking the sash in an open or closed condition respectively, by a spring which acts upon one or other side of a protuberance on the cam, according as it is desired to have the sash held in an open condition, or locked when closed.]

36,525.—G. W. Penniston, of North Vernon, Ind., for Improvement in Hay and Hemp Presses:

I claim the falling doors, Fig. 2, letter I, in connection with the slide levers, Fig. 1, letter, F F.

I claim a number of concave cylinders, Fig. 3, letter, L, for passing the hoop or tie around the bale which saves the time and labor of making a pit, and working under the press box.

36,526.—Ovid Plumb, of Millport, N. Y., for Improved Canal-Boat Propeller:

I claim the side waterway or ways, G, connecting with the main inclosed passage, B, on either side, longitudinally, of the paddle wheel, and opening into the wheel chamber, D, by the passage, b, in such a manner that the water admitted therein is carried around by the paddle wheel, thus producing a centrifugal action, and escaping at the rear, the whole arranged and operating substantially as herein described.

I also claim covering the openings of the waterway or ways, G, leading from the main water passage, by the hinged adjusting valves or gates, H H, so that the water may be deflected in at either end of said way or ways, and discharged into the chamber, D, and thence out through the opposite end of the main passage, to adapt the boat to running in either direction, combined and operating substantially as herein set forth.

36,527.—N. Z. Potter, of Union Town, Ill., for Improved Sugar Evaporator:

First, I claim the arrangement of the double flues, G G′, pans, B B′, and dampers, I I′, in combination with the oscillating damper, l, in the chimney, constructed and operating as and for the purposes set forth.

Second, The shelves, r, between the fire and the bottom of pan, A, as and for the purpose specified.

36,528.—H. W. Putnum, of Cleveland, Ohio, for Improved Key and Cork Screw for Bottle Fasteners:

I claim the arms, C C, and nibs, D D, in combination with a cork screw, constructed and operating as and for the purpose herein set forth.

36,529.—Rensselaer Reynolds, of Stockport, N. Y., for Improvement in Looms:

I claim the roll, E, applied in fixed bearings entirely independent of the whip bar or whip roll, and in relation to the said bar or roll, substantially as herein described and operating as set forth.

36,530.—M. A. Richardson, of Sherman, N. Y., for Improvement in Cream Pumps:

I claim the use of the wire screens, M and K, or their equivalents, in combination with the spout, G, valves, H and I, pump stock, C C, lever, F, and piston, E, in the manner and for the purposes specified.

36,531.—B. S. Roberts, of United States Army, for Improvement in Breech-Loading Firearms:

I claim, first, In a breech-loading gun, in which the breech is opened and closed by the partial revolution of a lever around a center, the use of a sliding wedge, working in combination with the lever when such wedge has a longitudinal motion, which is radial to the center of revolution of said lever, substantially in the manner and for the purpose above set forth.

Second, I claim the combination of the lever, b, the wedge, a, and the shoulder, c, when operating in the manner and for the purpose above set forth.

36,532.—John Robinson, of Hobart, N. Y., for Improvement in Plows:

I claim having the rear portion of the beam, E, made to fill or cover that portion of the landside between the handles, D, and the moldboard, A, in combination with the triple adjusting slots, b, bolts, c, and landside, C, as and for the purpose herein shown and described.

[This invention relates to an improvement in that class of plows which are provided with moldboards for turning the sod or earth, in either sward or stock ground. The object of the invention is to attach the beam of the plow to the landside thereof, in such a manner that the beam will be capable of being adjusted in three different ways, to wit, first, vertically and bodily in a horizontal position; second, the point or end of the beam raised or lowered; and, third, a lateral adjustment of the beam either to the right or left. By these different adjustments of the beam, the plow may be adapted to work perfectly in all cases.]

36,533.—Joseph Robison, of Potter Center, N. Y., for Improvement in Machines for Upsetting Tires:

First, I claim the plate, A, when made as specified.

Second, I claim the band, F, when made as specified and used for the purpose set forth.

Third, I claim the roller, B, clasps, C and C, and connections, D and D, when constructed and arranged as and for the purpose specified.

36,534.—N. C. Sanford, of Meriden, Conn., for Improvement in Augers:

I claim the supplemental lips or cutters, d d, in combination with the lips or cutters, b, and spur or screw, c, all constructed and arranged substantially as shown, to form a new and improved implement or auger for the purpose specified.

[This invention relates to an improvement in augers, whereby the same are rendered capable of working or boring, exclusive of the grain of the wood, with equally as great facility as an ordinary auger can work or bore crosswise of the grain. The invention consists in providing the augur with supplemental lips or cutters formed on the end of the augur, in such a manner that they will cut transversely of the grain, and serve to feed the augur to its work.]

36,535.—Jackson Shannon, of Freeport, Ill., for Improvement in Seeding Machine:

I claim, first, The arrangement of the vertically-sliding bar, E, and vertically-adjustable axle, G, in combination with the caster wheels, C, wheels, D D′, and frame, A, all constructed and operating as shown and described.

Second, The arrangement of the balance weight, h′, in combination with the distributing board, L, as and for the purpose described.

Third, The arrangement and combination of the swivel boxes, d2, hangers, e2, axle, S, and conical rollers, R, as and for the purpose specified.

[The object of this invention is to combine in one machine, a gang plow; a rotating, self-cleaning expansion harrow; a corn drill, which makes its furrows, drops and covers the corn and rolls the ground, leaving it the highest over the corn; a corn planter by check, which makes its furrows, drops, covers and rolls the ground; an expansion corn-ground marker and cultivator; an expansion weed and corn-stock cutter; a wheat drill, which opens the furrows, drops the seed and covers it so as to leave the ground in ridges over the grain; and a broad-cast wheat sower, with a rotating, self-cleaning, expansion harrow.]

36,536.—A. F. Smith, of Norwich, Conn., and Webster Wagner, of Palatine Bridge, N. Y., for Improvement in Ventilating Railroad Cars:

We claim, first, Receiving the air from the interior of the car into the space, under the longitudinal elevated portion of the roof, and exhausting it from thence by deflectors, through openings uniformly distributed at the sides of such elevated position, for the purposes set forth.

Second, The combination and arrangement of the exhausting devices, or their equivalents, in the sides of an elevated central portion of the roof, and separately-adjustable apertures near the top of the sides of the car, for the admission of fresh air, substantially in the manner and for the purpose herein set forth.

36,537.—W. T. Spence, of St. Louis, Mo., for Improved Fan Attachment to Sewing Machines:

I claim the lever and fan applied to a sewing machine, and arranged so as to be operated from the treadle thereof, substantially as herein set forth.

[This invention consists in attaching a fan to the treadle of a sewing machine, in such a manner that motion will be given said fan by the movement of the treadle in operating the sewing machine, the device and at same time not in the least interfering with the proper operation of any of the parts of the sewing machine, nor receiving any special manipulation of any kind.]

36,538.—Greenleaf Stackpole, of Portland, Maine, for Improvement in Bit Braces:

First, I claim forming the socket of a bit brace, with bit shank bearings, C C′, substantially as and for the purpose set forth.

Second, I claim so forming the bearings, C C′, that the lesser grooves therein may be made to receive more than one-sized bit shank, without an enlargement of the grooves to the extent of the whole length of the socket, or the bit shank, substantially as specified.

Third, In combination with a divided bit-shank socket, having bearings, C C′, as specified, I claim the ring, E, for holding said bearings upon the shank with a solid unyielding impact, at two points of its length, substantially as set forth.

36,539.—R. M. Stivers and G. W. V. Smith, of New York City, for Improvement in Shifting Carriage Tops and Backs:

I claim the shifting rail, C, having two or more supports, d, feet, c, and screw or bolt ends, b, rigidly welded thereto or forged therefrom, in combination with the seat frame, A, and nut, e, substantially as and for the purposes set forth.

36,540.—J. M. and R. M. Thompson, of Coshocton, Ohio, for Improvement in Lifting Jacks:

We claim the combination with the standard, B, of the lever, C, perforated bar, F, groove box, E, and self-adjusting latch, D, as and for the purposes herein described.

36,541.—B. T. Trimmer, of Rochester, N. Y., for Improvement in Scouring and Cleaning Grain:

I claim, first, The screw scourers, with pins or teeth projecting from their sides, and holes through the body for the circulation of air.

Second, The conical huller or rubber, having strips of leather, india rubber, steel or other elastic material inserted or screwed on, so as to be moved out to compensate for wear.

Third, The undulating indentations in the scouring case, running in the direction of the circumference, with openings in the bottom for the escape of dust and other impurities.

Fourth, I claim the arrangement of the pipes and chamber, for the separation of matter after the hulling process.

Fifth, I claim the combination of scouring, hulling and separating, in the manner described, in one operation.

36,542.—William N. Walton, of New York City, for Improvement in Attaching Labels to Bottles:

I claim shaping the bottle, whether in *relievo* or *intaglio*, so as to correspond with the label or inscription plate, B, substantially as and for the purposes set forth.

I also claim the arrangement of the lip or ridge, a, whether distinct from or making a part of the cavity for the plate, B, for the purpose of preventing adds, oils, &c., from entering between the label plate and the bottle, substantially as described.

36,543.—Asher Warner, of Cleveland, Ohio, for Improvement in Animal Traps:

I claim the herein-described construction of a trap, having a movable platform, B, with a graduated lever, E, and weight, D, or their equivalents, in combination with the trigger, I, and door, K, operating substantially as and for the purpose set forth.

36,544.—Lewis Watson, of Canton, Mich., for Improvement in Wood-Sawing Machine:

I claim, first, The combination of the arrangement for feeding the log to the saws, consisting of the shaft, M, pulley, N′, band, b, pulley, d, pinion wheel and shaft, C, vibrating past, 2′, cog wheel, a, circle, c, trundling rod, B′, cylinder, A′, chain, 14, and slide, o′, and of the lever, Y, and weight, h, with the arrangement for driving the saw, G, consisting of the crank pulley, A, pitman, x, and stock, f, when constructed and operating, substantially as and for the purpose shown and described.

Second, The combination of the arrangement for feeding the log to the saws, the lever, Y, crank pulley, A, and belt pulley, Fig. 3, with the swinging frame, W, consisting of the belt pulleys, 3 3 3′ 4 4, the belts, 2 2 6′, the balance wheel, 11, and its shaft, and the saw, 5, and its arbor, when constructed and operating substantially as and for the purpose shown and described.

36,545.—S. B. Williams, of Baresville, Ohio, for Improvement in Smut Machine:

I claim the suction spouts, L M N O, when arranged and combined with a fan case, B, beater, F, scourer, G, and shell, H, to operate as and for the purpose herein set forth.

I also claim the particular arrangement and combination of the vertical rotating rods, b, of the arms, a, and the stationary rods, d, of the shell, H, with the conical scourer, G, and the lower conical part of the shell, H, to form a new and improved beating and scouring device, for the purpose specified.

I further claim the combination of the blast spouts, fan, fan case and beating and scouring device, when all arranged for joint operation, as and for the purpose herein set forth.

[This invention consists in the employment or use of a series of suction blast spouts, a fan, and a beating and scouring device, arranged in such a manner that the grain will, in passing through the machine, be subjected to several blasts from one and the same fan, and the grain thoroughly scoured, and all impurities separated from it. Mr Williams's post office address is Sardis, Monroe county, Ohio.]

36,546.—W. W. W. Wood, of Philadelphia, Pa., for Improved Defensive Armor for Ships and Other Batteries:

I claim the armor, composed of the series of inner plates, B, and outer plates, D, the former being secured to the vessel by bolts, whose heads are covered by the outer plates, each plate of one series having a rib fitting between ribs on one of the plates of the other series of plates, the two series of plates being secured to each other by pins, e, passing through the said ribs, the plates and ribs being so constructed that there shall be, at intervals between the inner and outer plates, a series of longitudinal spaces, for the introduction of strips of wood or other equivalent material, and the whole being arranged as and for the purpose herein set forth.

36,547.—G. C. Worth, of Upper Sandusky, Ohio, for Improvement in Locks:

I claim, first, The combination of the cam, E, and weighted ever, C, when constructed and arranged as set forth.

Second, The latch or cam, g, in combination with the cam, E, and its projection, f, substantially as and for the purpose set forth.

36,548.—Paul Pryibil (assignor to himself and George Scheiffele), of New York City, for Improved Machine for Cutting Crystals:

I claim, first, The arrangement of the adjustable inclined revolving shaft, E, carrying the clamp, D D′, in combination with the stone, A, rotating on a horizontal shaft, B, constructed and operating in the manner and for the purpose specified.

Second, The arrangement of the gaging screw, g, in combination with the frame, F, and with the adjusting screw, f, as and for the purpose described.

Third, The arrangement of the tipping head, H, with two or more set screws, y, in combination with the sliding carriage, F′, attached to the frame, F, the whole constructed and operating as and for the purpose set forth.

Fourth, The arrangement of two globe-shaped elastic pads, D D′, in combination with the rotary shaft, E, and pivot, E′, constructed and operating in the manner and for the purpose shown and described.

Fifth, The employment of the curved spring, e, in combination with the elastic pads, D D′, substantially as and for the purpose specified.

36,549.—J. W. Bryant, of Welake, Florida, assignor to L. A. Osborn, of Newark, N. J., for Improvement in Caps:

I claim a cap formed of woven wire, adapted to be worn without other covering, and also to receive such covering as the vicissitudes of the season or the vocation or taste of the wearer may require, all substantially as described.

36,550.—J. C. Millar (assignor to himself and R. D. Cunningham), of Troy, N. Y., for Improvement in Gig Mills:

I claim, first, The back-side napping roller, F, constructed substantially in the manner as herein described and shown, and operating in the manner and for the purposes as herein specified.

Second, I claim, in combination with the napping cylinder, B, the adjustable drawing rollers, K K′ K2, when the rollers, K′ K2, are constructed with adjustable bearings, and arranged substantially in the manner as herein shown and described, and operating as set forth, for the purpose of regulating the degree of tension on the cloth drawn over the napping cylinder, in the manner as herein specified.

Third, I claim, in combination with the improved napping cylinder, B, having either a direct or reverse revolution, at will, as herein described, the general arrangement of the adjustable rollers, E E′, the back side napping roller, F, the stretching rollers, J or Z, the adjustable drawing rollers, K K′ K2, and the auxiliary drawing roller, V, for the purpose of napping blankets and both sides of the cloth together, or at one operation, and raising the nap longitudinally in both directions, direct and reverse, without the necessity of shifting the cloth in the machine by hand, end for end or side for side, before such operation can be completed.

36,551.—Charles Beach (assignor to himself and S. C. Cleveland), of Penn Yan, N. Y., for Improvement in Machinery for Preparing Hemp and Flax for Carding:

I claim the two sets of saws, E E and F F, running at unequal rates of speed, when the same intermatch, as described, for the purpose of breaking the stalks and fibers, without cutting them abruptly, substantially as herein set forth.

I also claim the pressure rollers, L L, having their bearings, M M, resting in the guide supports, N N, and adjustable to different degrees of pressure, and yielding to inequalities of the material being acted on, by means of the spring, m, and screw, O, the whole arranged in combination with the trough, K, substantially as herein described.

I also claim the perforated cylinder, Q, in combination with the circular trough, K, for the purpose of retaining the filaments, while the shives and dust are allowed to escape, substantially as herein set forth.

I also claim, in combination with the perforated cylinder, Q, the the pickers, P P, whereby the blast created by the latter removes the trash without the fibers, substantially as herein specified.

36,552.—S. R. Smith (assignor to Lane and Bodley), of Cincinnati, Ohio, for Improvement in Head Blocks for Circular Sawmills:

I claim, first, A head block for sawmill carriages, provided with a block or base piece, B, of wrought iron, substantially as set forth.

Second, Connecting the rack, C, to the block or base piece, B, by means of a dovetail rib or projection, b, on the rack, a, of the block or base piece, and fitted in a recess, c, in the back surface of the rack, substantially as described.

Third The combination of the arms, D H cranks F G, and slide

bar, I, arranged in connection with the lever, J. and stops, f f, in the plate, L, for actuating the rack, C and knee, O, as specified.

Fourth, Securing the crank, G, to the arm, H, by means of the bolt, b', fitted in the oblong slot, a', of the arm, H, for the purpose of varying the length of crank, G, and equalizing the movement of the knees, O, as set forth.

[This invention relates, first, to an improved block or base piece, constructed of wrought iron, and second, to a new and improved means for operating the knees of the head blocks, whereby the log may be adjusted accurately to the saw, any variation in the racks or mechanism connected therewith, being duly compensated for by a very slight adjustment of parts, so that both knees of a mill carriage may be operated simultaneously and with an equal movement.]

EXTENSION.

5,759.—Josiah Kirby, of Cincinnati, Ohio, for Improvement in Machines for Cutting Bungs. Extended Sept. 12, 1862.

I claim the application to making plugs for covering the heads of screws, nails, bolts, &c., used in ship building and other work, and plugs and bungs for barrels, of a cutter or hollow chisel, made so as to fit into a mandrel, by screw or otherwise, and bored out of the mouth at any given size, straight up far enough for the depth of a plug or bung, or to a given distance, then tapering into the center so as to point the plug, by compressing the end of the wood, a hole being bored through the whole length of the cutter, so as to admit a rod through to drive out the plug when cut.

I also claim as my invention, and desire to secure by Letters Patent, the application to making plugs and bungs, of the combination of the mandrel, cutter, driving rod and separator, as described in this specification, drawings and model.

DESIGN.

1,656—S. W. Gibbs, of Albany, N. Y., for Design for the Plates of a Stove.

1,657.—F. H. Gibney, of New York City, for Design for a Spoon and Fork Handle.

1,658.—W. S. Hill and S. T. Reed, of New York City, for Design for a Chess or Checker Board.

1,659.—J. R. Hyde, of Troy, N. Y., for Design for a Cook's Stove.

1,660.—H. I. Seymour, of Troy, N. Y., for Design for a Chair.

1,661.—N. S. Vedder and Ezra Ripley, of Troy, N. Y., assignors to N. S. Vedder aforesaid, for Design for the Plates of a Stove.

Books and Publications Received.

CARD OF STAMP DUTIES. Published for the convenience of merchants, bankers, brokers, conveyancers, attorneys, &c., by Frederick A. Brady, 22 Ann street, New York:

This card exhibits the rates of all the stamp duties, very clearly arranged.

ATLANTIC MONTHLY. Published by Ticknor & Fields, Boston:

The October number of the *Atlantic* is too much filled with serials for our taste,

BLACKWOOD'S MAGAZINE. Published by Leonard, Scott & Co., 54 Gold street, New York City:

The last number of this able magazine contains two essays by Bulwer on action, thought and reverie, and how new theories should be received; also, a review of "Trollope's America," and several other articles.

TO OUR READERS.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

Notes and Queries

C. R., of N. Y.—The present law respecting steam-boiler inspection in this city, requires all persons who have charge of engines and boilers to undergo an examination before a competent Board.

E. H. G., of N. J.—Your whirling top is sustained in its horizontal position by the principle of the gyroscope. This is simply inertia. If you tie a stone to the end of a string and swing it rapidly around your finger you will find that it will resist any force tending to turn it from the plane of its revolution. Now, conceive a wheel made up of these revolving stones and you will understand that any rotating disk, by simple inertia, offers resistance to any force tending to divert it from the plane of its revolution. The force that raises your suspended string is the muscular power of your hand.

E. S., of N. Y.—To drive a cotton mill of 104 looms with all the accompanying machinery you will require about 40-horse power—to be safe you had better secure 45. To find the quantity of water which will flow out of an opening, multiply the square root of the depth of the water by 5·4; the product is the velocity in fee per second. This multiplied by the area of the orifice in feet will give the number of cubic feet per second. The depth of your opening is 30 feet, the square root of which is 5·5, and this multiplied by 5·4 gives the velocity of the water at 29·7 feet per second. The area of your opening is 20 square inches—·072 feet, which multiplied by 29·7 gives 2·14 cubic feet per second. To conduct this quantity of water through an open trunk 56 rods long with a fall of one-half inch to the rod, the trunk should be 16 inches wide with the water 8 inches deep. This last result is from Prof. Redtenbacher's formula, in which we have not perfect confidence. Indeed the velocity of water flowing through canals or troughs is affected by so many circumstances that a large margin for errors in any calculation should always be allowed.

O. C. H., of Conn.—Prescott's work on "The Electric Telegraph," published by Ticknor & Fields, Boston, is an admirable treatise. Smee's "Electro-Metallurgy" is an excellent work; we have not seen Walsher's.

S. W., of N. Y.—We do not know of any private manufacturers of paper cartridges. In relation to the motion of a carriage wheel your views would be correct provided the axle was stationary. All motion is relative, so far as human knowledge extends. If a man on a steamboat walk toward the stern, though in relation to the steamboat he will be moving forward, his motion will be backward in relation to that portion of the surface of the earth which is near to him; and it may be forward, backward or sideways in relation to the axis of the earth or to the solar system; while his motion through space depends upon the direction and motion of the solar system itself, which is not positively ascertained. The motion of all parts of the periphery of a carriage wheel are the same in relation to the axle, but they are not the same relatively to the surface of the earth; the upper portion moves faster than the lower, and the rear portion faster than the front.

S. L., of N. Y.—An overpressure of heated air in a boiler will explode it just as certainly as an overpressure of steam.

Money Received

At the Scientific American Office on account of Patent Office business, from Wednesday, September 24, to Wednesday October 1.

O. J. S., of N. Y., $10; J. T. B., of Ill., $15; O. S., of Ill., $15; H. G., of Pa., $25; E. D., of Mass., $25; G. & H., of Ill., $25; A. C., of N. B., $15; O. S. G., of N. Y., $25; B. S. & J. M., of Pa., $25; G. A. D., of Cal., $15; G. B. B., of Ind., $30; W. S. E., of N. Y., $15; W L. C., of Iowa, $15; A. L. F., of N. Y., $15; J. R. D., of Mass., $15; G. R., of N. Y., $15; A. B., of N. Y., $15; W. W. M., of Mo., $60; J. E., of N. Y., $15; G. H. R., of N. J., $15; M. & A., of Ill., $15; W. B., of Pa., $20; K. & R., of Ill., $20; J. E. C., of N. J., $20; S. F., of Ohio, $20; J. B. G., of Iowa, $29; S. W. R., of Mass., $45; C. K., of Iowa, $20; J. De L., of N. Y., $20; A. B. B., of Conn., G. T., of Mass., $20; P. L., of Ind., $20; H. H. E., of Conn., $45; R. B., of N. Y., $20; H. S. B., of La., $20; J. C., of Mass., $20; P. H., of Pa., $45; D. W. W., of N. Y., $20; G. B. O., of N. Y., $60; P. L. H., of Ill., $30; H. N., of N. Y., $12; H. H. C., of N. Y., $12.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and in form us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from September 24 to Wednesday, October 1, 1862:—

G. B. O., of N. Y.; B. S. and J. M., of Pa.; H. C. A., of Ill.; C. E. S., of Wis.; G. and H., of Ill.; O. S. G., of N. Y.; P. L. H., of Ill.; T. N. H., of Cal.; E. D., of Mass.; H. G., of Pa.; H. N., of N. Y.; H. H. C., of N. Y.; G. B. B., of N. Y.

Back Numbers and Volumes of the Scientific American.

VOLUMES I., II., III., IV., V., VI. (NEW SERIES) COMplete (bound or unbound) may be had at this office and from all periodical dealers. Price, bound, $1 50 per volume, by mail, $2—which include postage. Price, in sheets, $1. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. Numbers 3, 4, 6, 8, 9, 10, 11, 12 and 16, of Vol. VI. are out of print and cannot be supplied.

Binding.

We are prepared to bind volumes in handsome covers, with illuminated sides, and to furnish covers for other binders. Price for binding, 50 cents. Price for covers, by mail, 50 cents; by express, or delivered at the office, 40 cents.

APPLETON'S NEW AMERICAN CYCLOPEDIA.

By the receipt of the fifteenth volume, we perceive that the large enterprise of publishing this work is moving on in spite of the war. As samples of the articles we make two extracts :—

TALENT.

This term was originally applied by the ancient Greeks to a balance for weighing, afterward to the substance weighed, and finally to the weight itself. In the system of weights in use the talent was of the highest denomination, and was equivalent to 50 minas, each of which was equal to 100 drachmas, and each of these to 6 oboli. The value of these weights remained constant in relation to each other, while that of the units of the measure varied in different times and in different places. The system of money being based upon the weight of silver, the names of the weights employed came to be used as money values, in the same way as the English pound originally represented a pound weight of silver. No coins, however, are known to have been made larger than the tetradrachma, and the mina and talent were moneys of account only. The talent, when spoken of by ancient Greek writers, and not otherwise designated, is understood to refer to the Attic talent, the weight of which has been calculated from ancient coins which have been preserved, and, according to Dr. Arbuthnot, was equal to 59 lbs. 11 ozs. 17$\frac{1}{7}$th gr. troy weight. Previous to the time of Solon, however, who lowered the standard of money, the weight of the talent was to that named as 100 : 73. The value of the later talent has been estimated at about £198, or about $958. The Euboic talent is generally rated as of the same value as the Attic; and the Romans reckoned the weight of each as equal to 80 Roman pounds. A talent of Ægina, which in very early times was a standard over the greater part of Greece, has been generally considered to have been in proportion to the Attic as 5 : 3. Various other talents are named by the ancient writers, the comparative values of which have been treated in the works of Böckh and of Hussey, in Gibbon's "Miscellaneous Works" (iii. 410), and in Dr. Arbuthnot's "Tables of Ancient Coins, Weights and Measures." The gold talent of the Greeks, or the Sicilian talent, which is the talent always meant in Homer, contained about $\frac{3}{4}$ oz. and 71 gr. avoirdupois of gold, and is supposed to have been called talent from the value of the gold being equal to that of a talent of copper, the weight of which was 1,000 times as much. The talent (*kikkar*) of the Hebrews, frequently named in the Old Testament, was a weight equal to 93 lbs. 12 oz. avoirdupois. Its subdivisions were the maneh or mina and the shekel, 100 of the latter making 1 mina and 30 minas a talent. Its value is rated at about $1,500.

TARANTULA.

This is a terrestrial hunting or wolf spider of Southern Europe. It is the largest of European spiders, measuring 1$\frac{1}{2}$ to 2 inches in the length of the body; the color is ashy brown above, marked with gray on the thorax, and with triangular spots and curved streaks of black bordered with white on the abdomen; below saffron colored, with a transverse black band. It received its popular name from being common in the vicinity of Taranto in southern Italy; it makes no web, wandering for prey, which it runs down with great swiftness, and hiding in holes in the ground and crevices lined with its silk; there is one spiracle on each side, one pulmonary sac, and eight eyes; it is very active and fierce, and the females defend their eggs and young with self-sacrificing bravery. Its bite was once considered highly poisonous, producing the nervous febrile condition called tarantism, which was supposed to be curable only by dancing to lively music until the person fell exhausted; the extraordinary accounts of travelers in relation to the bite of this spider are mere fables, though in patients thus bitten it is well to combat the terrors of the imagination by the musical remedy which the popular belief regards as effectual. The *L. Carolinensis* (Bosc) is called tarantula in the Southern States; it attains a length of 2 inches, with an extent of legs of 4; it is mouse colored above, with white sides and whitish dots and lines on the abdomen; below blackish; legs whitish tipped with black. It makes deep excavations in the ground, which it lines with silk; the females carry their young on the back, giving them a hideous appearance, as if covered with warts; the young run off in all directions if the mother be disturbed. Its poison is active, and might cause troublesome symptoms in man if the fangs could be opened at an angle proper to pierce his skin.

BROWN'S LAMP CHIMNEY.

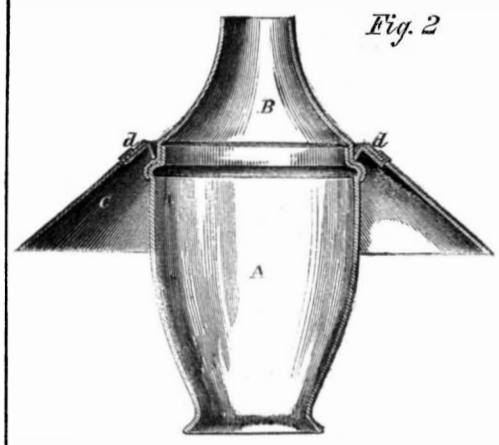
The primary object of the invention here illustrated is the production of a lamp chimney which will not be broken by a draft of cold air, or any other sudden change of temperature, while there is secured

Fig. 1

an incidental advantage of no small importance—a material reduction in the hight of the chimney, thus making the lamp far more convenient for carrying about the house.

The principle from which the inventor started is that the upper portion of the chimney is more highly heated than the lower portion, and that when the

Fig. 2



chimney thus unequally heated is encountered by a draft of cold air, the unequal contraction causes a fracture. This he proposes to overcome by the simple device of making the upper portion of the chimney of metal; the walls of the glass chimney having such position in relation to the flame that they will be heated alike in all parts, and will consequently contract alike on being cooled.

Fig. 1 of the engravings is a perspective view of a lamp with the chimney attached, and Fig. 2 is a section of the chimney supporting a small paper shade.

The short glass chimney, A, has a bead formed around its upper end to support and hold the metallic top, B. The paper shade, C, may be attached by metal clasps, *d d*; and as the metal top is itself a a shade as far as it goes, the paper shade may be very small.

We have seen a lamp burning with this chimney, and it makes a clear, steady, and beautiful light.

The patent for this invention was granted March 25, 1862, and a patent in England has also been procured through the Scientific American Patent Agency. Further information in relation to it may be obtained by addressing the inventor, Harvey Brown, at 121 Nassau street, New York. [See advertisement on another page.]

FROM THE STEAM PRESS OF JOHN A GRAY