

SWITCH.

1,045,897.

2 SHEETS—SHEET 1.

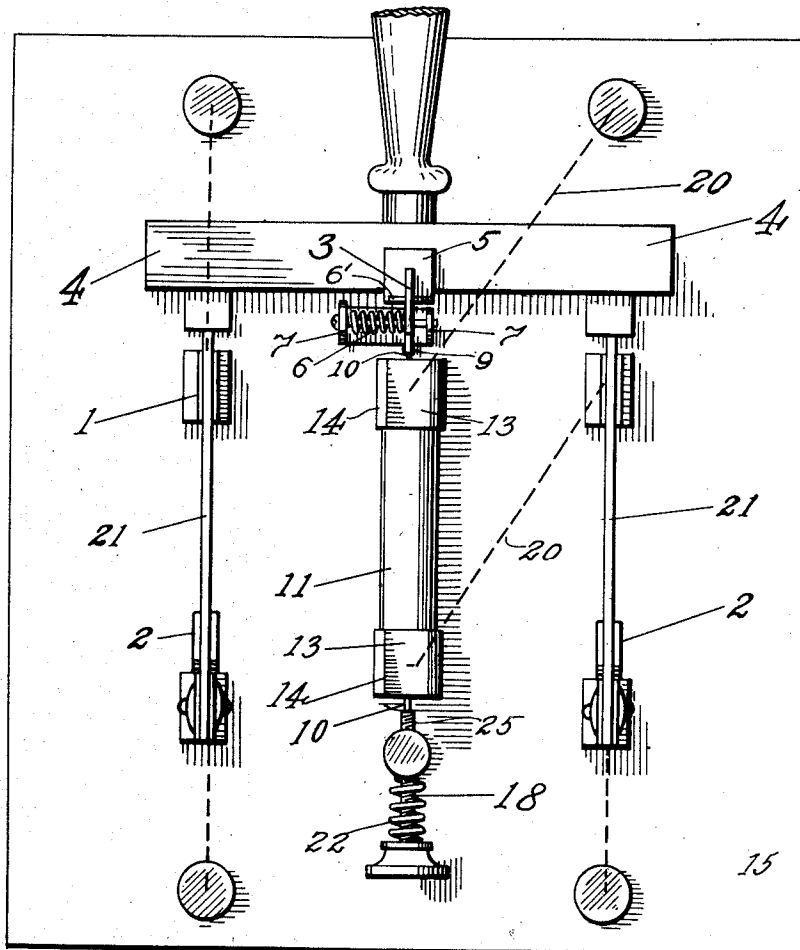


Fig. 1.

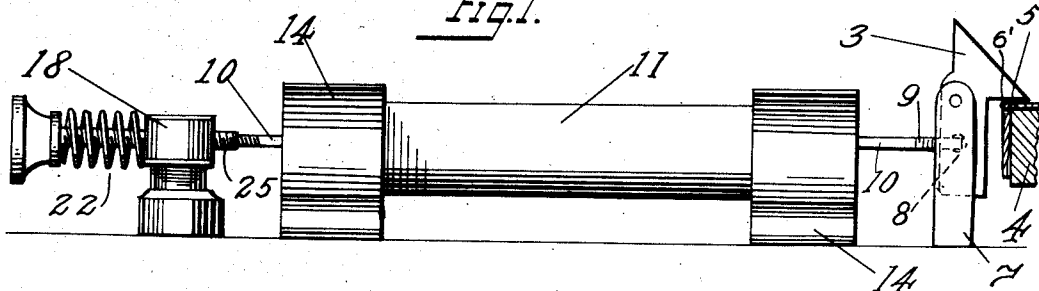
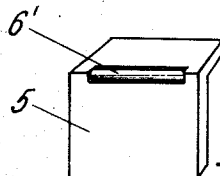


Fig. 2.

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Fig. 6.

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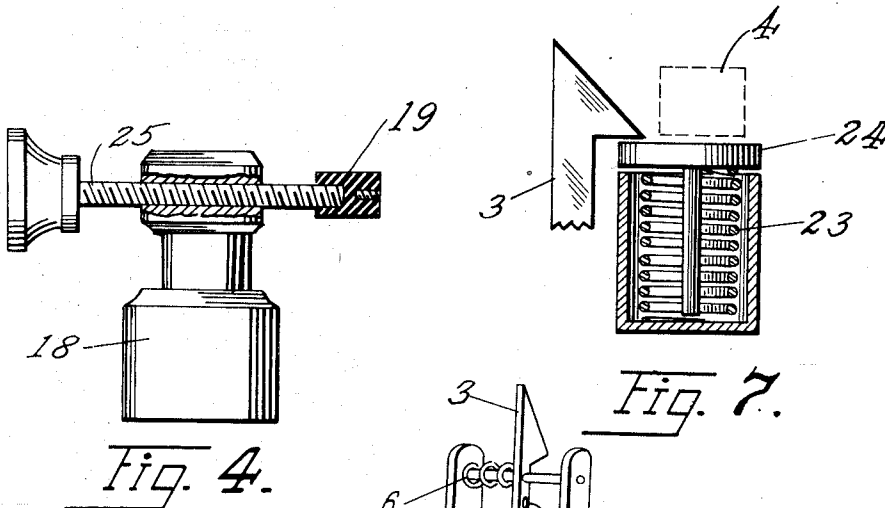
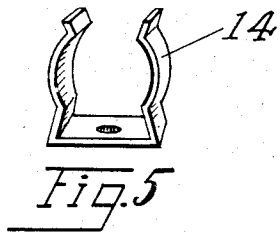
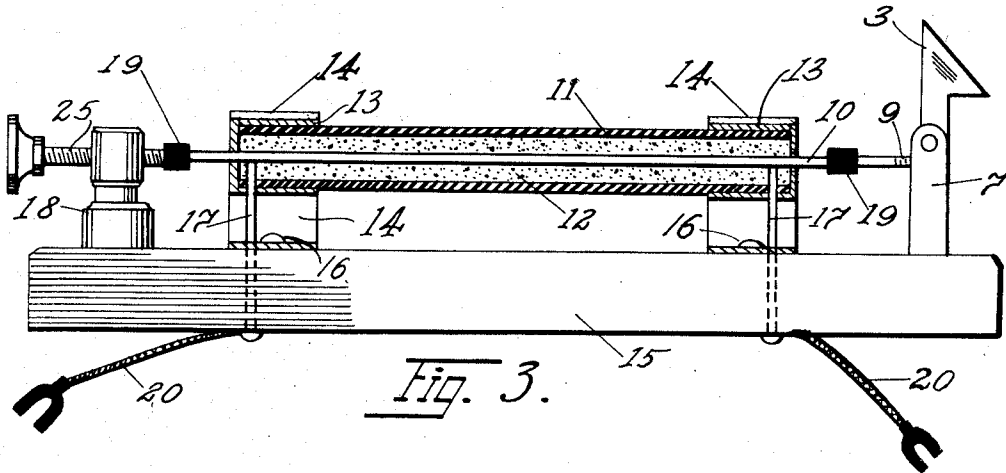
SWITCH.

APPLICATION FILED AUG. 21, 1911.

1,045,897.

Patented Dec. 3, 1912.

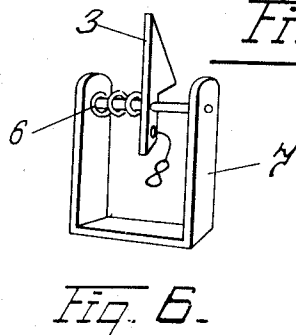
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UNITED STATES PATENT OFFICE.

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SWITCH.

1,045,897.

Specification of Letters Patent.

Patented Dec. 3, 1912.

Application filed August 21, 1911. Serial No. 645,054.

To all whom it may concern:

Be it known that I, FREDERICK J. SEYERLE, a citizen of the United States, residing at 1223 Carson street, Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Switch, of which the following is a specification.

This invention relates to electrical apparatus and more particularly to that class of devices which are known as switches, circuit breakers and remote control apparatus, and the like.

The main object of this invention is to provide a device which can be readily applied to a switch or circuit breaker for the purpose of opening the same when the current therethrough becomes excessive.

Another object of the invention is to have a device of very simple construction so that its parts can be readily assembled, inspected and repaired as desired, and at the same time relatively low in cost to manufacture and install.

A further object of the invention is to provide such a device with means to protect it from the atmospheric effects which might tend to impair and interfere with its proper operation.

A still further object is to arrange its parts so that they can be built up in standard designs and thereby made readily interchangeable and replaceable.

Still another object is to arrange the device so that its mechanical adjustments can be easily made and without affecting the operative accuracy of the device.

Many other objects will become apparent to those skilled or familiar with the art as the invention is more fully set forth.

It is well known that the usual types of circuit breaker of the electro-magnetic action involve such elaborate construction and incidentally high cost that their use becomes prohibitive for ordinary purposes. In addition a relatively great amount of care is required on the part of the workman when the circuit breakers are installed or their accuracy will be very uncertain. The large numbers of parts that the devices referred to have further increases their great liability to disarrangement, or non-working when most required. Further, the mechanical parts of such devices usually take up a large amount of valuable space on a switch board and thereby are the cause of a great increase in the cost of the same.

The adjusting mechanism of the usual circuit-breaker is a special source of weakness because it can be so easily tampered with. These, together with other disadvantages, keep the usual type of circuit-breaker from being an entirely satisfactory device and from being commonly used. This invention avoids these objections in that it provides a device which can be readily applied to a common switch and in such a manner as not to require additional space to be provided for it on the board or base that supports the switch. The cost of the device is insignificant in comparison to its value and is arranged to eliminate, as far as possible, the use of fuse in connection with the apparatus it is used with. Further, the operating mechanism of the device is arranged to actuate only as a definite amount of current passes therethrough and this cannot be changed or interfered with except by the removal or interchange of the actuating element, at the same time means are provided for keeping it properly adjusted.

In the accompanying drawings which illustrate by way of example, an embodiment of this invention, Figure 1 represents a device embodying this invention employed with a knife switch, Fig. 2, is a view in elevation of the device, Fig. 3, is a detail of the element used in this device for giving the desired opening action to the same, Fig. 4, is a detail of a means for adjusting the device for wear and the like, and Fig. 5, is a detail of a catch clip for the device in question. Fig. 6 is a detail of the catch mechanism, and Fig. 7 is a modification of a spring means for actuating the switch. Fig. 8, is a detail of the plate member used in connection with the catch mechanism.

Similar reference characters refer to similar parts throughout the drawings.

In the construction shown in the appended drawings 1 represents a knife switch which is preferably provided with resilient means 2 which tend to open said switch and thereby the circuit in which it is connected but is prevented from opening by reason of a movable catch or pawl 3 engaging with a suitable part of the switch. In the drawings the pawl 3 engages over the cross bar 4 of the switch 1 and rests on a plate 5 having a frictionless roller 6 on the edge portion thereof for improving the action of the device when being actuated for releasing the switch.

The pawl 3 is preferably kept in contact with the plate 5 through the use of a spring 6 secured to the base 7 which pivotally supports the catch or pawl 3. Disposed in a hole 8 in the pawl 3 is a hook 9 which is disposed on the end of a thermostatic member 10 that is held and protected by a non-conducting fireproof casing 11 which is filled with asbestos or other desirable refractory material 12 so that the heating of the member 10 will not affect the material appreciably and also so that the air will be kept from affecting the member in a manner to interfere with its accuracy and proper action.

The casing has suitable caps 13 provided on its end portions for strengthening and protective purposes, and for keeping the material 12 within the casing, and also for permitting any repairs desirable to be readily made. These caps are preferably screwed on so that the material 12 within the casing can be kept compressed or loosened as desired. However, it is understood that other means can be used for holding the caps securely in place. These caps 13 are arranged to slip into clips 14 provided therefor on the base 15 which supports the various parts of the device. The clips 14 are securely and rigidly held in position by means of bolts and nuts 16, and the thermostatic member is held properly within the casing by means of the pieces 17 sweated or threaded on the ends thereof and arranged to keep the same taut. The pieces can be provided with means for attaching them to the hook 9 and if desired to an adjusting mechanism 18. The last mentioned parts can be included in the circuit or insulated therefrom by insulators 19 should the conditions under which the device is used make it necessary or beneficial.

The connections of the device to a switch are clearly shown in Fig. 1. These connections can be made with flexible insulated conductors 20 or conductors which can be adjusted to connect to the parts of a switch without changing the length of conductor that the current has to go through, at the same time these conductors must be arranged so as not to become objectionable to the fire and protective regulations that have to be ordinarily complied with.

The ordinary way to install this device is to attach it between the blades 21 of a switch that normally tends to open under the action of a spring 2 or weight. In cases where it is not feasible to have a spring switch it is better to use the type of attachment shown in the modification as it provides the necessary force to open the switch by having a spring member 23, preferably having a cap 24 attached to it which strikes the switch and opens the same when the pawl is released by the member expanding

from being heated by the excessive current passing therethrough, and by the additional effect of the spring action on the pawl. As the member expands it permits the pawl to rotate under the action of the spring and at a certain point of its travel to readily slip off the plate and permit the switch to open under the action of the resilient means.

The modification shown in Fig. 6 indicates a coiled electrostatic member which is suitable when the material used for the same has a low coefficient of expansion, and also as a choke coil so that the device can be arranged to meet special conditions such as arise with lightning, etc.

In making up the device it is preferred to make the thermostatic member in various sizes so that they can readily be placed in the clips provided therefor, that is a thermostatic member which will actuate the catch when say two amperes flow through the same, may be placed in the clips or one say for 15 amperes, or some other size depending on the conditions under which the device is used, both being arranged to permit this interchangeability.

The simplicity of this device is so pronounced as to be readily apparent and the cheapness with which it can be manufactured and installed recommends it to common use so that the device in general serves as a means for protecting electrical circuits of large or small capacity without involving any considerable cost.

The adjusting mechanism 18 is preferably provided with a spring 22 to keep its threaded member 25 tightly in place. When the insulators 19 are used it is preferable to thread the ends of the various parts as is clearly shown in the drawings.

Obviously it is not desired to limit the invention to the form shown in the drawings or in any other way otherwise than necessitated by the prior art as many modifications in the construction of this invention may be made without departing from the principles thereof.

Having thus described the invention what is claimed is:

1. In combination with a self opening knife switch, a thermostatic holding device comprising a thermostatic member, pawl mechanism attached to one end of said member, means for securely holding the other end of said member, a spring for tensioning said mechanism against the restraining pull of said member, a casing for said member having conducting end caps, said caps being connected with said member, spring clips for holding said caps and conducting current thereto, a plate secured to the crossbar of said switch, and a roller disposed in and freely rotatable in said plate, said roller being arranged to form the means engaged by said pawl mechanism

whereby the switch is restrained from opening, and to reduce the frictional resistance offered to the opening movement of said mechanism.

5 2. In combination with a self opening knife switch, a thermostatic holding device comprising a thermostatic member, pawl mechanism attached to one end of said member, means for securely holding the other
10 end of said member, a spring for tensioning said mechanism against the restraining pull of said member, a casing for said member having conducting end caps, said caps being connected with said member, spring clips
15 for holding said caps and conducting current thereto, a plate secured to the crossbar of said switch, and a roller disposed in and freely rotatable in said plate, said roller being arranged to form the means engaged by
20 said pawl mechanism whereby the switch is restrained from opening, and to reduce the frictional resistance offered to the opening movement of said mechanism, means for adjustably tensioning said member, and resilient means for keeping said last mentioned
25 means tensioned.

3. An attachment for switches and the like comprising in combination a thermo-

static member, a pawl actuated thereby, a spring for said pawl and means for supporting said spring and pawl, a casing for said member, refractory material loosely disposed in said casing and around said member, means for removably holding said casing; means for connecting said member in a
35 circuit, means for adjusting the tension of said member and a supporting base for said parts.

4. An attachment for switches and the like comprising in combination a thermo- 40 static member, a pawl actuated thereby, a spring for said pawl and means for supporting said spring and pawl, a casing for said member, refractory material loosely disposed in said casing and around said 45 member, means for removably holding said casing, means for connecting said member in a circuit, means for adjusting the tension of said member, and means for insulating said member from said pawl and adjusting 50 means.

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Witnesses:

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