(No Model.)

J. O. HEINZE, Jr.

ELECTRIC SWITCH.

No. 540,358. Patented June 4, 1895.

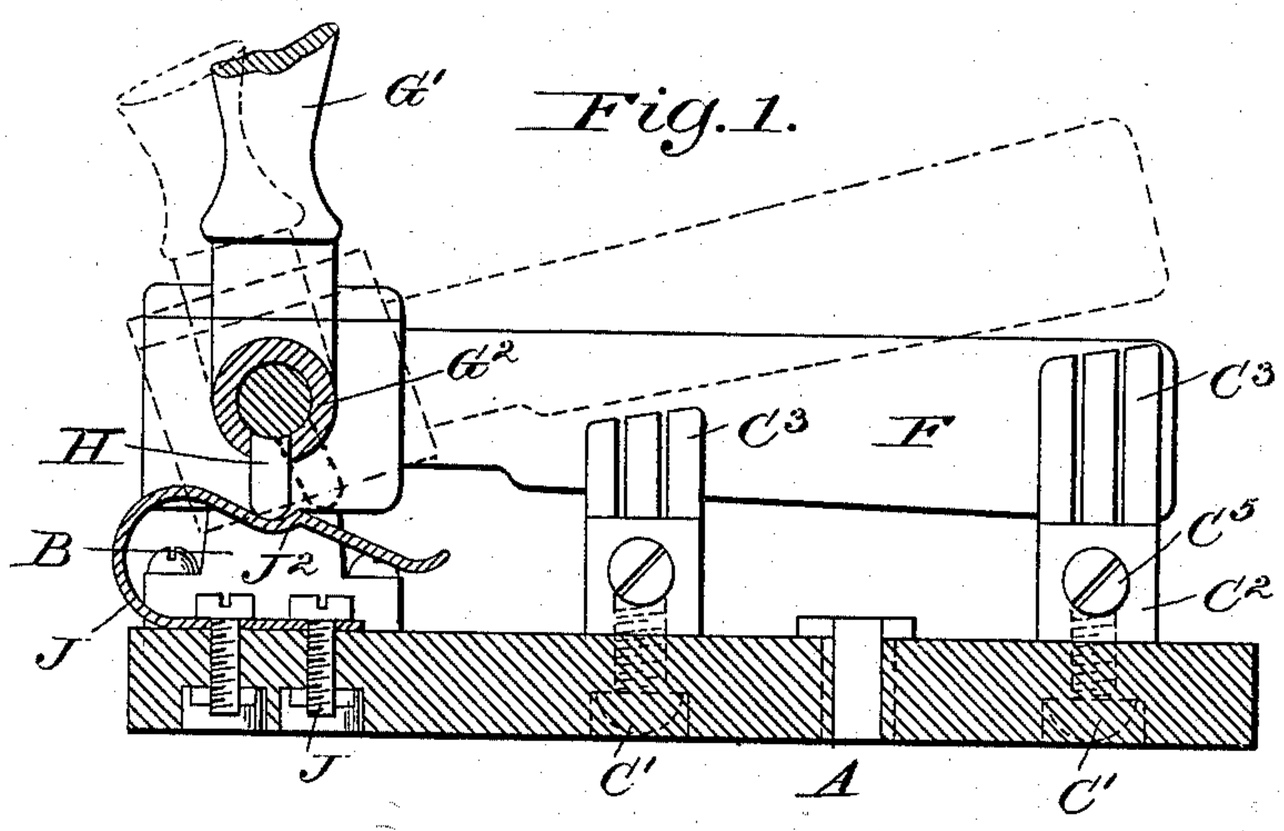

Fig. 1.

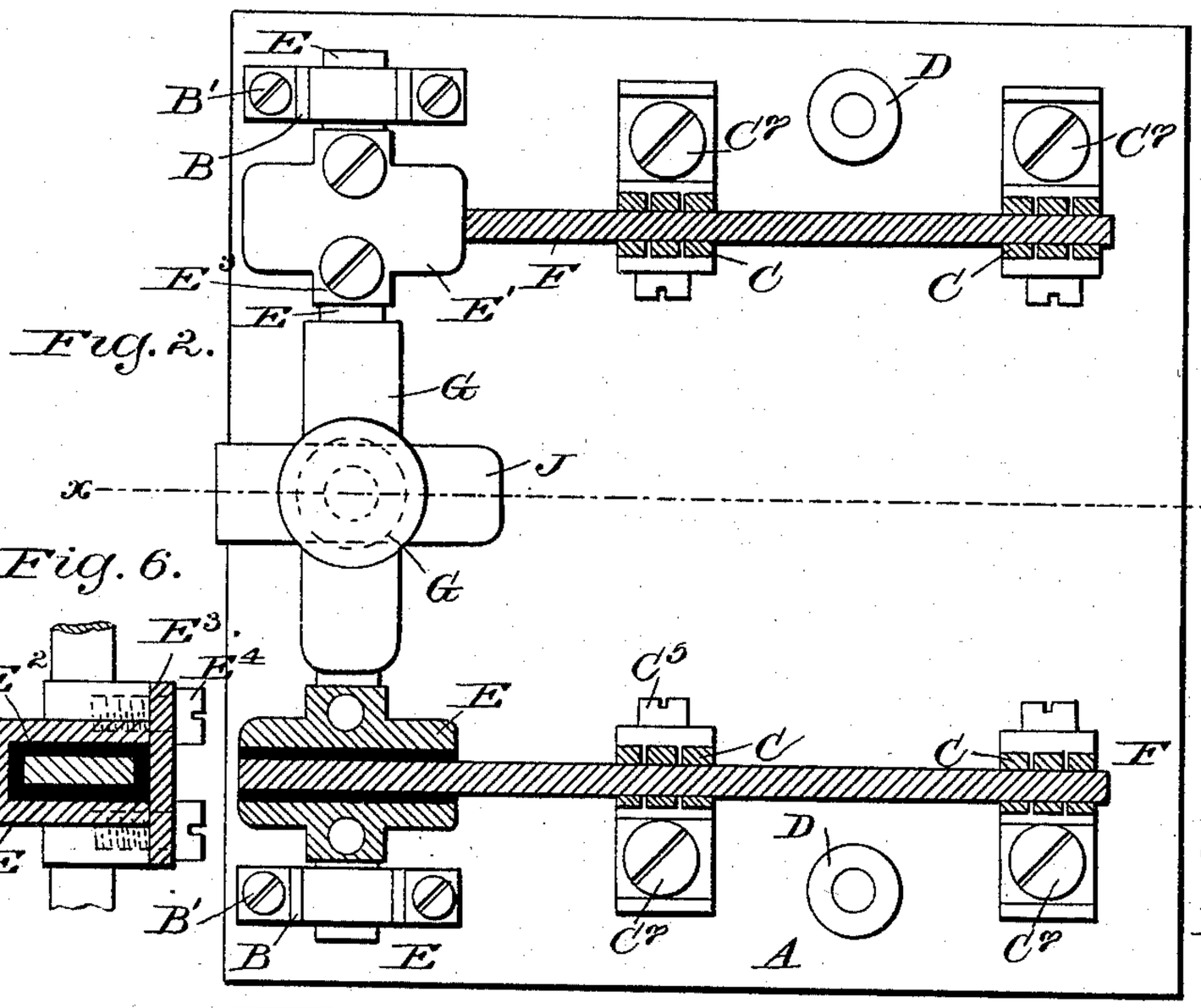

Fig. 2.

Fig. 6.

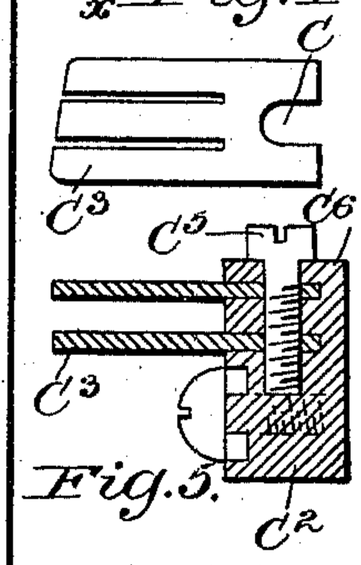

Fig. 4

Fig. 5.

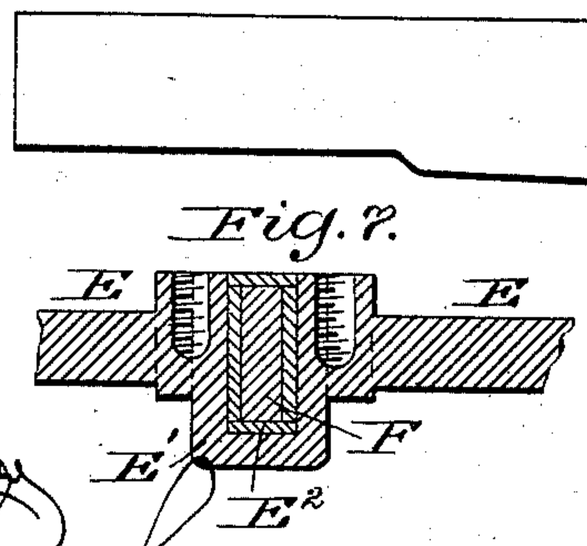

Fig. 7.

Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN O. HEINZE, JR., OF LYNN, MASSACHUSETTS.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 540,358, dated June 4, 1895.

Application filed December 4, 1894. Serial No. 530,795. (No model.)

To all whom it may concern:

Be it known that I, JOHN O. HEINZE, JR., of Lynn, county of Essex, and State of Massachusetts, have invented new and useful Improvements in Electric Switches; and I hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to new and useful improvements in electric switches, and consists of certain novel features, arrangements and combinations hereinafter described and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical section taken on the line *x x* of Fig. 2. Fig. 2 is a plan view showing the knives and certain other parts in section. Fig. 3 is a side view of one of the knives. Fig. 4 is a detail view of one of the copper contact-pieces. Fig. 5 is a sectional detail view showing the contact-pieces secured in place. Fig. 6 is an end detail view, partly in section, showing one of the boxes in which one of the knives is secured, with the shaft broken off on each side. Fig. 7 is a detail view in section, showing one of the boxes with shafts cast therewith on each side.

Like letters of reference refer to like parts throughout the several views.

A represents an electric switch base of the usual construction, and of insulating quality, and upon it are secured the standards B on opposite sides and at one end of the same, and secured to the switch base A by suitable screws B′. The contact pieces C are secured to said base by suitable screws C′ passing into the base of said contact pieces. The base C^2 of each is provided with suitable recesses C^6 into which the thin copper contact pieces or springs C^3 are located, and these contact pieces at their lower ends are provided with recesses or slots C^4 to fit part way around the shank of the screw C^5, which when screwed up tightly into the base C^2 compresses the metal and holds or clasps said copper contact pieces C^3 firmly in place, and when said copper contact pieces C^3 are burned or otherwise injured they can be removed by loosening the said screw C^5 and new pieces inserted and secured in place by tightening up the said screw.

C^7 represents suitable binding screws to which the electric wires may be connected. The said base is secured to the wall or other convenient place by suitable screws or bolts passing through the openings D, which extend through said base.

Journaled in the standards B is the shaft E, which on each side extends to the rectangular-shape box E′, and is secured fast to the side thereof, and to the inner side of each of the said boxes there is firmly secured the central portion of the shaft E, so that the said shaft is composed of three portions—the center portion and the two end portions, and being firmly secured to said boxes E′ when the said shaft revolves the said boxes must also revolve, being secured thereto and forming a part thereof, or the same may be formed of one entire casting. (See Fig. 7.)

The knives F which pass in between the copper contact pieces C^3 and close the circuit are secured in the boxes E′, as shown, and insulated therefrom by suitable non-conducting or insulating material E^2, as unburned porcelain, mica or fiber, and held firmly in place by the top E^3 which is firmly attached to said boxes E′ by the screws E^4, and in this manner the said knives on each side of the base are firmly secured in said boxes E′, and when the shaft and boxes revolve the knives must necessarily move therewith. These knives are made of copper punchings or castings independently of the boxes E′ or actuating lever by which said boxes are moved, and are held in place, as above described, so that when a knife is burned or otherwise injured it can be removed and a new knife inserted in its place, without interfering with any other part of the electric switch.

Around the central portion of the shaft E there is a sleeve G loosely mounted thereon, and secured to said sleeve is a handle G′. In the under side of said sleeve and in the center thereof there is a space or slot G^2 in which the pin H, secured fast to the shaft E is adapted to move, as will be explained. Under said pin and contacting therewith is a curved spring J secured to said switch base by screws J′, and having a seat J^2 in which the end of the pin H is adapted to rest when the knives F are down between the contact pieces C^3 and the circuit closed.

The burning of the copper contact springs and the knives is caused by an arc forming in the air space between the under side of the knife and the said copper contact pieces or

springs as the knife leaves said pieces, so that any means which would give the arc formed as short a time to exist as possible would necessarily reduce the burning out or injury of the copper contact pieces and knives. Therefore I have provided mechanism for causing said knives, as soon as they leave the contact pieces C^3, to be thrown up quickly away from said contact pieces and thereby break the arc.

In the position shown in full lines in Fig. 1 the knives are between said contact pieces and closing a circuit, and when it is desired to cut off the circuit the operator catching hold of the handle G′ moves it in a direction as indicated in dotted lines, so that the knife F moves upwardly. When the movement of the handle G′, to which the sleeve G is fast, has brought the pin H, by the sleeve G forcing the same from out of its seat J^2, on to the top thereof, as shown in dotted lines, the said spring immediately acts on said pin and throws it to the upper side of the recess G^2 of the sleeve G, and in this position the spring continues its upward tension, and the pin being fast to the shaft E causes a revolution of said shaft, and with it the boxes E′, and with said boxes the knives F, which are secured thereto, and at the same time the pin H bearing against the sleeve G forces the handle G′, connected to said sleeve, backward to its farthest position.

The parts are so constructed that the end of the pin H is out of its seat J^2 and on top of the spring J, as shown in dotted lines, in position to receive the upward throw of said spring when the knife is in the position shown in dotted lines, so that a quick throw is given by said spring through the connecting parts to said knives, and the existence of the arc between the under side of said knife and the contact pieces is of short duration, and consequently the burning of the metal of the knives and copper contact pieces by reason of said arc is reduced to a minimum.

While I have shown the arrangement as embodied in a double pole switch, it is understood, of course, that it is applicable to single, triple or other pole switches.

From the above description it will be seen that the two main points of my invention consist in providing the independent knives, which can be easily secured in place without interfering with the rest of the switch, and in providing means for giving a quick throw to said knives as they leave the said copper contact pieces. These and other features of my invention are carried out by an apparatus constructed like that shown in the drawings, but it is obvious that other forms of apparatus may be used, which will embody the features of my invention, and I therefore do not limit myself to the exact arrangement and construction shown, as the same may be varied without departing from the spirit of my invention.

From the above description it is clear that after the operator, by manipulating the handle G′, has raised the knives or blades to the position shown in dotted lines, that the spring J, exerting its tension against said knives or blades, will give them a sudden increased impetus or momentum over that which the blades or knives first received by the operation of the handle, and by reason of this increased impetus or momentum the time of existence of the arc formed between the under side of the knives or blades and the copper contact pieces is reduced to a minimum.

Having thus ascertained the nature and set forth the construction of my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an electric switch, the combination with the contact pieces, of one or more blades, a shaft to which said blades are attached, one or more boxes on said shaft for receiving one end of each blade, a handle for actuating said shaft, a pin secured to said shaft and moving therewith, a spring having a seat for receiving said pin and holding said shaft in a fixed position when the blades are in contact with said contact pieces, and means for moving said shaft from engagement with said spring as the blades leave the contact pieces to permit said spring to exert its tension on said shaft and thereby give an increased impetus to said shaft.

2. In an electric switch, the combination with the contact pieces, of one or more blades, a shaft to which said blades are attached, a handle for actuating said shaft, a pin secured to said shaft and moving therewith, a spring having a seat for receiving said pin and holding said shaft in a fixed position when the blades are in contact with said contact pieces, and means for moving said shaft from engagement with said spring as the blades leave the contact pieces to permit said spring to exert its tension on said shaft and thereby give an increased impetus to said shaft.

3. In an electric switch, the combination with the contact pieces, of one or more blades, a shaft to which said blades are attached, a pin secured to said shaft and moving therewith, a spring having a seat for receiving said pin and holding said shaft in a fixed position when the blades are in contact with said contact pieces, and a handle provided with a sleeve mounted loosely on said shaft and adapted to contact with said pin and move the same from engagement with the said spring as the blades leave the contact pieces to permit said spring to exert its tension on said shaft and thereby give an increased impetus to said shaft.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 27th day of November, 1894.

JOHN O. HEINZE, JR.

Witnesses:
WM. H. PALMER,
S. H. TROW.