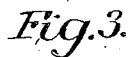


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2 SHEETS—SHEET 1.



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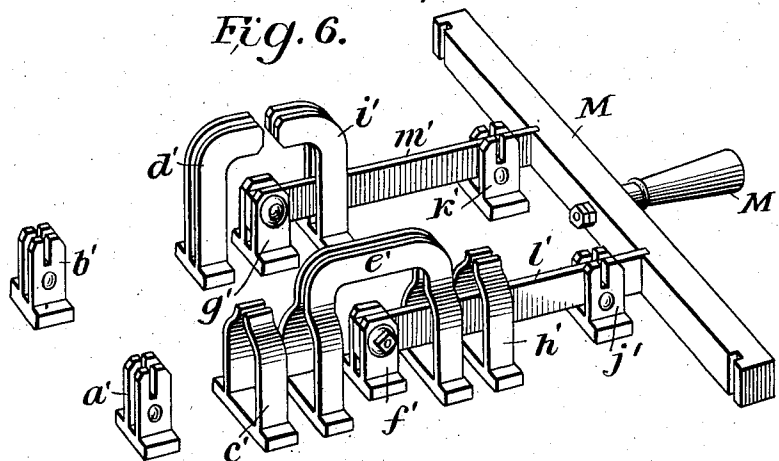
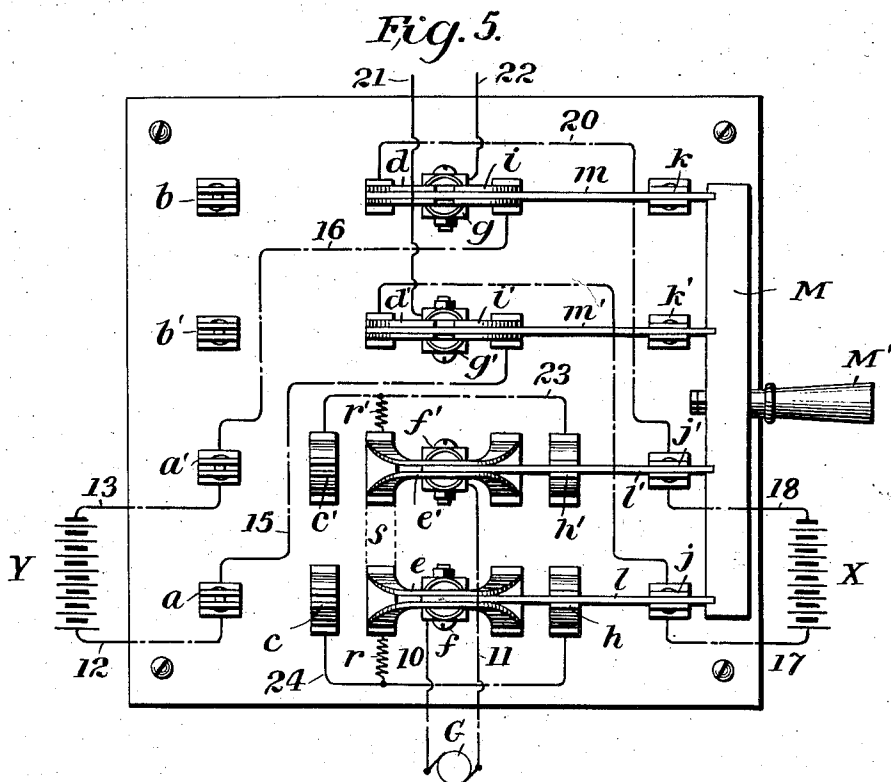
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J. H. CORMICK.
 SWITCH FOR CHARGING AND DISCHARGING STORAGE BATTERIES.
 APPLICATION FILED FEB. 29, 1908.

901,423.

Patented Oct. 20, 1908.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JAMES H. CORMICK, OF BELLEVILLE, NEW JERSEY, ASSIGNOR TO THE UNION SWITCH AND SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

SWITCH FOR CHARGING AND DISCHARGING STORAGE BATTERIES.

No. 901,423.

Specification of Letters Patent.

Patented Oct. 20, 1908.

Application filed February 29, 1908. Serial No. 418,485.

To all whom it may concern:

Be it known that I, JAMES H. CORMICK, a citizen of the United States, and a resident of Belleville, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Switches for Charging and Discharging Storage Batteries, of which the following is a specification.

This invention relates to switches for charging and discharging storage batteries. By the use of my invention in connection with two storage batteries, one charging line and one discharging line the switch will operate in such manner that the discharging line will always be in circuit with at least one of the storage batteries and the circuit of the charging line will never be broken even though it is not in circuit with either of the storage batteries.

I will describe a preferred embodiment of my invention and then point out the novel features in claims.

In the accompanying drawings Figure 1 is a plan view of a switch constructed in accordance with my invention, and also showing two storage batteries, the charging and discharging lines and the connections between them. Fig. 2 is a side elevation showing a portion of the switch which controls the charging line. Fig. 3 is a similar view showing a portion of the switch which controls the discharging line. Fig. 4 is a section taken on the line 4—4 of Fig. 1. Fig. 5 is a view similar to Fig. 1 but showing the parts in different positions. Fig. 6 is a perspective view to illustrate particularly the construction of the clips with which the several knife blades of the switch cooperate.

A indicates a base which may be of any suitable material and upon which a series of what I shall designate charging clips are mounted in pairs. The clips for charging the battery Y are indicated by *a* and *a'* and those for the battery X are indicated by *j* and *j'*. There are also two pairs of clips which I shall designate discharging clips. Those which control the discharge from the battery Y are indicated by *i* and *i'* and those which control the discharge from battery X are indicated by *d* and *d'*.

The construction of the various clips so far described is clearly shown in Fig. 6, it being understood that the clips *a* and *a'*,

j and *j'* are similar and that the clips *d* and *d'*, *i* and *i'* are also similar.

Two blades *l* and *l'* are adapted to cooperate with the clips *a* and *a'* and *j* and *j'*, and two blades *m* and *m'* are adapted to cooperate with the clips *d* and *d'* and *i* and *i'*. All of these blades are connected at one end to a bar M provided with a handle M'. The blades *l* and *l'* are respectively pivoted to supports *f* and *f'* and the blades *m* and *m'* are respectively pivoted to supports *g* and *g'*. The battery Y is connected to the clips *a* and *a'* by wires 12 and 13.

G indicates a generator which is connected by wires 10 and 11 with the pivot supports *f* and *f'* respectively and these constitute the charging line.

The clip *a* is connected to the clip *i'* by a wire 15 and the clip *a'* is connected to the clip *i* by a wire 16.

The battery X is connected to the clips *j* and *j'* by wires 17 and 18, the clip *j* is connected to the clip *d'* by a wire 19 and the clip *j'* is connected to the clip *d* by a wire 20.

21 and 22 indicate wires of the discharging line which lead respectively from the pivot supports *g'* and *g*.

With this construction and with the switch in the position indicated in Fig. 1 current will pass from the generator to the battery Y over the circuit comprising wire 11, pivot support *f'*, blade *l'*, clip *a'*, wire 13, battery Y, wire 12, clip *a*, blade *l*, pivot support *f* and wire 10. At the same time battery X will be discharging through the following circuit: wire 21, pivot support *g'*, blade *m'*, clip *d'*, wire 19, clip *j*, wire 17, battery X, wire 18, clip *j'*, wire 20, clip *d*, blade *m*, pivot support *g* and wire 22.

If the switch blades are turned to the position indicated in Fig. 5 then the battery X will be charged while the battery Y is discharging.

It is not deemed necessary to describe the circuits in detail as they can readily be followed out on the drawing.

Over the pivot supports *f* and *f'* I arrange two clips indicated by *e* and *e'*. As shown these clips form an arch above the pivot supports but the two members thereof are so arranged that the levers *l* and *l'* will not make contact with them until after the levers are out of engagement with the clips *a* and *a'* or the clips *j* and *j'* as the case may

be. Between the clips *e* and *e'* and the clips *a* and *a'* I provide other clips indicated by *c* and *c'*, and between the clips *e* and *e'* and the clips *j* and *j'* I provide other clips *h* and *h'*. The construction of these clips is clearly shown in Fig. 6 where it will be seen that they will contact with the lever only at the upper ends. The clip *e* and *e'* are higher than the clips *c* and *c'*, *h* and *h'* and when the blades are fully in contact with the clips *j* and *j'* or *a* and *a'* as the case may be they will be entirely out of engagement with the clips *c* and *c'*, *h* and *h'*. The clips *c* and *h* are connected by a wire 23 and the clip *c* is connected to the clip *h* by a wire 24. Clips *e* and *e'* are connected by a copper strip *s* and the wires 24 and 23 are respectively connected to the clips *e* and *e'* by resistances *r* and *r'*.

Assuming the switch blades to be in the position shown in Figs. 5 and 6 if it be desired to reverse them the upward movement of the blades will cause them to engage with the clips *h* and *h'* before they are entirely disengaged from the clips *j* and *j'* and this will close a circuit through the generator *g* by way of the wires 23 and 24 and resistances *r* and *r'* and the clips *e* and *e'*, and as this latter circuit is established before the circuit through the battery is broken the charging line will not be opened nor will an arc be caused on the switch, nor will the storage battery be put on a dead short circuit. Further upward movement of the blades *l* and *l'* will bring them into engagement with the clips *e* and *e'* and entirely out of engagement with the clips *j* and *j'* and the clips *h* and *h'* but the charging line will still be kept closed and will remain so until the blades *l* and *l'* are brought to the position shown in Fig. 1 after having first been engaged with the clips *c* and *c'*. After the blades *l* and *l'* are disengaged from the clips *j* and *j'* both batteries will be out of circuit with the charging line until the blades *l* and *l'* are engaged with either clips *a* and *a'* or else reengaged with the clips *j* and *j'*.

In the movement of the blades from one position to the other as just described the blades *m* and *m'* will still maintain their contact with the clips *i* and *i'* until after they have moved past a vertical position. When they are in a vertical position the blades *m* and *m'* will be in contact with the clips *i* and *i'* and *d* and *d'* and when in such position both batteries will be connected to the discharging line. Further movement of the blades will cause them to disengage the clips *i* and *i'*, thus leaving only the battery X in circuit with the discharging line.

I have provided clips *b* and *b'*, *k* and *k'* to receive the blades *m* and *m'* when in their extreme positions. These clips are not essential but they serve to hold the blades against lateral movement.

I do not limit my invention to the precise details of construction illustrated and described, but

Having described my invention, I claim:

1. In a switch for charging storage batteries, the combination with two batteries, of two pivot supports, a pair of knives pivoted on said supports, a generator, wires connecting said generator to the pivot supports, two pairs of charging clips connected respectively to the respective batteries and with which the knife blades cooperate to close a circuit between the generator and the batteries, a pair of clips between the charging clips and the pivoted supports with which said knives are in contact after they are disengaged from the charging clips, and circuits connecting the clips to each other.

2. In a switch for charging storage batteries, the combination with two batteries, of two pairs of charging clips connected respectively to the batteries, two pivot supports intermediate the clips, knives pivoted to the supports to cooperate with the charging clips, a generator, wires connecting the generator to the pivot supports, a series of clips of different heights interposed between the two pairs of charging clips and with which the knives contact when they are disengaged from the charging clips, and circuits connecting said interposed clips to each other.

3. In a switch for charging storage batteries, the combination with two batteries, of two pairs of charging clips connected respectively to the batteries, two pivot supports intermediate the clips, knives pivoted to the supports to cooperate with the charging clips, a generator, wires connecting the generator to the pivot supports, two pairs of clips of greater height than the charging clips interposed between the pivot supports and the respective pairs of charging clips, a pair of clips forming an arch over the pivot supports and of greater height than the said interposed clips, and circuits connecting the interposed clips to each other.

4. In a switch for charging and discharging storage batteries, the combination with two batteries, of two pairs of charging clips connected respectively to the batteries, two pairs of discharging clips arranged adjacent to each other but separated, two pivot supports intermediate the pairs of charging clips, two pivot supports intermediate the pairs of discharging clips, two pairs of knives pivoted on the respective pivot supports to cooperate respectively with the charging and discharging clips, a generator, wires connecting said generator to the pivot supports intermediate the charging clips, a discharging line the wires of which lead from the pivot supports intermediate the discharging clips, wire connections between the batteries and the respective pairs of dis-

charging clips, a series of pairs of clips interposed between the said pairs of charging clips of greater height than the charging clips with which the knives contact when they are disengaged from the charging clips, circuits including resistances connecting the interposed clips to each other, and means for moving the blades simultaneously, and one pair of blades at a point in their move-

ment engaging both pairs of discharging 10 clips.

In testimony whereof I have signed my name to this specification in the presence of two subscribed witnesses.

JAMES H. CORMICK.

Witnesses:

H. A. HAMILTON,
F. L. WALTON.