No. 885,988. PATENTED APR. 28, 1908.

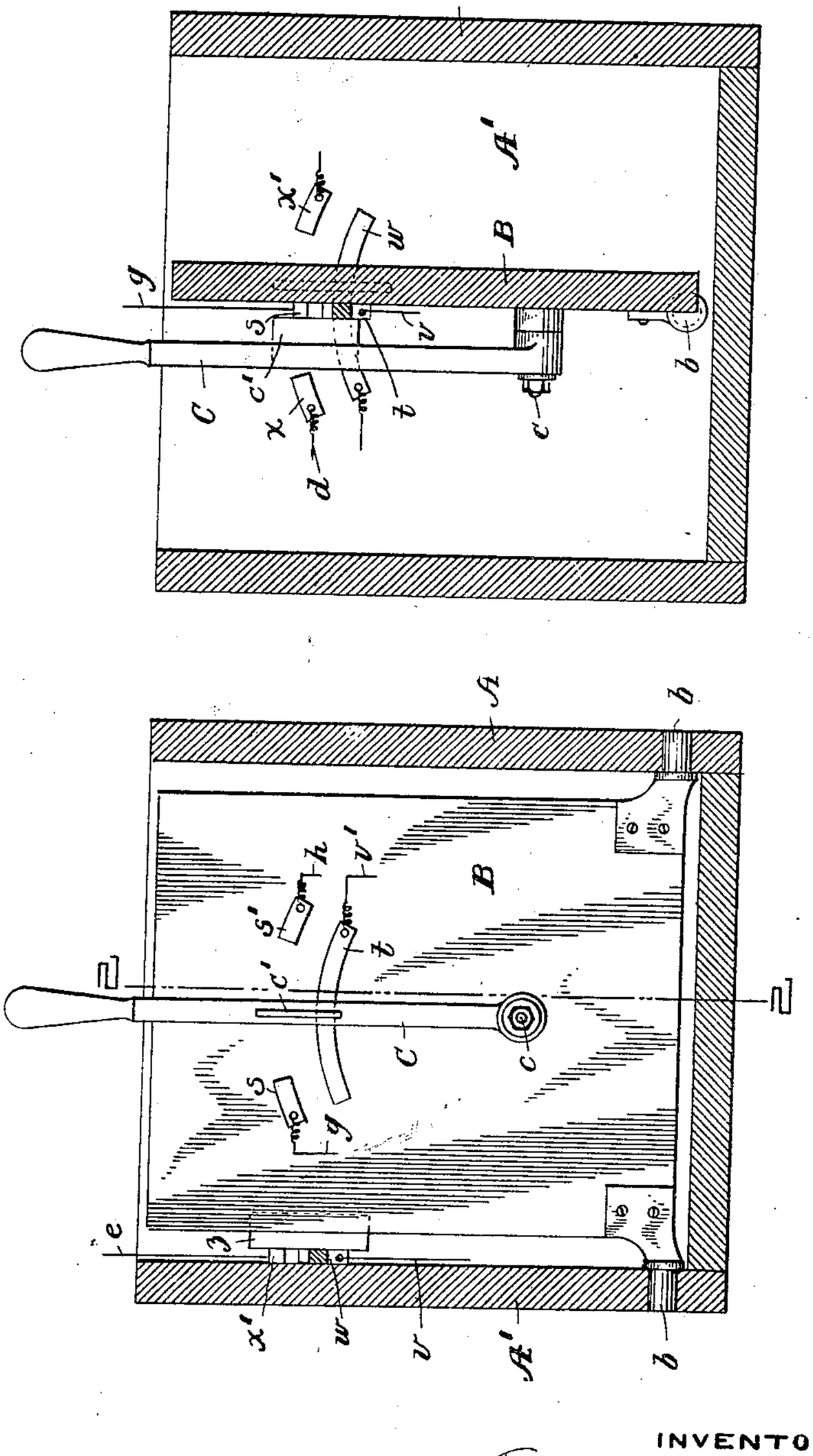
F. R. FISHBACK.

DUPLEX MOTOR CONTROL SYSTEM.

APPLICATION FILED SEPT. 13, 1907.

2 SHEETS—SHEET 1.

FIG. 1.

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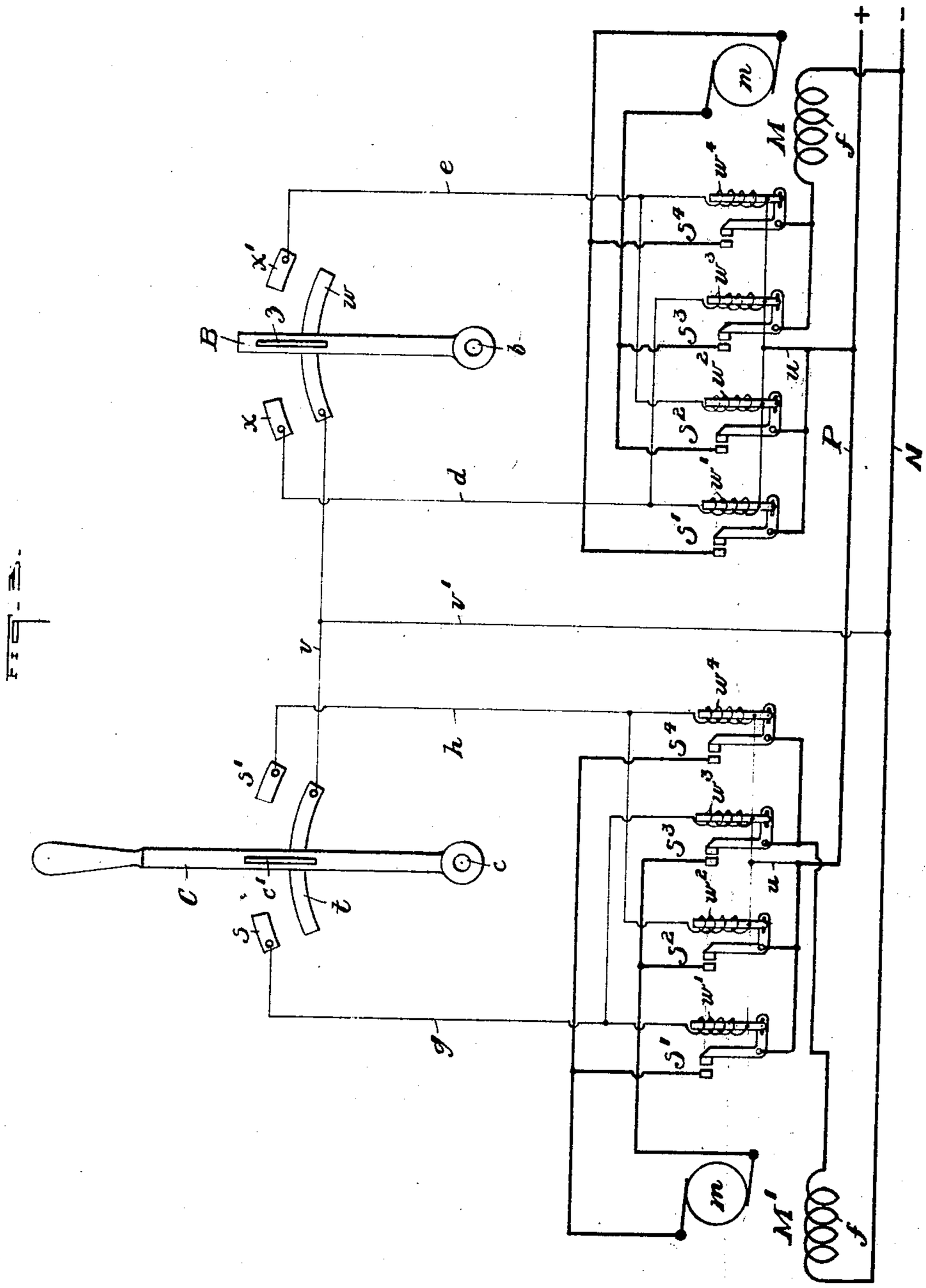
2 SHEETS—SHEET 2.

Fig. 2.

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## DUPLEX MOTOR-CONTROL SYSTEM.

No. 885,988. Specification of Letters Patent. Patented April 28, 1908.

Application filed September 13, 1907. Serial No. 392,662.

*To all whom it may concern:*

Be it known that I, FRED R. FISHBACK, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented or discovered new and useful Improvements in Duplex Motor-Control Systems, of which the following is a specification.

My invention relates to motor control systems for operating a plurality of magnetically operated switch controllers by means of a single handle, so that by said handle either one or both of the magnetically operated controllers may be actuated. I have illustrated the simple case of a master controller for two motors, with all speed controlling devices omitted for the sake of clearness.

Referring to the drawings, Figure 1 is a view of my master controller, the containing box being shown in vertical section. Fig. 2 is a view taken at right angles to Fig. 1, the containing box being in vertical section. Fig. 3 is a diagrammatic view of my invention, without setting forth any essential details of mechanical construction.

Within the box A is the vertical board or slate B, provided at its lower edge with bearing pins *b* seated in the sides of the box. The side $A^1$ of the box A supports the stationary contact slips *w*, *x*, and $x^1$, the two latter standing at opposite sides of the board B when vertical, and the strip *w* preferably being continuous and having its extremities lying in lines drawn from the pivot *b* to the contacts *x* and $x^1$.

Z is a brush carried by the board B, said brush having one portion always in contact with the long strip *w* and another portion located so as to be capable of contacting with the strip *x* or the strip $x^1$, as the board is rocked one way or the other.

The controller handle C is mounted to swing parallel with the board on the bolt *c*, passing through the lower end thereof, and into the board or slate B. The board B is provided with the long contact *t*, with which the brush $c^1$, carried by the handle C, is always in contact, and with the short contacts or strips *s* and $s^1$ arranged on opposite sides of the handle when vertical, the brush $c^1$ being arranged so as to contact with the strip *s* or the strip $s^1$, as the handle is swung in one direction or the other. The handle swings to right angles to the direction in which the board B swings.

As shown in Fig. 3, the board with its brush *z* controls one motor, and the handle C with its brush $c^1$ controls the other motor. In this figure the board and the handle have been separated to show the wiring and operations more clearly.

Referring now to Fig. 3, I have shown two motors M and $M^1$, having their armatures connected on one side to the fixed contacts of the switches $S^1$ and $S^4$, and on the other side to the fixed contacts of the switches $S^2$ and $S^3$. The fields are connected on one side to the negative main N, and on the other side to the movable contacts of the switches $S^3$ and $S^4$. The movable contacts of the switches $S^1$ and $S^2$ are joined to the positive main P.

The windings $w^1$, $w^2$, $w^3$, $w^4$ are each provided with movable cores connected with the movable contacts of the switches $S^1$, $S^2$, $S^3$, $S^4$, respectively. The lower ends of the said windings are all connected to the positive main through the wire *u*. The upper ends of the windings $w^1$ and $w^3$ of the switches controlling the motor M are connected by the wire *d* to the contact strip *x*, and the upper ends of the windings $w^2$ and $w^4$ of the same set of switches is connected by the wire *e*, to the contact strip $x^1$. The contact strips *t* and *w* are connected to the negative main N by the wires *v* and $v^1$. The upper end of the windings $w^1$ and $w^3$ of the switches controlling the motor $M^1$ are connected by the wire *g* to the contact strips *s*, and the upper ends of the windings $w^2$ and $w^4$ of the same set of switches are connected by the wire *h* to the contact strip $s^1$.

Referring now to all the views, let the handle C be moved transversely of the board or slate B, for example, so that the brush *z* shall connect the strips *w* and $x^1$. The current will flow from the positive main P, through the wire *u*, the windings $w^2$ and $w^4$ of the switch $S^2$ and $S^4$ associated with the motor M, the wire *e*, the contact strip $x^1$, the brush *z*, the contact strip *w*, the wire *v*, and the wire $v^1$ to the negative main N. The windings $w^2$ and $w^4$ become energized and cause the switches $S^2$ and $S^4$ to close, whereby the circuit of the motor M is completed. This motor circuit is as follows: from the positive main P, through the switch $S^2$, the armature *m*, the switch $S^4$ and the field *f* to the negative main. In case the board B be swung so that the board *z* shall connect the

strips $w$ and $x$, the windings $w^1$ and $w^3$ will be energized, causing the switches $S^1$ and $S^3$ to close, whereupon the motor M will run in the opposite direction, owing to the change of direction of the current through its armature. If the board B shall stand with the brush $z$ out of contact with the strips $x$ or $x^1$ and the handle C be moved parallel with the board until the brush $c^1$ contacts with the strips $s^1$ and $t$, the motor $M^1$ will run in a certain direction. If, however, the handle be moved so that the brush $c^1$ shall connect the strips $s$ and $t$, the motor $M^1$ will run in the opposite direction. The operation of the switches and the circuits for the motor $M^1$ and its controlling switches are the same as for the corresponding parts for the motor M. If the board B is set to cause the rotation of the motor M, the handle C may also be moved to cause the rotation of the motor $M^1$ in either direction, and the direction of rotation of either motor may be changed without affecting the operation of the other motor; or either motor may be stopped without affecting the other. Both motors may be started simultaneously by moving the handle diagonally, that is, in both directions at the same time.

By means of my invention, the parts to be moved manually in the control of the motors are very light, as they consist merely of switches which control the motor controlling switches located at a distance from the manually actuated switches.

I claim—

1. In a motor control system, two magnetic switch controllers, a motor controlled by each of said controllers, a master switch having contacts arranged to control the magnetic switches separately and both jointly, and a single handle for operating the master switch.

2. In a motor control system, two magnetic switch controllers, a motor controlled as to its direction of rotation by each of said controllers, a master switch having contacts arranged to control the magnetic switches separately and both jointly, and a single handle for operating the master switch.

3. In a motor control system, two magnetic switch controllers, a motor controlled by each of said controllers, a master switch having contacts arranged to control the magnetic switches separately and both jointly, and a single handle for operating the master switch, movable in one direction to control one motor, in a different direction to control the other motor, and in a third direction to control both motors.

4. In a motor control system, two electric motors, a master controller therefor, consisting of an oscillatory member, movable contacts carried thereby, fixed contacts cooperating with the said movable contacts and associated with one motor, a second oscillatory member pivotally supported by the first member, movable contacts carried by the second member, and contacts carried by the first movable member coöperating with the last named movable contacts, and associated with the remaining motor.

Signed at Cleveland, Ohio, this 3d day of Sept, 1907.

F. R. FISHBACK.

Witnesses:
J. H. HALL,
R. I. WRIGHT.