(No Model.)

G. H. WHITTINGHAM.

THERMAL CUT-OUT.

No. 438,721. Patented Oct. 21, 1890.

Fig. 1.

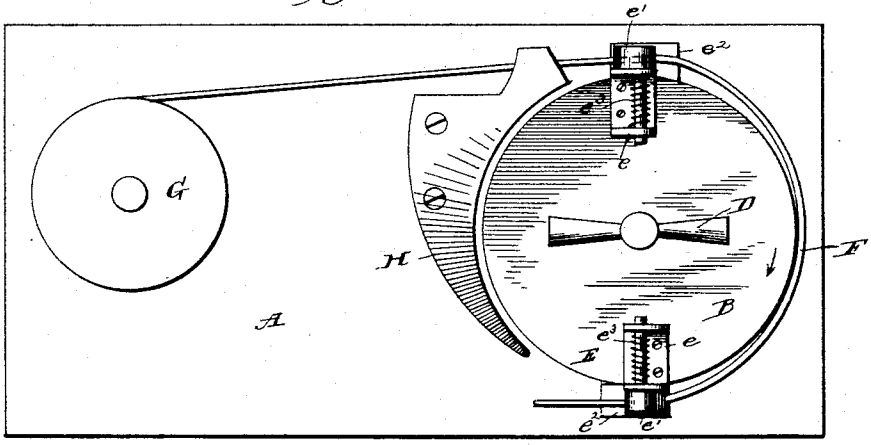


Fig. 2.

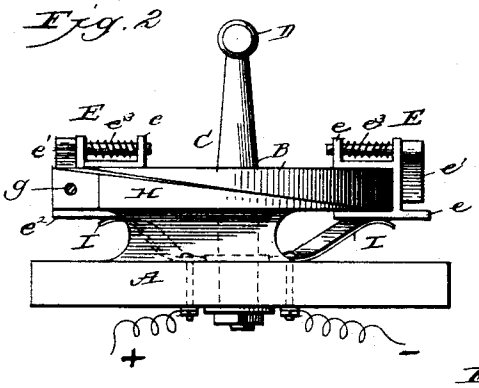


Fig. 3.

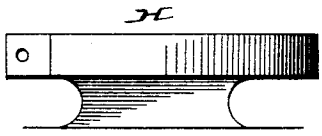
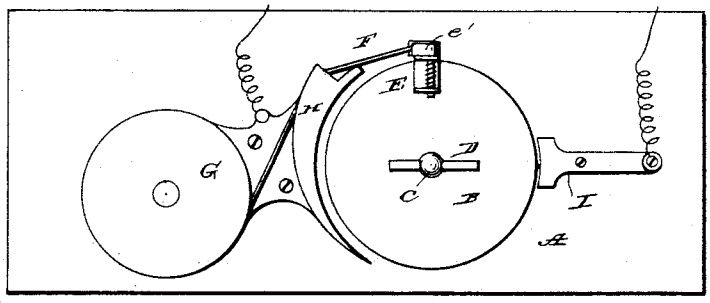


Fig. 4.



Witnesses
E. H. Smith
Thomas Durant.

Inventor
George H. Whittingham,
By his Attorneys
Church & Church

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE HERBERT WHITTINGHAM, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE AUTOMATIC SWITCH COMPANY, OF SAME PLACE.

THERMAL CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 438,721, dated October 21, 1890.

Application filed June 9, 1890. Serial No. 354,780. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HERBERT WHITTINGHAM, of the city of Baltimore, State of Maryland, have invented certain new and useful Improvements in Thermal Cut-Outs; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates to that class of cut-outs, indicators, or thermal-actuating devices wherein a short strip or section of fusible or destructible material is exposed to the action of heat, and under the influence of an abnormal increase in temperature is melted, consumed, or its condition otherwise so changed as to effect the interruption of an electric circuit, sound an alarm, work an indicator, or set in action suitable safety devices; and it consists in the novel and improved construction and arrangement of devices for automatically resetting or recharging the apparatus after a section of the fusible or other equivalent material has been consumed, as hereinafter fully described, and pointed out in the claims.

The present invention constitutes, in effect, an improvement upon the thermal cut-out embraced in my prior application, Serial No. 341,107, and is designed especially with a view to overcoming some minor defects and improve the action of the device therein shown.

In the drawings, Figure 1 is a top plan view, and Fig. 2 is a side elevation, of my improved cut-out; Fig. 3, a detail view of a slightly-modified form of deflector. Fig. 4 is a plan view of a modified form of the apparatus employing a single clamp.

Similar letters of reference in the several figures indicate the same parts.

Upon a proper base A of insulating material is mounted a rotary head or disk B, preferably of slate or equivalent insulating substance. In the illustration the head B is mounted upon a post C, which is provided with a suitable handle D or other convenient means for turning the head. To the disk or head B are secured at least two clamping devices E, which latter, when the apparatus is intended for use in an electric circuit, form terminals of the line.

The clamping devices E, preferably duplicates, are designed and constructed to clamp the fusible strip F near the end and take a firm hold on it, so that when the head is rotated the strip will be drawn from a supply spool or holder G and wound upon the periphery of the head or disk until the next succeeding clamp is brought over or in position to engage the strip F in rear of the first clamp, when said second clamp is caused to impinge upon or grasp the strip, thereby completing the circuit or connection between the two clamps or the line-terminals. Should the strip lying between the clamps be consumed or melted, the connection can be restored by simply turning the head B until the next succeeding clamp is brought into engagement with the strip, the second or rearmost clamp retaining its hold upon the end of the strip and serving to draw and wind the latter about the disk.

The preferred form of clamp is one having a movable jaw or section exercising a dogging action upon the strip to prevent its being withdrawn as the head is moved forward, but capable of being opened to release the forward end of the strip and again move into engagement with the latter in rear of the next preceding clamp by automatic releasing devices engaging or actuating the movable jaw. A clamp of this description is shown in the drawings. It consists of a frame *e*, extending on opposite faces of the head or disk B to provide a firm and secure bearing thereon, and carrying a pivoted dog e', whose end or engaging portion co-operates with a flange or supporting surface e^2. The dog e' is arranged to stand, when closed, at an angle to the plane of rotation of the head, its point or engaging portion being in advance, and a spring e^3 is caused to act upon the dog on its supporting-pin, so as to hold the point depressed and at the same time permit it to be elevated or swung back from the support e^2.

The automatic releasing device here shown consists of an arm or deflector H, mounted upon the base and projecting into or across the path traversed by the dog to engage and

elevate the latter as the head is advanced, and thereby effect the release of the forward end of the strip. The deflector H is preferably formed with a tapering surface and curved so as to lie in the path traversed by the dogs, and a guide or opening *g* is provided at or near the heel or rear end of the deflector in which the strip F is received and guided. It is not essential that the deflector should be tapered throughout its length, or that it should be tapered at all, in order to effect the disengagement of the dog and release the end of the strip, as the inclination of the dog may be sufficient to cause its elevation upon making contact with the front end of the deflector, as illustrated in Fig. 3. The tapering form of deflector is preferred, however, because by reason of the wedging action less power is required in rotating the head. The forward or entering end of the deflector is also shown tapered on its outer face, while the lower face is about in the plane of the surface e^2 of the clamp. This construction is adapted for two purposes—first, in order that the deflector may also operate as a clearer to remove the end of the strip from the clamp after the strip has been ruptured and when the head is revolved to insert another section, and, second, as incidental to the above, to prevent the strip from being caught or running beneath the deflector.

The two clamps may be connected to or maintained in communication with their respective line-wires in a variety of ways well known and understood by those skilled in the art. Thus in the present instance two springs or brushes I are secured upon the base, their free ends projecting into the path traversed by the clamps or contact-plates connected thereto, and being so arranged as to make contact therewith when the head has been rotated sufficiently to cause both jaws to bear upon and engage the strip F. By this means a switch or cut-out is formed, and the strip is not subjected to the action of the current until the clamps have been seated and connection between them fully established.

The operation of the device is simple and obvious. The holder G—such as a spool or other receptacle—is charged with a supply of the fusible or other material in the form of a wire or strip, and the end conducted through the guide *g* and beneath the jaw of one of the clamps, by which it is engaged and firmly held. Upon rotating the head in the direction indicated by the arrow in Fig. 1, the strip or wire is drawn from the holder through the guide and wound upon the periphery of the head. As the wire or strip employed for heavily-charged circuits is necessarily of large sectional area, some considerable power is required to coil or bend it around the head, and by winding it in contact with the periphery the pressure on the clamp is in a measure relieved by the frictional contact of the strip upon the head. By the continued forward motion of the head the dog of the clamp in advance of the one just described as engaging the strip at or near the end is carried in contact with and caused to ride upon the deflector, which latter raises the jaw and holds it elevated or removed from the opposing surface e^2 until, by the continued movement of the head, the strip or wire is brought within the clamp—that is to say, between the surface e^2 and the biting end of the dog—when the dog passing off from the deflector impinges and is seated upon the strip, thus establishing communication between the two clamps through the strip lying between them. At the same time, or by a slight further movement of the head, the circuit is closed between the springs and the frames of the clamps. The apparatus is now in condition for service. Should the strip or wire be consumed, melted, or ruptured, it will occur at a point intermediate the two clamps or at the point of contact between one or both of the clamping-dogs with the strip. If the rupture occurs at the forward clamp—*i. e.*, the one engaging the strip near the end or at a point intermediate the two clamps—a partial rotation of the head will bring a new section of the strip into position, any portion of the strip retained by the forward clamp being detached and removed by the front end of the deflector. Should the strip be consumed or ruptured so near the second or rear clamp as to detach the strip from the dog, the connection will be re-established by a complete movement of the head, whereby one clamp will be caused to engage the end of the strip projecting from the guide and will draw the strip until the next clamp is brought into position and caused to engage the strip at or near the guide.

Instead of mounting a multiplicity of clamps upon the movable head or disk, a single clamp may be employed, as illustrated in Fig. 4, wherein the guide for the fusible strip is connected to one circuit-wire, the other terminal being connected to a spring clip or contact I in position to engage the clamp or its frame as the movable head is advanced. As thus arranged the head is moved until the circuit is established between the guide or support over or through which the strip is drawn and the clip I by bringing the clamp against said clip.

Should the fusible strip be consumed between the guide and clamp, by giving the head a complete revolution on its axis the clamp will be caused to grasp the end of the strip protruding from the guide and draw a fresh supply from the holder.

In order to insure grasping the end of the strip, the guiding-surface is arranged to stand or project slightly beyond the heel of the deflector, so that when the movable jaw of the clamp is released or passes off it will be sure to engage the end of the strip.

Having thus described my invention, what I claim as new is—

1. In an apparatus such as described, the combination, with a movable head or support

carrying a clamp, of means for automatically opening and closing said clamp, and a guide for the strip or wire supported in proximity to the clamp and in such relation to the devices for actuating the clamp that the strip or wire will be presented to and engaged by the clamp as the latter is brought near the guide, substantially as described.

2. In an apparatus such as described, the combination, with a movable head carrying a multiplicity of clamps insulated one from another, of a deflector lying in the path of and engaging the clamps successively to open them, and a guide for the fusible strip located in rear or at the releasing end of the deflector, substantially as described.

3. In an apparatus such as described, the combination of a rotary head, clamps mounted thereon, a fixed deflector standing in the path of the clamps and engaging the latter successively, and contact-plates mounted on the base and engaging the clamps, substantially as described.

4. In an apparatus such as described, the combination of a head or disk pivotally supported and carrying a clamp, and a guide through which the fusible strip or wire is conducted and presented between the sections of the clamp, the latter moving on opposite sides of the guide to engage the strip and wind it upon the head, substantially as described.

5. In an apparatus such as described, the combination, with the holder, guide, and deflector mounted upon the base, of the rotary head carrying a plurality of clamps, each of the latter provided with a spring-pressed dog engaging the deflector, as set forth.

6. In an apparatus such as described, the combination, with the fixed guide and deflector, of the rotary head provided with a plurality of clamps, each of the latter comprising a frame embracing the disk, and a pivoted dog inclined to the plane of rotation of the head, substantially as described.

7. In an apparatus such as described, the combination, with the rotary head and its spring-actuated dogs, of the tapered deflector engaging the dogs and entering between the latter and the opposing wall of the clamp, substantially as described.

8. In an apparatus such as described, the combination, with the rotary head and its clamps, of the wedge-shaped deflector engaging the movable sections of the clamps, and the guide located in rear of the deflector, substantially as described.

9. In an apparatus such as described, the combination, with the rotary head carrying circuit-contacts and a plurality of clamps, of a deflector engaging said clamps successively to open them, and a guide for the strip or wire for directing the latter into the clamps as they are released by the deflector, substantially as described.

10. In an apparatus such as described, the combination, with the movable head or support carrying a clamp, of a guide for the flexible strip in line with the clamp, and a deflector operating upon the movable section of the clamp to open the latter for the admission of the fusible strip, substantially as described.

GEORGE HERBERT WHITTINGHAM.

Witnesses:
FELIX R. SULLIVAN,
JOS. W. BROOKS.