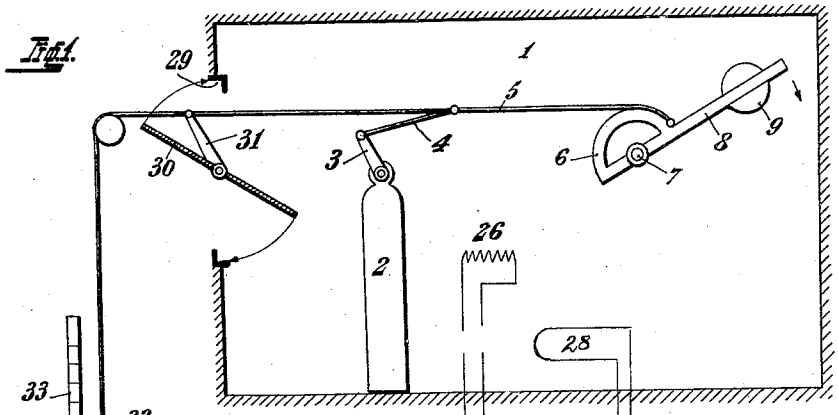
May 26, 1931. D. SIEBENMANN 1,806,829

AUTOMATIC FIRE EXTINGUISHING DEVICE

Filed Oct. 8, 1926

Fig. 1.



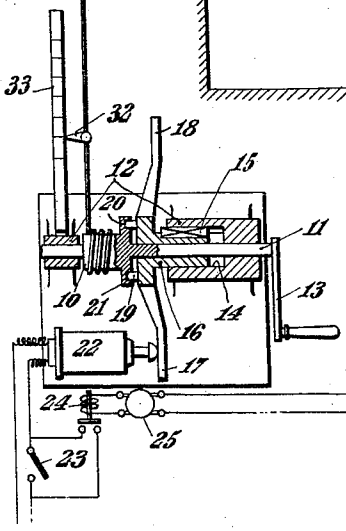


Fig. 2.

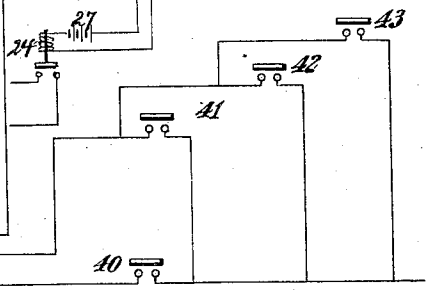


Fig. 3.

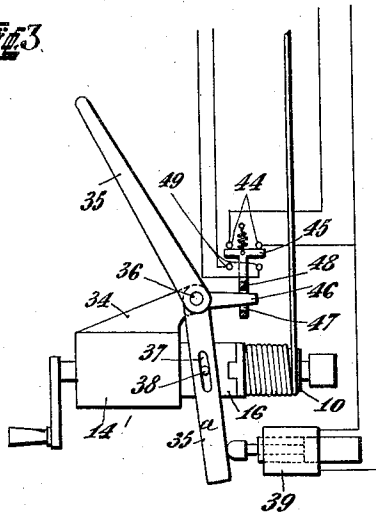
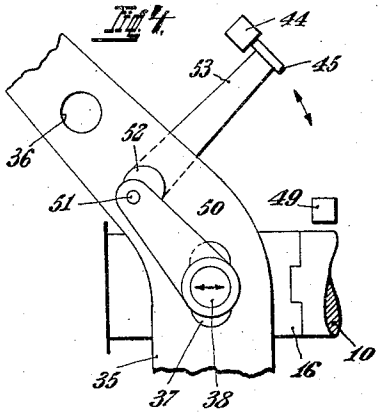


Fig. 4.



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UNITED STATES PATENT OFFICE

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AUTOMATIC FIRE-EXTINGUISHING DEVICE

Application filed October 8, 1926, Serial No. 140,258, and in Switzerland October 14, 1925.

My invention relates to automatic fire-extinguishing devices of the kind comprising a fire-extinguishing apparatus in the chamber or space to be protected and a control member that automatically operates at a predetermined temperature.

According to a primary feature of the invention, a fire-extinguishing device of this type is characterized in that a flexible connection, such as a cord, which is wound on the drum of a winch that is normally locked but can be released by hand or electromagnetically, is so connected with the fire-extinguishing apparatus and with a weight that when the drum is released the fire-extinguishing apparatus is set in operation by the fall of the weight.

Preferably, a bushing coaxial with said drum is movable endwise in a bore of a bearing carrying the shaft of the drum, which bushing can be locked to the drum.

Conveniently, the bushing which serves to lock and release the drum has at least one arm for actuating it and can be shifted endwise by an electromagnet arranged in operative relation to said arm.

The said weight may be arranged on an arm of a segment to which the flexible tie is attached.

Further, the tie may carry near the winch a pointer that is movable along a scale and indicates at the winch outside said chamber the position of the weight in the latter.

Moreover, a contact device may be provided by which the energizing current of the electromagnet controlling the release of the drum is automatically switched off at the end of the working stroke of its core.

Other features of the invention will be described hereinafter and pointed out in the claims.

Two embodiments of the invention and modifications thereof are diagrammatically illustrated by way of example in the accompanying drawings, wherein:—

Figure 1 is a side elevation, partly in section, showing one form of fire-extinguishing installation according to the invention and Figure 2 shows a modified detail thereof; Figure 3 is a side elevation of a second embodiment, and

Figure 4 shows a modified detail thereof, drawn to a larger scale.

According to Figure 1, a chamber 1 to be protected from fire contains a flask 2, or a pipe, filled with a fire-extinguishing gas or liquid, the closure member of which flask or pipe is connected with a flexible tie 5, e. g. a rope or a cord, by means of a lever 3 and a link 4. The tie 5 is attached to a sector 6 which is rotatable about a fixed axle 7 and carries a weight 9 on an arm 8. The other end of the tie 5 extending outside the chamber 1 is wound up on a drum 10 whose shaft 11 integral with it is journaled in a bearing 12 and carries a crank handle 13. In an enlargement 14 of the bore of the bearing 12 is provided a sleeve or bushing 16 that is concentric with the shaft 11 and is guided to slide endwise by means of a key 15. The bushing 16 has two arms 17 and 18 adapted to shift it. On its end face adjacent the drum 10 the bushing has dogs or claws 19 which can engage in recesses 20 of a flange 21 of the drum, whereby the latter can be locked against rotation. Opposite the arm 17 is an electromagnet 22 whose energizing circuit can be closed by a hand switch 23 and by a relay 24. This relay is connected in well known manner by a cross-wound coil 25 with a resistance element 26 in the chamber 1 which, on attaining a predetermined temperature, brings about the operation of the relay 24 and thus serves as a control or supervisory member in the chamber 1.

As shown in Figure 2, a fusible wire 28 connected in the closed circuit of an electric battery 27 may serve as a control or supervisory member in the chamber 1 instead of the resistance element aforesaid. When the wire 28 fuses, the relay 24 in series with it operates and closes the energizing circuit of the electromagnet 22.

If the chamber 1 has, as shown in Figure 1, one or more openings 29, which can be closed each by a shutter 30, there is attached to the rope 5 a lever 31 fast on the axle of the shutter or valve 30. The rope 5 carries a pointer 32 which, when the drum 10 ro-

tates, moves along a vertical graduated rod 33 and indicates the position of the weighted lever 8 which may be out of sight.

When the described apparatus is set, the weight 9 is elevated as shown, the flask 2 is closed, the shutter 30 is open and the drum 5 is secured against rotation by the bushing 16, i. e. it is locked.

If an abnormal rise of temperature occurs in the chamber 1, either because a fire is about to start or has broken out, the relay 24 will be actuated by the resistance element 26 or the fusible wire 28. The core of the energized electromagnet will hit the arm 17 and push the bushing 16 away from the drum 10. As soon as the latter is released, the weight 9 will operate, turning the sector 6, actuating the fire-extinguisher 2 and closing the shutter 30.

Should the described protective apparatus not operate automatically when a fire threatens, or has broken out, the described operations can be brought about by closing the switch 23, or by pushing back the bushing 16 by means of its arm 18.

In the modification shown in Figure 3, the locking bushing 16 is normally clutched with the drum 10, as shown in Figure 1, and is axially movable in the fixed casing 14'. A three-armed lever 35, 35a, 46 is fulcrumed at 36 on an arm 34 of the casing 14'. A pin 38 projecting laterally from the bushing 16 extends into a longitudinal slot 37 in the lower arm 35a of the lever, so that by rocking the upper arm 35 the drum 10 is disengaged and the remainder of the apparatus, not illustrated, is actuated. The lever 35, 35a, 46 can be rocked manually or by an electromagnet 39 whose energizing circuit can be closed by four separate switches 4, 41, 42, 43 in the chamber to be protected. Of these switches the one numbered 40 can be closed by hand, 41 by a closed-circuit relay, 42 by an excess temperature relay, and 43 by a differential relay.

In order to interrupt the energizing current of the electromagnet 39 automatically, as soon as the core of the latter is at the end of its working stroke, the diagrammatically illustrated contact device shown in Figure 3 may be used. The pair of contacts 44 is connected, on the one hand, with the one lead of the electromagnet 39 and, on the other hand, with a contact of each of the switches 41, 42, 43. The contacts 44 are normally, i. e. in the set condition of the apparatus, connected together electrically by a switch member 45 which is pressed, e. g. resiliently, against the contacts 44. The arm 46 of the lever aforesaid extends with play through a slot 47 of a rod 48 carried by the switch member 45 and pulls the latter away from the contacts 44 only when the core of the electromagnet 39 is at the end of its working stroke and the drum 10 is released by the bushing 16. The energizing current of the electromagnet 39 is thereby interrupted. Below the switch member 45 are two contacts 49 which are electrically connected together by the downwardly moved switch member 45. In this manner, the circuit containing these two contacts is closed. If the apparatus serves for protecting electric generators it is preferable to weaken the field of the generator by the said circuit, or to actuate any other suitable device for assisting the fire-extinguishing apparatus.

Figure 4 shows a modification of such a contact device actuated by the lever 35, 35a. As the electromagnet 39 is operated by direct current, for protecting the contact pieces it is important, in spite of the relatively small stroke of the lever 35, to break the circuit as rapidly as possible, i. e. to have a high velocity of the switch member 45 with a small stroke of the lever. This is obtained in the construction shown in Figure 4. The pivot 38 is operatively connected by a lever 50 with an eccentric pivot 51 of a shaft 52 journaled in the lever arm 35. On the shaft 52 is fixed a lever 53 that carriers the switch member 45 between the pairs of contacts 44 and 49. In order that the electromagnet core may act as powerfully as possible on the lever 35, 35a which is influenced by a spring not shown, the distance between the core and the lever is so selected that the former coacts with the lever only during the latter part of its working stroke. As soon as the lever 35 is actuated by the electromagnet, the bushing 16 is moved away from the drum 10, i. e. the latter is unlocked. At the same time, the shaft 52 carrying the lever 53 is rotated very rapidly owing to the great leverage, so that no appreciable spark can occur at the contacts 44 and 45. The energizing current of the electromagnet 39 is thus interrupted also during the latter part of the working stroke of the core of the electromagnet and after the release of the winch drum.

An advantage of the fire-extinguishing apparatus illustrated in Figures 3 and 4 is that the electromagnet is automatically cut out of circuit after it has operated, and that the supervisory circuit is automatically closed when the winch drum is set in its position in which it is ready to operate.

I claim:—

1. In a fire-extinguishing device including a container having an extinguishing medium therein and means thereon to be operated to release the extinguishing medium, a winch and a rope connecting said winch with said fire-extinguishing device, a release mechanism comprising an axially movable member adapted to normally lock said winch in inoperative position, an electro-magnet, and means operatively associated with said axially movable member and adapted to be actuated by said electromagnet to move said mov-

able member into unlocking position, permitting said winch to be operated.

2. In a fire-extinguishing device including a container having an extinguishing medium therein and means thereon to be operated to release the extinguishing medium, a winch and a rope connecting said winch to said fire-extinguishing device, a release mechanism comprising an axially movable bushing adapted to normally lock said winch in inoperative position, a pivoted arm operatively associated with said bushing, an electromagnet adapted to rock said pivoted arm to thereby move said bushing into unlocking position, an electric circuit for said electromagnet, a contact device included in said circuit, and a means connected with said pivoted arm to open said contact device to thereby break said circuit upon the operation of said pivoted arm by said electromagnet.

3. The combination as specified in claim 2, in which said contact device comprises a shaft journalled in said pivoted arm, a contact arm secured to said shaft, and means operatively connecting said shaft with a portion of said pivoted arm so as to cause said contact arm to be rocked upon the rocking of said pivoted arm to break the circuit.

4. The combination as specified in claim 2, in which said contact device comprises a shaft journalled in said pivoted arm remote from the fulcrum of said arm, a contact arm secured to said shaft, a pin eccentrically carried by said shaft, and a link having one end concentric with the fulcrum of said pivoted arm and the other end rotatable about said pin.

Signed at Berne, this 25th day of September 1926.

DANIEL SIEBENMANN.