

metallic cylinder suspended from a strong support and inclosing a lamp of great illuminating power. To this cylinder are secured telescopes, as well as tubes for the circulation of water for cooling the telescopes and compressors. These telescopes are provided with rock crystal lenses. Between the two side ones there is a space filled with distilled water for the purpose of protecting the lenses against a high temperature and of eliminating the calorific rays. The last of these are absorbed at the other end by a column of distilled water about twelve inches in length comprised between the two lenses. The compressors consist of two rock crystal lenses between which water constantly circulates. They are applied closely to the skin and finally exclude every trace of all but the chemical rays.

Another operating room contains apparatus (Fig. 3) for experiments in galvanism, Faradization, and electrolysis. Here, too, are treated rheumatism and paralysis, and more particularly the affection known as writer's cramp.

The apparatus of this laboratory are connected with a tablet of polished marble which carries different measuring, regulating, and commutating instruments. These latter are principally a sensitive galvanometer of precision for measuring intensities; a reversing commutator for reversing the direction of the current; and a rheostat, otherwise called a regulatable resistance, of 10,000 ohms divided into 56 degrees, that is to say, permitting of passing from 0 to 10,000 ohms through 56 graduated values, and of thus obtaining a very precise regulation of the current, etc.

A second group of very similar apparatus is placed in another room.

Roentgen rays are rendering valuable services in therapeutics, and the use of them in hospitals is now quite general. These rays, with whose strange powers every one is familiar, are, as is well known, obtained by producing electric discharges of great frequency in bulbs of highly rarefied air. Such discharges are produced by an induction coil of which the arrangement presents certain analogies with that which we have briefly referred to above in connection with high-tension currents. The most characteristic part (Fig. 4) is the bulb, which is mounted upon a heavy standard surrounded by a transparent screen in the form of a globe, which intercepts the X-rays and protects the operator and patient against their dangerous effects. They are capable of reaching only the part of the body affected, since they are conducted by a tube of appropriate form fixed in an aperture with which the globe is provided. Such an arrangement presents different advantages.

Let us have a few words to say also of the Wimshurst machine (Fig. 5), one of the most remarkable of friction apparatus, and which is described in all works on electrostatics. This apparatus is employed with success in America for the treatment, under the name of Franklinization, of certain nervous affections, and especially of rheumatism. The use of it is spreading likewise in England.

Finally, an apparatus which is no less interesting is the one that serves for massage and advantageously replaces massage by hand. This apparatus, of which the use is rapidly spreading, consists of an electric motor to the shaft of which is secured a large flexible cable, to the end of which is fastened a ball to which is communicated a vibratory motion of which the amplitude depends upon the regulation given it by means of a special arrangement that can be made to

act during the operation. In this massage ball there are three screw holes into which may be introduced pieces of appropriate form for the local massage of small muscles in certain parts of the body. The motor employed for this is a special one, and is at the same time a transformer which converts the continuous current furnished it by the line wire into an alternating one—a form of current that changes direction periodically and regularly with more or less rapidity.

Another purpose for which the current is used is for the small electric lamps employed for the treat-

pany, of Berlin, who were the constructors of these stations, have recently designed another type of such lightness as to require no carts in their transportation.

Chiefly remarkable in this portable outfit are the means of generating energy. A bicycle dynamo is used. The constructive principle of the latter is simple. A small direct-current dynamo of about 100 watts output is fitted to a bicycle frame. The rider, if he may be so called, keeps the machine going by smart pedaling. From the sprocket of the bicycle frame the movement is transmitted to the dynamo by means of a belt, driving a specially-designed aluminium disk, the ratio of transmission being so designed as to have the dynamo produce sparks of 4 millimeters length in the induction coil, in normal operation. As the dynamo is located in front of the operator, the latter is in a position at any moment to supervise its uniform activity. The weight of the dynamo outfit is 30 kilogrammes (66 pounds). In the place of the device above described, a stationary motor cycle with a dynamo fitted on can be used. Apart from the dynamo a portable accumulator battery can be made use of to supply the energy required. The battery includes eight cells (16 volts), possessing a capacity of about 30 ampere-hours with a five hours' discharge. The admissible limit of discharging intensity is about 25 per cent greater than the energy necessary in normal working order. The cells are inclosed in an ebonite box, which is in turn divided into two compartments of 30 kilogrammes (66 pounds) weight each.



A BICYCLE GENERATING STATION USED BY THE GERMAN ARMY'S WIRELESS TELEGRAPH CORPS IN THE SOUTH AFRICAN CAMPAIGN.

ment of laryngitis and analogous affections. The applications of electric energy to medicine will doubtless not stop here. Surgery will also find in the electric current a sure and valuable aid.

M. Leduc has already made known the anæsthetic effect of electric currents of high frequency, and has demonstrated that, under their influence, any animal falling upon the side sleeps a deep sleep that is interrupted neither by the prick of a needle or a burn by a hot iron.

It is doubtless known that MM. Didsbury and Regnier have constructed upon this principle an apparatus designed for the painless extraction of teeth. It has recently been found that the violet rays have the same effect.

The rays of an incandescent lamp, with a bulb of proper color surrounded by an appropriate shade, directed upon the eyes of a patient by means of a reflector of nickel-plated metal, produce at the end of two or three minutes an anæsthesia that suffices for the performance of unimportant operations.

These are facts of great interest that are multiplying every day and are constantly increasing the number of our methods of combating disease.

A NEW TYPE OF PORTABLE WIRELESS TELEGRAPH STATION.

BY DR. ALFRED GRADENWITZ.

A very convenient type of portable wireless telegraph station was described by the author some time ago in these pages. The Wireless Telegraph Com-

A CLEVER MECHANICAL AND ELECTRICAL AUTOMATON.

An interesting, novel, and pseudo-scientific attraction has recently been entertaining London audiences at the Hippodrome variety theater.

This is a cleverly-constructed figure which apparently walks and writes automatically. It is called "Enigmarelle," and is seemingly a mechanical and electrical combination. The figure stands exactly six feet in height, weighs 198 pounds, and is composed of 365 distinct and separate parts. As to composition, the feet are of iron, the lower limbs of steel and wood, while the arms are of steel and copper. The body is an insulated steel wire frame, cased with fiber and rawhide, while the head is of wax. The figure contains seven motors, three of which are spring and four electric. They are distributed in different parts of the body and are said to operate the various members assigned to them in the following manner:

The two most powerful motors, which are of special design, propel the lower limbs, and cause the automaton to walk. A third operates the arms, a fourth the balance weights. Of the spring motors, the first controls the head, the second acts as an auxiliary to the electric motors in the movement of the arms, while the third operates the wire bobbins, which wind and unwind with the ever-changing position of the weights.

There are fourteen dry storage battery cells of small capacity. They are of special design and constructed to serve a double purpose—not only to furnish power to the motors, but also to maintain the equilibrium of the figure. A little below where the hip joint would be on the left of the figure, is the terminal of a semi-circular vulcanite track, which passes up and over the upper part of the chest, de-

(Continued on page 57.)



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which all four wheels are shaft-driven through bevel gears. The dispensing with chains on a vehicle of this size and construction should be a valuable feature, as such a machine has to go through all kinds of weather and traverse bad road surfaces, and the four long chains heretofore employed were apt to stretch and become clogged with mud. The new trucks are made in several sizes. The drive by all four wheels gives them great tractive power, and makes them able to extricate themselves from almost any position without difficulty.

The Swinehart Solid Cushion Tire.

The Swinehart tire, which was illustrated in our last automobile number, has been used with success by an increasing number of automobilists during the past year, and almost all of these testify to its good qualities as regards resiliency and speed. While it is generally conceded that with an ordinary solid tire a speed of 15 miles an hour is about the limit, several users of the Swinehart tire have traveled in the neighborhood of 40 miles an hour without serious results or great discomfort, and have proved that this tire is applicable to the heaviest and fastest vehicles, as well as to the runabout and light touring car. The large number of testimonials from users of the tire apparently show that the great troubles of shaking to pieces of the car and crystallization of the parts from excessive vibration are not what they were thought to be. The tire is constructed on very different lines from the ordinary solid tire, it having concaved sides, a rigid tread, and a clincher flange on the bottom. The latter makes it possible to use the tire with the ordinary clincher rim employed with pneumatics. The tires are constructed with rather soft rubber, which has great resiliency; and it is due to this fact and to their peculiar shape that they ride much more easily than the ordinary solid or cushion tire. For the automobilist who wishes to be free from the thought of puncture, there is no better substitute for a pneumatic tire than that made by the Swinehart Company.

A Useful Ignition Battery.

An improved form of storage battery for ignition purposes is made by the Witherbee Igniter Company, of this city. The plates are assembled in separate compartments formed by division walls in the containing hard-rubber case, and the lugs are connected to suitable binding posts in the cover. The latter is sealed in the case by a soft rubber edge, and its overlapping top is bolted to flanges on the latter. The new battery has a new form of plate connection inside, and all metal parts that might cause a short-circuit should water accumulate on the top, have been dispensed with. A new form of vent having a large chamber for the separation of the gas from the acid is fitted. The battery is one of the neatest at present upon the market.

A CLEVER MECHANICAL AND ELECTRICAL AUTOMATON.

(Continued from page 46.)

scending and terminating on the right side at a level with the terminal on the left. Upon this track travel fourteen ball-bearing swinging carriages, their movements being controlled by an electric motor. The carriages are filled with dry storage batteries, the combined weight of which is sixty pounds. These batteries are shifted from one side to the other of the body by means of an electric motor controlled by a mercury governor.

At the back of the figure is the switch-board containing the rheostat, fifteen switches, three single levers, and three automatic brakes, besides several other ingenious devices for directing the movements.

The connections are made, the current switched on, and at a given number of degrees or steps regulated by the centered gear-wheel, working on the cam of the motors, the weights are released from

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their normal center and rapidly descend into the abdominal cavity on the right, causing the figure to lean forward at an angle of 20 degrees. The motor controlling the left limb being in full operation throws its member forward, the figure being in such a position that this free and rapid movement swings it round to the right; at the same instant the mercury governor, finding its level, forms an electric contact, setting in motion the motor, which rapidly draws the weights back to the line of gravity and causes the figure to regain its equilibrium. By changing the gear wheel, which controls the number of steps, the distance traversed is increased or decreased.

The figure also writes its name, "Enigmarelle," upon a blackboard. The arrangement by which this is done is said to be a series of electro-magnets in the shoulder. These attract an armature in the upper arm and cause the latter to make certain strokes.

The method by which the crowning feat, that of riding a cycle, is accomplished is similar to the walk. At a given number of revolutions the weights again descend into the abdominal cavity, but in this instance on the left, causing the cycle and figure, which are attached, to lean toward the center, at an angle of about 40 deg. with the perpendicular, so that the figure, like a coin or wheel, starts round a circle. The arm locks the handlebar at an angle such that the bicycle will turn the circle desired and the feet revolve the pedals and drive the machine in the regulation manner.

[The photographs of this automaton were submitted to the managers of a well-known New York theatrical enterprise and they at once stated that they had seen the automaton in London and that there was really a man concealed in the midst of this aggregation of machinery.—Ed.]

A 4,000-mile road test of pneumatic and solid tires will be started by the Automobile Club of Great Britain February 1. A complete set (four tires) of each make represented will be placed on an automobile of the weight which such tires are intended to carry. The four main classes are cars weighing, with occupants, 1,500, 2,400, 3,000, and 4,500 pounds respectively. There will be a special class for armored, or otherwise protected, tires. Such tires are to be used on cars of 3,000 pounds weight. In awarding the prizes the size, weight, and price of the tires in relation to the weight carried will be considered. The rules are very strict, and an accurate account will be taken of any extra tires, tubes, or protective devices supplied to the competitors during the course of the test. Any parts replaced are considered as worn out, and charged against the competitor. In the event of a set of tires lasting out the test, the competitor has the privilege of continuing this test at an expense of \$10 a day for the use of the car. The test will be continued under the auspices of the club.

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National

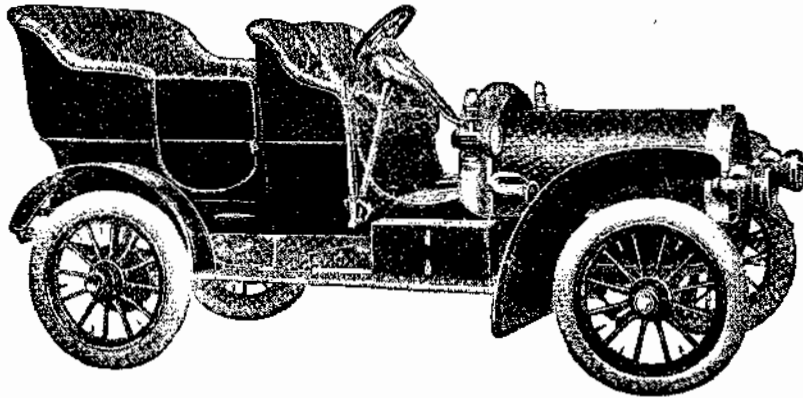
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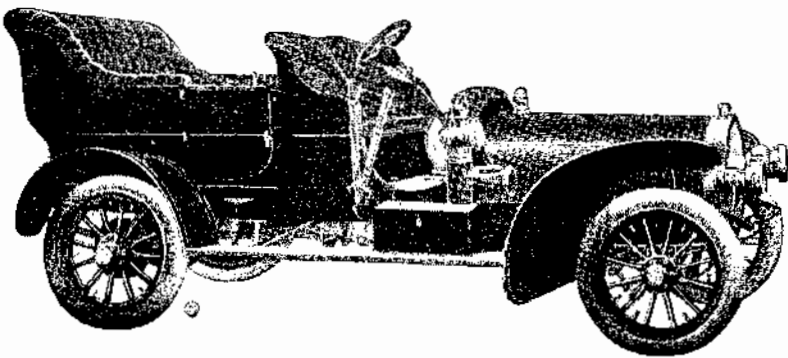
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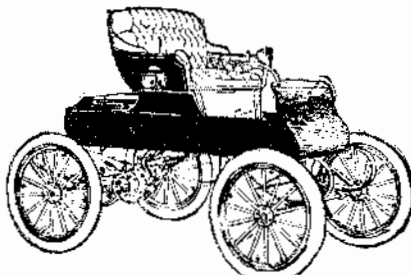
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Coffee pot, M. M. De Grody	808,730
Cooking machine, M. C. Lovejoy	809,269
Coke handling apparatus, G. G. Fryer	808,741
Collapsible table, W. L. Broadwell	809,170
Collar, F. W. Parsons	809,009
Collar protector, J. F. Connell	808,816
Collector ring, H. G. Reist	809,220
Compasses, adjusting mechanism for screw threaded needle point insertions of, J. Eichmuller	808,644
Compo board machine, Johnson & Porter	808,756
Composition of matter, D. Lichtenstein	809,068
Concentrator, solution, J. U. Lloyd	808,997
Concrete, mixing, P. C. Hains	808,836
Concrete structural work, interior, F. C. Caine	809,090
Conveyer, Miller & Dickinson	808,858
Conveyer belt support, A. W. F. Steckel	809,227
Cooking utensil, J. R. Nye	809,129
Copy holder, J. S. Dudley	809,821
Corn popper, H. W. Eakins	808,734
Cotton chopper, J. W. Haynie	809,109
Cotton gin, F. Phelps	809,131
Cotton marker, self-fastening, G. W. Leng	809,197
Crane, window, T. E. French	809,104
Cream cooler and aerator, M. Mortensen	809,125
Cultivator and seed drill, interchangeable, J. B. Smiley	809,025
Curette, finger, M. J. C. Leuchs	809,119
Curtain fastener, J. Schneider	809,140
Cut off socket, D. H. Haywood	808,656
Cut off socket, E. Saugstad	808,689
Cutter head gage, E. A. Walker	809,037
Damper, time controlled, S. B. Brown	808,896
Dental task handle, T. G. Lewis	808,835
Dental silk box, C. C. Schulz	808,680
Dies for die stocks, machine for cutting, H. W. Oster	809,007
Disappearing seat, C. K. Pickles	808,679
Diseased tissues, apparatus for treating, Gielfi & Case	808,635
Disinfecting apparatus dropper, W. H. Rose	809,014
Display rack or stand, H. M. Willis	808,962
Distilling and condensing, J. S. Forbes	808,649
Door, N. P. Sjobring	809,145
Door bolt and means for operating the same, W. B. Morewood	808,673
Door check or fastener, C. N. P. Ingalls	809,062
Door support, sliding, L. Holmer	808,749
Dowel, P. L. E. Drelshagen	809,177
Doweling machine, J. L. Lovett	809,069
Draft equalizer, N. N. Egge	808,823
Draper, W. T. Gordon	809,916
Draw bar centering device, M. A. Garrett	808,181
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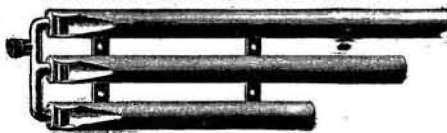
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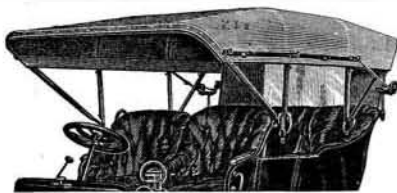


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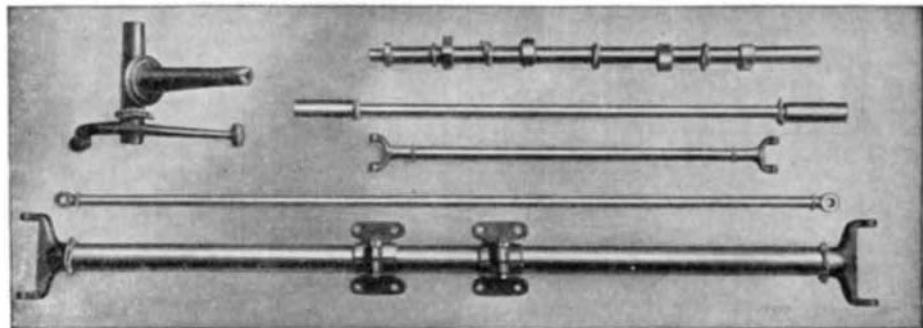
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