

(No Model.)

4 Sheets—Sheet 1.

J. G. GERMANN.
REVERSING SWITCH FOR ELECTRIC MOTORS.

No. 510,596.

Patented Dec. 12, 1893.

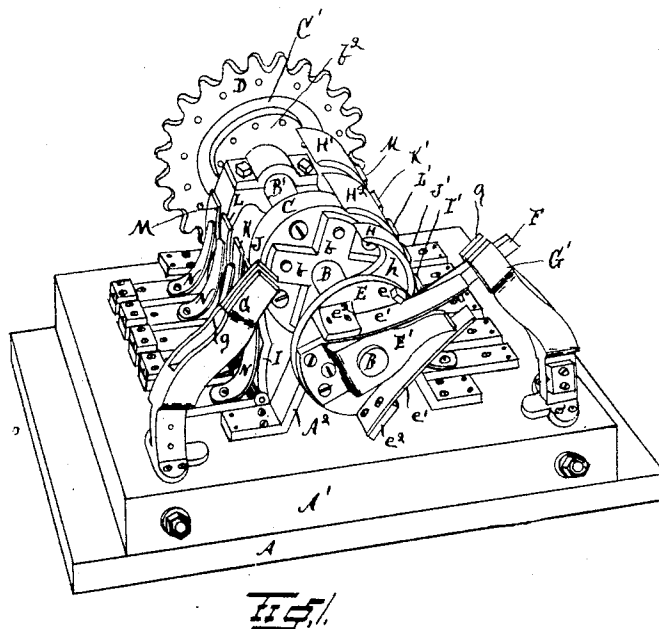


Fig. 1.

Witnesses

Wm. M. Baker Jr.
H. C. Long

Inventor

John G. Germann
By Attorneys
Hallock & Hallock

(No Model.)

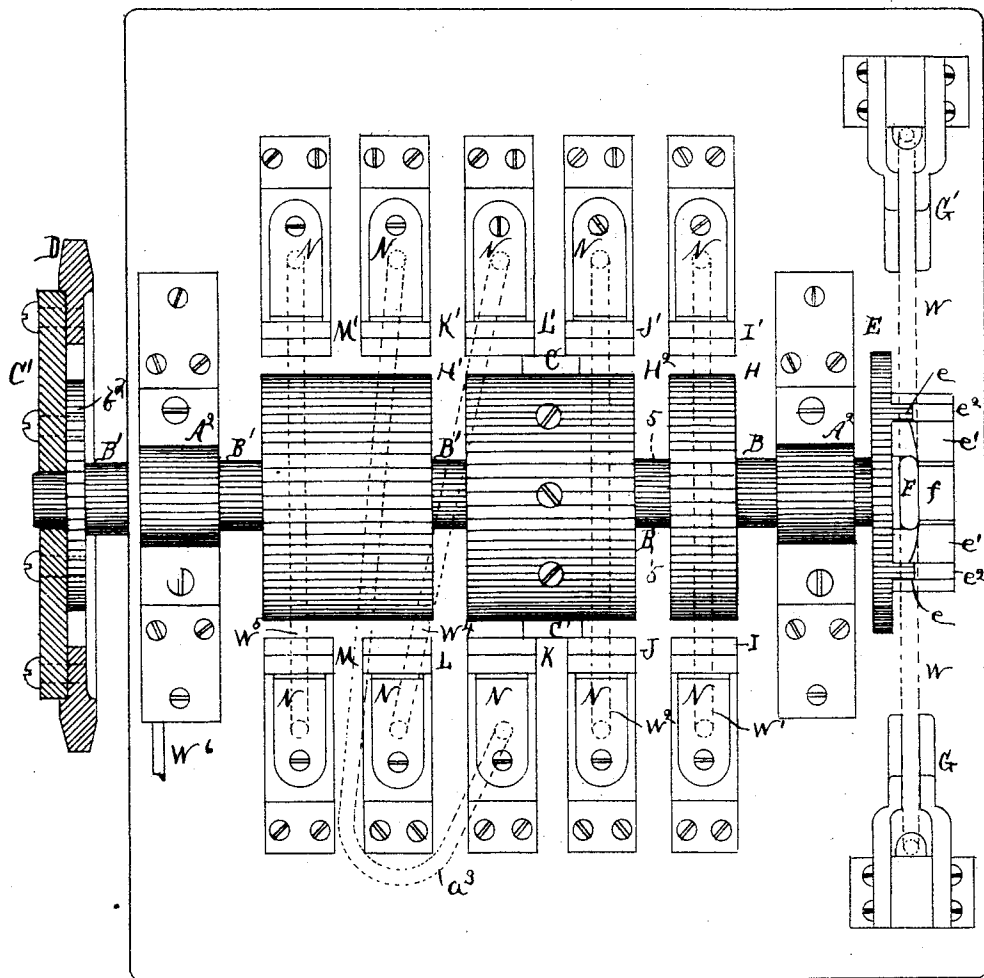
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552.

Witnesses

Wm. H. Markes, Jr.
H. C. Long

Inventor

Inventor
John G. Gramann

By Attorneys

Hallock & Hallbeck

J. G. GERMANN.

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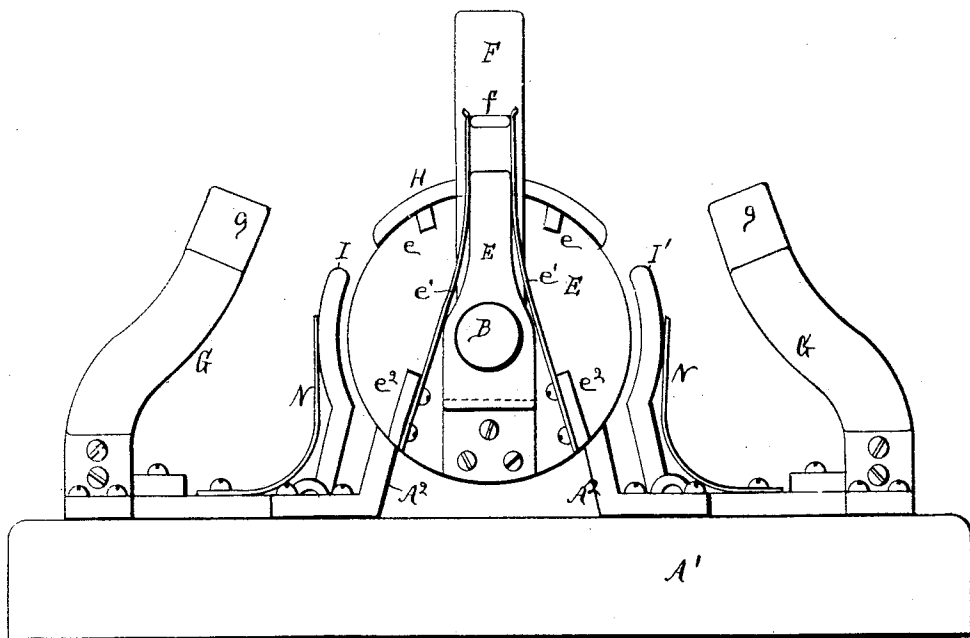
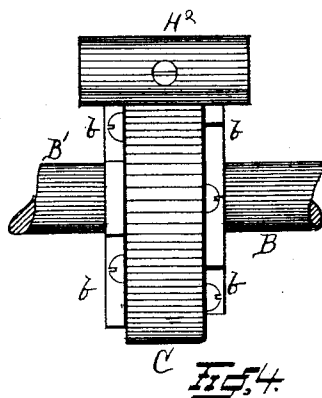
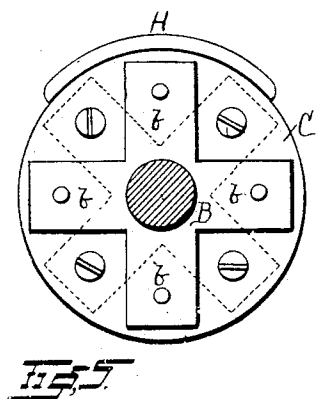


Fig. 3.

Witnesses

Wm. Marks, Jr.
H. H. Hall

Inventor

John G. Germann
By Attorneys
Hallowell Hallowell

(No Model.)

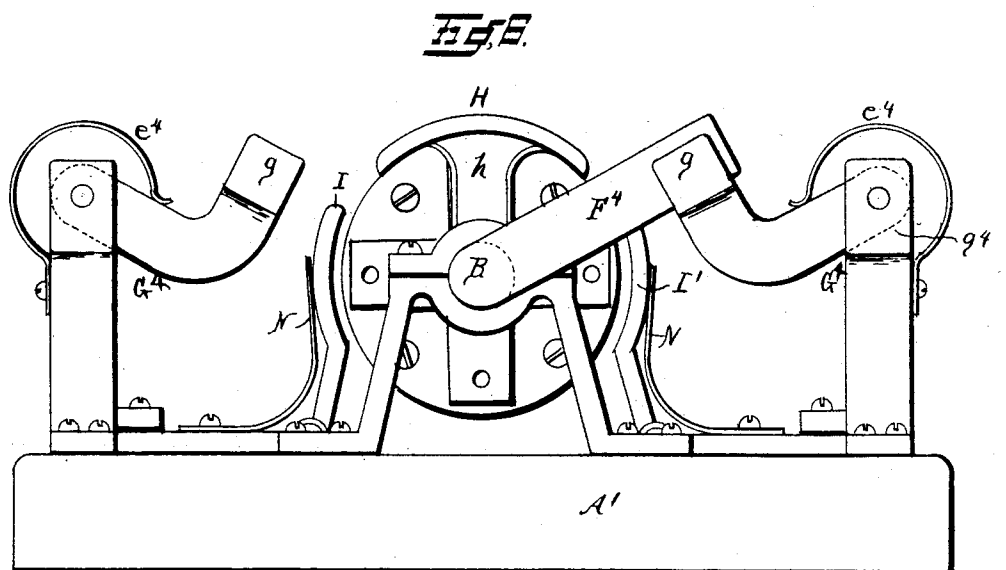
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J. G. GERMANN.

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Witnesses

Wm. Marley Jr.
H. C. Lord

Inventor

John G. Germann

By Attorneys

Hullock & Hall

UNITED STATES PATENT OFFICE.

JOHN G. GERMANN, OF ERIE, PENNSYLVANIA.

REVERSING-SWITCH FOR ELECTRIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 510,596, dated December 12, 1893.

Application filed April 19, 1893. Serial No. 470,932. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. GERMANN, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Reversing-Switches for Electric Motors; and I do hereby 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.

This invention relates to reversing switches for electric motors, and consists in certain improvements in the construction thereof, as is herein fully set forth and pointed out in the claims.

My invention is illustrated in the accompanying drawings, as follows:

Figure 1 is a perspective view of a reversing switch for electric motors in which my invention is embodied. Fig. 2 is a plan view of the same with the actuating wheel in horizontal section. Fig. 3 is an end elevation looking from the right of Fig. 2. Fig. 4 is a side elevation of the shafts, B B' at their point of connection, and of the insulating block between them, said shafts being broken off. Fig. 5 is a section on the line 5-5 in Fig. 2, and shows the parts shown in Fig. 4 in elevation, looking from the left of Fig. 4. Fig. 6 is a view like Fig. 3, showing an alternative construction.

The primary object of the invention is to provide means for making a quick break of the circuit without turning the switch shaft quickly.

The secondary objects of the invention relate to details of construction, and will be fully explained herein.

Like letters of reference indicate like parts in all the figures.

A marks the base board; A', a non-combustible super-base, usually made of slate; A², the mounting for the revoluble part of the switch; B B' are the shaft sections of said revoluble part. These two shaft sections have a spider, b, at their inner ends, which are secured to an insulating block, C, in the manner shown clearly in Figs. 4 and 5, whereby the two shaft sections can have no direct electrical connection. This insulating block

may be made of any suitable material, such as porcelain, glass, india-rubber or vulcanized fiber, which latter I generally use.

At the outer end of the shaft-section, B', there is a propelling sprocket wheel, D, which is attached to a centering, C', that is also of insulating material, so there can be no electrical connection between the shaft section, B', and the means for moving said revoluble part, said centering, C', being attached to a disk, b², at the outer end of said shaft. At the outer end of the shaft section, B, is a disk E, having thereon a bracket, E', and lugs, ee, and e² e². A circuit forming and breaking lever or key, F, is pivoted on the shaft, B, between the disk, E, and bracket, E', and its pivotal action is limited by the lugs, ee, and is resisted by springs, e' e', attached to the lugs, e² e², and bearing upon the lug, f, on said key.

Mounted on the super-base, A', on each side of, and in line with the key, F, are the contact posts, G G', upon which the said key acts. These contact posts are bifurcated at their upper ends, so as to form jaws, g, between which the key, F, is held when in contact with said posts, and said jaws are so formed as to exert a sufficient degree of pressure upon the key to hold it against movement by the force of the springs, e' e'. For example, in Fig. 1, the lever, F, is shown as in contact with one of the posts, G', and engaged by the jaws, g. Now when the revoluble part of the switch is moved back to the left, the key, F, will be retained by the jaws, and cause said key to turn on its pivot on the shaft and overcome the spring, e', at the right, until the lug, e, on the disk, E, contacts with the key, and then the key must move with the shaft and disk, and will be disengaged from the jaws, and when this occurs, the spring, e', will act and quickly throw the key away from the post, thus effecting a quick breaking of the connection. It will be noted that the shaft, B, will not have been accelerated in its movement, but the quick action is wholly by the key, F, being suddenly thrown forward by the action of the spring, e'.

It is well understood in the art that in switches of this class, it is necessary that the breaking of connection must be made with

suddenness in order to prevent burning the contact points, and this has heretofore been effected by a quick movement of the means by which the revoluble part of the switch is actuated; but in certain cases this is not practical or desirable, as, for example, in operating motors in places where the switch is not under the immediate control of the operators, but is operated by connections from a distance, as in elevators and many other places. In all such places my device is of great utility as it insures a quick breaking of connection without any care or attention in that particular by the operator as he can move the switch actuating device uniformly at a moderate speed throughout its entire movement and the quick action necessary to break the contact properly will be performed automatically by the means just described. I do not intend to be limited to the precise construction just described, and in Fig. 6, I have illustrated an alternative construction for the purpose of showing that the means for effecting the desired result may be varied. In this alternative construction, the key, F^4 , is rigid and unyielding, while the connecting contact posts, G^4 G^4 , are jointed and made yielding until the points, g^4 g^4 , contact, when it becomes rigid, and the frictional contact of the key, F^4 , in the jaws of the post, G^4 , must be broken as the revoluble part continues its movement. A spring, e^4 , resists and is tensioned by the deflection of said yielding part, and when the contact is broken, quickly separates the parts by instantly reinstating the yielding part to its normal position.

From the foregoing, it will be seen that the essential features are that the contact between the key and the post shall be by a slipping or disengaging clutch of some kind, which, as the switch is thrown in the reverse direction from either contact, in disengaging overcomes or tensions a spring which, as soon as the clutch is finally disengaged, will quickly separate the lately contacted parts without accelerating the movement of the revoluble part of the switch.

Heretofore, so far as I am informed, the revoluble part of the switch has been made in the form of a cylinder formed often of blocks of wood on the shaft sections, and the contact plates are laid onto the surface and metallicly connected with the shafts by screws or bolts that extend from the plates to the shafts. In my construction, I make the revoluble part in skeleton form, using no wood or other substance to form a cylinder. The shafts, B and B', are cast with arms, h , on which are formed the contact plates, H and H', and the bridging contact plate, H², I fasten to the insulating block, C. I find this construction very simple, cheap and durable. I, J, K, L, M and I', J', K', L', M' mark the non-revoluble contact plates, and N, the springs that hold said plates in contact with the revoluble plates, H, H', H²; W, W', W², W³, W⁴, W⁵ and W⁶ mark the various connecting

wires. When the key, F, is in contact with clutch, G, the current passes from the wire, W, through clutch, G, key, F, shaft, B, contact, H, brush, I, through fields of motor to brush, J, over bridge contact, H², through brush K, through armature of motor to brush, L, by contact, H', and shaft, B', to return wire, W⁶. When the switch is reversed, the current passes from wire, W, through clutch, G', key, F, shaft, B, contact, H, brush, I', through fields of motor to brush, J', over bridge contact, H², through brush, L', wire W⁴, brush connection of brush, L, to armature, through armature to brush connection of brush K, through wire, W³, to brush, K', through contact, H', by shaft, B', to return wire, W⁶. It will be noted that when key, F, is contacted with clutch, G, the current passes from brush, K, through the armature to brush, L; and that when the key, F, is reversed and in contact with clutch, G', the current passes from brush, L, through the armature to brush, K, thus effecting the reverse. The brushes, M and M', carry the shunt circuit.

What I claim as new is—

1. In a reversing switch for electric motors, the combination with the connecting contact posts and the revoluble part of said switch of a disengaging clutch through which the contact between said posts and said revoluble part is established and a spring that is tensioned by the disengaging throw of the switch in either direction and when the disengagement of the clutch is effected reacts and quickly separates the lately engaging parts, without accelerating the movement of the revoluble part of the switch.

2. In a reversing switch for electric motors, the combination with the revoluble part of said switch and the connecting contact posts of a contact key carried by said revoluble part which engages said posts by a disengaging clutch, means whereby one of said contacted parts will yield as the switch is thrown in the reverse direction from either contact before said clutch can be disengaged and a spring that is tensioned by the deflection of said yielding part and quickly reinstates the same as soon as the said clutch is disengaged substantially as and for the purposes set forth.

3. In a reversing switch for electric motors, the combination with the revoluble part of said switch and the connecting contact posts of a contact key carried by said revoluble part which engages said posts by a friction clutch, means whereby one of said contacted parts yields as the switch is thrown in the reverse direction from either contact before said friction clutch can be disengaged and a spring that is tensioned by the deflection of said yielding part and quickly reinstates said yielding part as soon as the friction clutch is disengaged, substantially as and for the purposes set forth.

4. In a reversing switch for electric motors, the combination with the revoluble part of said switch and the connecting contact posts,

of a key carried by said revoluble part, that is yielding in either direction a spring device having a neutral point that is tensioned by the yielding of said key in either direction and a clutch on said posts that engages said key and holds it against release throughout its yielding action, but releases it when said key ceases to yield, substantially as and for the purposes set forth.

5. In a reversing switch for electric motors, the combination with the revoluble part of said switch and the connecting contact posts, of a key carried by said revoluble part, that is yielding in either direction a spring device having a neutral point that is tensioned by the yielding of said key in either direction and a friction clutch on said post that engages said key and holds it against release throughout its yielding action, but releases it when said key ceases to yield, substantially as and for the purposes set forth.

6. In a reversing switch for electric motors, the combination with the revoluble part of said switch and the connecting contacting posts, of a friction clutch on said posts consisting of the jaws, *g g*, a disk, *E*, on the said revoluble part of said switch, a contact key, *F*, pivoted on the shaft of said revoluble part

and limited in its pivotal action by lugs, *e e*, on said disk and springs, *e' e'*, carried by said disk that are tensioned by the pivotal action of said key, substantially as and for the purposes set forth.

7. In a reversing switch for electric motors, the combination with the non-revoluble contact plates, of a revoluble part consisting of the shaft sections *B B'*, connected and insulated from each other by the insulating block, *C*, said shaft sections having arms extending therefrom which carry the revoluble contact plates, *H* and *H'*, and the intermediate or bridging contact plate, *H²*, being attached to said insulating block, *C*.

8. In a reversing switch for electric motors, the combination with the revoluble part of said switch of the shaft sections, *B B'*, the spiders, *b*, on said sections and the insulating block, *C*, between said spiders and secured thereto.

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

JOHN G. GERMANN.

Witnesses:

JNO. K. HALLOCK,
C. B. HAYES.