H. P. DODGE.

CONTROLLER FOR ELECTRIC AUTOMOBILES.

APPLICATION FILED JUNE 5, 1909.

942,488. Patented Dec. 7, 1909.

Fig. 1

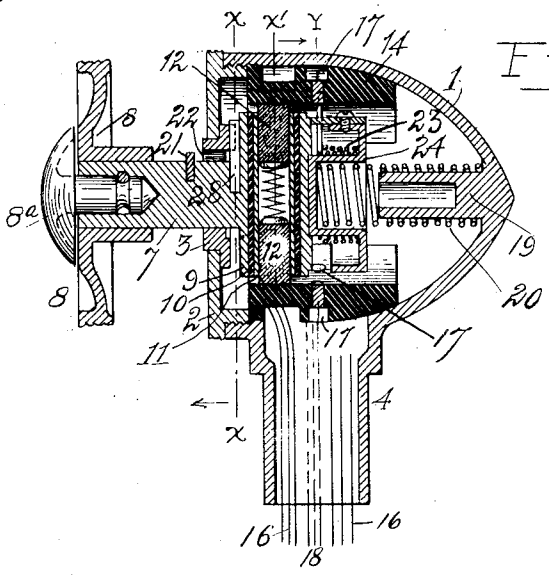


Fig. 4.

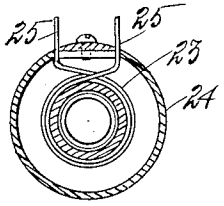


Fig. 2.

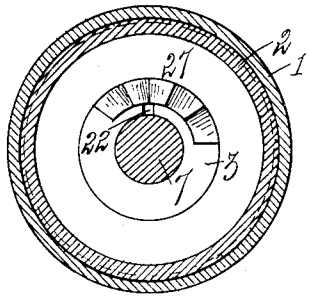


Fig. 3

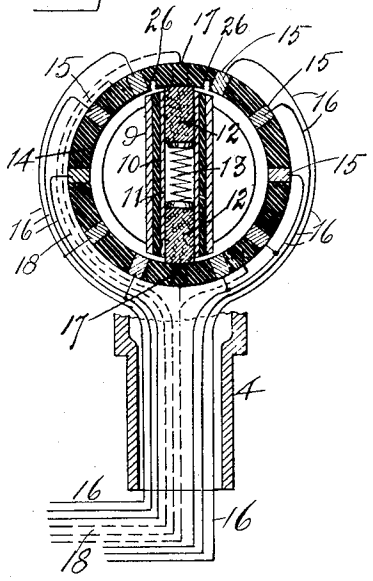
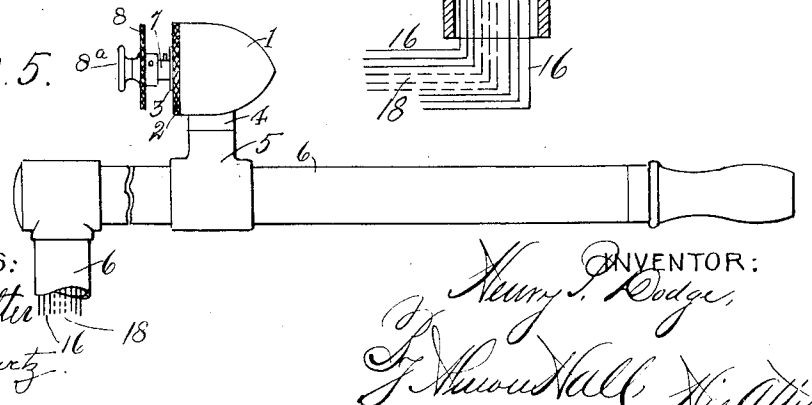


Fig. 5.



WITNESSES:

D. C. Walter

Lena Kiburtz.

INVENTOR:

Henry P. Dodge,

by F. Allen Hall His Atty.

UNITED STATES PATENT OFFICE.

HENRY P. DODGE, OF TOLEDO, OHIO.

CONTROLLER FOR ELECTRIC AUTOMOBILES.

942,488. Specification of Letters Patent. Patented Dec. 7, 1909.

Application filed June 5, 1909. Serial No. 500,322.

To all whom it may concern:

Be it known that I, HENRY P. DODGE, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Controllers for Electric Automobiles; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others, skilled in the art to which it appertains, to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

In the operation of electric automobiles,—a large proportion of which are operated by ladies,—considerable manual energy is required in starting and stopping the machine and in varying the speed. Moreover, these operations are sometimes dangerously slow.

My invention relates to and its object is to provide means for overcoming the difficulties and objections here indicated, and, more particularly, to provide a device for controlling the stopping, starting, speed varying and the reversing mechanisms of the vehicle, rapidly and positively, and with only such physical exertion as is necessary to open and close the proper circuits for actuating the appropriate mechanisms.

My invention is also intended to furnish a compact, neat and durable device, which may be readily and conveniently secured upon the steering-handle of the automobile in such position that the hand of the operator may rest thereon.

A further object of my invention is to provide a controlling device of the character indicated in which there is a stopping and starting mechanism, a speed control, a reversing-mechanism and a brake-control, all so arranged that the brake-control can not be actuated, except by first throwing the driving-mechanism of the car out of circuit.

I attain these objects by means of the devices and arrangement of parts hereinafter described, and shown and illustrated in the accompanying drawings, in which,—

Figure 1 is a central, vertical, longitudinal, sectional elevation of my controller, detached from its support. Fig. 2, a transverse sectional elevation of the same taken on line x—x Fig. 1; Fig. 3, a like elevation taken on line x' Fig. 1; Fig. 4, a like-elevation taken on line Y Fig. 1, and Fig. 5, a side-elevation of my controller in place on a steering-handle of an automobile.

Like numerals of reference indicate like parts throughout the drawings.

In the drawings, 1 is a shell of suitable metal, preferably conical in form, though other forms,—such as cylindrical or globular,—will answer. The larger end of the shell is closed with a threaded cap 2, having a central opening provided with a bushing 3. Formed integral with or secured to the underside the shell 1 is a hollow stem 4 adapted to fit into a socket-piece 5 upon the hollow steering-handle and steering-staff 6—6, or to be connected with a socket-piece located at any other point in the car within convenient reach of the operator.

7 is an axially-revoluble, longitudinally-movable shaft extending through the opening of the bushing 3, having fixed at its outer end a hand-wheel 8 and carrying at its inner end within the shell,—either integral with the shaft or otherwise,—a transverse tubular member 9. The interior of the tubular part 9 is insulated, as at 10, and within this insulation is a metal tube 11. Within the inner metal tube 11 and in electrical contact therewith, are two carbon pencils 12 having interposed between them a coil spring 13 which forces the carbon pencils apart so that their ends project oppositely slightly beyond the tubes 9 and 11 and into frictional contact with the interior lining of the shell 1. This lining consists of an internal sleeve 14 of vulcanite or other suitable insulating material. In this insulating sleeve 14 is a series of contact-points or screws 15 extending through the sleeve and arranged in a circle, in diametrically opposed pairs, in the path of the projecting ends of the carbon pencils 12, the arrangement being such that when, by means of the hand-wheel 8, the shaft 7 and the tube 9 are revolved, the two projecting carbon pencils will successively and in unison come into contact with the exposed inner ends of the contact-screws 15. Each one of the insulated contact-points 15 is connected with an insulated wire 16. These wires are connected with a minor source of electrical energy, and lead to solenoids or other suitable magnets in a controller-box, conveniently located. The various solenoids, when energized, make the different electrical contacts in the major circuit to operate the

motor at various speeds and to reverse. These latter devices constitute no part of the present invention, and need not be here further described. 17 is a second series of contact-points or screws extending through the internal sleeve 14 and arranged in a circle in diametrically opposed pairs, this circle of contact-points lying close to and parallel with the circular series of points 15, above referred to. The points 17 are, respectively, connected with wires 18 which, in the manner above indicated, lead to and control the different electrical contacts in a circuit, designed to actuate the brake-mechanism with different degrees of force, varying from light to "emergency."

The shaft 7 and its transverse tubular portion 9 are movable longitudinally of the shell 1. In the inner apex of the cone is a lug 19 around which is coiled a spring 20 which presses outwardly against the side of the tube 9, thus holding the carbon pencils 12 normally in alinement with the circular series of contact-points 15. If sufficient pressure be applied to the outer end of the shaft 7, the spring 20 will yield and permit the pair of carbon pencils to be moved into alinement with the other circular series of contact-points, 17.

Projecting radially from the shaft 7 is a small stud 21 normally in alinement with a corresponding notch or slot 22 in the inner margin of the bushing 3. When the stud 21 and notch 22 are in alinement,—the shaft 7 being in its outer position,—the two carbon pencils are in open-circuit position,—that is to say, out of contact with either of the points 15. The shaft 7 and the carbon pencils are held normally in open-circuit position by means of a coiled spring 23 located in an annular casing 24, secured to the inner side of the tube 9, the ends of the coiled spring crossing each other and being turned outwardly through the casing 24, as at 25. The projecting ends of the spring engage slots 26 in the inner sleeve 14, these slots serving not only to hold the ends of the spring in place but to permit the tube 8 and its attached parts with the projecting prongs 25 of the spring to all be slipped together into place within the inner sleeve. The spring 23 holds the shaft 7 and the tube 8 normally in such position that the stud 21 and the slot 22 are in alinement, and the carbon pencils out of contact with either of the contact-pieces 15. If the shaft be turned either to the right or to the left, the double acting spring 25 will automatically return the shaft to its normal axial position.

The central circular recess in the annular casing 24 forms a convenient socket for the outer end of the spring 20, and by means of this socket and the lug 19, the spring 20 is always held in operative position and against displacement.

Upon the inner face or flange of the bushing plate 3 is formed a series of wedge-like notches 27,—for illustration, six in number,—to correspond with open-circuit, three speeds ahead and two speeds backward. Projecting radially from the shaft 7 and next to the inner face of the bushing plate 3 is a pin 28 in alinement with the stud 21. The pin 28 is held by the spring 23 in open-circuit position and is pressed by the spring 20 into the corresponding notch 27.

The operation of my device is as follows: The parts being assembled, as above described, and the operator desiring to go ahead at slow speed, the hand-wheel is given a slight turn so that the pin 28, sliding upon the teeth 27, drops into and yieldingly engages the first forward notch 27. The pressure of the spring 20 holds the pin 28 in this position, the two carbon pencils being now in contact with that pair of contact-points 15 which close the minor circuit to make the proper electrical contact in the major circuit for the desired speed ahead. To attain a greater speed, the hand-wheel 8 is given a turn another notch ahead, the pin 28 now dropping into the next notch where it is held as before. The circuit is now closed through the contact-points 15 which are in circuit with the appropriate mechanism for giving the second speed ahead. For the third speed ahead, the hand-wheel is given a slight further turn forward, the minor circuit being now closed through the third pair of contact-points to energize a magnet which causes the requisite electrical contact in the major circuit for the third speed ahead. If, at any time the operator wishes to stop, it is only necessary to press inwardly slightly upon the hand-wheel when the spring 20 will yield, the pin 28 will be released from the notches 27 and the shaft and the carbon pencils will be instantly thrown back into normal open-circuit position by the stress of the spring 23. Should the operator desire to reverse or move backwardly, it is only necessary to turn the hand-wheel one or two notches in the opposite direction in a manner and with the effect which will now be understood without further explanation.

It will be understood that when the hand-wheel is in normal open-circuit position, the stud 21 being in alinement with the notch 22, the shaft is permitted to be moved inwardly with its carbon pencils in alinement with the second series of contact-points 17. This, without turning the shaft, brings the carbon pencils immediately into contact with two contact-points 17, closing the circuit through two wires 18 and causing the brake of the vehicle to be applied lightly. By releasing the pressure on the end of the shaft 7, the shaft will be forced outwardly by the spring 20 into position for starting either ahead or back, but if the brake is to be

applied with greater force, as for an emergency, the inward pressure on the end of the shaft is maintained, and a slight turn is given to the hand-wheel to bring the two carbon pencils into contact with the second pair of contact-points 17, thus setting the emergency brake. It will be seen that a slight hand pressure on the shaft,—it being left free to revolve,—will always, through the coöperation of the two springs 20—23, restore the parts to normal open-circuit, starting position, and that until the shaft is in this position, it cannot be forced inwardly to apply the brakes. Thus the current and the brakes never work in opposition to each other.

To permit the rotation of the hand-wheel while end-pressure is exerted upon the shaft, I provide a knob 8^a revolubly mounted upon the outer end of the shaft 7, as indicated. The palm of the hand may be pressed against this knob while the fingers release the hand-wheel, and now the shaft and hand-wheel are free to rotate while the hand is pressed against the knob. It will now be seen that to send the car ahead or back at the required speed, it is only necessary to give the hand-wheel a slight turn ahead the proper distance in the proper direction; that if the motor is to be stopped, a slight pressure is applied to the knob 8^a; that if the brakes are to be applied, a slightly greater pressure is used; that if the brakes are to be set strongly, the shaft is both pressed inwardly and turned slightly, and that to restore the device to normal open-circuit position, the hand is removed from the device.

Having described my invention, what I claim and desire to secure by Letters Patent is,—

1. In a device of the described character, a fixed member, a member mounted movably relatively to the fixed member, two parallel series of electrical contacts carried by one of said members, a contact-piece carried by the other member, and means for moving said contact-piece into alinement with either of said series and into electrical engagement with either of said contacts combined with means for holding said contact piece normally in open circuit position.

2. In a device of the described character, a fixed member, a member mounted movably relatively to the fixed member, two parallel series of electrical contacts carried by one of said members, a contact-piece carried by the other of said members, means for moving said contact-piece into alinement with either of said series and into electrical engagement with either of said contacts, a spring which holds said contact-piece normally in alinement with one of said series, and another spring which holds said contact-piece normally out of engagement with either of the contacts of said latter series.

3. In a device of the described character, a fixed member, a member mounted movably relatively to the fixed member, a contact-piece carried by one of said members, a series of electrical contacts carried by the other member and disposed in the path of and arranged to contact successively with said contact-piece, a hand-piece for actuating the movable member, a hollow stem which supports said members in operative position, and wires connected with said contacts and leading through said hollow stem.

4. In a device of the described character, a shell having a hollow stem adapted for engagement with the steering-handle of an automobile, a shaft revolubly and longitudinally mounted in said shell, two parallel series of contact-points circularly disposed within and insulated from said shell, contact-pieces carried by said shaft and arranged,—by the longitudinal movement of the shaft,—to coincide with either of said series, and arranged,—by the rotation of the shaft,—to electrically engage either of the several contact-points in said series.

5. In a device of the described character, a shell, a shaft arranged for rotation and longitudinal movement therein, a spring which holds the shaft normally at a predetermined point in its rotation, a spring which holds the shaft normally at a predetermined point longitudinally, a hand-wheel for actuating the shaft, contact-pieces carried by the shaft and contacts supported within and insulated from the shell and disposed in the circular paths of the contact-pieces.

6. In a device of the described character, a shell, a shaft arranged for rotation and longitudinal movement therein, a spring which holds the shaft normally at a predetermined point in its rotation, a spring which holds the shaft normally at a predetermined point longitudinally, a hand-wheel for actuating the shaft, contact-pieces carried by the shaft, and contacts supported within and insulated from the shell and disposed in the circular paths of the contact-pieces, combined with a hollow stem for the shell and wires connected with said contacts and leading through said hollow stem.

7. In a device of the described character, a hollow steering staff for automobiles and a steering-handle connected therewith, combined with a case supported by the staff, electrical make-and-break devices in the case, means for manually actuating the respective make-and-break devices, and groups of wires connected with the make-and-break devices and leading into the hollow of the staff.

8. In a device of the described character, a hollow steering staff for automobiles and a steering-handle connected therewith, combined with a case supported by the staff, electrical make-and-break devices in the

case, means for manually actuating the respective make-and-break devices, groups of wires connected with the make-and-break devices and leading into the hollow of the staff, and means for holding the make-and-break devices normally in open-circuit relation.

9. In a device for the control of an automobile, a case, electrical make-and-break devices in the case,—said several make-and-break devices corresponding to the requisite speeds ahead and backward and to a brake mechanism,—means for manually actuating the respective make-and-break devices, and wires connected with said make-and-break devices and leading from said case, combined with means for holding said make-and-break mechanisms normally in open-circuit position.

10. In a device for the control of automobiles, a case, electrical make-and-break devices in the case,—said several make-and-break devices corresponding to the requisite speeds ahead and backward and to a brake-mechanism,—means for manually actuating the respective make-and-break devices, and means which prevent the actuation of that make-and-break device which corresponds to a brake-mechanism in advance of placing the other make-and-break devices in open-circuit position.

11. In a device for the control of automobiles, a case, electrical make-and-break devices in the case,—said several make-and-break devices corresponding to the requisite speeds ahead and backward and to a brake-mechanism,—means for manually actuating the respective make-and-break devices, means for holding said make-and-break devices normally in open-circuit position, and means which prevent the actuation of that make-and-break device which corresponds to a brake-mechanism in advance of placing the other make-and-break devices in open-circuit position.

12. In a device for the control of automobiles, a case, electrical make-and-break devices in the case,—said several make-and-break devices corresponding to the requisite speeds ahead and backward and to a brake-mechanism,—means for manually actuating the respective make-and-break mechanisms, means for holding said make-and-break mechanisms normally in open-circuit relation, and means which prevent the actuation of that make-and-break device which corresponds to a brake-mechanism in advance of placing the other make-and-break devices in open-circuit relation, combined with a hollow steering-lever, means for securing the case upon the lever, and wires connected with the make-and-break devices and leading into the hollow of the lever.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY P. DODGE.

Witnesses:

CLAYTON MURPHY,

LEONA KIBURTZ.