No. 615,347. Patented Dec. 6, 1898.

W. ELY.

ELECTRIC SWITCH.

(Application filed Aug. 14, 1896.)

(No Model.)

2 Sheets—Sheet 1.

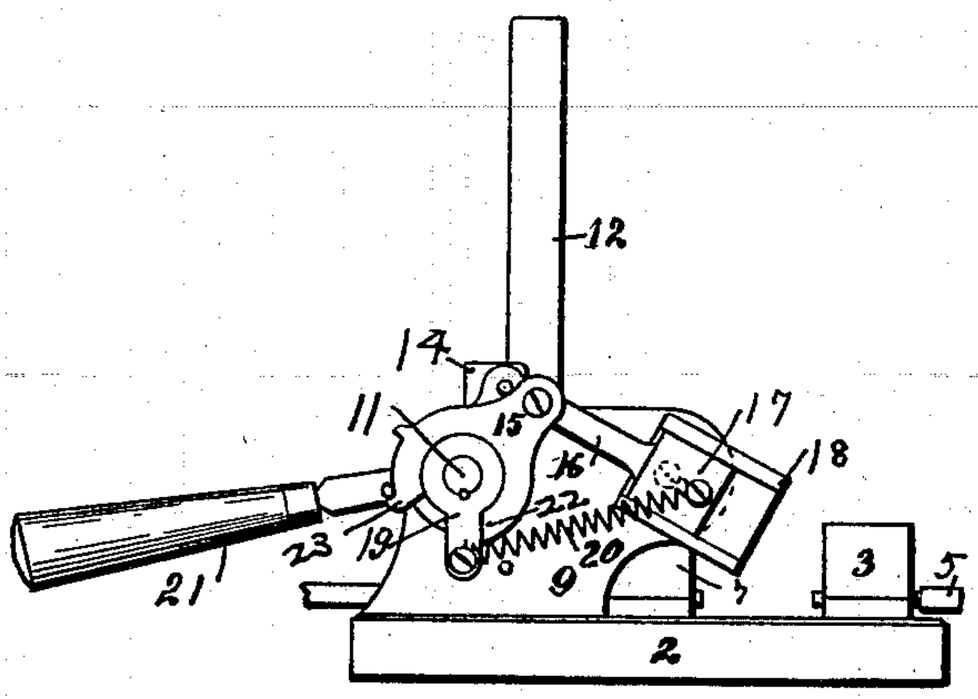

FIG. 3.

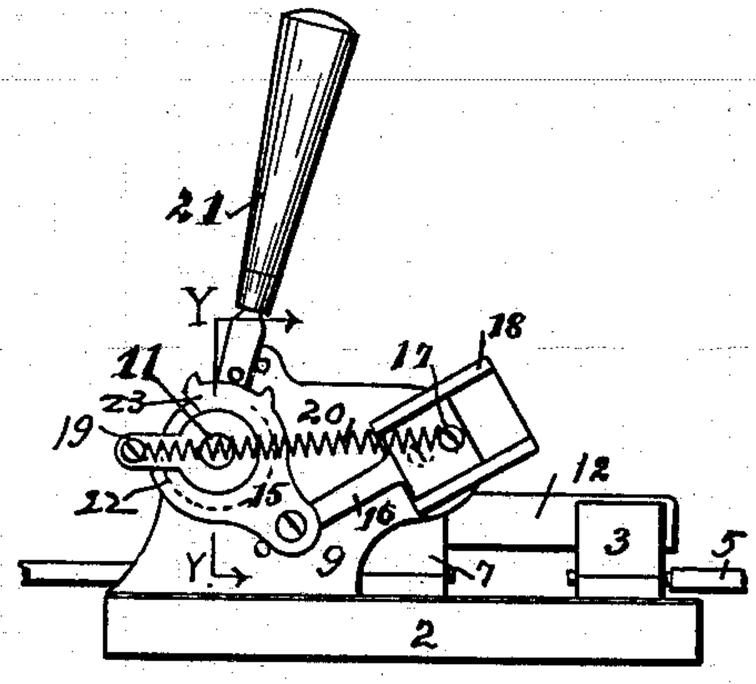

FIG. 1

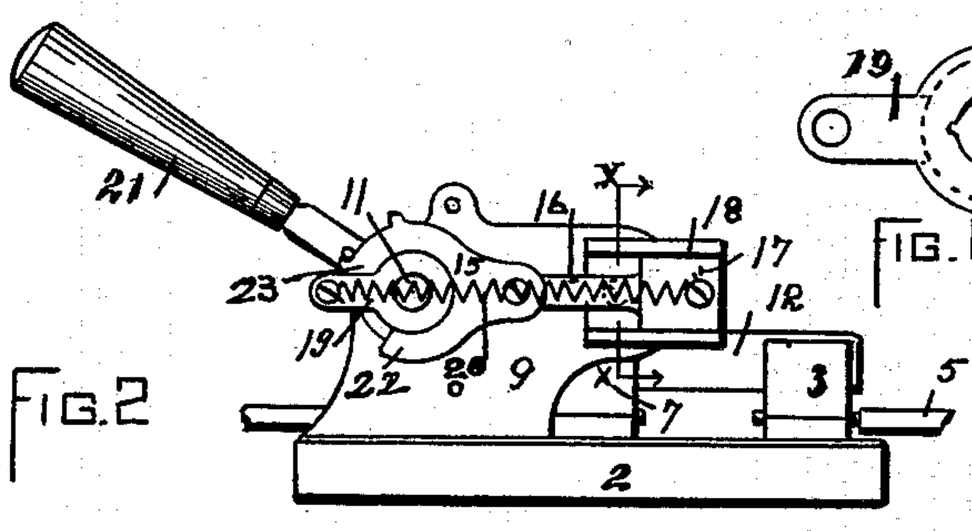

FIG. 2

FIG. 6.

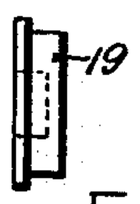

FIG. 7.

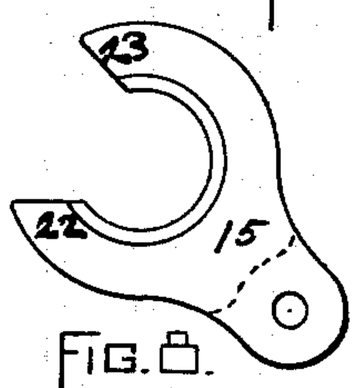

FIG. 8.

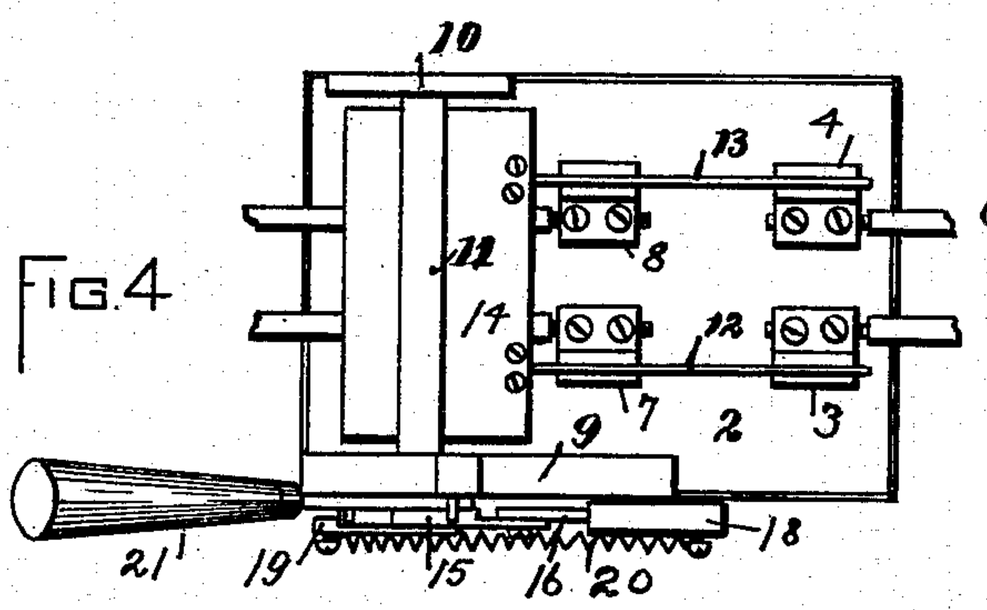

FIG. 4

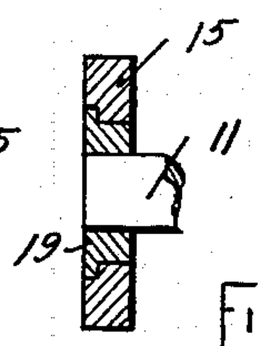

FIG. 9.

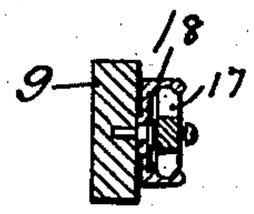

FIG. 5

WITNESSES:

Harry J. Garceau

Edward S. Allen

INVENTOR:

William Ely

BY Henry Marsh Jr.

ATTY.

No. 615,347. Patented Dec. 6, 1898.

W. ELY.

ELECTRIC SWITCH.

(Application filed Aug. 14, 1896.)

(No Model.) 2 Sheets—Sheet 2.

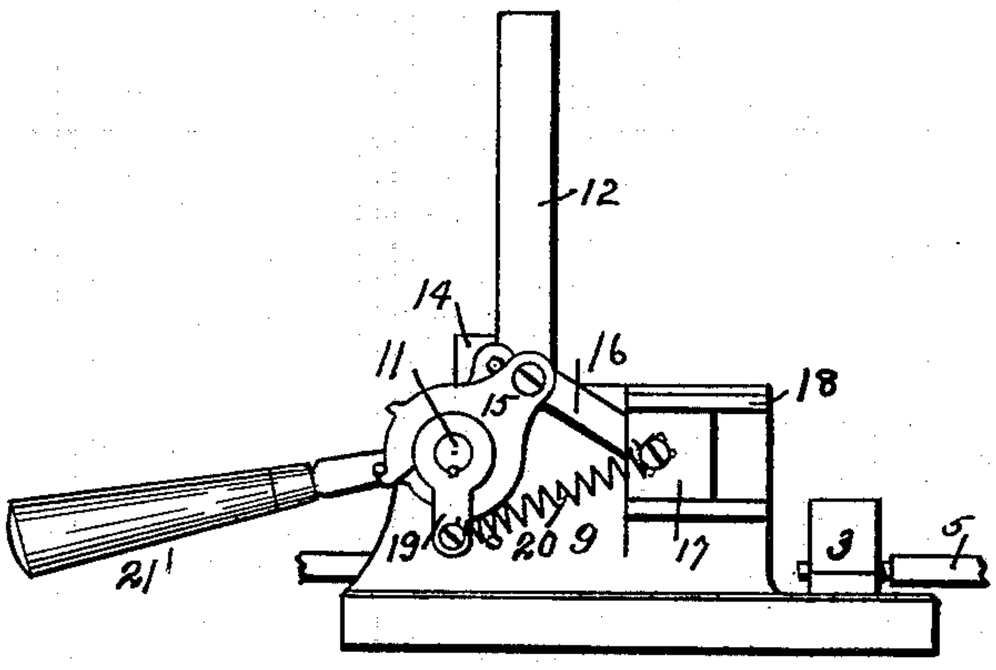

FIG. 11.

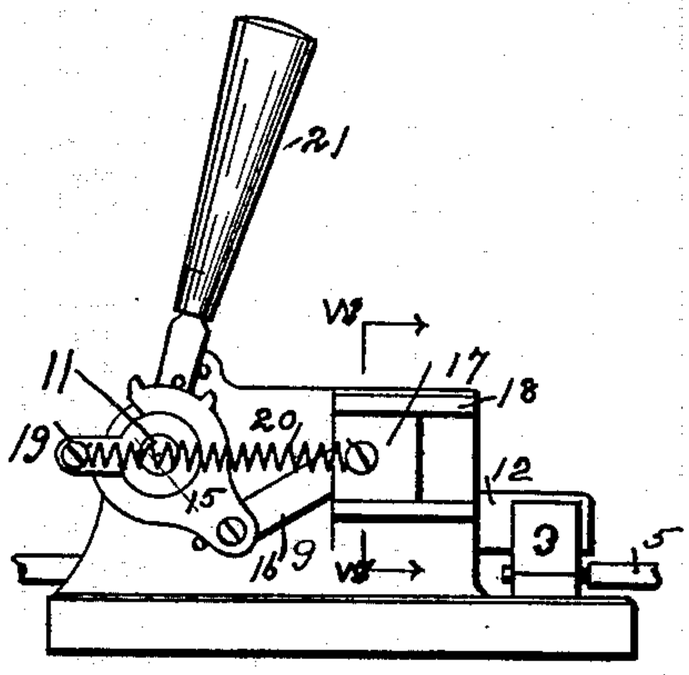

FIG. 10

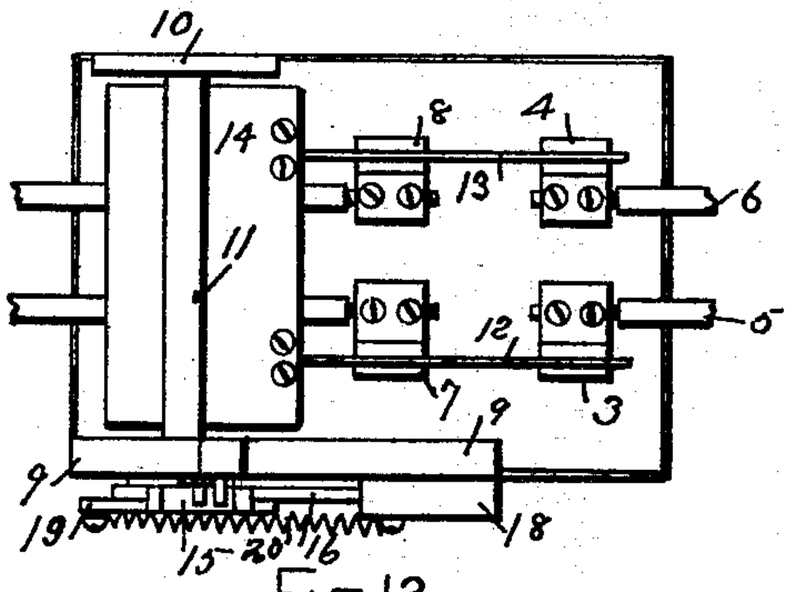

FIG. 12.

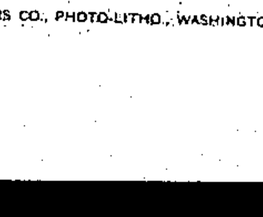

FIG. 13.

WITNESSES:
Harry J. Garceau.
Edward C. Allen

INVENTOR:
William Ely
BY Henry Marshall
ATTY.

UNITED STATES PATENT OFFICE.

WILLIAM ELY, OF PROVIDENCE, RHODE ISLAND.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 615,347, dated December 6, 1898.

Application filed August 14, 1896. Serial No. 602,759. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ELY, a citizen of the United States, residing in the city and county of Providence, in the State of Rhode Island, have invented a new and useful Electric Switch, of which the following is a specification.

My invention relates to electric switches having knives or arms carried by a rotatable shaft for connecting contact-posts arranged in pairs or series. It is also applicable for use in cases where two distinct systems or circuits are arranged with their contact-posts in line with each other, and it may be desirable that the knives or arms should traverse an arc of one hundred and eighty degrees in order to break the circuit in one of said systems and make it in the other.

The object of my invention is to provide means for actuating said knives to give them sudden and positive movement in either direction to open or close the circuit with adequate rapidity and positiveness to prevent short-circuiting or the formation of an arc between said knives and contact-posts.

I attain the desired end by the novel construction and arrangement of the knife-actuating mechanism, as more fully described hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of an electric switch, showing my invention applied thereto and the knives or arms connecting the contact-posts to close the circuit. Fig. 2 is a similar view showing the position of the knife-actuating mechanism just at the point of rotating the shaft to withdraw the knives from contact with the posts. Fig. 3 is a similar view showing the knives raised to an angle of ninety degrees and the circuit broken. Fig. 4 is a plan view. Fig. 5 is a section on line $x\,x$ of Fig. 2. Fig. 6 is a plan view of the crank. Fig. 7 is an edge view of the same. Fig. 8 is a plan view of an arm which is rotatably fitted upon the shaft and is adapted to receive and be rotated by the crank. Fig. 9 is a section on line Y Y of Fig. 1. Figs. 10 and 11 are side elevations illustrating a modification of my invention. Fig. 12 is a plan view of the same. Fig. 13 is a section on line W W of Fig. 10.

Similar reference-numerals indicate like parts where they occur in the drawings.

2 represents the base. 3 and 4 are contact-posts secured to said base, and 5 and 6 are the main wires secured to said posts. 7 and 8 are other contact-posts arranged in line with said posts 3 and 4 and serving also as binding-posts to which the service-wires are secured. Secured to or forming integral parts of said base are upright housings 9 and 10, in which is journaled a rotatable shaft 11, carrying knives 12 and 13, for connecting said posts in pairs, as shown, or in series, as may in some cases be preferable. Said knives are secured to a block or plate of insulating material, in turn secured to said shaft. The parts so far described I do not claim as new.

I construct an arm 15, as shown in Fig. 8, open-slotted on one side, either entirely or partially through, and rotatably fit the same upon the shaft 11, so that it may partially rotate without reference to the movement of said shaft. Said arm 15 is bored or counterbored to receive a crank 19, rigidly secured upon said shaft 11 and adapted for partial rotation with said shaft without reference to the movement of said arm 15. Said crank extends at right angles to said shaft and is rotatable within the bore or counterbore of said arm 15 and is actuated for purpose of rotation by force exerted against its sides by the respective sides or jaws 22 and 23 of said open-slotted arm. A lever 21, loosely pivoted upon said shaft 11 and rotatable without reference to the movement of the latter and provided with a lug or pin adapted to engage with lugs on said arm 15, serves as a means for applying force to said arm 15 to partially rotate it in either direction. Upon the side of said housing 9 I pivot an oscillating guideway 18, within which is fitted to reciprocate a cross-head 17, preferably made with an integral arm or extended portion 16. The free end of said extension 16 is pivoted to the free end of the arm 15. An extensible spring 20, extending from the free end of the crank 19 to the cross-head 17 and connecting the two, serves to accelerate the movement of the crank, and thereby throw the knives into or withdraw them from con-

tact with the posts with rapidity and positiveness.

In practical operation of my invention, the parts being assembled as shown and described, force applied to the lever 21 causes the arm 15 to partially rotate till its jaws engage with the side of the crank 19, bringing the cross-head and arm into central alinement with each other, the guideway 18 accommodating itself to the changing position of the cross-head, and the spring 20 being extended further movement of the lever throws the arm and cross-head out of alinement, when the reaction of the spring 20 accelerates the movement of the crank and its shaft, causing them to move more rapidly than does the arm 15. The device operates in the same manner in either direction.

Modifications may be made without departing from the principle of my invention or impairing the efficiency of the device. The guideway may be made stationary and the cross-head and arm be connected by a link pivoted to each. The jaws of the arm may be made wider and the link or extension 16 be made longer, thereby allowing the knives to traverse an arc of one hundred and eighty degrees instead of ninety degrees, as shown. The jaws may also be prolonged and the lever caused to engage with their inner faces instead of with the lugs, as shown.

I claim as my invention and desire to secure by Letters Patent—

1. In an electric switch, a supporting base or body, a rotatable shaft journaled therein, a crank rigidly secured upon said shaft and rotatable therewith, an arm open-slotted at one side and rotatably fitted over said crank and shaft and adapted for partial rotation without reference to the movement of said shaft and crank, a lever loosely pivoted upon said shaft and rotatable without reference to the movement of the latter, and adapted for engagement with said open-slotted arm to actuate it and said crank, a cross-head pivotally connected with said arm and adapted for synchronous oscillating and reciprocating movements, a pivoted guideway fitted to receive said cross-head and to oscillate therewith, an extensible spring connecting said cross-head and the free end of said crank and adapted to serve as specified to accelerate the movement in either direction of said crank and shaft, all combined with each other and adapted to serve as and for the purposes specified.

2. In an electric switch, a supporting base or frame, a rotatable shaft, one or more contact knives or blades carried by said shaft, a crank secured upon said shaft, an arm open-slotted at one side and as to such side rotatably fitted upon the confined end of said crank concentrically with said shaft, and partially embracing said confined end of said crank whereon it is capable of partial rotation without reference to the movement of said crank and shaft, a cross-head pivotally connected with the free end of said slotted arm, guide means for said cross-head, and an extensible spring connecting said cross-head and the free end of said crank, all combined with each other and with actuating means.

3. In an electric switch having a rotatable shaft and a crank or crank-arm rigidly secured thereon, and supporting means, combined with said parts an arm 15 open-slotted at one side and rotatably fitted upon said shaft and crank concentrically therewith and capable of partial rotation without reference to the movement of the same, a pivoted guideway 18 adapted for oscillating movement, a cross-head 17 adapted for reciprocating movement in said guideway and for oscillating movement therewith, and pivotally connected with the free end of said arm 15, and an extensible spring 20 connecting said cross-head and the free end of said rigid crank or crank-arm.

In testimony whereof I have hereunto set my hand, in presence of two witnesses, this 11th day of August, 1896.

WILLIAM ELY.

Witnesses:
HENRY MARSH, Jr.,
EDWARD C. ALLEN.