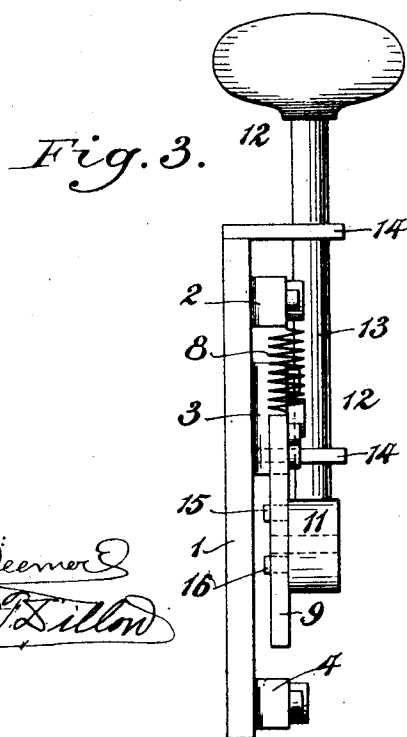
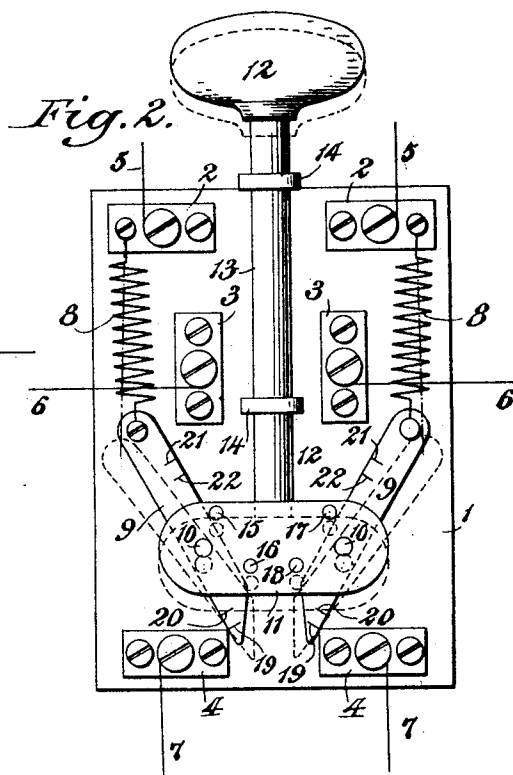
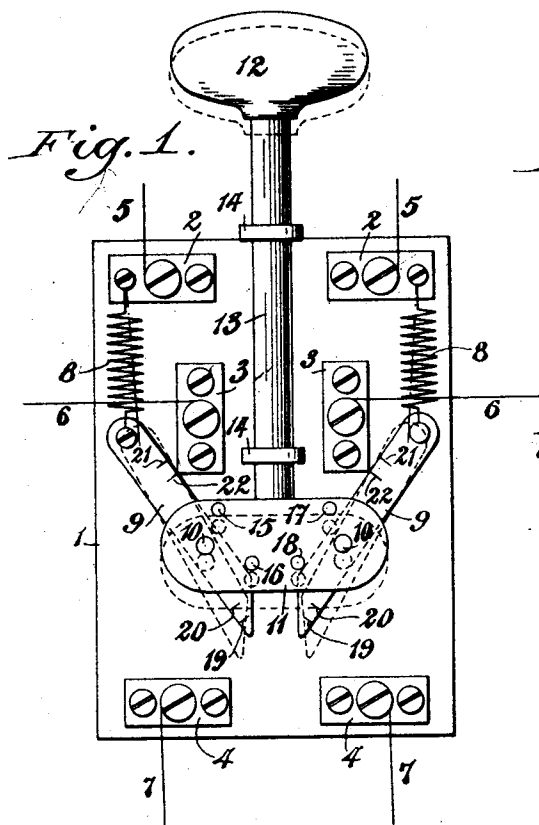


(No Model.)

C. F. W. HÖFER.
ELECTRIC SWITCH.

No. 501,071.

Patented July 11, 1893.



WITNESSES:
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CARL FRIEDRICH WILHELM HÖFER, OF BERLIN, GERMANY, ASSIGNOR TO
SIEMENS & HALSKE, OF SAME PLACE.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 501,071, dated July 11, 1893.

Application filed March 25, 1893. Serial No. 467,864. (No model.) Patented in Germany January 10, 1892, No. 65,550,
and in Belgium May 17, 1892, No. 99,704.

To all whom it may concern:

Be it known that I, CARL FRIEDRICH WILHELM HÖFER, a subject of the Emperor of Germany, residing at Berlin, Germany, have
5 invented new and useful Improvements in Circuit-Closing Keys, (patented in Belgium, No. 99,704, dated May 17, 1892, and in Germany, No. 65,550, dated January 10, 1892,) of which the following is a specification.

10 My invention has for its object to provide a circuit closing key, by means of which positive contacts may be made with wire terminals or binding posts to effect reliable electric current transmission through the key and
15 either one of two local circuits including bells, telegraph instruments, signals or other electrically operative device, or to switch one local circuit into or out of a main line circuit.

20 The invention consists in the employment of pivoted contact levers fitted to a reciprocating plunger which carries stops which the levers strike in effecting sliding contact and positive clean engagement with the binding plates or posts of the key device.

25 The invention will first be described and then will be particularly defined in claims hereinafter set forth.

30 Reference is to be had to the accompanying drawings, forming a part of this specification, and in which like numerals of reference indicate similar parts in all the views.

35 Figure 1 is a plan view of my improved circuit closing key, showing it adjusted to cut one local circuit into the main line. Fig. 2 is a plan view, showing the key adjusted to cut or switch in another local circuit, and Fig. 3 is a side view of the key device.

40 To any suitable support, such as a base plate 1, are fastened three pairs of contact plates 2, 2; 3, 3; and 4, 4, and having binding screws by which the terminals 5, 5 of the main line wire are connected to the plates 2, 2, and whereby terminal wires 6, 6 are made to connect to the plates 3, 3, one local circuit
45 in which is a bell, signal or other electrically operative device, while the terminal wires 7, 7 of another local circuit including electrically operative devices are connected to the plates 4, 4; all as shown in Figs. 1 and 2 of
50 the drawings.

To the contact plates 2, 2, is connected one end of spiral springs 8, 8, the other ends of which are attached to the adjacent ends of two switch levers 9, 9, which are pivoted at 10, 10 to the head 11 of a plunger device 12
55 having a rod 13, by which it is fitted for reciprocation in bearings 14, 14 on the base or bed-plate 1. On the plunger head are fixed two pairs of pins or studs 15, 16, and 17, 18, to which respectively the switch levers 9, 9
60 are adapted in making contacts with the pairs of plates 3, 4 of the key. The springs 8 normally contract and pull or draw upon the switch levers, and the contacts 3, 4, preferably have sharp or angular corners where the
65 switch levers strike and have a sliding or rubbing movement upon them.

The operation of the key device is very simple and effective. When the plunger 12 is in its normal position shown in Fig. 1 of the
70 drawings, the contact levers 9 are drawn by the springs 8 to hold points on them indicated by the lines 22 bearing on the corners of the contact plates 3, while the levers then rest against the plunger stop pins 16, 18, and the
75 local circuit through the wires 6 is closed to operate signal or telegraph instruments included therein. If the plunger 12 now be pushed inward, the springs 8 as they are expanded, will hold the switch levers 9 against the contacts 3
80 until the levers strike the stops 15, 17 on the plunger, by which time the levers will have slid along these contacts from the points indicated by the lines 22 to the lines 21, whereupon the levers then being retained by the
85 stops 15, 17 will leave the contacts 3, and break or open the local circuit at the wires 6. As the switch levers approach the contacts 4, the springs 8 will hold them against the stops 15, 17, until after the levers strike said con-
90 tacts at points indicated by the lines 19 thereon, and as shown by full lines in Fig. 2 of the drawings. Further movement of the plunger to the extreme inward position will swing the contact levers 9 from the stop pins 15, 17
95 to the other two stops 16, 18 and the surfaces of the levers between the lines 19 and 20 thereon will slide along the corners of the contacts 4, and the levers then assume the positions indicated by the dotted lines in Fig. 2 and the
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local circuit through the wires 7 will then be closed to operate bells, signals or other devices included therein. When the plunger is released, the springs 8 will at once move the plunger to carry the switch levers from the contacts 4 and to the opposing contacts 3. As they leave 4, the levers will again strike the stops 15, 17, after having slid along the contacts from the points 20 to those 19, and the levers will first strike the contacts 3 at the points 21, and after or while moving to the extreme positions shown in full lines in Fig. 1 of the drawings, the levers will scrape or rub on said contacts for a distance equaling that between the lines 21 and 22 on the levers, while the latter will be again swung from the stops 15, 17 to those 16 and 18 on the plunger. The springs 8 form parts of the electric circuits.

It is obvious, that the rubbing or scraping contact of the levers 9 between the points indicated by the lines 19, 20 and 21, 22, will keep the opposing faces or parts of the switch levers 9 and contacts 3, 4, clean and bright and thus assure constant reliable electric current transmission through the key. It is not essential that the contacts 3, 4 have sharp angular corners where the levers 9 make contact with them, but such construction is preferred in practice. Manifestly, the two contacts 3, 3, may be connected by a wire and the wires 6 be omitted, in which case there would be but one local circuit at the wires 7 to be switched into and out of the main circuit 5, by the key device. Various other circuits may be controlled for a variety of purposes by the use of my improved circuit closing key.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A circuit closing key, comprising opposing pairs of contacts, a reciprocating plunger or part, and switch levers or devices pivoted to the plunger and having sliding or rubbing action on the contacts, substantially as described.

2. A circuit closing key, comprising opposing pairs of contacts, a reciprocating plunger or part having stops, and switch levers or devices pivoted to the plunger and adapted to the stops and having sliding or rubbing action on the contacts, substantially as described.

3. A circuit closing key, comprising opposing pairs of contacts presenting angular or comparatively sharp corners or parts, a reciprocating plunger or part, and switch levers or devices pivoted to the plunger and having sliding or rubbing action on the contacts, substantially as described.

4. A circuit closing key, comprising opposing contacts presenting angular or compara-

tively sharp corners or parts, a plunger having stops and carrying pivoted switch levers or devices adapted to the stops and having sliding or rubbing action on the contacts, substantially as described.

5. A circuit closing key, comprising opposing pairs of contacts, a reciprocating plunger or part, and elastically held switch levers or devices pivoted to the plunger and adapted to the contacts, substantially as described.

6. A circuit closing key, comprising opposing pairs of contacts presenting angular or comparatively sharp corners or parts, a reciprocating plunger or part, and elastically held switch levers or devices pivoted to the plunger and adapted to the contacts, substantially as described.

7. A circuit closing key, comprising opposing pairs of contacts, a reciprocating plunger or part having stops, and elastically held switch levers or devices pivoted to the plunger and adapted to the contacts and stops, substantially as described.

8. A circuit closing key, comprising opposing pairs of contacts presenting angular or comparatively sharp corners or parts, a reciprocating plunger or part having stops, and elastically held switch levers or devices pivoted to the plunger and adapted to the contacts and stops, substantially as described.

9. A circuit closing key, comprising opposing pairs of contacts, a plunger, switch levers pivoted to the plunger, and springs connecting the levers with a third pair of contacts, substantially as described.

10. A circuit closing key, comprising pairs of contacts, a plunger having pairs of stops or detents, switch levers pivoted to the plunger and limited in movement by the stops, and springs connecting the levers with a third pair of contacts, substantially as described.

11. A circuit closing key, comprising opposing pairs of contacts presenting angular or comparatively sharp corners or parts, a plunger having pairs of stops, switch levers pivoted to the plunger and limited in movement by the stops, and springs connecting the levers with a third pair of contacts, substantially as described.

12. The combination in a circuit closing key, of a base 1, pairs of contacts 2, 2; 3, 3, and 4, 4 thereon, a plunger 12 having stops 15, 16, 17, 18, and pivoted levers 9, 9; and spiral springs 8, 8 connecting the levers with the contacts 2, 2, substantially as described, for the purposes set forth.

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

CARL FRIEDRICH WILHELM HÖFER.

Witnesses:

MAX WAGNER,

GEO. H. BENJAMIN.