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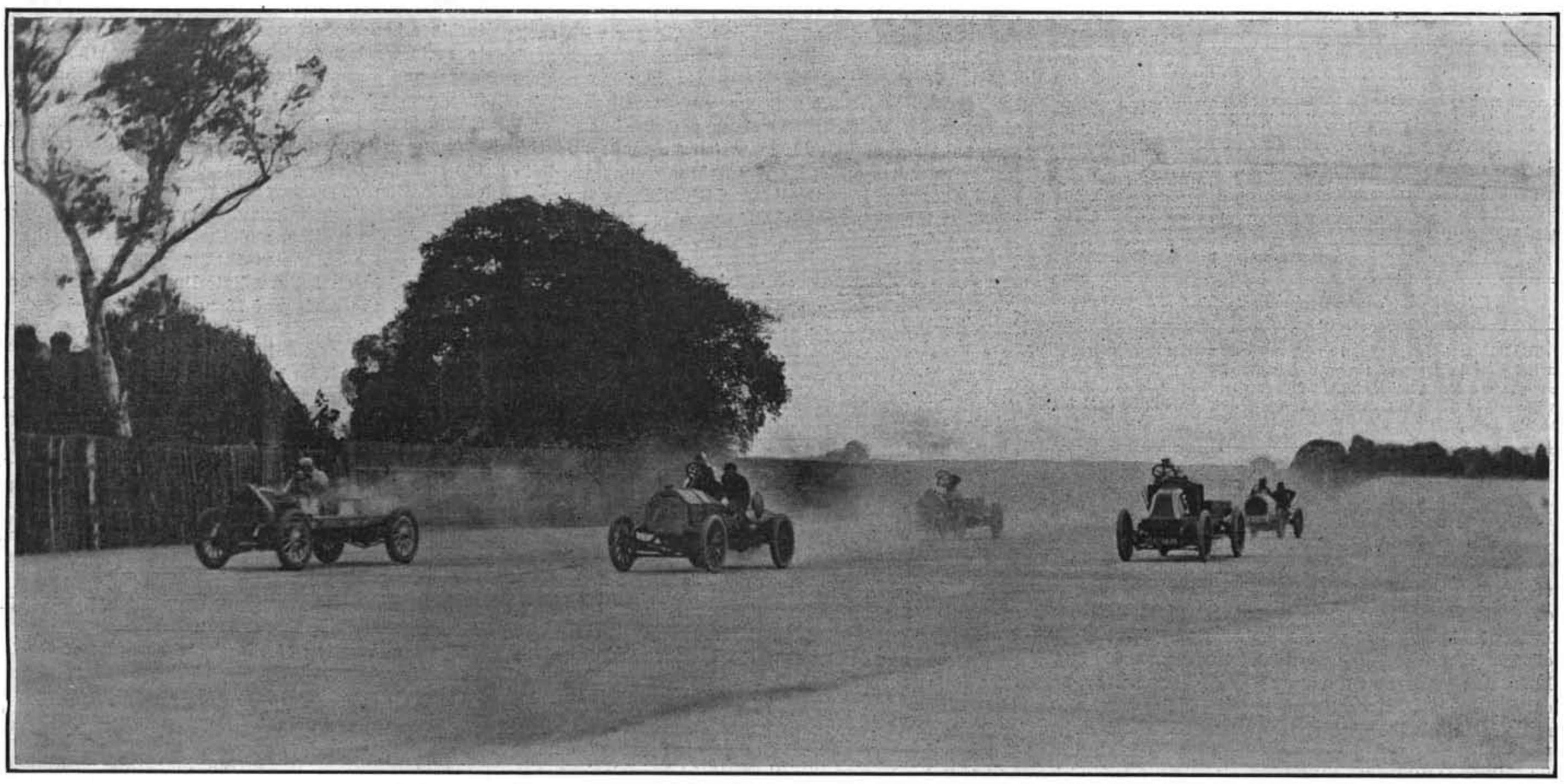
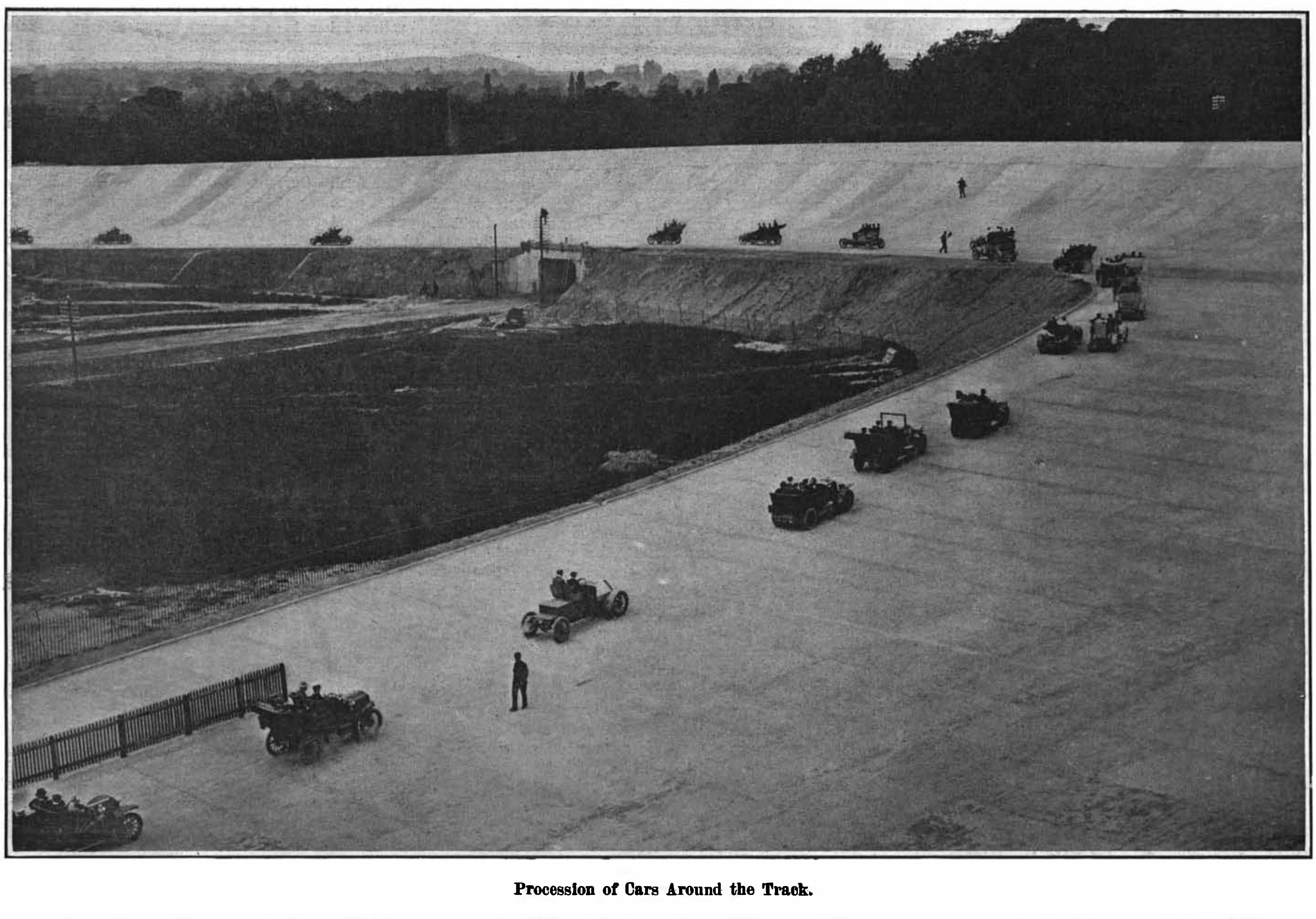


The Finale of the Race for the Renault Memorial Plate.



Procession of Cars Around the Track.

THE OPENING RACES AND SPEED TRIALS ON THE NEW CEMENT TRACK OF THE BROOKLANDS RACING CLUB AT WEYBRIDGE, ENGLAND.—[See page 60.]

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NEW YORK, SATURDAY, JULY 27, 1907.

The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

IS A REVISION OF GATUN DAM NECESSARY?

When the discussion of the great earth dam at Gatun was at its height, much mention was made of a certain large dike which had been built across a depression in the contour of the Wachusett Reservoir. This dike was constructed of earth, and was of the general type to which the proposed Gatun Dam will belong. If we remember rightly, the slope of the Wachusett dike, which was some 60 feet high, was made at the natural angle assumed by an earth fill. It was considered by the engineer who is responsible for the design, that when the inner slope had been properly riprapped with rock, it would maintain its stability after the reservoir was filled with water. The behavior of the dike, after the water had been impounded, appeared at first to vindicate the plan upon which it was built; but a few weeks ago, a huge section of the inshore slope went out, suddenly and slid into the body of the reservoir. Fortunately, the slide did not extend far enough back into the body of the dam to allow the water to break through; otherwise, practically the whole of the lake would have been lost.

The importance of this accident (which came very near being a disaster) as affecting the proposed Gatun Dam, lies in the fact that the larger structure (the Gatun Dam will be 130 feet in height) has been designed upon the same principles as those followed in the Wachusett dike; and the plan shows that the inner slope, facing the water, is the same as that which has recently proved unstable at Wachusett. It has been suggested, and we think with good reason, that the slope of the Gatun Dam should be made easier (less steep) than that called for in the present plan. If any considerable change be made, it will of course involve a large increase in the cost of the structure, for the Gatun Dam is from 7,000 to 8,000 feet in length, and the extra yardage involved in extending the slope will entail an extra cost of no small amount. In view of the fact, however, that the security of the whole canal depends upon the dam, it will surely be agreed that, with the Wachusett failure in mind, the proposed change should be given very careful consideration.

BATTLESHIP "GEORGIA" DISASTER.

Another ghastly turret disaster has been added to the already too long list of similar accidents on the new ships of our navy. The recurrence of these disasters brings home the uncomfortable conclusion that there must be something radically wrong either with the materials or the methods adopted in carrying on target practice with the big guns of our navy. This conclusion is forced upon us by the undeniable fact that, while accidents in target practice are not unknown in other navies, they have not been so frequent and fatal as those which have occurred upon our own ships within the past few years. Indeed, we doubt if the statistics of gunnery accidents for all the other navies combined would equal the total number of fatalities which have occurred under the same conditions in the United States navy since the beginning of the year 1903. First, there was the "Massachusetts" disaster, in which nine men were killed; then came the loss of five men on the "Iowa," followed by the death of thirty-two men on the "Missouri," seven on the "Kearsarge," and ten, and possibly more, on the "Georgia." This makes a total of sixty-three officers and men killed in the turrets of our battleships in the past five years!

This latest disaster, which happened on one of our finest ships which had only recently gone in commission, renders it imperative upon the Navy Department to make a searching investigation of the conditions which have made such wholesale slaughter of officers and men in time of peace possible. The indifference to the sanctity of human life which prevails in what the officers of our navy broadly term "civilian" life is bad enough, Heaven knows; but it becomes doubly shocking when it finds its way into a service which is supposed to represent, and we believe does represent, the highest ideals of attitude and conduct. When turret accidents, due to the premature ignition of smokeless powder, occur with such persistent regularity in our own navy, as compared with their comparative infrequency in other navies, it is certain that there must be some clearly-ascertainable, predisposing causes, which can be known and removed, if thorough investigation be made and the proper remedies applied. What these causes are it is for the board of investigation, which will be appointed, to determine. We know that in previous accidents the causes have been various. On the "Missouri" it was a "flare-back"; on the "Kearsarge," the dropping of fused metal from a short-circuit of the electric apparatus; on the "Iowa" it was the using of smokeless powder in guns which had never been designed to withstand the high pressures along the chase due to these powders; and now, in the "Georgia," it is suggested that a spark from the smokestacks of the ship may have fallen through the open grating in the roof of the turret.

It has been our opinion for some years past that, while the direct causes of these accidents may vary, the fundamental cause is to be found in the tendency, during the excitement of target practice, to neglect certain rules of caution, in order to acquire that speed of loading which is essential to rapidity of fire and the scoring of the highest possible number of hits in a given time on the target. Every precaution tending to protect the powder charge from ignition, from the time it is taken out of the ammunition rooms to the instant at which it is fired in the gun, calls for more or less delay. It is natural that, in the enthusiasm of a target contest and with that contempt of danger which is bred of familiarity with high explosives, the men should omit this or that time-consuming precaution, and expose the powder to just such accidental ignition as has caused the majority of the accidents.

LATEST RESULTS WITH MARINE TURBINES.

Because of the vast amount of experience which has been gained by the Parsons Company, as the pioneers and largest manufacturers of marine turbines, any statement made by the Hon. Charles Parsons as to the actual results obtained with this new form of marine engine, is necessarily of great value. In a recent paper read by the inventor before the Institution of Civil Engineers, he has summarized results and answered several questions as to present efficiency and probable future developments of the marine turbine, which cannot fail to command widespread interest. The turbines at present in use may be comprised under three principal types: First, the compound type, which was first commercially applied in 1884, and comprises the Parsons, Rateau, and Zoelly. All of these adopt a line of flow of the steam generally parallel to the shaft. Mr. Parsons states that one chief object in his type of turbine has been to minimize the skin friction, by reducing to a minimum the extent of moving surface in contact with the steam; another object has been to reduce the percentage of leakage by the adoption of a shaft of large diameter and great rigidity, so as to secure small working clearances over the tops of the blades. The second, or single-wheel type, of which the De Laval is the chief representative, has been used extensively on land for small and moderate powers; but, because of its high angular speed and the necessity of reduction gear on the screw shaft, it has received but little application for marine propulsion. The third, or sinuous-flow type, of which the Curtis turbine is the chief representative, ranks second to the Parsons in the extent of its use for marine purposes. It may be generally described as semi-compound, with a few stages of expansion, at each of which the De Laval expanding-jet principle is used. According to Mr. Parsons, the skin friction in the blades themselves, owing to the sinuous course at high velocity, is greater than in any of the varieties of the compound type.

The figures given of the total amount of horsepower installed in marine turbines show that the Parsons type has an almost exclusive command of the field, the total power at present in service being divided as follows: In pleasure steamers, 18,200; cross-channel steamers, 149,900; yachts, 18,100; ocean-going steamers, 91,900; and war vessels, 106,900; making a total of 385,000 horse-power. The total power of marine turbines of the Curtis, Rateau, and other types, completed, is about 16,000 horse-power.

On the important question of consumption of coal in turbine vessels, Mr. Parsons states that, in fast pleasure steamers and cross-channel boats, the economy has been found to be from 5 to 15 per cent superior to that of similar vessels equipped with triple-expansion reciprocating engines, and about 25 per cent superior to that of vessels propelled with compound paddle engines. To this advantage must be added others, such as the saving in cubical space, reduced consumption of oils and stores, and reduced work for the engine-room staff. It is well known that there is a critical speed of ship, below which the economical advantage of the turbine disappears. We are informed in this paper that for speeds down to about 16 knots, turbines have been found equal or superior in economy to reciprocating engines; and in some cases, where large and comparatively costly turbines have been fitted, as in the case of yachts, this advantage is maintained down to speeds of about 12 to 15 knots.

A noteworthy admission by Mr. Parsons is that the solution of the problem for slow vessels lies in a combination of reciprocating engines and turbines; the reciprocating engines dealing with the high pressure of the expansion, and the turbines with the low pressure. He estimates that a combination of this kind, used in an intermediate liner of 15 knots speed, will effect the saving of 12 per cent in fuel over the best quadruple-expansion engines, and that there will be a reduction of total weights. In a large vessel of 10 to 12 knots speed the dual motive power would show a saving of 15 to 20 per cent in fuel over the best triple-expansion reciprocating engines; and, although in some cases the first cost will be greater, it is estimated that, because of the increased earning power of the vessel, the excess will be recovered in less than three years. In the larger vessels, however, there will be little or no increase in the capital cost.

OPENING OF THE NEW HAVEN RAILROAD ELECTRIC SERVICE.

The inauguration of the electric service of the New York, New Haven & Hartford Company, by the operation of all trains between New Rochelle and the Grand Central station, must be regarded as one of the epoch-making events in the history of electric traction in this country. It is true that this opening was antedated by six months in the commencement of electric operation on the lines of the New York Central Railroad Company; but the interest in the New Haven equipment lies in the fact, that it is the first time a large section of the main line of an important steam railroad has been operated by an alternating-current system. The electrified line consists of a 22-mile stretch of four-track road, extending from Stamford on the main line to Woodlawn, where the road makes connection with the four-track road of the Harlem branch of the New York Central system. Power is supplied by a turbo-generator plant located on the water side at Cos Cob station, about three miles from Stamford. Current is delivered to the line at the high pressure of 11,000 volts. The overhead system is used, and the design and construction of these lines is of particular interest. It consists of a series of lattice-work bridges, spanning the four tracks at 100-yard intervals. Each of the four overhead lines is built up in the form of a catenary, consisting of two half-inch steel cable "messenger" lines, from which is suspended by a series of triangles the copper trolley wire. The two "messenger" suspension lines are "cradled," being about 6 feet apart where they cross the bridges, and 6 inches apart at the center, the triangular suspenders decreasing from 6 feet on the side at the bridges to 6 inches on the side of the center of each span. This gives a suspension system of considerable vertical and lateral rigidity, and makes it possible to hold the copper wire in fairly good alignment and level.

The use of the alternating current has the double advantage of dispensing with sub-stations and reducing the amount of copper in feeders. The stepping down of the current is done in transformers, which are carried upon the locomotives. Each locomotive has a nominal horse-power of 1,000, and weighs about 95 tons. Unlike the New York Central Company, which is making use of the multiple-unit system for its suburban service, the New Haven Company will operate its electrical zone entirely by electric locomotives, of which thirty-four have been delivered. The opening of this service is to be progressive. For the present, the change of locomotives from steam to electric will be made at New Rochelle, from which point all trains will be taken into the Grand Central station by electric power; and from this time on the notorious Park Avenue tunnel will be entirely free from the steam and gases and fierce heat, which have made travel through the tunnel so insufferable in past years. It is expected that by August 1 the electric service will be extended to Port Chester, and a month later to the terminus of the electric zone at Stamford.

THE HEAVENS IN AUGUST.

BY HENRY NORRIS RUSSELL, PH.D.

The warm clear summer evenings give us a very good opportunity to make ourselves familiar with the constellations. We may well begin with the Lyre (Lyra) which is right overhead at 9 o'clock in the evening early in August. Our map shows that it contains one very bright star Vega, of the first magnitude. This star is remarkable for its strong bluish color. Though appearing so bright, it is not one of our nearest neighbors, for the best determinations of its distance show it to be about two million times as far off as the sun, and there are probably more than a hundred stars nearer us than this. Still, as compared with the thousands of stars visible even to the unaided eye, Vega must be called nearer than the average. The sun, removed to the same distance, would appear to us a faint point of light, just visible to the unaided eye (very much like the two small stars close to Vega, which form a triangle with it). It appears, in fact, that in actual brightness Vega surpasses our sun a hundred fold.

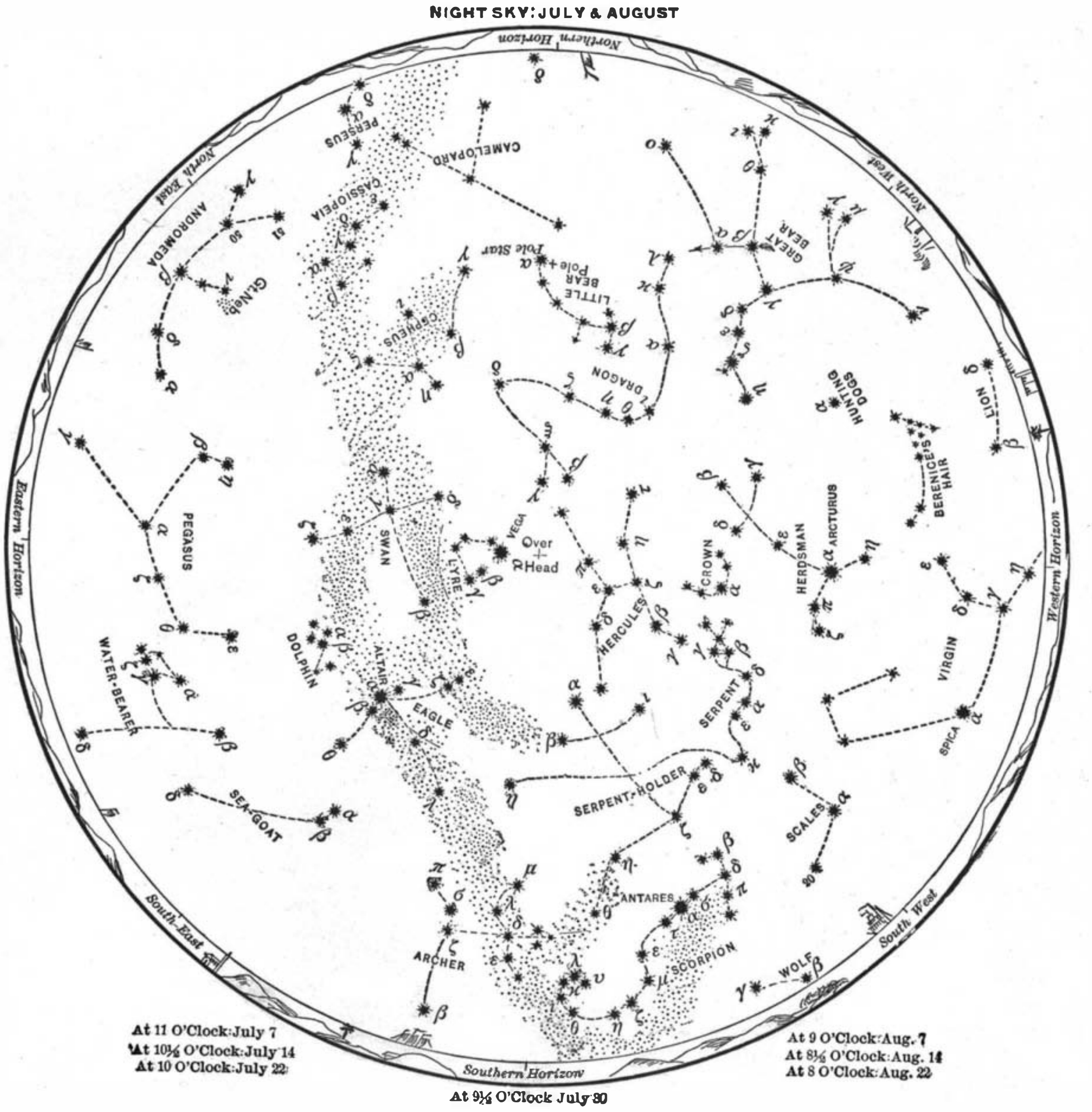
Great as this brightness is, there are many stars, apparently fainter, whose distance from us is so great that Vega itself, if placed alongside them, would be inconspicuous. An example of a star which we have good reason to believe to be of this class is β Lyræ, which is shown on the map a short distance southeast of Vega. This star is worth watching, as it is variable. At its brightest it is about equal to its near neighbor γ Lyræ, but when faintest it is less than half as bright. These minima of light repeat themselves regularly at intervals of twelve days, with less conspicuous minima midway between.

To the east of Lyra is Cygnus, the Swan, a figure in which it is easy to see a great cross (much the best cross in all the heavens) or the flying swan itself, the brightest star α being in its head, the star β in the tail, and the transverse line δ γ ϵ marking the extended wings.

The stars α (Alpha) and β (Beta) deserve special notice, the former because it seems, from the best determination, to be so very far off, at least ten times as far as Vega, and the latter (which is also very remote) as a very fine double star, well seen with a small telescope.

South of the Swan is the Eagle (Aquila) with the bright star Altair, which is a near neighbor of ours, about half as far away as Vega.

NIGHT SKY: JULY & AUGUST



In the map, stars of the first magnitude are eight-pointed; second magnitude, six-pointed; third magnitude, five-pointed; fourth magnitude (a few), four-pointed; fifth magnitude (very few), three-pointed, counting the points only as shown in the solid outline, without the intermediate lines signifying star rays.

The little group of the Dolphin is below this, and farther to the right is the Sea Goat (Capricornus). Its brightest star is a fine naked-eye double. The Water Bearer (Aquarius) has just risen, but contains no bright stars. The planet Saturn is in this vicinity, but at the hour for which our map is made it has barely risen.

The great square of Pegasus stands on one corner, low in the east. Andromeda and Perseus are dimly seen in the haze of the horizon. The zigzag line of Cassiopeia, whose brightest stars form an irregular letter W, is above these, and higher up is her husband Cepheus, who is by no means as brilliant as his wife.

The Little Bear stands on its tail above the Pole Star, surrounded by the coils of the Dragon, whose two eyes (β and γ) are close to the zenith.

The Great Bear is sinking in the northwest, the Dipper hanging by its handle. The Herdsman (Boötes) is due west, his brightest star Arcturus leading the others toward the horizon. Below this is the Virgin, whose principal star Spica will soon set.

The southern constellations can be studied better with the aid of the map than by verbal description. Hercules and the Northern Crown lie between Lyra and Boötes. South of them is the tangled mass of the Serpent and the Serpent Holder (Ophiuchus). Below these we find the Scorpion, a splendid constellation which we do not see to advantage, as it is always low in the south. On a clear night, however, the long tail, streaming down from the red Antares to the horizon and bending back to the stinging tip, can all be seen. It is worth remarking that the star μ is another fine naked-eye double.

The Archer (Sagittarius) is not as bright as the Scorpion. Its principal configuration, the Milk Dipper, is a little hard to trace just now, because Mars, who is right in the midst of it, draws the eye to himself by his overpowering brilliance.

THE PLANETS.

Mercury is morning star all through the month. He is at his greatest elongation on the 12th, when he rises before 4 A. M., and, as he is unusually bright, should be well seen in the dawn.

Venus is also a morning star, but is so near the sun that she can be seen with difficulty if at all.

Mars is in Sagittarius, just past opposition, and visible almost all night. Under the present very favorable conditions he is almost as bright as Jupiter, and by far the most prominent object in the evening sky.

Jupiter is morning star in Gemini and Cancer. On the 10th he is in conjunction with Mercury, being two degrees north of him. The two planets can be seen almost due east a little before sunrise. Saturn is in Aquarius, and rises about 8:30 P. M. in the middle of the month. Uranus is in Sagittarius, about 5 deg. north of Mars. At the beginning of the month he is almost exactly on a line carried from the southernmost of the stars of the Milk Dipper diagonally across the bowl, and southward not quite as far again. He moves slowly westward all through the month, but does not cover as much as one degree. Neptune is a morning star in Gemini, not easily observable.

THE MOON.

New moon occurs at 1 A. M. on the 9th, first quarter at 4 P. M. on the 16th, full moon at 7 A. M. on the 23d, and last quarter at noon on the 30th. The moon is nearest us on the 21st and farthest away on the 5th. She is in conjunction with Neptune on the 6th, Mercury and Jupiter on the 7th, Venus on the 8th, Mars and Uranus on the 19th, and Saturn on the 24th.

Daniel's comet, discovered in June, was then rapidly approaching both earth and sun. According to the earliest calculation of its orbit, its nearest approach to the earth comes about the end of July, at a distance of some sixty million miles, and to the sun on September 4 at a distance of forty-six million miles. In the middle of August it should be more than twenty times as bright as at discovery, and be situated somewhere on Gemini, rising before 3 A. M. Later and more accurate calculations may modify these statements somewhat; but it seems certain that the comet, which shortly after discovery was visible in a field glass, will not be hard to see.

Princeton University Observatory.

THE HEATING OF COPPER WIRES BY ELECTRIC CURRENTS.

Perhaps the simplest and most familiar fact connected with the flow of electric current through a wire is that the watt rate of generation of heat within any length of it is equal to the square of the amperes multiplied by the resistance of that length. This is a consequence of Ohm's law. When, however, we try to deduce from this fact the temperature elevation attained by the wire under the conditions of heat liberation, we encounter numerous difficulties, and the problem of either measuring or computing the increase of temperature becomes difficult. It is known that the temperature elevation of a concealed wire, cooled by conduction, follows a law similar to Ohm's law; that is, the temperature elevation of the wire corresponds to e. m. f., the flow of heat corresponds to the flow of electric current, and the electric resistance is represented by a thermal resistance, depending upon the dimensions of the insulating cover or covers, as well as on the thermal resistivity of the materials.

An interesting paper on the subject of concealed wires heated by electric currents, was presented by Dr. A. E. Kennelly and Mr. E. R. Shepard before the recent convention of the American Institute of Electrical Engineers. It was shown that the final temperature elevation of the wires increased faster than the square of the current in all cases. The measurements showed, in fact, that the temperature elevation for very small currents increased as the square of the current; but that at elevations near 50 deg. C. they increased at an exponent of about 2.2, or faster than the square, while at elevations near 100 deg. C. they increased at an exponent of about 2.3. The reason for this is that the hotter the wire becomes, the greater its resistance, and the greater the heat produced by a given current in that resistance. If the resistivity of copper did not increase with temperature, the final temperature elevation of the wire might be expected to increase in direct proportion to the square of the current strength. Within the range of 100 deg. C. temperature elevation, the plotting of final temperature against steady current followed nearly straight lines on logarithm paper. A large number of measurements were made on the heating of wires in sand, soil and gravel, from which a number of data on thermal resistivity of such substances have been tabulated for reference.—Electrical World.

BUILDING RAILWAY COACHES WITH SIDE DOORS.

President Harriman of the Southern Pacific a short time ago gave orders to have a number of new fine passenger coaches built at the company's car shops at Sacramento with side doors instead of end doors.

Harriman believes that cars thus constructed will be much stronger and more durable than the style now used; and also that in case of wreck, there will be little danger of the coaches telescoping each other. These new cars will have a small passageway by which passengers may go from one coach to another, but this will be so arranged that it will not weaken the end walls of the cars.

Another feature of these coaches is the use of round instead of square windows. New patent ventilators, now being used by the Union Pacific on its motor cars, will be placed on the new coaches, and the cars will present an appearance so little in common with the ordinary coach, that they will at first hardly be recognized as a passenger vehicle. Some of these cars will soon be completed and placed in commission on the Southern Pacific western roads.

THE FIRST RACES AND RECORDS ON THE NEW WEYBRIDGE TRACK.

BY THE LONDON CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

The opening meet of the Brooklands Automobile Racing Club at the newly-constructed course near Weybridge on Saturday, July 6, would certainly go to indicate that motor racing as a sport will become very popular in Great Britain. There were six distinct races, some of them having to be run in heats on account of the numerous entries, while nearly $25,000 was offered in prizes as well as a gold cup.

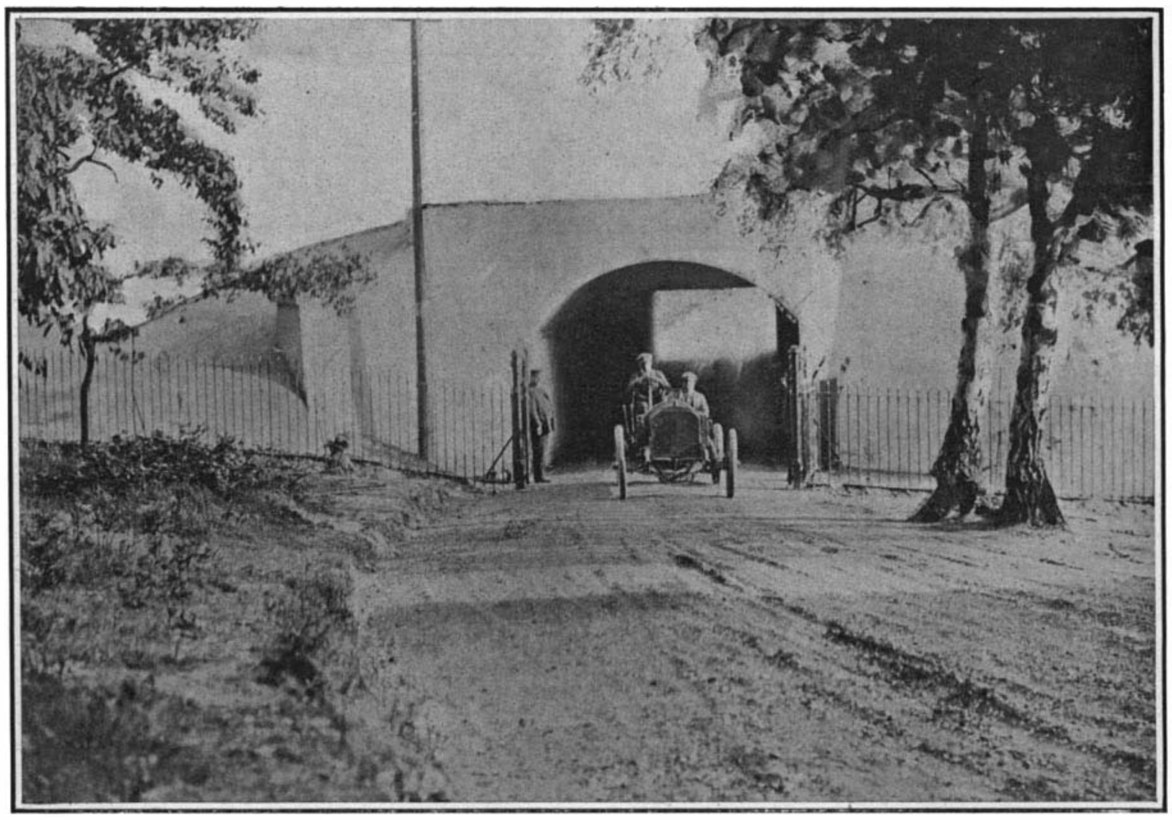
The track, which is the only one of its kind in the world, is situated at Weybridge, some 19 miles from Waterloo Station, in Surrey. It is nothing less than a huge pear-shaped cycle track, 100 feet wide and 3¼ miles in length measured on the outside curve, and banked in parts to such an extent that it would be impossible to walk up the track higher than about 15 feet from the top. It is the largest circular track in Europe, if not in the world. It is designed so that motorists may attain a speed of one hundred and twenty miles an hour with perfect safety. Indeed, over one hundred miles an hour has already been accomplished on the course.

It was built in the incredibly short time of twelve months. During that period 1,500 men were engaged upon it day and night. They removed 200,000 cubic yards of earth, felled 300 trees, diverted the course of the River Wey for a considerable distance, and laid a concrete track five inches thick of the length already mentioned. The total cost is put down at $750,000. In the monster ampitheater no fewer than 30,000 people can be comfortably seated to watch the races, while half a million can be accommodated with standing room. Around the course are placed sentry boxes, each giving a full view of the complete circuit. These are fitted with telephones, so that, in the event of a breakdown or an accident, the sentry in the nearest box, after first hoisting a flag and ringing his electric bell which signals to the sentries on either side of him, can telephone to the head exchange in the official building facing the winning post for what is required. It may be mentioned that a special staff, ambulance car, and breakdown gang are in attendance at all races.

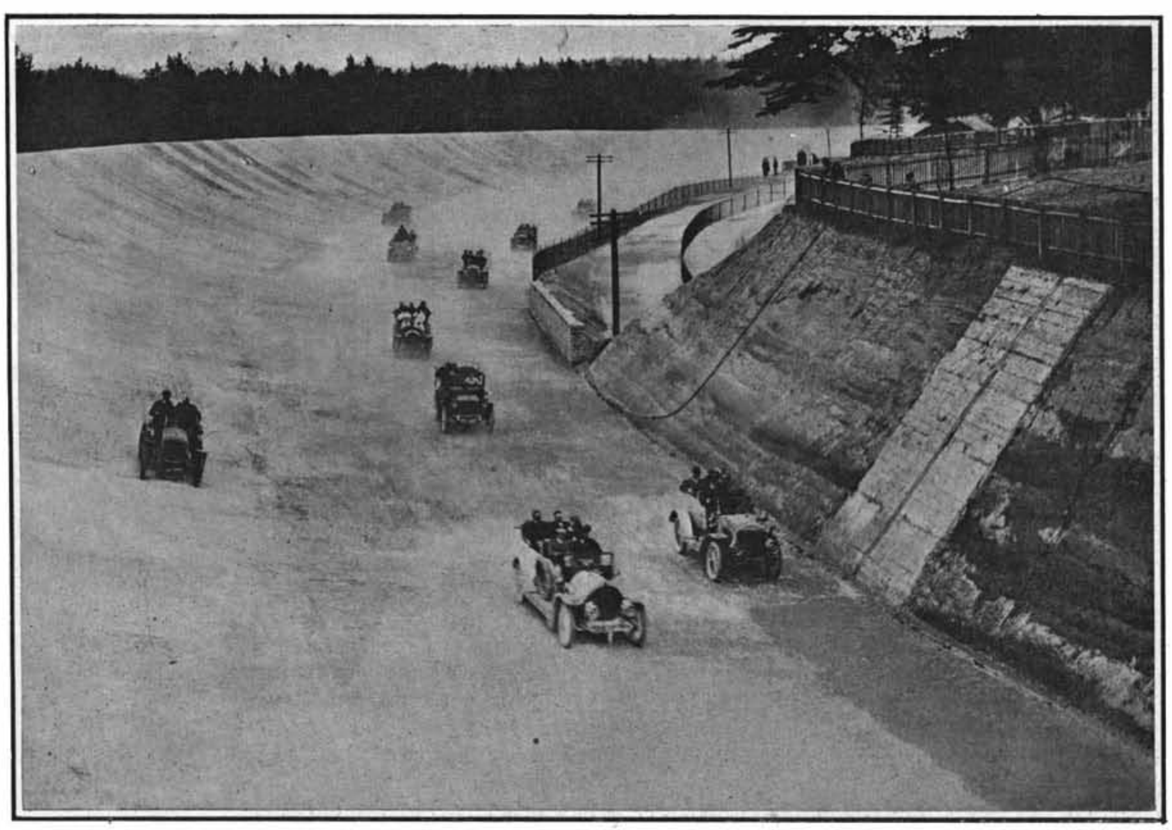
It was on this track that Mr. S. F. Edge, the well-known racing motorist, a week previously established a wonderful record by driving a car 1,581 miles in twenty-four hours, or at an average speed of over 65 miles per hour. The best-known performance for twenty-four hours, prior to this feat, was 1,096 miles, accomplished two years ago at Philadelphia by Merz and Clemens. Mr. Edge started his ride at 6 o'clock on the Friday evening, finishing it at the same time on the following day. He was accompanied by two cars of similar build to that which he drove, viz., a 60-horse-power six-cylinder Napier. The two cars that followed him were each driven by two men, one car being painted white and the other red. The official measurement of the track is 2 11-16 miles to the lap, the measurement being taken 50 feet from the inside edge. So that there should be no question as to his covering the full registered distance, Edge had the 50-feet border marked during the night by red hurricane lamps, outside which the cars kept. The checking and time arrangements were in the hands of the officials of the Automobile Club.

In the first two hours Mr. Edge covered 140 miles. He drove his car throughout the twenty-four hours entirely by himself, though he was accompanied by J. Blackburn as mechanician, who had just returned from India. His principal duty was to feed his companion with sandwiches and meat tabloids. The first 100 miles was reeled off in 1 hour, 25 minutes, 13 2-5 seconds. All the three cars suffered very badly from tire trouble, but detachable wheels had been fitted in anticipation of this, and the changes were quickly effected; indeed, on several occasions a new wheel

The Circuit Counters and Scoring Board.



View of Subway by Which Cars Leave the Track.



Cars Racing Round One of the Turns.

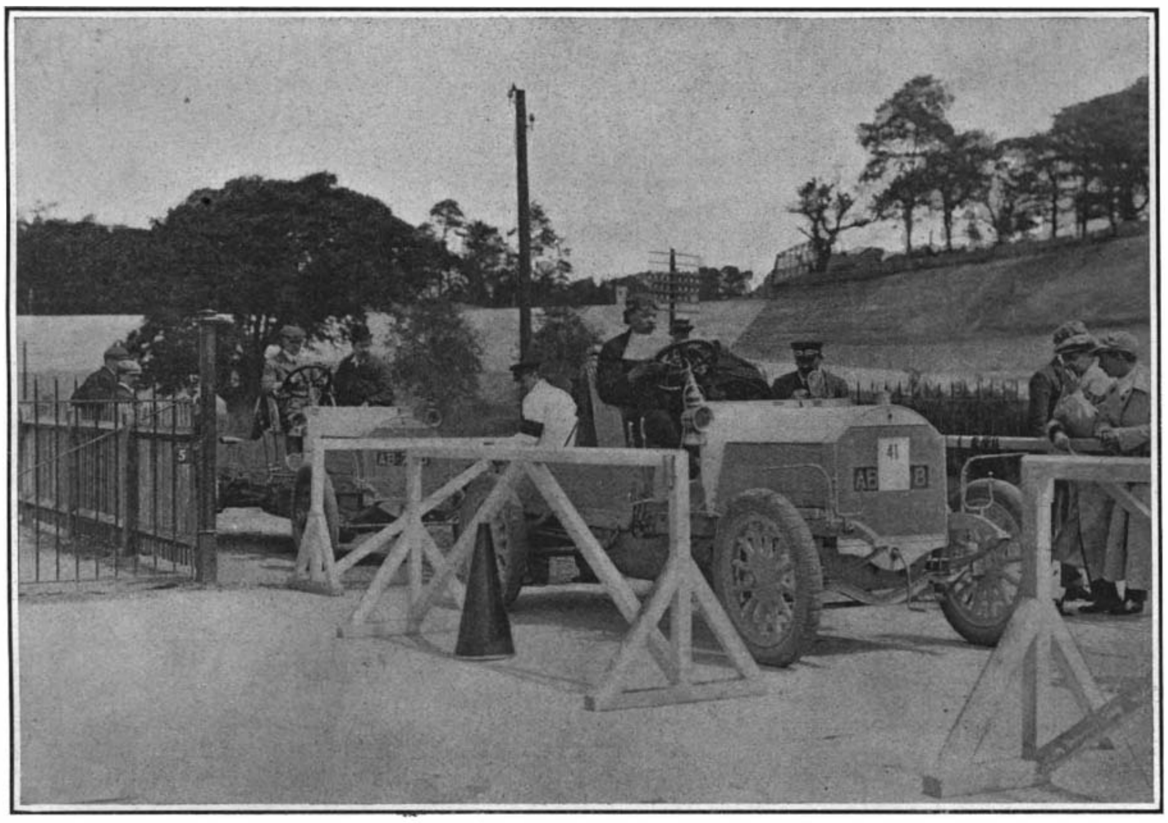
All the turns are steeply banked, making possible a speed of 100 miles an hour and over with complete safety.

S. F. Edge Going at 65 Miles an Hour in His 24-Hour Speed Trial.

He covered 1,581 miles. Note the small glass wind-shield in front of the driver.

THE FIRST RACES AND RECORDS ON THE NEW WEYBRIDGE TRACK.

was fitted in thirty seconds. Stops for other reasons were very few. During the early part of the performance the white car had to have a new spark plug fitted in addition to changing a tire, these operations causing a delay of eight minutes. In less than an hour, in the middle of the night, Edge had to change two wheels, back and front. At 1,000 miles Edge, who had completed that distance in 14 hours, 15 minutes, and 2-5 of a second, had beaten Merz and Clemens's record by no less than 7 hours, 3 minutes, 4 3-5 seconds.



Weighing and Checking Cars and Giving Them Their Numbers on Entering the Inclosure.

THE FIRST RACES AND RECORDS ON THE NEW WEYBRIDGE TRACK.

The drive proved to be a very severe trial for the track, the cement surface of which was broken in several places. After he had been driving seventeen hours, Edge changed his clothes, and appeared quite fresh and well. The track by this time showed signs of crumbling away at various points, the cars scattering dense masses of dust on passing over the defective places. On one occasion, while going at over 70 miles an hour, Edge had two tires burst, the report being heard right across the track. The wheels whirled round on their rims for a considerable distance, fortunately without serious results. Edge eventually finished his ride with 1,581 miles 1,310 yards to his credit. The white car covered 1,538 miles 160 yards, and the red car 1,521 miles 80 yards.

This performance by Edge naturally attracted public attention to the course and to the first meet. Indeed, over 10,000 persons traveled down from Waterloo to witness the races. As already stated, there were six distinct contests or races. Before each race the cars were lined up, in order to make certain that they complied with the conditions, such as size, cost, and class. They were sent down the course to the starting point at the fork, where they looked like a battery of artillery enveloped in smoke. The ringing of a bell announced that they had started. Round and round the cars went, now high up on the bank, now low down; now forging ahead till the race became a procession, or dropping out altogether when a tire came off, as it did on one occasion, or when something happened to the machinery, which was not uncommon.

The first race was for the Marcel Renault Memorial Plate of $2,750 distributed in three prizes, for motor cars propelled by means of internal combustion engines having a cylinder bore of from 85 to 110 millimeters (3.346 to 4.330 inches) and a weight of not over 3,000 pounds. The distance was 12 miles. Fourteen cars took part in this race, necessitating two heats and then a final. The winners were Mr. H. C. Tryon on a Napier car, Mr. A. Clifford Earp on an Iris, and Mr. A. Huntley Walker on a Darracq. The last named would have done better had he not lost half the rubber tread of his nearside driving wheel during the first round. A Darracq car came in first in the second race, namely, for the Horsley plate, a Daimler coming in first in the third race for the Gottlieb Daimler Memorial Plate.

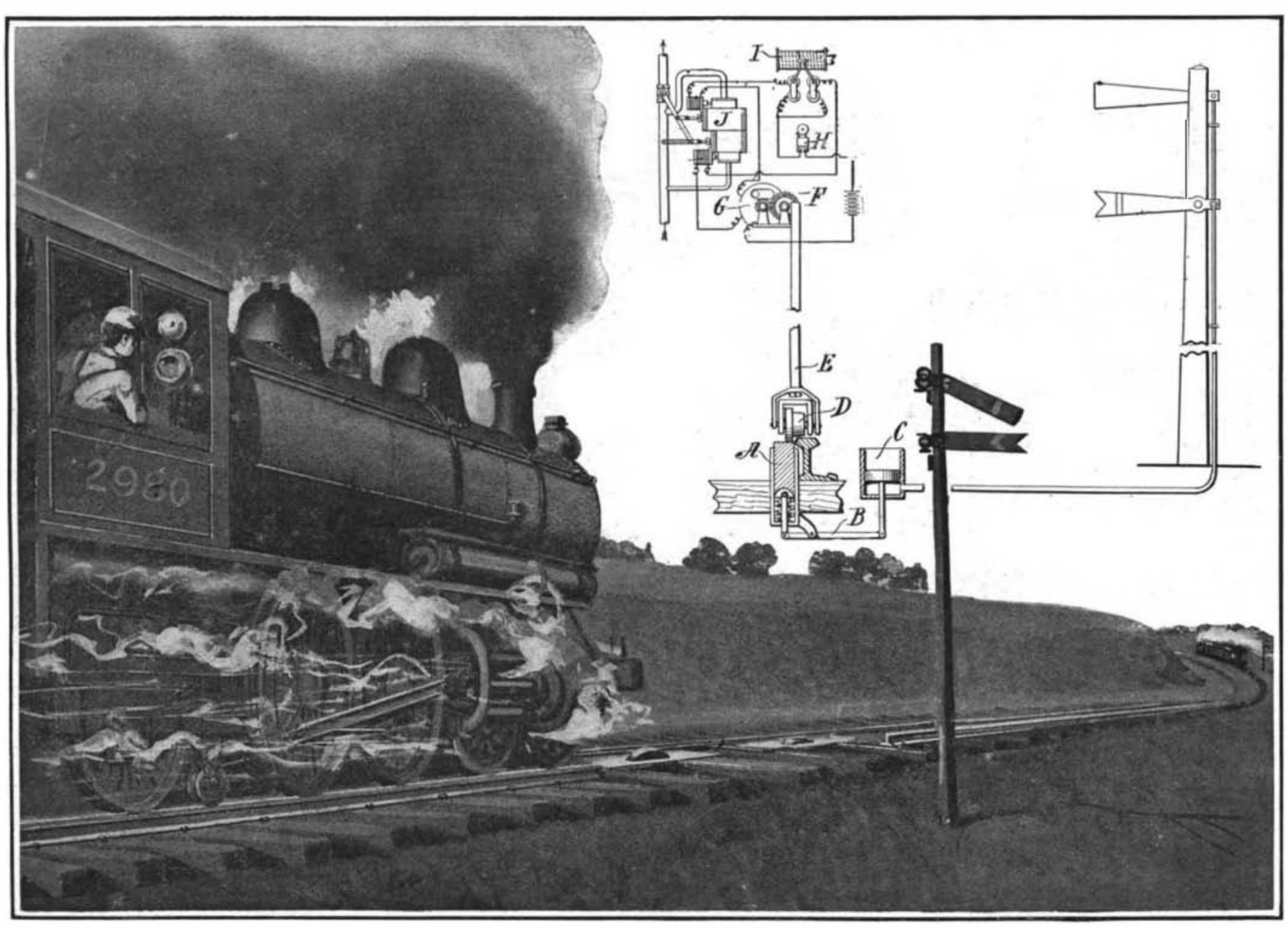
The most exciting race of the day was that for the Byfleet Plate, which resulted in a dead heat between Mr. Charles Jarrott on a 60-horse-power De Dietrich car and Mr. F. Newton on a 45-horse-power Napier. The distance was three times round the course and finish down the five-furlong straight. Newton on the Napier got off best at the start, and held a lead of a couple of lengths over Jarrott for the first round, when Jarrott, who was on the outside, passed him on the high banking, to be caught himself and held for the next round, which they ran bonnet to bonnet, amid intense excitement from the crowd of spectators. Up the long straight course the two cars came, the De Dietrich having an advantage of inches only. When a yard or two from the finishing line, the Napier leaped forward like a shot from a gun, and they passed the winning post together, wheel to wheel, traveling at the rate of between 75 and 80 miles per hour.

The other two races were for the Montagu Cup and the Stephenson Plate. The winners of the first named were Mr. J. E. Hutton on a Mercedes car, Mr. K. Okura on a Fiat, and Mr. F. R. Fry also on a Mercedes. In the Stephenson Plate the first three were Mr. A. Huntlet's Darracq car, Mr. C. Sangster's Ariel-Simplex, and Capt. Owen's Junior.

Several bookmakers were present on the course, and many bets were taken. The drivers wore colors, so that some of them, with their goggles, presented fantastic images as they hustled by. As in the beginning of every great undertaking, the management discovered that complete as were their arrangements, a few alterations will be necessary for the next meeting. The times occupied in finishing the races were not given. As the Brooklands Automobile Racing Club hope to permit successful handicaps, they are keeping this information for the present to themselves, in order to get statistics for these performances. When these are complete it is expected, and it is really desirable, that the times will be hoisted on the number board with the winner's name, as it will lead to a number of misleading statements of a car's performance if the official times are not given. On the whole, the first meeting passed off very satisfactorily. Races every fortnight will now take place for some little time to come, and during the season some $75,000 in money prizes will be competed for.

The 24-hour race has become very popular in America during the past few months, and at such a race held at Detroit on the 21st and 22d of June, a new record was made, which superseded that made by the National car in 1905. In this race each car was allowed two drivers, who could take turns at the wheel, and it was also permissible to change the cars in case of an accident, or if found desirable. The new record is 1,135 miles, made by Messrs. Kulick and Lorimer on a 6-cylinder Ford car, while Herbert Lytle, with a Pope-Toledo, was second, scoring 1,109 miles. C. A. Coey, with a 40-horse-power Thomas, was third with 990 miles. During the course of the race a Wayne car and Lytle's Pope-Toledo both went through the fence. The former was only slightly damaged, and within 20 minutes a new axle and wheels had been put on and the car set running again, the result being that it obtained fourth place with a score of 958 miles. The Pope-Toledo was badly damaged, but Lytle took a substitute car, with which he finished the race. Two Ford 4-cylinder runabouts obtained fifth and seventh places with scores of 798 and 728 miles respectively. A Buick car was sixth with 752 miles, and a Stevens-Duryea eighth with 713 miles. Several of the drivers completed the 24-hour test without being relieved by a substitute.

BLOCK SIGNALS IN THE CAB OF THE LOCOMOTIVE.



A MECHANICAL SYSTEM FOR REPEATING BLOCK SIGNALS IN THE LOCOMOTIVE CAB.

Although automatic railroad block-signal systems have been developed to the highest degree of efficiency, they cannot yet be relied upon entirely to prevent accident; for collisions continue to occur even on our most elaborately equipped railroads. Investigation into a number of accidents which have happened in recent years has shown that the signals were in perfect working order, but had either been obscured by steam or fog, or had been neglected owing to the carelessness of the engineer. In one instance the engineer, while attempting to repair a leaking valve, apparently forgot to watch his signals, for, although five separate warning lights were set for him, he plunged his engine into a stalled train, causing a fearful loss of life.

Accidents of this sort cannot be blamed upon the block signals, but obviously, in addition to these signals something more is needful which will force the attention of the engineer to the signals and impel him to act, or in case he does not act, will automatically throw the throttle and operate the brakes for him. Very evidently, visual signals alone are inadequate, particularly when they are set at the side of the road, where smoke or fog can intervene between them and the engineer. In addition to the visual signal an audible signal should be used, to draw the engineer's attention even when the usual semaphore is invisible.

A number of systems have been invented, which provide for operating signals in the cab of the engine directly before the eyes of the engineer. Such a system, which is now being tried in England, was described in these columns a few weeks ago. It comprised a pair of semaphores in the cab adapted to show "danger" and "caution," and a horn which was sounded when the danger signal was set. In addition to this the steam was cut off and the brakes set automatically, in case the signals were disregarded by the engineer. These cab signals were controlled by trippers along the track, which were set by a signalman.

In the accompanying engraving we illustrate a somewhat similar cab signal system, belonging to the Safety Signal Company, of 407 Drexel Building, Philadelphia, Pa. This system, however, differs from the English system in the fact that it is controlled directly by the regular automatic block signals, repeating these line signals in the cab. The line drawing illustrates diagramatically the method of transmitting the signals to the cab. Close to one of the rails are a pair of blocks, only one of which is shown in the diagram, as the two blocks and the mechanism connecting them with the line signal system are identical. The block *A* is mounted to slide vertically in a chamber secured to the ties. A coil spring bears against the under face of the block, tending to hold it up to the desired height. The object of fastening the chamber to the ties instead of burying it in the roadbed is to preserve the same relative position between the rail and the block regardless of any settling of the roadbed due to frost or other weather conditions. A rod connects the block with a lever *B*, which is hinged to a bracket depending from the chamber. The opposite end of the lever carries a plunger, which is adapted to slide vertically in a cylinder *C*. A pipe connects this cylinder with the compressed-air system of the electro-pneumatic block signal. One of the blocks *A* is controlled by the "danger" signal, and the other by the "caution."

The system is especially adapted to be operated with line signals of the type which are normally set at danger, and show a clear track only when the train is about to enter the block. For this reason, the blocks *A* are normally held in raised position by the coil springs, this position being the one in which they will operate the cab signals, so that in case of any failure on the part of the line signals, the cab signals would show "danger" and bring the train to a stop. When the semaphore signals are set for "clear," both cylinders *C* are connected with the compressed-air system of the line signals, raising the plungers therein, and lowering the blocks *A*. If, on the approach of a train, the "danger" signal should drop, it would throw a valve, releasing the air from its corresponding cylinder *C*, and lowering its respective block *A*. The blocks *A* thus rise or fall with the semaphores.

Carried by the locomotive is a search wheel *D*, supported in a yoked bar *E*, mounted to slide vertically. The search wheel is provided with two treads, one normally running on the rail, and the other, which is of a larger diameter, adapted to engage the blocks *A*. The rod *E* projects up into the cab of the locomotive, and at its upper end is provided with a pawl adapted to engage a ratchet wheel *F*. This wheel is geared to a disk mounted to turn in a casing *G*. The disk which carries a red and a green glass may be swung to show these signals through an opening in the casing *G*. As the locomotive passes over the blocks *A*, if, for instance, the "caution" block is raised, the search wheel *D* striking the block will be lifted, and by means of the ratchet wheel *F* will shift the signal disk until the green signal shows through the opening in the casing *G*. On passing the first block *A*, if the "danger" block is raised, the search wheel will be lifted again, turning the disk to show the red as well as the green signal. At each operation of the search wheel an electric circuit is closed, which operates to ring a bell *H*. The bell *H* will continue to ring until the engineer has broken the circuit and reset the signal disk.

In addition to the signal mechanism, there is an electrically-controlled mechanism *J*, adapted to act directly upon the throttle and brake lever, so that in case of a lapse on the part of the engineer, the train will be automatically brought to a stop. One of the great objections to mechanism for automatically stopping a train, is that it conduces to carelessness on the part of the engineer, who is apt to put too much confidence in the automatic mechanism, and permit it to govern the engine at all times. Since no machinery may be trusted to work forever without failure, there is danger that at some time it may fail while the engineer's attention is drawn elsewhere, and a serious accident would result. To obviate such conditions, the present system employs an indicator *I*, which is driven by clockwork, and on which is recorded every automatic action of the signal apparatus. This indicator shows whether the engineer has operated the throttle himself, or whether he has depended upon the mechanism for doing this work. These records may be examined at the end of each run, and in case they disclose any failure of the engineer to regard the signals and operate the engine himself, he should be severely censured. It is believed that by thus keeping a check on the actions of the engineer, the faults of the automatic system are avoided and its benefits retained. The chances of a lapse upon the part of the engineer, and a failure of the mechanism occurring at the same time, are exceedingly remote. Hence, the safety of a train equipped with this automatic cab signal and control system is doubly assured.

DEATH OF SIR WILLIAM PERKIN.

Sir William Perkin, founder of the coal-tar industry, died last week at the age of sixty-nine years. Few

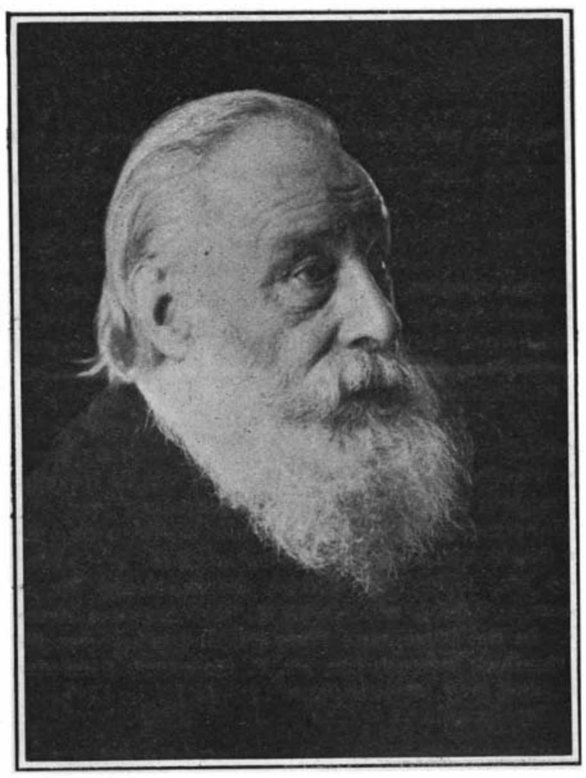
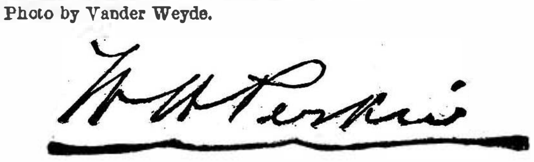


Photo by Vander Weyde.



men of science began active life so early and attained success so quickly.

His early chemical training Sir William received at the City of London School, where, during the noon recess, lectures on chemistry and physics were given by Thomas Hall. At the age of fifteen Perkin went to Dr. Hoffman, who occupied a chair in the Royal College of Chemistry. After having finished his course in quantitative and qualitative analysis, Perkin began research work. Strangely enough, the first subject Dr. Hoffman selected for him was anthracene. The experience acquired in investigating this substance was of immense advantage to him when he began to work on alizarine many years afterward. At the age of seventeen Dr. Hoffman made him an assistant in his experimental laboratory. In that capacity he was occupied all day with his researches. His own work was carried on in the evening in a scantily-furnished laboratory. There it was that in the Easter vacation of 1856, when only eighteen years of age, he discovered mauve. He was led thereto by an attempt to produce quinine artificially from allyltoluidine, which caused him next to study the oxidation of aniline. While experimenting with the dyestuff thus obtained, he found that it was a very stable body which produced on silk a beautiful violet, exceedingly resistant to light. Manufactured in large quantities, it seemed to Perkin that it would be a useful dye. He continued his investigations, and succeeded in interesting Messrs. Pullar, of Perth, in his discovery. On August 26, 1856, the process was patented. Experimental attempts to use the new dye for cotton and other materials proved so successful, that its manufacture was undertaken by Sir William Perkin, his father, and his brother, under the name of Perkin & Sons. His dye was a pioneer, and it cleared the way for all that came after it. It completely revolutionized the dyeing and textile printing industry, and gave rise to an amount of chemical research in the coal-tar colors which is probably without an industrial parallel.

Death of Angelo Heilprin.

Angelo Heilprin, well known for his investigations of Mont Pelée, died on July 17 at the age of fifty-four.

Prof. Heilprin was born in Hungary, but emigrated to this country with his parents at the age of three years. He studied chiefly in Europe. He early made natural history a special study, with such distinction that he was honored in London, 1877, with the Forbes medal. On his return to the United States in 1879 he was made Professor of Invertebrate Paleontology in the Academy of Natural Sciences, Philadelphia. From 1883 to 1892 he was executive curator in the institution. For five years he was president of the Geographical Society of that city, and in 1892 he led the Peary relief expedition to the polar regions.

On May 20, 1902, Prof. Heilprin ascended the volcano side of Mont Pelée while the eruption was still in progress. Arriving at the edge of the summit crater he remained there four hours, and when he descended he was encrusted with mud, the weight of which, together with the atmosphere he had been breathing and the difficulties he had encountered, reduced him to a condition of great fatigue. Nevertheless he ascended the mountain a second time.

Prof. Heilprin was made an officer of the French Academy and was awarded the Elisha Kent Kane medal by the Philadelphia Geographical Society.

Fossils in Egypt.

Some rare fossils have been discovered in Northern Egypt by an exploring party under the direction of Prof. H. F. Osborne, vice-president of the American Museum of Natural History, and Walter Granger and George Olsen, members of the museum staff.

The fossils were discovered in the Fayum Desert, situated a few miles from the Nile Valley. The collection made was put into twenty-seven large packing cases and shipped on a freight steamer, which has already arrived in New York.

The main object of the expedition was to seek the ancestor of the elephant. A very important find was that of the ancestral elephant known as the palæomastodon. The skeleton is not complete, but the skull, the lower jaw, leg and foot bones and several vertebræ were found. A thorough search was made for the missing bones, but with no success. According to Mr. Granger this animal dates back more than a million years.

Another important fossil found was that of a skull of an arsinoitherium, which takes its name from Queen Arsinoe, who reigned 316 B. C. The skull, which is very rare, is the only one in this country, and there are only two in the world. The bones of the body and legs of this animal have never been found.

Among other fossils in the collection are the bones of ungulates and rodents. It is the first time that the fossil rodent was ever found in Egypt, but many have been found in other parts of Africa. Several skulls of the ancient crocodile were found, their heads being from three to four feet long. Judging from the size of the skulls, the bodies must have been from twenty to twenty-five feet long.

In some of the excavations skeletons of the ancient and aberrant whales were found, which existed generations ago. They have become entirely extinct. Ivory teeth that belonged to animals that existed so far back that the time cannot possibly be established were also unearthed.

The American Museum of Natural History has now the largest and rarest collection of fossils in the world.

University of California Will Send Expedition to Observe Next Total Eclipse of the Sun.

William H. Crocker, of San Francisco, has given $4,500 to the University of California for the purpose of defraying the expenses of an expedition to observe the next total solar eclipse, which will occur on January 3, 1908. The eclipse will be visible all over the Pacific Coast. The astronomers of the University of California will also make observations in South America, the precise points not having been selected yet. The University of California has an excellent collection of astronomical instruments, some of which were presented by William H. Crocker. The work done with the photographic apparatus has been particularly successful. The University has received large donations for astronomical purposes from William H. Crocker and D. O. Mills, at whose expense parties were sent out to Labrador and Spain for the purpose of studying an eclipse of the sun.

Correspondence.

An Idea for Inventors.

To the Editor of the SCIENTIFIC AMERICAN:

Please ask inventors to get up a "short-stop" for electric cars. Pressure by the motorman's foot ought to simultaneously set the air-brakes on the wheels of one truck, send a reversing current into the motor on the other truck, sand the tracks, and pull back the lever of the controller to "off." Raising the foot ought to cut off the reverse; lifting a lever ought to release brakes. This leaves the car ready to start again.

SPENCER CONE WYCKOFF.

Brooklyn, N. Y.

Milk Diet.

To the Editor of the SCIENTIFIC AMERICAN:

The letters published in the SCIENTIFIC AMERICAN *pro* and *contra* a milk diet were very interesting. They show a very general mistake made by the majority of people, laymen and professional. To any intelligent observer it must be clear that the same article of food taken under the same conditions may be very beneficial to one person and very harmful to another person. It may even be easily digested and tolerated by, or disagree with, one and the same individual at various times. For many years I digested milk and eggs without difficulty; now they disagree with me.

This is one of the greatest mistakes made by enthusiasts in a certain form of diet. They sincerely believe that what is good for one man must be good for every man. The average physician is apt to commit the same error and not give as much consideration as is necessary to the peculiarities and idiosyncrasies of each individual patient.

There is one thing, however, to be said against cow's milk. While it undoubtedly possesses wonderful nutritive properties, it was never destined for human beings, but for calves. The digestive apparatus of a human being and of a calf are entirely different, and while some persons have the necessary power to assimilate and thrive on milk, many have not. Then, of course, there is the danger of infection through milk and probably the greater danger of adulteration or impurity.

MAURICE MOSCOVITZ.

New York.

Home-Made Barometers.

To the Editor of the SCIENTIEIC AMERICAN:

I note your commendable instructions for making home-made mercurial barometers. Thirty years ago I wrote your paper that, in filling the tubes, a little tuft of absorbent cotton, tied to a long thread, should be thrust to the bottom of the tube before filling. When the tube is full, pull the tuft out, and all bubbles in the mercury will condense into the cotton. A clean tube—next to that resulting in boiling—will result.

My experience is that barometers so made should have extra long tubes so that the small amount of air that necessarily remains may have room at the top to be rarefied greatly, and thus affect the sensitiveness of the mercury less.

With regard to the general shape and special projections on the tree-hoppers, so recently illustrated in your journal, it had always occurred to me that these were largely protective. The excrescences enable the insect to resemble a greenish bud or new thorn on a twig of the year on many trees, and it is probable that those of extravagant length in other countries mimic a branch or leaf-stem.

It has always seemed to me that in hopping these creatures were projected by means of a downward stroke of the wing as well as by use of the special saltatorial legs. These latter appear too weak for the very sudden propulsion, and besides this there is always a very audible snap on the surface from which the hopper springs, as if it were suddenly struck by something. I could never, however, perceive any such wing action with the eye.

Any information on this subject from those experienced in the study of these creatures might be of interest.

JAMES NEWTON BASKETT.

Mexico, Mo., June 8, 1907.

Marine Turbines as Gyrostats.

To the Editor of the SCIENTIFIC AMERICAN:

In reading the account in your number of June 15 of the practical tests of the Schlick gyrostat for ships, there occurs to my mind a suggestion which I offer for your consideration and that of your readers.

Experience with a Curtis steam turbine combined with electric generator, as supplied to the trade by the General Electric Company, convinces me that this is the means of converting the energy of coal into effective work, combining more advantages of economy and flexibility than any other.

Now, the steam turbine as a propelling agent for vessels seems to be the favorite device of modern engineering. Most of the models so far tried have been of horizontally placed turbines, operating directly upon the shafts of the propellers of the ships.

Would it not be economical both of space in the ship, of weight, and of torsional strain, to substitute the vertical type of turbine such as the Curtis? Equip the vessels with the usual form of Curtis turbine and generator, have a short shaft for each propeller and to each attach an electric motor receiving its power by wire from the generator. This shaft could be propelled in either direction by changing the direction of the current through switches, each shaft and propeller being entirely independent in its action.

Then to steady the vessel, preventing rolling, a heavy plate revolving in the same plane as the turbine could be placed above the turbine itself, and actuated by the power the turbine generates.

Would not this combination produce a condition of stability, the turbine itself acting in some sort as a gyroscope, which would be a desirable and economical arrangement of forces?

SPENCER BORDEN.

Fall River, Mass., June 22, 1907.

[The proposal to use a turbo-electric drive for steamships has been made by one of the large electrical companies. It would have many advantages. The proposal to use the Curtis type of turbine in such a way as to secure gyrostatic effects is impracticable, because of its slow speed of rotation, to say nothing of many mechanical difficulties.—ED.]

Progress of the Glidden Tour.

After a two days' rest in Chicago, 69 of the original 74 cars started on Monday, the 15th instant, on the remainder of the journey to Pittsburg and New York. Thirty-one contestants still had perfect scores. Nine had received penalizations, and seven had dropped out. Among these were the Apperson car No. 1, which had a broken magneto, the Pierce and Packard cars of K. R. Otis and T. J. Clark (both of which overturned on the third day's run to Chicago), the 24-horse-power Maxwell (which broke its rear axle on the third day), a Dragon runabout (which stripped its differential), a Cleveland runabout, and a Royal touring car equipped with ordinary pneumatic tires with a gelatinous filling known as "Newmastic." The non-contestants consisted of 14 touring cars and 4 runabouts. Five of the non-contestants had perfect scores. Two cars—a Wayne and a Maxwell—joined the tour at Chicago.

The fourth day's run, from Chicago to South Bend, Ind., was made over a very muddy and rutty road, owing to heavy rain in the night. As a result, a number of cars were stuck in the mud and had to be pulled out by horses. A 45-horse-power Matheson runabout had a connecting rod break loose and make a hole in the crank case, which put this car out of the Hower trophy competition. A Reo machine (Car No. 34) was penalized and withdrew, as did its mate (No. 35) at Chicago. An Aerocar broke a water pipe, and an Autocar seriously strained its frame. The distance this day was 101.2 miles. The cars were provided with a pace maker, and were numbered according to their place in line. If any car was held up on account of a breakdown or for other cause, the cars behind it could pass by exchanging numbers. This new arrangement worked well, and stopped racing to a large extent.

The fifth day's run of 147½ miles, from South Bend to Indianapolis, was begun in a heavy rainstorm, and ended in stifling heat. The roads were fairly good though muddy. An average speed of about 18 miles an hour was maintained. Among the events of the run was a collision between a Thomas 4-cylinder runabout and a Maxwell 2-cylinder touring car, which resulted in a broken front spring hanger for the latter. A Marion 4-cylinder runabout (Car No. 107, competing for the Hower trophy) was ditched and broke its left rear wheel, which effectually put it out of the competition. The 40-horse-power Lozier touring car made very slow progress on account of a broken front spring. About half a dozen of the cars took the wrong road and made a detour of 22 miles, but despite this they all arrived on time. Another Haynes car—a 4-cylinder runabout—joined the tour at Indianapolis.

At the completion of the sixth day's run, which completed half of the tour, 27 contestants for the Glidden trophy and 4 non-contestants still had perfect scores, while in the competition for the Hower trophy, 6 of the 13 runabouts that started remained perfect. The run of 174.2 miles from Indianapolis to Columbus consumed nine hours' time, and was made at an average speed of 19½ miles an hour. Like the run of the previous day, it began in a driving rain and ended in hot sunshine. The roads were good nearly all the way, most of the distance being covered over the National highway. The Mitchell car was the only Glidden contestant to lose points in this day's run. Eight points were lost on account of delay due to tire trouble. The car had four blow-outs and two punctures during the day. A Maxwell runabout, despite delay due to faulty wiring and three punctures, managed to arrive on time. One of the contestants was arrested for exceeding the speed limit.

The seventh day's run of 151.4 miles, from Columbus to Canton, Ohio, was made at an average speed of 17½ miles an hour. The roads were somewhat rougher and more hilly than those traversed before. The 35-horse-power Deere car broke its steering gear and skidded off the road into a canal, but was subsequently pulled out and towed into Canton by a Packard non-contestant. A Walter and a White car also skidded off the road into the ditch. The former was got back into the road, and was able to make up the time lost, so that it received no penalization. The confetti car took the wrong road, and made a considerable detour over some extremely mountainous roads. It was followed by about half a dozen cars before the mistake was noticed by the contestants. The road was mostly of clay, and had many deep mudholes and water breaks in some sections. A 40-horse-power Aerocar collided with a wagon and dropped out of the tour, while a 30-horse-power Packard car received 91 points penalization, thus doing away with the perfect score of the Buffalo Club, and leaving only the Pittsburg Club remaining with a perfect score.

The eighth day's run of 92.2 miles from Canton, O., to Pittsburg, Pa., was covered at an average speed of about 15 miles an hour, which was none too slow for the extremely poor roads encountered. The first part of the run from Canton to New Brighton consisted of frequent steep hills and water breaks, which, however, was as nothing compared with the wretched clay roads and high hills encountered nearer Pittsburg. On account of the bad state of the road, the route was changed, a detour being made at Freedom. Owing to extremely bad roads, four more cars which had perfect scores received penalizations. These were the Lozier, Gaeth, Maxwell and Haynes. In the Hower trophy competition the 40-horse-power Thomas runabout received 77 points penalization.

With the tour about three-quarters finished, 20 contestants for the Glidden trophy and two non-contestants still had perfect scores upon their arrival at Pittsburg, while but 5 of the Hower trophy contestants remained in the perfect score class. As the very worst roads are yet to be encountered, it is probable that not more than a dozen cars will finish at New York with a perfect score in this, the most strenuous touring competition that has ever been held in America.

The Current Supplement.

One of the most brilliant and successful races of the season was the Grand Prix of the Automobile Club of France, which brought together the leading racing cars of different countries mounted by the most experienced pilots. The high average speed of 70 miles an hour, made by the winner, is unprecedented. The Paris correspondent of the SCIENTIFIC AMERICAN describes the race in detail, and presents pictures of the leading cars. Roquefort cheese, which derives its name from a little village in the south of France, is known throughout the civilized world, and is the most celebrated of French exports with the exception of champagne. E. Marre tells exactly how the cheese is made. The splendid paper on gun distribution aboard modern battleships is concluded. That plants marry and are given in marriage becomes evident from the simply-worded but interesting article of Percy Collins, entitled "The Nuptials of the Flowers." In an article entitled "The Passing of the Animals," Edwin Vivian gives an account of some creatures that are now known only by their names. The cymometer, or wave-measuring device, is an instrument designed by Dr. J. A. Fleming, F.R.S., to determine not only the frequency of electric oscillations and the length of electric waves, but also to measure small capacities and inductances of circuits employed in wireless telegraphy. The new Lumière tricolor photographic process is described in detail, the exact formulas for development, inversion, oxidation, intensification, clearing, fixing, and varnishing being given.

A party of scientists have sailed from Seattle, Wash., to cruise for several months in northern waters. The little vessel "Lydia," of 400 tons has been chartered, and fitted out for the expedition. The principal purpose of this cruise is to study the geological formation of the Aleutian group of islands, and other scientific features connected with that archipelago. The party will make particular investigation of Perry Island, which suddenly rose from the sea more than a year ago. This party is headed by Dr. T. A. Jaggar, Jr., head of the department of geology, Massachusetts Institute of Technology, and includes Dr. H. S. Eakle, University of California; Prof. H. V. Gummery, professor of mathematics, Drexel Institute, Philadelphia, who will have charge of the magnetic observations; Dr. Van Dyke, who will study the botany and entomology of these islands, and Prof. F. T. Colby, who will look into the natural history of the region. The party will begin working westward from Attu Island, and will devote several months' time to their researches.

PHOTOMICROGRAPHS WITHOUT A MICROSCOPE.

BY C. H. CLAUDY.

Hitherto, when that division of the Department of Agriculture which has to do with seeds desired to illustrate seeds in its publications, it had recourse to a drawing made by an artist with the aid of the microscope and the camera lucida. Although both accurate and beautiful, the preparation of these drawings entailed a great deal of time and cost a great deal of money.

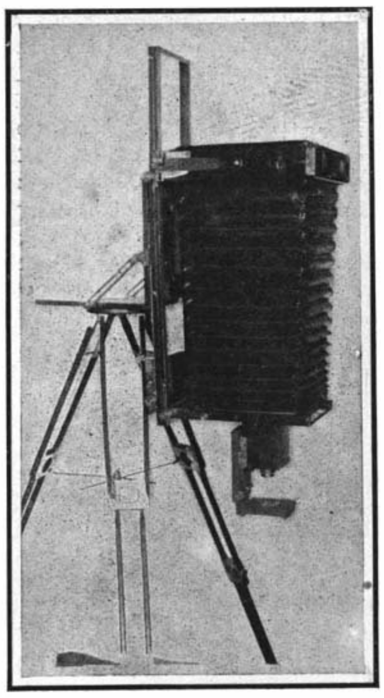
From time to time, attempts were made to photograph seeds in an enlarged perspective, so that the labor of drawing them could be dispensed with. The experiment was made both with the camera alone, and with the camera and microscope combined. In the one case, if the magnification was sufficient, the detail was not sharp enough; in the other, the magnification, even when low for a microscope, took in too small a field and was also in other ways quite unsatisfactory.

Prof. F. Lamson Scribner, ex-chief of the Insular Department of Agriculture in the Philippines, botanist and agrostologist, set himself the task of devising a simple and effective apparatus, with the result that the one which he perfected and is now used gives the most perfect results.

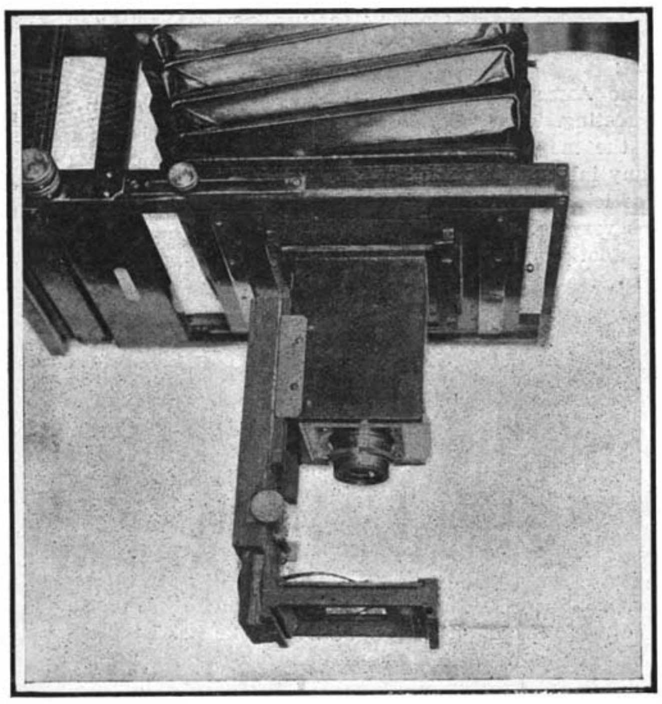
It consists of an ordinary view camera, with a long bellows. A Goerz lens, Series III, of 2⅜ inches focus, is used, also a stage, carying a ground glass and a plane glass movable with a rack and pinion, and a box extension carrying the lens. This arrangement is shown in the accompanying photograph. When a lens is distant just twice its focal length from an object, measured when in focus on infinity, the image reproduced in the camera is exactly the natural size of the object at the plane from which the measurement is taken. That is, when the lens is 4¾ inches from the glass stage, on which some seeds are laid, the image of the seeds will be formed 4¾ inches behind the lens and of life size.

For every additional unit of focal length that the plate is withdrawn, the magnification is increased by one diameter. That is, if the lens and plate are distant from each other 4¾ inches plus 2⅜ inches, and the stage carrying the seeds is moved up until the image is sharp, the magnification will be two diameters instead of life size. To obtain, therefore, a magnification of nine times, the lens must be 9 x 2⅜ + 2⅜ inches distant from the plate, or a total of 23¾ inches. This distance, of course, called for a lengthy exposure. This was given, with a normal north light, to the amount of ten minutes with a stop in the lens which is normally sixteen. It must be remembered, however, that the lens is here working at a focal length ten times its normal and that the stop is therefore one hundred times smaller in fact than its designation indicates. For instance, in an 8-inch lens, a 1-inch stop is *f*/8. The same lens at ten times its focal length and with the same stop would be working at *f*/80.*F*/80, which is equal to *U.S.* 400 (80 × 80 ÷ 16, meeting point of two systems, equals 400) and *f*/8 is equal to *U.S.* 4, and 4 is to 400 as 1 is to 100. Comparison is best made in the U.S. system, because it refers to areas of stops, while I.F. system refers to diameters. Therefore a long exposure is made necessary in the above instance, the stop sixteen being in reality *f*/160 or U. S. 1600.

Shorter exposures would do the work in some sort of manner, but it is essential in these photographs to show the detail in the shadows, which requires more time. The above time and magnification is of course but one instance, other seeds, of different colors or with a black background, requiring longer time, or if the magnification is less, a shorter time.



Complete Apparatus for Photographing Seeds.



Details of Apparatus, Showing the Stage and Seed Holder, Also the Rack and Pinion.

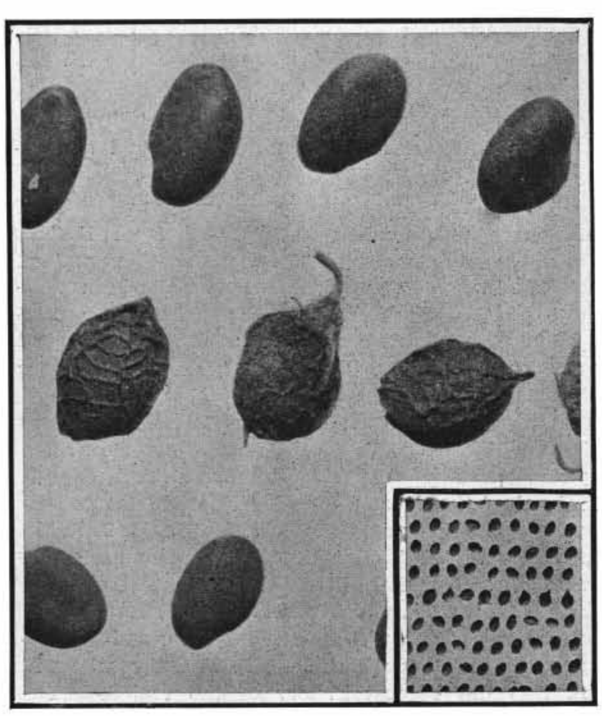
It is essential, of course, with such a long exposure, that everything about the apparatus be absolutely rigid; hence the tripod stay and the perpendicular position of the apparatus, which insures that the seeds themselves do not move.

In the accompanying photographs of various seeds the comparison between a good and a poor lot of seed is made manifest. In poor seed, the seeds themselves are neither so vigorous nor so perfectly formed, and numbers of other seeds, weeds, and foreign varieties are easily discerned. While in making accurate percentage statements of the amount of pure seed and the amount of weed and other impurities present, the usual method of counting a measured amount of seed by an expert, and actually separating the good from the bad, will be followed as before. For preliminary comparisons, or where a large number of samples must be compared in a short time, the photographic method offers great advantages. Besides this factor, the photograph is in itself of considerable value, as it provides a permanent record of the impurities of any particular variety of seed.

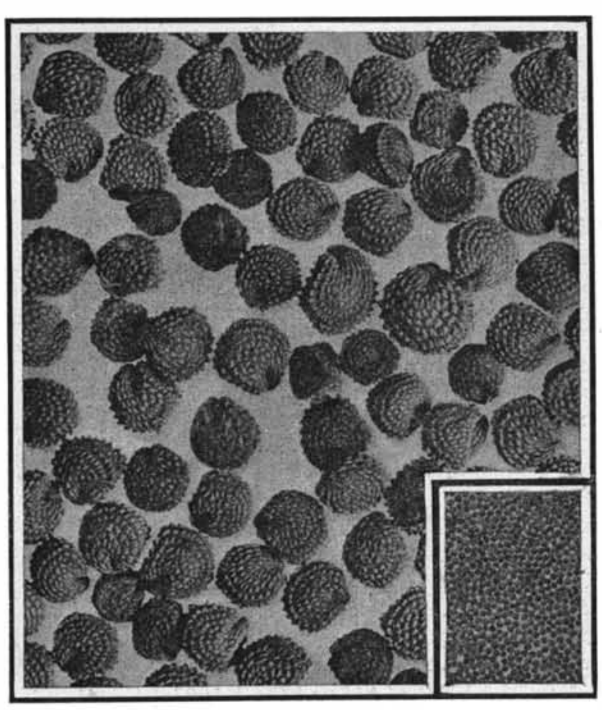
There are at present supplied to seedmen or any one who wishes to make use of them, cases of bottles containing seeds of many varieties. The Department of Agriculture requires the applicant to pay for the case and the small bottles, which amounts to about a dollar and a half, but supplies the seeds, labels the bottles, and ships the case complete. When a new variety of seed is to be located, the seedman does it by comparing it with the known pure seeds in his collection. Obviously, this is a method which takes time, tiny seeds in a bottle and equally tiny ones under the glass being difficult subjects for comparison. Drawings of seeds in printed form have been used, but no matter how perfect the drawing, it has been found that they are not easily recognized when compared with real seeds. With the photographs, however, this is not the case, and it has been suggested that a report be published which will contain plates of seeds, magnified, as in the present samples, and made after Prof. Scribner's method.

In the government exhibit at the Portland Exposition, the seeds exhibited were shown under microscopes. This method was interesting in itself, but required considerable time on the part of the visitor and allowed but a small number to view the exhibit at one time. At Jamestown the seed exhibit has been supplemented with these photographs, which show at a mere glance the work of the seed department, and prove an interesting and instructive feature of the exhibit. Prof. Scribner, who was in charge of that portion of the exhibition at Portland, now holds a similar position at Jamestown. He started to make these photographs with the idea of exhibition purposes; that they have resulted in such practical value to seed work is of course a matter of pride and satisfaction with him. The seed department is much delighted with the photographs, and the writer was informed by Prof. Duval of the Pure Seed Investigation Department that their value was as yet unknown, inasmuch as new ways of using them were being constantly thought of. He cited as an example the training of a new workman in seed examination and seed identification. By means of the photographs, the new workman can easily recognize seeds under the microscope, while if compelled to depend upon drawings, no matter how perfect, the recognition is not nearly so quick or so accurate. This is but one of the many uses to which the photographs are put. It is hoped in time to obtain a complete collection of photographs of all American seeds, in pure and impure states, for permanent record in the department. The whole idea marks one more step in the all-embracing importance of photography in the arts and sciences.

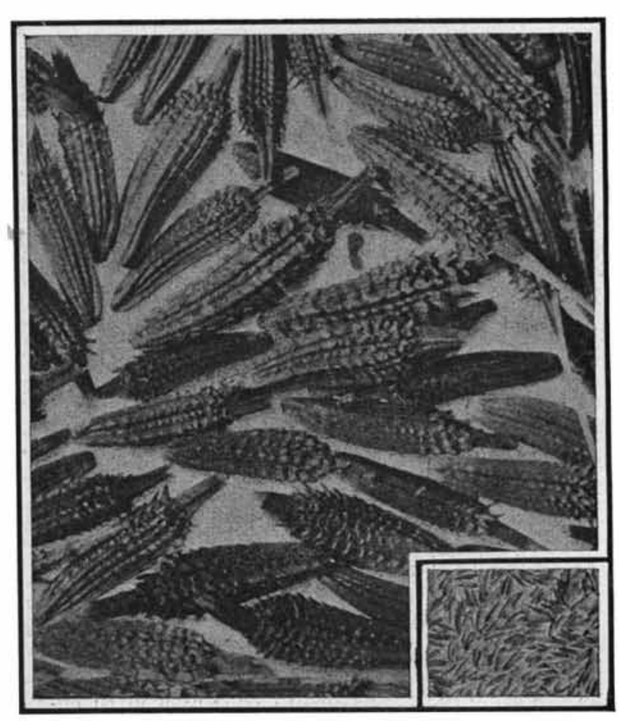
Bronze Varnish for Leather.—10 parts of fuchsine and 5 parts of methyl-violet are dissolved in the water or sand bath in 100 parts of 90 deg. alcohol, then 5 parts of benzoic acid are added, after which it is allowed to boil from five to ten minutes, until the mass has assumed a brilliant gold bronze color.



Sweet Clover Seed, Natural Size and Enlarged.



Chickweed Seed, Natural Size and Enlarged.



Dandelion Seed, Natural Size and Enlarged.

PHOTOMICROGRAPHS WITHOUT A MICROSCOPE.

ORTHOPEDIC APPLIANCES.

BY JACQUES BOYER.

The methods of treatment in orthopedic diseases have undergone many changes in the course of the development of our medical and surgical knowledge. At one period operations were usually resorted to in such cases. Since that time, despite the discovery of antiseptics and anesthetics, active surgery has been relegated to a subordinate position. Modern orthopedists are inclined to abandon operations in favor of scientific gymnastic exercises, prolonged fixed positions, persistent massage and the wearing of the perfect mechanical appliances which are now to be had at moderate cost. This branch of orthopedics is now of great importance, and the following is an account of the manufacture of jointed artificial limbs, simple wooden legs, cuirasses for curvature of the spine, wire bandages for hip joint disease and other bandages and belts designed to alleviate various forms of suffering or to conceal every deformity from the slightest deviation from symmetry to the result of the most extensive amputation.

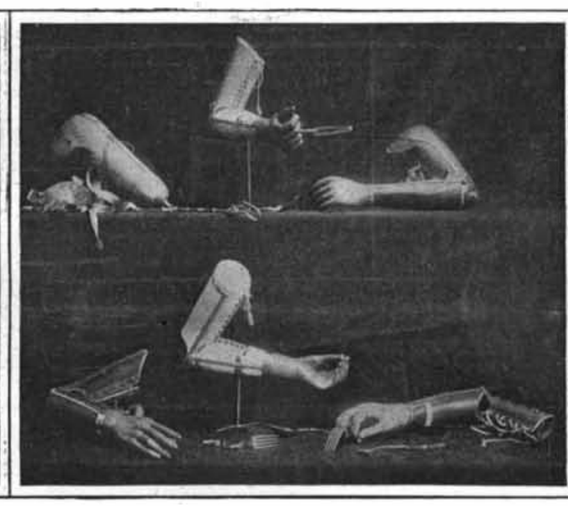
Finishing Molds for Spinal and Hip-joint Diseases. The Large Molds at the Right Represent the Appliance Devised by Dr. Bonnet and Commonly Used in the Treatment of Hip-Joint Disease.

Manikin Fitted with Various Appliances.

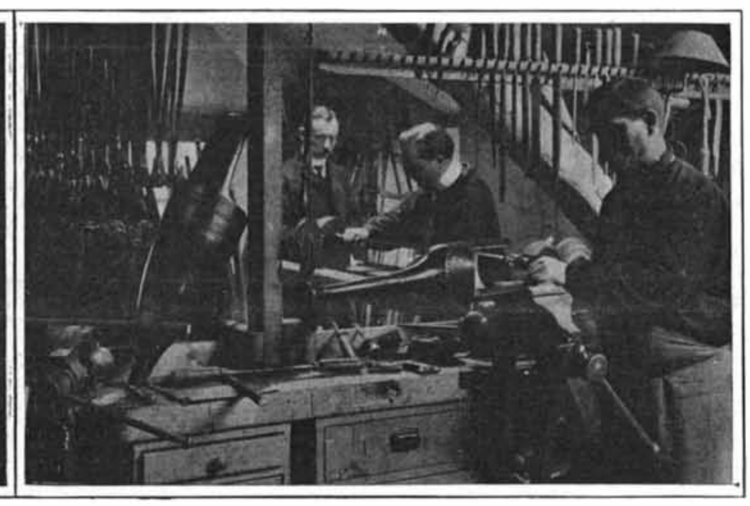
Appliances for the Treatment of Humped Backs, Hip-joint Diseases, Club-feet, Dislocations of the Neck, Etc.

As a glance at the accompanying engravings of the workshops of E. Haran, in Paris, will show, the mechanical equipment of a manufactory of orthopedic appliances is very simple. There are a few machines, of recent introduction, but most of the work is done by hand. The perfection of the products is due to the skill of the workers and their low price is made possible by wholesale production and economical division of labor. Crutches, canes, and wooden legs of the primitive type are turned on a lathe, finished with the knife, and painted. Of more elaborate artificial legs, jointed for convenience in sitting, various types are used according to the character of the injury. If the leg has been amputated below the knee and the joint has lost the power of flexion and extension, the bent knee is used as a base of support and to it is fitted the artificial leg which has a hinge and a bolt just under the real knee and terminates below either in a knob or in an artificial foot attached by a second hinge and bolt.

Fashioning Artificial Hands and Arms.



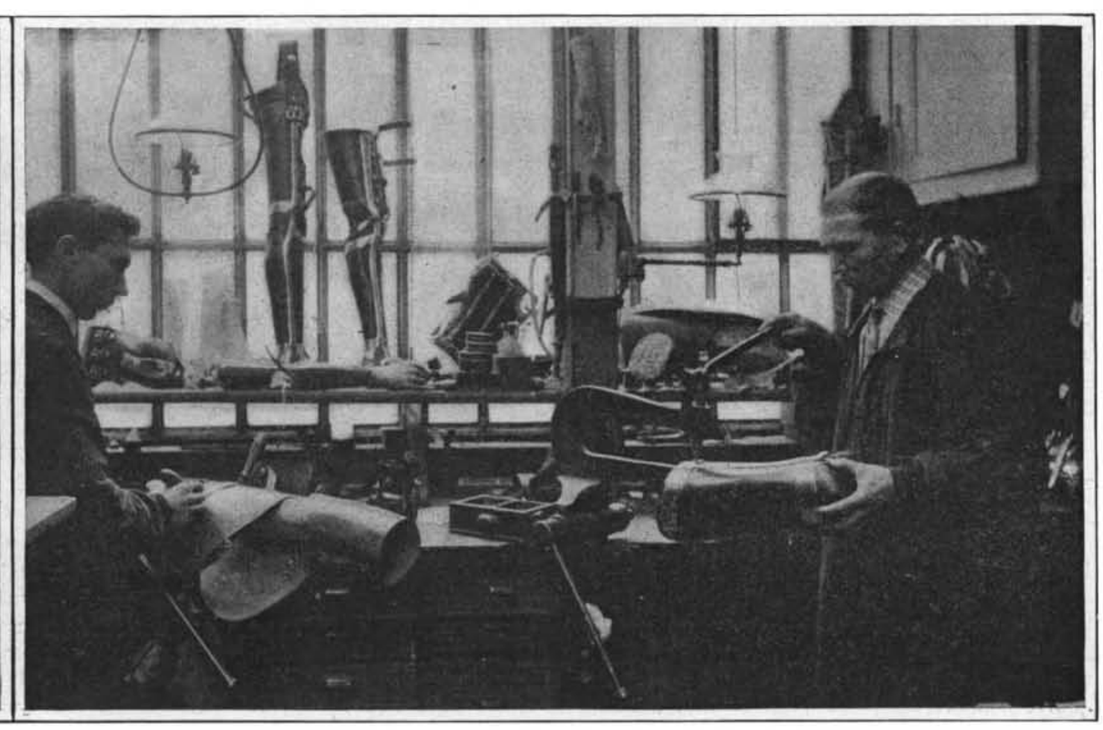
Jointed Artificial Arms and Hands with Spoons, Forks, and Knives.



Making the Old-Style Wooden Peg-Leg.

After amputation of the thigh it is desirable to use an artificial limb which bends at the knee for convenience in sitting, but if the thigh has been removed at the hip joint the substitute must be rigid when in use, although it may have one or two hinges and bolts, so that it can be folded. A fine specimen of M. Haran's workmanship is a complete artificial limb attached to a girdle of iron and leather which surrounds and molds the pelvis. The thigh and leg are also of leather. An artificial foot is attached by a joint, and when the patient is clothed his deformity would not be suspected. The construction of so perfect and delicate an appliance requires the utmost care. First, a skilled workman forges the metal frame according to the dimensions of a cast of the limb. The parts are then provided with the hinges and bolts and covered with leather. Mechanical arms and hands are now made which are very different from Paré's primitive devices. Prof. Delorme has invented a very ingenious apparatus for a patient who has lost all the fingers of the left hand and four fingers of the right hand. Paré, however, made no attempt to imitate the real hand and arm but merely endeavored to give the patient an implement by means of which, with the aid of the uninjured hand, he could hold a sword, guide a horse, or securely grasp any heavy object. For this purpose he had made, by a locksmith, an artificial hand with fingers capable of moving about a common axis in the palm. To each finger was attached a toothed wheel, and all four wheels could be locked in any position by moving a catch. A spring attached to each finger caused it to open when released. But mechanical hands and arms were rarely used until within recent

Trying the Appliances on Plaster Casts.



Cutting Leather Covers, Making Eyelets, and Assembling Artificial Limbs.

ORTHOPEDIC APPLIANCES.

years, for the intervention of the uninjured hand was required in order to flex or extend them, and hence their usefulness was very limited. Besides, only wealthy persons could afford to purchase them. Now, however, a workingman can buy for 100 francs ($20) the artificial arm invented by Dr. Gripouilleau which will enable him to continue at work, while for 500 francs ($100) or less, a wealthier patient can even conceal his deformity by the use of one of the ingenious contrivances of modern Parisian makers. The illustrations show some of the latest models, including arms with elbow joints, with rigid or jointed fingers and various accessories, such as knives, forks, and spoons. The manufacture of these artificial arms is very similar to that of artificial legs and feet. The hand and fingers are carved in wood, after a cast, the iron parts are added and the whole is covered with leather.

For the treatment of fractures and ankyloses molds or rigid bandages are employed which exactly fit the part of the body to which they are applied. They are made of stiff wire, upholstered and covered with cloth. In the illustration which shows women padding and covering the frames the large molds, at the right, represent the appliance devised by Dr. Bonnet and commonly used in the treatment of hip joint disease.

The frames of corsets or cuirasses are often, for the sake of lightness, made of perforated plates of aluminium, hammered to the proper forms on a mold. The frames are then padded and covered. Orthopedic corsets for the treatment of rickets vary in type according to the nature of the case, but always consist essentially of girdles of leather molded to the form of the body and provided with supports for the shoulders in the form either of gussets or of vertical braces which are made extensible so that they can be easily applied and removed, and adapted to the growth of the child. In some cases horizontal and back braces and plates are added to correct protruding shoulder blades or a back too hollow or too greatly arched, or to frame and protect a hump without exerting painful pressure. These cuirasses, which with their side braces support and tend to straighten the spine, are fitted carefully to a cast of the body before they are assembled and finished.

The essential parts of a truss, or herniary bandage, are a pad which is applied to the rupture and a belt or spring which holds the pad firmly in place. Of the numerous forms of trusses now in use, some are flexible, some are rigid, and some operate by means of springs. The spring trusses, which are the best, are of two types, French and English. In the French truss the pad is attached to a padded spring which is curved to fit the body and partially surrounds it, the circuit being completed by a leather strap of which the free end is buckled to the pad. The English truss has two pads placed at the ends of a curved spring which envelops the side of the body opposite to the rupture, pressing one pad firmly against the rupture while the other serves as a point of support at the back. In the manufacture of either variety of bandage the springs and rivets and the central metal plate known as the shield are made by men, while women cover them with chamois skin, lined with wool or silk, and attach the straps.

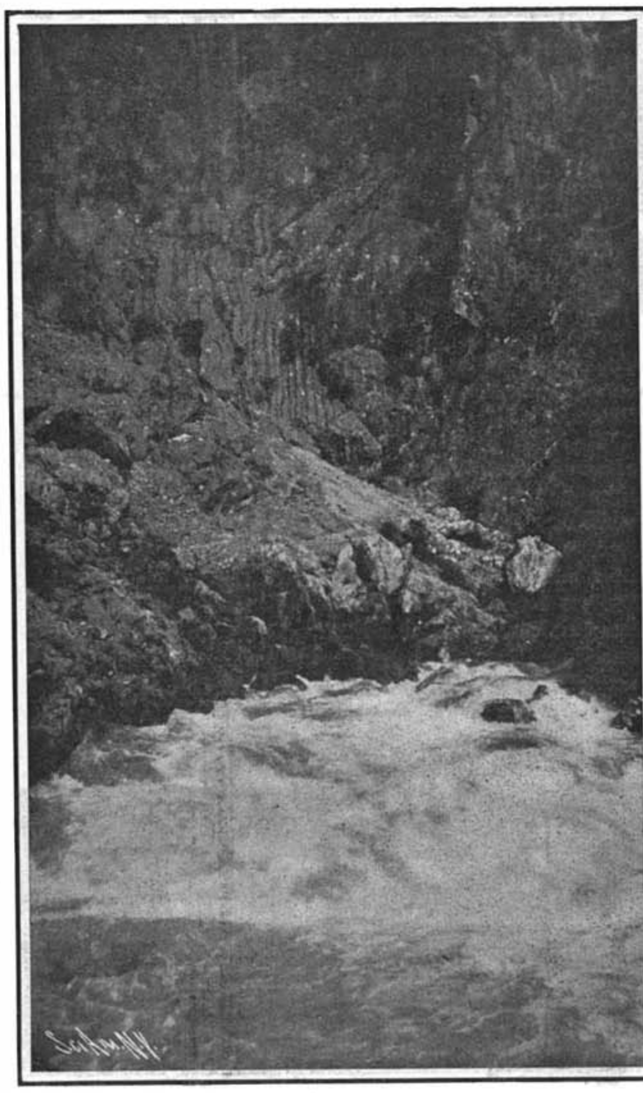
SOME STRANGE SOURCES OF WATER POWER ON THE COAST OF DALMATIA.

BY PROF. ARTHUR L. WILLISTON.

Nature has, in every quarter of the globe, many surprises, but few of these that have come to my notice, have impressed me with more interest than did two very strange sources of water power which I visited a few months ago, while cruising along the Dalmatian coast on the east shore of the Adriatic Sea.

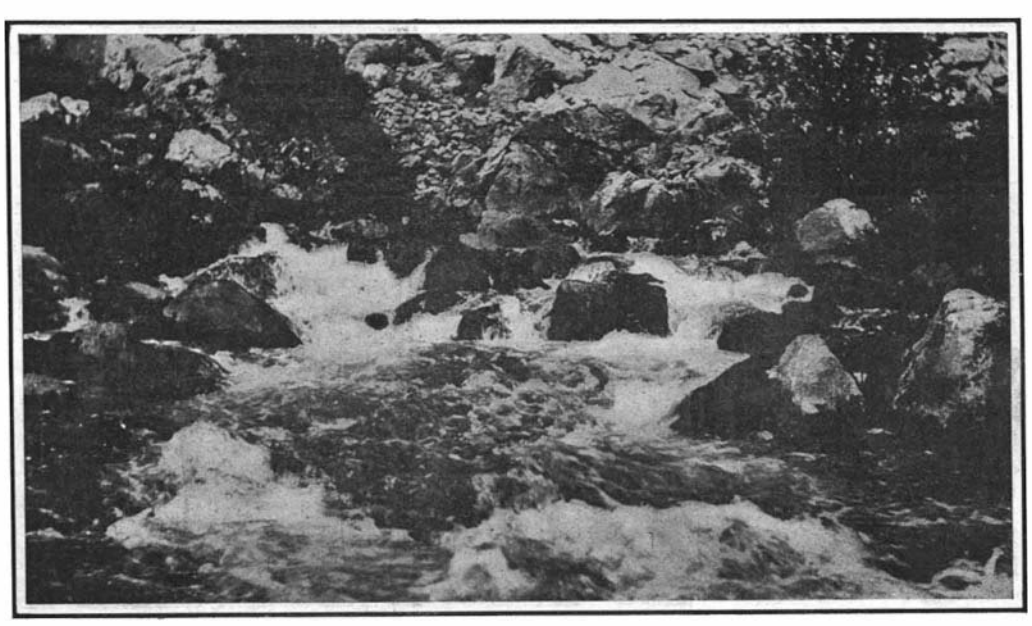
The first of these was situated in the Breno Valley—a small and fertile valley with rugged, barren mountains overshadowing it on almost every side, and lying ten or twelve miles to the southward of the quaint and picturesque town of Ragusa, whose ancient and turreted walls date back for many centuries. Here, at the base of the cliff, which rises abruptly for hundreds of feet, gushes out of the face of the rock what, excepting for its surprising volume, looks much like an ordinary mountain spring. There is nothing else in the surrounding landscape which would indicate the possible presence of such a volume of water as comes boiling and foaming from its hidden source. One of the accompanying photographs shows it just as the water is issuing from the rock. A few hundred feet from its source a small portion of the stream is used to operate an old grist mill.

But farther down the coast, seventy-five or a hundred miles, is another even more extraordinary illustration of the same kind of a source of power, which discharges its water into the almost land-locked harbor of Cattaro.



The Spring at Cattaro Issuing from Beneath a Cliff.

As we continue southward along the Dalmatian coast, the mountains which skirt the shore grow more rugged and precipitous and much higher, until, when Cattaro is reached, we find them with their tops here and there continuously enveloped in a white mantle of snow; and as we thread our way through the intricate passages that lead into the harbor, they rise so abruptly from the surface of the water as to make it seem impossible for us to advance further, so close together and so high above our little steamer do they tower. We are passing through what resembles one of the grandest of the Norwegian fjords and the region from which Montenegro takes its name. Here is the military road that Freeman describes which leads from the peaceful little town of Cattaro to the frontier line which divides Dalmatia from Montenegro as a "staircase which climbs on, up and up till it seems lost among the higher peaks."



Remarkable Stream in the Breno Valley Issuing from the Rock.

SOME STRANGE SOURCES OF WATER POWER ON THE COAST OF DALMATIA.

In such a region surrounded, as has been said, by mountains on some of which the snow seldom or never disappears, we would expect to find water flowing in streams through the natural divisions between the mountains, or falling precipitously over the cliffs as it does in so many places in Switzerland, but as we look about in the harbor of Cattaro we see no evidence of anything of the kind. Instead of this we find, just as we enter the inner harbor, another spring similar to the one in the Breno Valley, which has just been described, but far more powerful. Its origin is underneath one of the highest of the mountains, and the wall of rock rises almost perpendicular above it. The first photograph shows the character of this wall of rock, and also shows the spring with its boiling surface as it issues forth, apparently under a terrific pressure. The photograph does not give a proper appreciation of the width of the stream here because of the massive cliffs which surround it, but it does suggest the condition of foam and spray, which indicates in turn the velocity with which the water is flowing. Standing on the bridge or on the banks above this stream, one tries to form some estimate of the volume of the water that is flowing beneath, and gradually one comes to the realization of the fact that it is only when one thinks in such terms as the volumes of water which flow in the Merrimac or the Connecticut or Hudson rivers in freshet seasons, that any true conception can be obtained of this underground torrent that springs from the rock at Cattaro.

Whistle Signals for Power Boats.

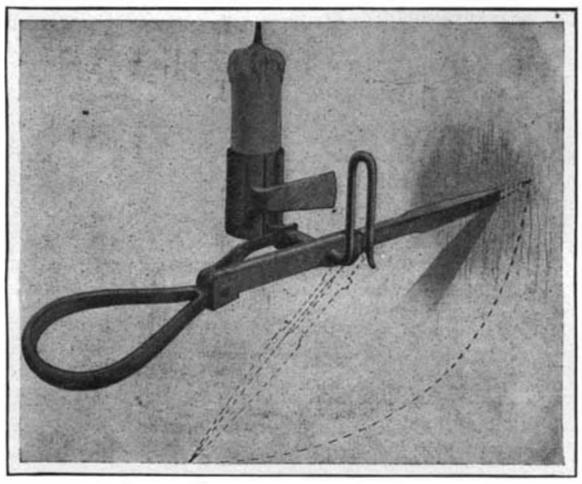
How many power-boat owners know the various whistle signals, as given by steam and power craft equipped, as the law demands, with proper whistles, for exchanging or giving whistle signals? A long blast of the whistle when a steam vessel is leaving a wharf or slip is a warning to passing craft, and is an important one. A short, sharp blast at about the same time is a signal to cast off the lines from the wharf. When a captain meeting any power craft desires to signal that he prefers to pass to the right or starboard, he challenges with one blast, which, if satisfactory, must be answered by the other boat. If, however, the other craft is unable to answer with one blast and finds it inexpedient or inadvisable to go to port, its master may answer with two blasts, each thereby agreeing to pass to the left. If the signals are misunderstood, or there is a possibility of collision, both should signal to stop and reverse, at the same time sounding three short, sharp blasts, to show that the signals are misunderstood and to warn other craft that they are backing and have probably lost steerage way; when properly straightened out and the single or double blast has been returned, they both proceed. Three long blasts of the whistle denote a salute. Four long blasts are used in case a vessel is not under control, as may happen with broken wheel rope or other trouble with the steering gear or engine. Continued long blasts denote danger and are used to summon assistance. If you get in the way of a larger boat a rapidity of short toots is usually sufficient to send you scurrying to one side. Other prearranged signals are often used, as a towboat's private code to shorten or lengthen the towline or the two long and one short used by pilots to salute known members of a local harbor of Masters and Pilots, as this fraternal and protective order is styled. Whistling of boats is often unnecessarily prolonged or indiscriminately indulged in, so that federal laws have been sought to regulate the evil in and about New York and other crowded harbors. The local steamboat inspectors have issued special instructions to all pilots and masters holding licenses issued through the New York district, to abate as much as possible what had become an intolerable nuisance. Not included in the above is the condition arising when one power craft may challenge the other with a single long blast, meaning that he intends to pass to the right or starboard, or two blasts indicating a wish to pass to the left or port. The single blast must be answered by two blasts or the two blasts by a single blast, the course of the challenged craft being at the same time changed to allow the challenger to pass as indicated by signals.

There are said to be at present 250,000 miles of cable in all at the bottom of the sea, representing $250,000,000. This works out at about $1,000 per mile to make and lay.

Patent Department

AN IMPROVED MINERS' CANDLESTICK.

The accompanying engraving illustrates a new form of miners' candlestick, which possesses a number of

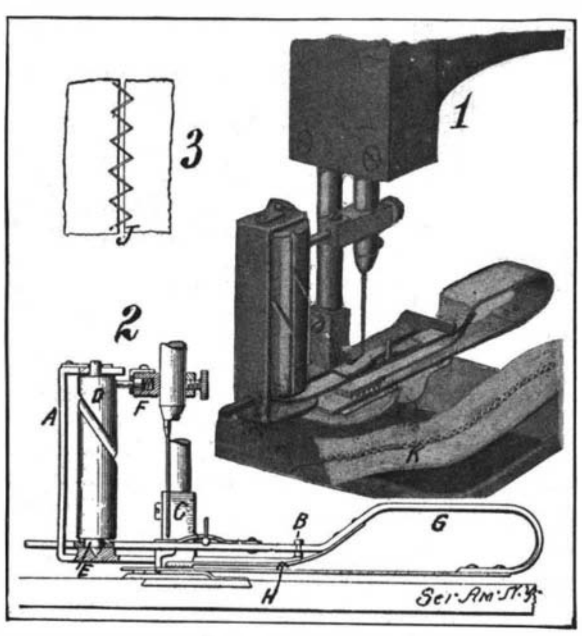


AN IMPROVED MINERS' CANDLESTICK.

important advantages. The device can be folded into a small space for conveniently carrying it in the pocket; the candle-holder may be adjusted to keep the candle upright whether the candlestick be attached to the wall, ceiling, or floor, and the adjustment also permits of adapting the candle for the use of a right or left-handed miner, as desired. The device consists of a shank provided at one end with a handle. At the other end is a point which is pivoted to the shank. A flat spring on the shank bears against the heel of the point. This heel is formed with flat faces against which the spring bears, so that the point may be held in extended position, as shown by full lines in the engraving, or at right angles thereto, or folded against the handle, the spring holds the point in much the same way as the spring of a knife holds the knife blade. The candle-holder consists of a split tube attached to a rod, which passes through an aperture in the main shank of the candlestick, and terminates in a hook. The rod is formed with an angular portion adapted to be engaged by a spring catch, which locks the holder in set position with respect to the shank. This permits the candle-holder to be adjusted relatively to the shank, to hold the candle vertical when the point is stuck into a slanting wall. By completely inverting the position of the holder, it will be evident that the candlestick will be adapted for the use of a left-handed miner. A patent on this improved miner's candlestick has just been procured by Mr. Otto A. Poirier, of Virginia, Minn.

ATTACHMENT FOR SEWING MACHINES.

A recent invention provides a simple attachment which can readily be applied to the ordinary sewing machine, and with which various stitches, such as the "briar" or "herringbone" stitch, may be produced. Briefly stated, the attachment provides a means for shifting the work laterally under the needle, so that a zigzag stitch is produced, which may be used for binding down a cord, for connecting two pieces of insertion, and the like. A clear understanding of the operation of this appliance may be had by referring to the accompanying engraving. The attachment comprises a U-shaped frame *A*, having a short upper horizontal member and a long lower horizontal member

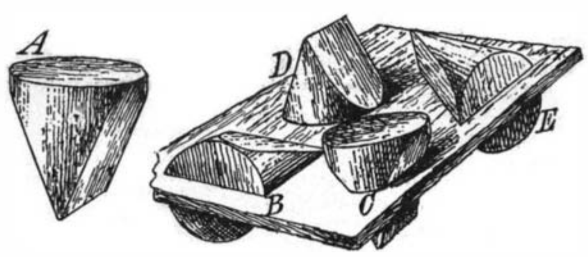


ATTACHMENT FOR SEWING MACHINES.

which terminates in a pair of jaws *B*. The latter member is provided with an apertured lug *C*, adapted to receive the presser-foot bar of the machine, and a set-screw is threaded through the lug into the bar to firmly hold the bracket in set position. Journaled vertically in the bracket *A* is a barrel *D*, which at its lower end is formed with an eccentric cam *E*. The barrel at opposite sides is provided with straight vertical grooves extending the length of the barrel, and a pair of spiral grooves which connect the vertical grooves. Attached to the needle bar of the machine by means of a set-screw is a block *F*, from which a spring-pressed pin projects. The latter is adapted to engage the grooves in the barrel. As the needle bar descends, it travels down one of the vertical grooves. It will be observed that at the lower end of each spiral groove a flange or projection is formed, which separates the upper wall of this groove from the upper length of the vertical groove into which it runs. On the downward stroke of the needle bar the pin slips over this projection, but on the upward stroke it is caused by the projection to enter the spiral groove, and thus rotate the drum through half a revolution. When this occurs, the cam *E*, acting upon the bar *G*, causes the latter to shift, and a spring arm *H* connected to the bar *G*, and provided with a toothed portion engaging the work, moves the latter to one side under the needle. The next stitch will thus be laterally offset, and when the needle bar again moves upward, the pin engaging the second spiral groove in the barrel *D* will return the work to its original position. A sample of the work done by the machine is shown at *J*, Fig. 3. It will be noticed that this shows two separate pieces uniformly spaced apart and connected by the stitch. A finger on the end of a leaf spring attached to the bar *G* serves to keep the two pieces of the work at the proper distance apart. This finger may be raised by a bolt when it is desired to lift it out of the path of the work. Shown at *K*, Fig. 1, is a sample of the "herringbone" stitch used in laying a cord on a piece of material. The inventor of this improved sewing-machine attachment is Mrs. Ella D. Harris, of 219 Harrison Street, Brooklyn, N. Y.

ANSWER TO THE PLUG PUZZLE.

On page 32 of our issue of July 13, we published as a puzzle an illustration of a board formed with four

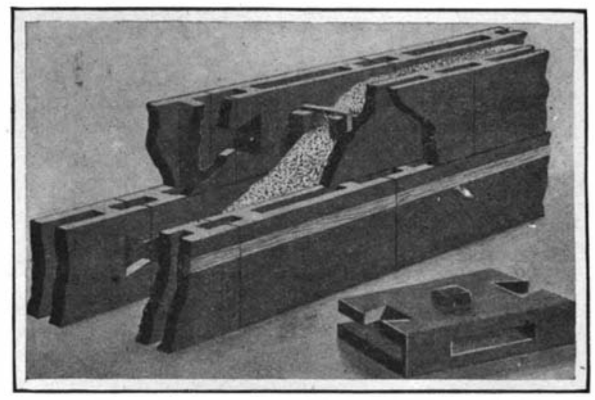


ANSWER TO THE PLUG PUZZLE.

holes of different shape. The object was to cut a plug which would fit any and every one of these holes. Several replies to this puzzle have been received, suggesting some rather ingenious plugs. In the accompanying illustration we illustrate what is probably the simplest form of plug adapted to fit the holes. The plug as shown at *A* is in the form of a chisel point. If laid on its side, it will fit the square hole *B*. The oblong hole *C* is closed by inserting the sharp end of the plug into it. The circular end of the plug fits the hole *D*, and if the plug be turned on its side at right angles to its position at *B*, it will fit the triangular hole *E*.

BUILDING BLOCK FOR CONCRETE CONSTRUCTION.

One of the drawbacks to the use of concrete for the walls of dwelling houses is the fact that the material does not prevent the seepage of moisture therethrough into the building. With a view to overcoming this defect, it is customary to form the blocks which are commonly used for the outer face of the wall with air spaces adapted to interrupt the passage of moisture, and arranged to provide ventilating channels through which the air can circulate. This expedient is only partially successful, because moisture will seep through the partition walls at the sides of the air channels. The accompanying engraving shows an improved form of block and building construction adapted to entirely avoid the "sweating" of the walls. It consists in the use of hollow blocks for both the inner and outer walls, so that such moisture as may find its way through to the inner facing of blocks will be carried away by the circulation of air therein. Each block virtually consists of two walls spaced apart by a pair of partitions inclosing between them a central vertical channel, and forming at the end of the blocks two half channels or recesses. These recesses in abutting blocks combine to form complete air channels. A dovetail slot is cut in each end of the inner wall of each block. The blocks are set in position, as shown in the engraving, leaving a space between the inner and outer facings for the concrete. The inner face of each block is formed with a lug having a vertical slot therein. Tie-bars with downwardly-turned ends respectively engaging the slots in opposite lugs serve to hold the blocks in place while the concrete is deposited between them. The practice heretofore has been to use wooden forms on the inside and outside of the wall during construction but the present invention does away with the expense of this falsework as the blocks are held in place by the tie bars. The concrete enters the dovetail openings in the blocks, thereby permanently keying the blocks in position. If de-

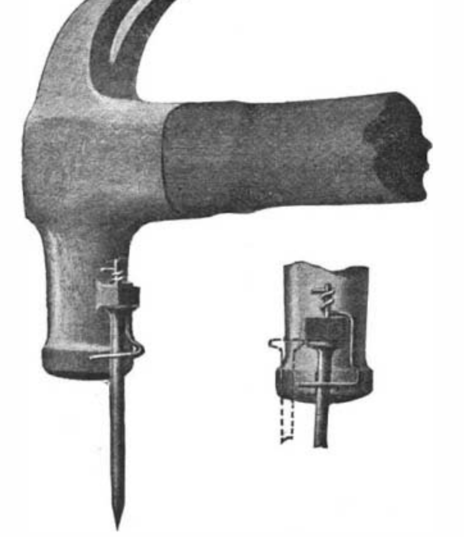


BUILDING BLOCK FOR CONCRETE CONSTRUCTION.

sired, the inner facing of hollow blocks may be dispensed with, and a falsework used to retain the concrete until it is set. The tie-bars may be bolted to this falsework, so as to keep the outer facing of blocks temporarily in place. Furring strips may be inserted just back of the falsework where baseboards, moldings, etc., are to be nailed to the wall. Where blocks are used for the inner facing of the wall furring strips are built in the blocks as shown in the engraving. The inventor of this improved block and building construction is Mr. Edward J. White, 310 East 35th Street, New York, N. Y.

AN IMPROVEMENT IN HAMMERS.

It is often a very difficult matter to drive a nail in certain remote and awkward places, owing to the fact that the nail must be held with the hand when the first blows of the hammer are struck, so as to start it into the wood. At such times an attachment, such as is shown in the accompanying engraving, for holding the nail to the hammer head, will prove very useful. The improvement is exceedingly simple, and adds nothing that would hinder the use of a hammer in any other way. It will be observed that the hammer head is formed with a poll, which terminates in an enlarged head or knob. A groove is cut in this knob on the side toward the handle. In the poll just above this groove is a post, which is driven tightly into a transverse opening. The post projects beyond the axis of the groove, so that it may operate as an abutment against which the head of a nail lying in a groove may bear. Coiled about a pin on the post is a spring, which extends downwardly and is formed with a lateral offset overlying the groove. This offset or finger is adapted normally to bear against the face of the knob directly over the groove. When it is desired to apply a nail in the groove, the body of the nail is held in substantially the position indicated in the detail view. The nail is then forced toward the right, passing readily under the spring finger and into the groove. With the nail in position, it is possible to drive it into the wood, even in remote corners or places which can be reached with one hand only. A light blow fixes the point of the nail in the wood, after which an upward movement of the hammer disengages the nail from the finger, whereupon the hammer may be used to drive the nail in the usual manner. The inventor of this improved hammer head is Mr. Soren S. Stuhag, of 204 Union Street, Brooklyn, New York.



NAIL-HOLDING DEVICE FOR HAMMERS.

RECENTLY PATENTED INVENTIONS.

Electrical Devices.

TELEPHONE-STAND.—L. Steinberger, New York, N. Y. This invention relates to telephone stands and fixtures applicable to such stands for the purpose of enabling the stands to perform duties relating in various degrees to telephony or to work incidental thereto. The receiver rests on a table, which enables the operator to step away from the telephone without replacing the receiver on the switch hook. It also enables the operator to employ both hands as an aid to looking up records and the like.

INSULATING-STRAIN.—L. Steinberger, New York, N. Y. The invention pertains to insulating strains for the support and insulation of electric conductors and more especially for use in connection with currents of high voltage. The more particular objects are to so improve the insulation as to lessen the tendency, under wet weather or other unfavorable conditions, of a high voltage current to arc over the surface of the insulator, and also to have the latter act as a turn-buckle when so desired.

Of General Interest.

DENTAL MALLET.—G. H. Shannon, Cambridge, N. Y. A purpose in this instance is to provide a right and left-hand dental mallet of simple construction, wherein all the working parts are concealed and the device is given a plain cylindrical exterior, thus removing obstructions calculated to interfere with a perfect view of the interior of the mouth during the progress of work therein.

INVALID-REST.—G. F. Rauch, Medford, Wis. The parts of the device are so constructed that the user may readily operate the rest and adjust the inclination of the main frame from a lying to a sitting position, and permit at all times a free circulation of air under the user and also permit ice pans or hot water bags to be readily applied under the apron of the frame without disturbing a patient and particularly without interfering with the pillow.

LIFE-SAVING STATION.—F. C. Martin, New York, N. Y. The invention relates to life-saving stations, and the object of the improvement is to produce a floating abode for life savers which is provided with means for housing a life boat and for launching the same quickly without danger of capsizing. The arrangement is such that the station also constitutes a lighthouse.

PENCIL-SHARPENER.—O. S. Matthews, St. Louis, Mo. One purpose of the invention is to provide a device adapted as an article of desk furniture, or as a toilet article, being particularly adapted, however, for sharpening pencils, or as an ink eraser, but which can also be advantageously employed for cleaning the finger nails or for removing flesh nails from the hand.

PUMP.—H. Nagel and J. E. Nagel, Brunswick, Neb. The invention consists in a simple attachment to this form of pump, whereby either a vacuum or the pressure of an air cushion is made to promote the continuity of the up-flow of water. It is a divisional application of these inventors' application for pumps formerly filed, and relates to driven or deep-well pumps.

NASAL DOUCHE.—E. J. Lamport, Cape Town, Cape Colony, South Africa. The principal purpose of the present invention is to so construct the douche that it will operate simultaneously upon both nostrils, and whereby the flow of liquid to the outlet will be automatic and constant until cut off, also to provide means for regulating the flow of liquid.

BLANK-MOLD.—R. Johns, Fairmount, W. Va. The object of the improvement is to provide means for keeping the molds at working heat and thus increasing their rate of production, the means employed being such that the moment the valve is raised to press a piece from the mold air vents are opened from the bottom, permitting a current of air from the top downward through and out from the mold at the bottom, the vents being automatically closed when the valve is seated.

LIMEKILN.—J. H. Campbell, Strasburg Junction, Va. The design in this case is to overcome difficulties that occur in kilns of that class which employ a vertical stack or cupola into which at an elevated level at or near the top, the lime-stone is charged and into the lower part of which stack one or more extraneous abutting furnaces discharge their heat and gases laterally into the stack to calcine the lime-stone, which, as it is reduced to quick-lime, is removed from the drawing pit at the lower end of the stack.

PEN-STAFF HOLDER.—F. J. Guilford, Aurora, N. C. This device is particularly useful for pupils or beginners in the art of chirography, since it supports the penstaff constantly in the correct position or habit in the use of the hand. It is also useful to those accustomed to writing since it greatly relieves the hand of muscular effort in holding a pen-staff.

Machines and Mechanical Devices.

BRUSHING-MACHINE.—P. H. Bacon, New York, N. Y. Primarily the object of this inventor is to provide a machine which may be manually lifted and guided over the work and in which the brushes may be rapidly driven by machine power transmitted through a flexible shaft. The invention relates to a machine designed especially for washing electrotype plates, but useful in many other connections.

DRAWER-LOCK FOR DESKS.—J. McDowell, Sr., New York, N. Y. The invention refers to improvements in mechanism for locking the drawers of a desk, cabinet, or other piece of furniture in their closed position, and relates more particularly to locking means adapted to be operated by a roller top or other movable section of a piece of furniture, and serving to engage with each of the drawers to prevent opening while the top or other movable section is closed.

STAKING-TOOL.—A. S. Koch, Lancaster, Pa. This staking tool is for use by watchmakers. Usually the die is held as adjusted by means of an eccentric or cam mechanism, but such construction is objectionable as by hammer impulses the cam becomes loose and consequently the die is permitted to tilt and move out of adjustment. Means are provided in this invention for rigidly holding the die as adjusted and from any possible tilting motion.

STREET-SWEEPING MACHINE.—C. Bly, Ticonderoga, New York. The invention has reference more especially to motor-propelled street-sweeping machines, though capable of being drawn by animals in the ordinary way. The inventor seeks to provide such a machine as may be easily regulated and quickly controlled. Means are provided for supporting a suitable gasoline or other motor by which the machine is propelled, and from which the active parts are driven or operated.

PILE-FABRIC LOOM.—J. K. Dalkranian, New York, N. Y. The invention relates to looms such as are used for weaving Axminster carpets, and its object is to provide a pile-fabric loom for weaving pile-fabrics resembling Turkish, Persian, and similar weaves and permitting of weaving the fabric in any desired design and with the pile threads of any desired color. Mr. Dalkranian has invented another pile-fabric loom whose object is the provision of a loom more especially designed for weaving pile-fabrics in any desired design and color and of the oriental rug type, having Persian knots, such as shown and described in his former application for Letters Patent of the U. S., No. 250,980. In a third pile-fabric loom improvement this inventor provides a loom, more especially designed for weaving pile fabrics of the oriental rug type and preferably such having Persian knots formed in accordance with the method described and shown in his application for Letters Patent, serial number 265,887.

Pertaining to Vehicles.

SANDING DEVICE FOR MOTOR-VEHICLES.—A. L. Moss, Sandusky, Ohio. Mr. Moss's object in the present invention is to provide a sanding device for automobiles and like motor vehicles, and arranged to scatter sand on the path to be traveled by the driving wheels of the vehicle to prevent the latter from skidding on slippery roadways. The invention relates to sanding devices, such as shown and described in Letters Patent of the U. S., formerly granted to this inventor.

LAMP-SHADE FOR ROAD-VEHICLES.—K. H. Evans, 87 Sidwell Street, Exeter, Devon, England. The invention refers more especially to motor-driven vehicles. The object is to provide a device whereby those rays of light projected by a lamp, which would be otherwise directed upward at more than a predetermined small inclination to the horizontal, will be cut off or reflected downward without interfering with the horizontal or nearly horizontal rays, so that practically no rays will diverge to a height to cause danger or annoyance by dazzling the eyes looking toward a vehicle which carries the lamp or proceeding in a contrary direction.

Note.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.

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Traction wheel, Bell & Noel 860,119
Train stopping device, G. J. Gumm 860,464
Transmission mechanism, F. J. Pond 859,975
Trestle, adjustable, C. H. Berg 860,161
Trolley harp, C. E. Atkinson 860,114
Trolley stand, J. H. McPherson 860,229
Trolley wire hanger, W. G. Clark 860,526
Truck, car, W. E. Symons 860,267
Truck structure, W. E. Symons 860,268
Trunk, H. Davis 860,018
Trunk, J. H. Wienand 860,069
Trunk stay support, W. H. A. Stout 860,581
Tub. See Bath tub.
Tube cleaner, F. W. Canales 860,523

Turbine, W. B. Sayers 860,573
Turbine, elastic fluid, C. G. Curtis 860,595
Turbine, steam, T. F. Sheridan 860,108
Twyer, J. F. Flewwelling 860,287
Typewriter cylinder, E. Noguera 860,559
Typewriting machine, H. W. Merritt, 860,045, 860,145
Typewriting machine, W. W. Hopkins 860,215
Typewriting machine, H. W. Merritt 860,225
Typewriting machine, R. H. Strother 860,265
Typewriting machine, W. W. Hopkins 860,296
Typewriting machine, R. D. Parker 860,321
Typewriting machine, J. Felhel 860,361
Typewriting machine carriage stop, W. W. Hopkins 860,299
Typewriting machine ribbon feeding mechanism, W. W. Hopkins 860,297
Umbrella handle coupling, C. Marx 860,401
Uterine supporter, W. T. Baird 860,591
Valve, C. J. Jackson 860,217
Valve, check, J. A. Cuneo 860,017
Valve, check, H. Daniel 860,283
Valve, feed, B. H. Jeffries 860,384
Valve for gas engines, P. Schwehm 860,608
Valve gearing, J. F. Meyjes 860,402
Valve, piston throttle, Christman & Johnson 860,190
Valve, quick opening, J. P. Lavigne 860,141
Valve, reducing, H. F. Cunning 859,920
Varnishing composition and making same, K. Goldschmidt 859,937
Vault, burial, W. A. Hazelbaker 860,212
Vault, grave, W. A. Crew 860,282
Vaults, constructing cement burial, S. W. Beckwith 860,184
Vehicle, S. D. & H. T. Latty 859,951
Vehicle controller, hydraulic, J. W. Anderson 860,434
Vehicle driving clutch, mechanically propelled, T. B. Jeffery 859,945
Vehicle, motor, G. E. Whitney 860,614
Vehicle motor attachment, E. Hopper 860,603
Vehicle numbering device, A. Balzer 860,074
Vehicle snowshoe attachment, wheeled, N. Minster 859,963
Vehicle top support, Gurley & Roberts 860,087
Vehicle wheel, J. H. Forrest 860,363
Vehicles, fore carriage for, W. G. Hughes. 860,094
Vending machine, coin-controlled, J. C. Wilson 860,428
Ventilating apparatus, D. L. Ellis 860,197
Ventilating device, L. S. Graebing 860,366
Vessel, metallic, L. O. Brown 860,080
Vessel, transport, O. Mehrtens 860,492
Vise, R. W. Parker 860,106
Vise, pipe, D. L. Ellis 860,198
Wagon, dumping, W. J. Donnelly 859,928
Wagon, dumping, H. S. Palm 859,971
Wall structure, W. P. Francis 860,364
Walls and neutralizing saltpeter therein, construction for drying, M. Leser 859,954
Washing machine, W. A. Lee 860,389
Watch case bow, A. Milne 860,047
Water back shield, S. M. Stevens 860,420
Water closet, Hammann & Moore 860,372
Water closet apparatus, Hammann & Moore 860,540
Water closet tank valve. C. Pfau 859,973
Water for irrigation, etc., self-regulating apparatus for delivering, A. S. Gibb. . 859,935
Water meter installations, system for controlling valves for, C. Meinecke 860,100
Water pressure piston engine, H. B. Meier 859,961
Wave motor, J. Birch 860,519
Weather strip, H. Kean 860,032
Welge, Blake & Denison 860,347
Wedge, ax and tool handle, G. P. Morrill 859,965
Weighing mechanism, automatic, G. A. Lee 860,392
Well casing shoe, R. C. Baker 860,115
Wheel, J. Hippisley 860,133
Wheel flange lubricator, J. H. Miner 860,048
Wheel mounting, vehicle, C. W. Fulton. 860,023
Whiffletree hook, C. W. Blackburn 860,121
Whist tray, A. W. Hobson 859,942
Windmill regulator, J. B. Vail 860,613
Windmills, automatic cut out for, J. Roessler 860,152
Window, casement, I. Wroblewski 860,006
Window platform, adjustable, C. E. Balbach 860,073
Window screen, B. Worthington 860,005
Wire stretcher, M. E. Johnson 860,139
Wood with paraffin, method of and apparatus for treating, J. Binks 860,079
Wrappers around rectangular tablets, machine for folding, F. Grover 860,539
Wrapping machine, L. C. Wing 860,176
Wrench, R. O. Daniel 859,922
Wrench, T. T. Hurd 860,300
Wrench, J. F. Lynn 860,552

DESIGNS.

Automobile body, J. D. Maxwell 38,691
Ash can or garbage vessel, T. Lee 38,686
Car seat end frame, E. G. Budd 38,687
Fabric, woven, W. K. Smith 38,693
Furniture ornament, C. V. Holstein. .38,688, 38,689
Glass vessel, R. Haley 38,681
Hand bag, H. Grossman 38,683
Mandolin body, W. C. Stahl 38,682
Paper, wall, J. Wishart 38,692
Shade or globe, artificial light, K. Booth, 38,684, 38,685
Spoon, G. B. Ludy 38,678
Spoon, J. W. Brereton 38,680
Spoons, forks, or similar article, handle for, H. Hillbom 38,679
Watch dial, C. W. Schedler 38,677
Water heater, J. M. Tobias 38,690

TRADE MARKS.

Alloy, Ste. Ame. de Commentry Fourchambault et Decasville 63,970
Analgesic and antipyretic, Ammonol Chemical Co. 63,920
Antiseptics, H. B. Claflin Co. 63,932
Apples, pears, and quinces, fresh, Shafer Fruit & Cold Storage Co. 63,986
Automobiles, M. Fischer & Cie. Automobilfabrik Turicum 63,953
Axle grease, Leechburg Oil and Paint Co. . 63,960
Baking powder, C. S. Morey Mercantile Co. 63,923
Binders, temporary, Kalamazoo Loose Leaf Binder Co. 63,957
Books, pamphlets, lithographs, etc., Brooklyn Daily Eagle 63,891
Boots and shoes, leather, Selhy Shoe Co. . 64,022
Bread, Schulze Baking Co. 63,944
Bread, N. E. Smith 63,987
Bust supporters and corset covers, A. Drake 63,906
Canned fish, Northwestern Fisheries Co. . . 63,912
Canned fruits and vegetables, W. R. Roach & Co. 63,946
Canned fruits and vegetables, California Canneries Co. 63,994
Canned oysters, sardines, and salmon, Allen Brothers Co. 64,007
Cement, Rosendale, Consolidated Rosendale Cement Co. 63,925, 63,926
Chemicals, certain, Howards & Sons 63,980
Chocolate, S. F. Whitman & Son 64,004
Chocolate and cacao butter, Hance Bros. & White 63,955
Cigars, El Arte Cigar Co. 63,931
Cigars, Heineman Bros. 63,933
Cigars, Butler-Butler 63,952
Cigars, cigarettes, tobacco, and snuff, Prospero De Nobilli & Co. 63,905
Cleaning wall paper, calcimine, and fresco work, compound for, Sanitary Chemical Company of Pittsburg 63,967
Clothes wringers, mangles, and driers, American Wringer Co. 63,951
Coats, overcoats, vests, etc., J. M. Robinson, Norton & Co. 63,909
Coats, vests, trousers, and overcoats, J. Wurtzburger 63,919
Coffee, G. B. Farrington Co. 63,954
Coffee, H. R. Hall Co. 63,998
Coffee, Jones-Paddock Co. 64,000, 64,001
Coffee, Allen Brothers Co. 64.008
Coffee and tea, W. M. Cahill 63,993
Coffee substitutes, Emil Seelig, A. G. 63,968
Collars and cuffs, textile, Searle Manufacturing Co. 63,985

Confectionery, certain, Reiss & Brady.... 64,003
Corn starch, Corn Products Refining Co., 63,928, 63,930
Corsets, J. Wanamaker 63,917
Corsets, J. Cohen 63,924
Cotton batting, Walker & Harp Manufacturing Co. 63,900
Crackers, Pacific Coast Biscuit Co......... 63,941
Cream, lotion, or powder, toilet, Benzorose Co. 63,973
Cream, toilet, P. L. Cusachs, Limited.... 63,984
Cutlery and edge tools, certain, McIntosh Hardware Corporation 64,017
Disinfectant, insecticide, animal dip, etc., Zenner Disinfectant Co. 63,949
Engines, portable and traction, Avery Manufacturing Co. 64,009
Eye water, J. Wiley 63,989
Flour and cornmeal, Topeka Milling Co.... 63,972
Flour, wheat, Stoddard Gilbert & Co...... 63,988
Food, chick and poultry, D. A. de Lima & Co. 63,995
Food preparation, peptogenic, Peptol Co... 64,018
Foods, certain, Holbrook Grocery Co....... 63,934
Foods, certain cereal, Everett, Aughenbaugh & Co. 63,979
Furnaces, Graff Furnace Co. 63,907
Furniture polish, Japan Polish Company of Baltimore City 63,956
Gum, chewing, B. H. Galland............. 63,997
Hair tonics, J. B. Austin 63,921
Hair washes, Wilhelm Anhalt Gesellschaft mit beschrankter Haftung 63,948
Lamps, incandescent electric, Franklin Electric Mfg. Co. 63,996
Ledgers, Lefebure Ledger Co. 64,002
Macaroni, C. F. Mueller Co.............. 63,975
Machinery, certain parts of, Sanderson Brothers & Newbould 64,021
Magazine, monthly, Albaugh Bros, Dover & Co. 63,950
Magazine and periodicals, Short Stories Co. 63,899
Measuring instruments, certain, Victor Electric & Manufacturing Co. 63,916
Medicated stock food, C. H. Wintersteen. 63,990
Medicine for the cure of the tobacco habit, E. J. Burch 63,974
Metal, babbitt, J. A. Macaulay 63,962
Metal manufactures, certain, H. Mueller Manufacturing Co. 63,999
Metal manufactures, certain, Yale & Towne Mfg. Co. 64,023
Newspaper, W. D. Burleson 63,894
Newspapers, Brooklyn Daily Eagle........ 63,893
Oil, illuminating, National Refining Co.... 63,966
Packing, piston rod, and joint, Howland-Shearman Engineering Co.........63,935, 63,936
Packings and packing material, metallic, rubber, and fibrous, Pennsylvania Metallic Packing Co. 63,914
Paints, certain, P. Piequet 64,019
Paper, building, McClellan Paper Co...... 63,982
Paper, certain, James R. Crompton & Bros. 64,014
Paper, stencil, Neostyle Co. 63,911
Paper stock cutters and shredders, Taylor, Stiles & Co. 64,006
Patterns for ladies' dresses and parts thereof, A. Mayer 63,963
Periodical, Brooklyn Daily Eagle......... 63,892
Periodicals, weekly, Jewelers Circular Publishing Co. 63,897
Photographic papers, certain, C. Sawyer... 63,915
Pills, vegetable, Zebra Remedy Co........ 63,991
Pipes, metal, Continental Iron Works..... 63,927
Pitch and rosin, Charles Zoller Co. 63,895
Plants, cabbage, W. C. Geraty............ 63,896
Poison, animal, Stearns Electric Paste Co. 63,945
Powder, gun, King Powder Co............. 63,959
Putty, Benjamin Moore & Co............. 63,992
Remedies for debility, Magna Vita Co..... 63,939
Remedies for the treatment of affections of the feet and skin, Keene Co. 64,015
Remedy for catarrh, consumption, indigestion, and constipation, A. C. Long.... 63,961
Remedy for certain diseases, George H. Bundle Co. 64,011
Remedy for tuberculosis, general debility, etc., C. Raffaele 63,943
Remedy for venereal diseases, P. L. Cusachs, Limited 63,940, 63,983
Salve, Keystone Catarrh Remedy Co...... 63,958
Sashes, frames, etc., certain window, R. A. Morrison 63,898
Shirts and underwear, Chatham Shirt Co.. 63,978
Shoe polish, patent leather, L. Graziadel...64,012
Silver plated flatware, International Silver Co. 63,981
Soap, laundry, Ruschhaupt Bros. 64,020
Soap substitutes, C. M. McAfee 63,964
Sodium sulfid and blanc fixe, Cheeseman Chemical Co. 63,977
Soldering and coating preparation, metal, Kupper's Metallwerke Gesellschaft mit beschrankter Haftung 63,910
Starch, laundry, Corn Products Refining Co. 63,929
Stearin candle pitch, Moore & Munger.... 63,965
Stoves and ranges, Walker Stove and Range Co. 63,947
Stoves and ranges, St. Louis Union Trust Co. 63,971
Suits, boys', Brill Brothers 63,922
Syrup, St. Paul Syrup Refining Co. 64,005
Tobacco, smoking, Plantation Tobacco Co.. 63,942
Tools, certain hand, Simmons Hardware Co. 63,969
Tracing cloth, Winterbottom Book Cloth Co. 63,901
Varnishes, E. W. Brown 64,010
Veilings and net fabrics, mesh, Weil Bros. 63,918
Wall coverings, certain, H. B. Wiggin's Sons Co. 63,908
Washing powder, Loverin & Browne Co.... 64,016
Water, natural spring, Huntoon Spring Water Co. 63,937
Weeds, preparation for killing, A. C. Chase. 63,976
Whips, Independent Whip Co. 63,938
Whisky, R. H. Cate 63,903
Whisky, Hoffheimer Bros. Co. 64,013
Whisky, corn, G. E. Payne 63,913
Wine, claret, Clover Leaf Wine Co........ 63,904
Wines, Atlantic Vineyard and Wine Co..... 63,902

LABELS.

"Arbuckle's Certified Coffee," for coffee, Arbuckle Bros 13,668
"Celery Fizz," for carbonated beverages, Central Bottling Co. 13,670
"Funke's Western Beauty Chocolates," for candy, J. B. Funke Co. 13,671
"Funke's Bitter Sweet Chocolates," for candy, J. B. Funke Co. 13,672
"Funke's Milk Chocolate Cremes," for candy, J. B. Funke Co. 13,673
"Funke's Chocolates—Royal Crown," for candy, J. B. Funke Co. 13,674
"Ginger Porter," for carbonated beverages, Central Bottling Co. 13,669
"Morning Dawn," for canned vegetables, L. Hower 13,676
"Perfection Peanut Butter," for peanut butter, E. W. Place 13,675
"Star Brand Shoes are Better," for shoes, Roberts, Johnson & Rand Shoe Co..... 13,677

PRINTS.

"Jerry Back, Congress Playing Cards," for playing cards, United States Playing Card Co. 2,057
"Men's and Boys' Apparel," for men's and boys' apparel, H. C. Lytton 2,058
"White Rolls," for cigarettes, Ware-Kramer Tobacco Co. 2,056
"Zhongiva," for mouth and gum washes, J. J. Ottinger.......................... 2,055

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