

F. KRATZ.
ELECTROMAGNETIC SWITCH.
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1,231,271.

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Fig. 1.

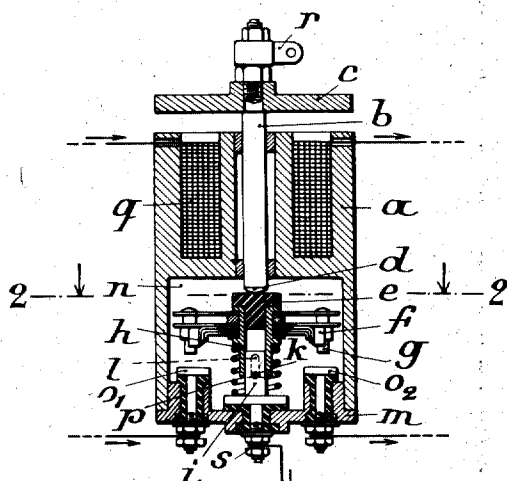
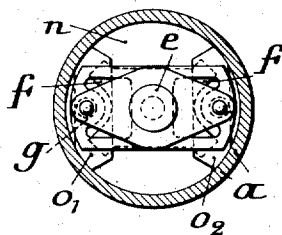


Fig. 2.



WITNESSES

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ELECTROMAGNETIC SWITCH.

1,231,271.

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To all whom it may concern:

Be it known that I, FRANZ KRATZ, a subject of the Emperor of Germany, residing at and whose post-office address is Schlossstrasse 59A, Stuttgart, Germany, have invented certain new and useful Improvements in Electromagnetic Switches; 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.

An electrical switch of large current capacity should provide an intimate engagement of low electrical resistance between the contacts upon establishing the circuit, and the separation of the contacts should be rapid and without appreciable arcing upon interrupting the circuit. Double pole switches for this purpose should in addition have uniform pressure exerted on the two poles in order to maintain an effective circuit closure, and they should also produce simultaneous interruption at the two points in the circuit. These requirements are especially important in case the switch is electromagnetically operated, first on account of the comparatively small movement available, and secondly on account of the limited amount of power available.

In the preferred form of the invention, I provide an electromagnetic switch in which these characteristics are secured by making the switch terminals with plane contact faces to contact with yielding fingers of a switch bridge, and by loosely mounting a sleeve, to which the switch bridge is secured, on a rigid guide post, so that the armature shaft of the electromagnet in pressing down on the switch bridge without connection thereto causes the switch bridge to tilt through the slight angle that is necessary to engage the switch terminals with uniform pressure. In this way, the contact resistance is maintained at a small value when the circuit is closed, and the fingers of the switch bridge in a double pole switch may be rapidly and simultaneously disengaged by a spring. Furthermore, by causing the armature of the electromagnet to bear loosely on the switch bridge without being connected thereto, the switch bridge may be insulated from the electromagnet structure in a simple and reliable manner, and at the same time the switch

bridge may be secured rigidly to the sleeve which embraces the guide post.

In the accompanying drawings illustrating the preferred embodiment of my invention,

Figure 1 is a central cross section of an electromagnetic switch of the double pole type for controlling the circuit with which it is associated; and

Fig. 2 is a section on line 2—2 of Fig. 1.

The armature shaft *b* is easily movable in bearings in the pot-shaped body *a*, and it carries at one end a clamp *r* for attachment to a mechanical part, the position of which is dependent upon the circuit connections effected by the switch. The other end *d* of the armature rests on an insulating bearing member *e* carried by the conducting switch bridge *f*, which is made up of a plurality of copper strips bent over to form yielding fingers. The switch bridge also carries the spring-mounted carbon contacts *g* designed to finally break the circuit and take the arc. The switch bridge *f* is fast on a metal sleeve *h*, which embraces a rigid post *i* with slight amount of play, the pin *k* in the post extending into the slot *l* of the sleeve to prevent rotation of the bridge. The cover *m* carries the post *i* and the insulated switch terminals *o*¹ and *o*², with which the fingers and the carbon contacts of the switch engage when the circuit is closed. The spring *p* serves to open the switch and to raise the armature shaft *b* with the clamp *r* when the current is cut off from the exciting winding *q* of the electromagnet. The terminal *s* may be provided for tapping off current from the circuit when the switch is closed.

When the winding *q* is excited, the armature *c* is strongly attracted, thereby closing the switch and moving the clamp *r*. As a result of the play between the sleeve *h* and the guide post *i*, the armature shaft *b* pressing on the insulating block *e* effects uniform pressure between both the contact fingers and the switch terminals. When the current flowing through the electromagnet winding *q* is interrupted, the spring *p* then compressed, rapidly raises the sleeve *h* and the switch bridge secured thereto, the fingers being simultaneously separated from the switch terminals and the carbon contacts *g* finally breaking the circuit.

By disconnecting the armature shaft *b*

from the switch bridge, the manner of insulating them is simplified and the switch bridge may be fastened directly to the sleeve 4. Furthermore, this arrangement provides the necessary tilting movement of the switch bridge for effecting uniform pressure between the yielding fingers and the switch contacts upon closing the circuit, and for effecting a simultaneous interruption of the circuit at two points when the electromagnet winding *g* is deexcited.

Having thus described my invention, what I claim is:

1. In an electromagnetic switch, a guide post, a switch bridge loosely mounted on the guide post for axial and tilting movements thereon, an electromagnetically responsive shaft resting loosely on the switch bridge, and a spring acting against the switch bridge in opposition to the electromagnet.

2. In an electromagnetic switch, a body portion having an electromagnet winding positioned in one end thereof, a switch bridge positioned within the other end of the body portion, a cover inclosing the switch bridge, a sleeve fastened to the switch bridge and embracing the post with a slight amount of play, an armature carry-

ing a shaft resting loosely on the switch bridge, and a spring acting between the cover and the switch bridge.

3. In an electromagnetic switch, a body portion having an electromagnet winding positioned in one end thereof, a switch bridge positioned within the other end of the body-portion and having an insulating bearing member, a cover inclosing the switch bridge and carrying switch terminals co-operative therewith, a post secured to the cover, a sleeve fastened to the switch bridge and embracing the post with a slight amount of play, an armature having a shaft passing through the electromagnet winding and resting upon the bearing member to engage the switch bridge with the switch terminals, and a spring acting between the cover and the switch bridge to disengage the switch bridge and the switch terminals upon de-excitation of the electromagnet.

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

FRANZ KRATZ.

Witnesses:

WILLIAM STRUP,
FREDERICK HOYERMANN.