



## UNITED STATES PATENT OFFICE

2,269,372

## PUSH-OUT FUSE

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Application March 12, 1940, Serial No. 323,613

12 Claims. (Cl. 200—116)

This invention relates to high tension electrical fuses and, among other objects, aims to provide important improvements in removable fuse units adapted to be employed also in gang operated fuse switch assemblies. The main idea is to provide a novel expulsion type automatic push-out fuse to supplant the well known drop-out fuses and eliminate some of the objectionable features encountered by the use of the drop-out mechanism. Another aim is to provide simple means which is positively operated to swing the fuse tube out of its fused position. A further aim is to provide a mechanism which relieves the fuse link of all stresses other than the tension necessary to hold the mechanism ready to be released and to make it impossible to break the fuse link when the fuse unit or tube is handled by an ordinary switch hook or operating implement. In many respects, this application involves improvements on the mechanism disclosed in my copending application Ser. No. 262,521, filed March 17, 1939.

Other aims and advantages of the invention will appear in the specification, when considered in connection with the accompanying drawings, wherein:

Fig. 1 is a side elevation of a single fuse unit constituting one phase of a gang fuse switch assembly and embodying the invention;

Fig. 2 is a fragmentary front elevation of the lower part of the fuse operating mechanism shown in Fig. 1;

Fig. 3 is a sectional view, partly in elevation, taken on the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary sectional view taken on the line 4—4 of Fig. 1; and

Fig. 5 is a side elevation of the fuse unit.

Referring particularly to the drawings, the improved fuse unit is shown as being adapted to be operated as a gang switch in the same general manner as is disclosed in the aforesaid copending application, except that the fuse units do not drop out in this case. It is to be understood, however, that the switch combination is optional and the invention is equally applicable to fuses per se. It has been found that the fuse wires in drop-out fuse assemblies are subjected to excessive strains due to handling and to the spring pressure applied to the fuse units initially to cause them to drop out. Also, the effective length of the fuse tubes is decreased due to stretching of the flexible fuse wires. In this instance, the fuse units are initially swung out of engagement with the upper fuse contact by a push-out or kick-out impulse imparted by a spring which is

also utilized to maintain the fuse wire under the desired tension and the link is not subjected to any other strains.

Referring particularly to the mechanism, the fuse tube 10 is shown as being supported vertically on the usual spaced insulators 11 and 12 secured to a support or channel 13. The lower insulator 11 is rotatable to operate the fuse as a switch and the upper insulator 12 carries a spring-urged contact 14 mounted for universal movement on a pivoted bracket 15 which is preferably identical with that shown in said copending application. However, other types of upper contacts may be employed. The upper end of the fuse tube carries a terminal 16 which cooperates with the contact 14. It is mounted on a ferrule 17 carrying the usual hook eye 18. The arrangement is such that the fuse unit may swing forwardly or to the right, as viewed in Fig. 1, when the fuse blows, and to one side by movement imparted to the insulator 11, when the fuse is operated as a switch.

The lower end of the fuse tube is shown as having a fixed collar or ferrule 19 carrying trunnions 20 mounted in bearing notches 21 on spaced bracket arms 22 carried by a cap plate 23 on the lower insulator 11. The back side of the fixed collar 19 has a contact extension 24 with a hook eye 25 and a clamp member 26 for the fuse wire 27. The rear face of this extension acts as a contact face engaging a combination contact arm and buffer 28 pivoted at 29 to a pair of downwardly projecting arms 30 on the brackets 22. The upper end portion of this arm is shown as having a flexible conductor 31 connecting it through the cap plate to a pivoted line terminal 32. The lower end of the arm 28 terminates in a fork having guiding fingers 33 to receive the fuse tube and its mechanism when the fuse swings to its lowermost position.

The cap plate 23 is shown as having a vertical bracket extension 34 carrying a pivoted bifurcated arm 35 straddling the fuse tube and it is connected to the upper end of the combination contact and buffer arm 28 by a spring 36. This arm is designed to hold the fuse tube assembled in its bearing when the fuse is operated as a switch and also serves as an abutment for the push-out mechanism on the tube when it is operated as a fuse. It is shown as having side flanges presenting notches 37 to receive trunnions 38 on forked arms 39 of a push-out lever 40 pivoted at 41 at the back of the tube 10 to a fixed collar 42. The push-out lever is generally Z-shaped and the pivot point 41 is near the trunnions 38

ber coacting with the upper end of said lever; a grooved fuse wire guide element pivotally connected to the lower end of said lever and extending rearwardly into the lower open end of the fuse tube; a sheave carried by the guide about which the fuse wire is trained to maintain it under tension and to release the push-out lever when the fuse blows.

7. A high tension electric fuse assembly of the class described comprising, in combination, a pair of vertically spaced insulators; an upper contact and a lower bearing support mounted on said insulators; an expulsion fuse unit including a tube pivotally and removably mounted in said bearing support and having a fuse wire therein; a terminal rigidly mounted on the lower end of the fuse tube to which the fuse wire is connected; a collar on the fuse tube above its lower end; a spring-biased, bifurcated push-out lever pivotally mounted on said collar at the back side of said tube and having an arm extending downwardly in front of the tube; a notched arm carried by the lower insulator and extending forwardly above the upper end of said lever; trunnions on the upper end of the lever arms engaging said notched arm as a push-out abutment; a grooved fuse wire guide element pivotally connected to the lower end of said lever and extending rearwardly into the lower open end of the fuse tube; a sheave carried by the guide about which the fuse wire is trained to maintain it under tension and to release the push-out lever when the fuse blows.

8. In a combination fuse and switch assembly of the class described, an upper insulator carrying a spring-biased contact; a lower rotatable insulator having supporting bearings; an expulsion fuse unit including a tube having an upper terminal engaging the upper contact; trunnions rigidly secured to the lower end of the tube and removably mounted in said bearings; a lower fuse terminal member secured to the back side of the tube; a fuse wire extending through the lower end of the tube and connected to said terminal member; a spring-biased push-out lever pivoted to the fuse tube above its lower end; a forked arm carried by the lower insulator and straddling said tube above said lever coacting with said lever both as a push-out abutment and to hold the tube in place when it is operated as a switch; and means connecting said push-out lever to the fuse wire to maintain it under tension, whereby the lever is released when the fuse blows.

9. In a combination fuse and switch assembly of the class described, an upper insulator carrying a spring-biased contact; a lower rotatable insulator having supporting bearings; an expulsion fuse unit including a tube having an upper terminal engaging the upper contact; trunnions rigidly secured to the lower end of the tube and removably mounted in said bearings; a lower fuse terminal member secured to the back side of the tube; a fuse wire extending through the

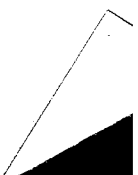
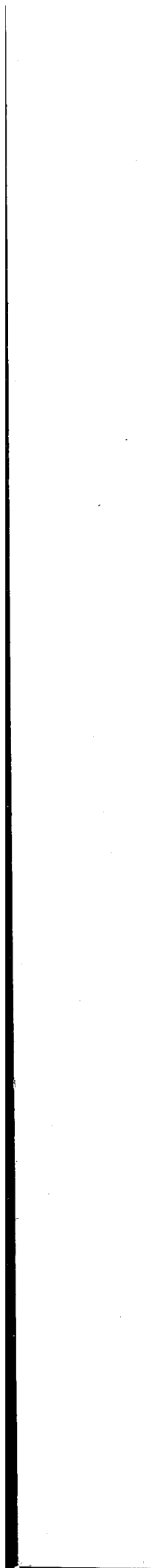
lower end of the tube and connected to said terminal member; a spring-biased push-out lever pivoted to the fuse tube above its lower end; a vertical bracket on the lower insulator; a substantially horizontal forked arm projecting forwardly from and pivoted to said bracket and straddling said tube above the push-out lever; depending flanges on the forks of said arm presenting push-out abutment shoulders; trunnions on the lever engaging said shoulders also coacting with said arm to hold the fuse unit assembled when it is operated as a switch; and means connecting said push-out lever to the fuse wire to maintain it under tension, whereby the lever is released when the fuse blows.

10. As an article of manufacture, a replaceable expulsion fuse unit adapted to be hingedly mounted in a substantially vertical position; an upper terminal on the tube; a fuse element in the tube having a fuse wire projecting through its lower end; a fixed collar on the lower end of the tube carrying a lower terminal to which the fuse wire is connected; a second collar on the tube above its lower end; a spring-biased push-out lever pivoted to said second collar having a depending vertical arm adjacent to the lower end of the tube; and means connecting said lever to the fuse wire to maintain it under tension.

11. As an article of manufacture, a replaceable expulsion fuse unit adapted to be hingedly mounted in a substantially vertical position; an upper terminal on the tube; a fuse element in the tube having a fuse wire projecting through its lower end; a fixed collar on the lower end of the tube carrying a lower terminal to which the fuse wire is connected; a hook eye on said lower terminal; a second collar on the tube above its lower end; a spring-biased push-out lever pivoted to said second collar having a depending vertical arm adjacent to the lower end of the tube; and a guide element fully pivoted on the lower end of the lever extending laterally below the open end of the tube and connected to the fuse wire to hold it under tension, whereby the lever will be released when the fuse blows.

12. As an article of manufacture, a replaceable expulsion fuse unit adapted to be hingedly mounted in a substantially vertical position; an upper terminal on the tube; a fuse element in the tube having a fuse wire projecting through its lower end; a fixed collar on the lower end of the tube carrying a lower terminal to which the fuse wire is connected; a forked, spring-biased, push-out lever straddling the tube above its lower end pivoted to the tube on one side and having a depending vertical arm on the opposite side of the tube; a guide element for the fuse wire pivoted to the lower end of said depending arm and projecting laterally below and into the lower end of the tube; and a sheave carried by said guide element about which the fuse wire is trained to hold it under tension.

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Jan. 6, 1942.

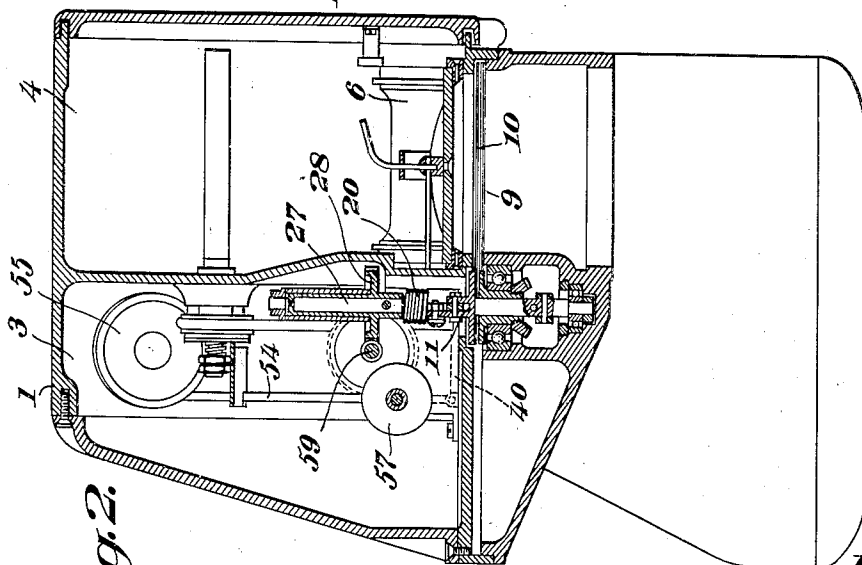
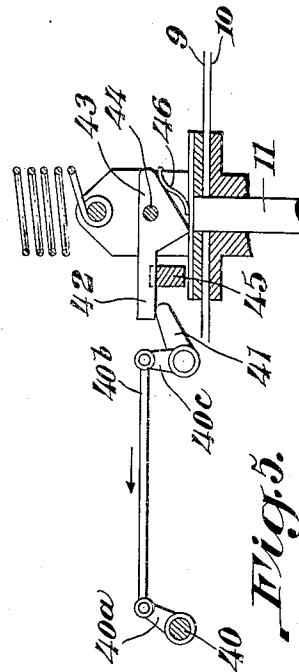
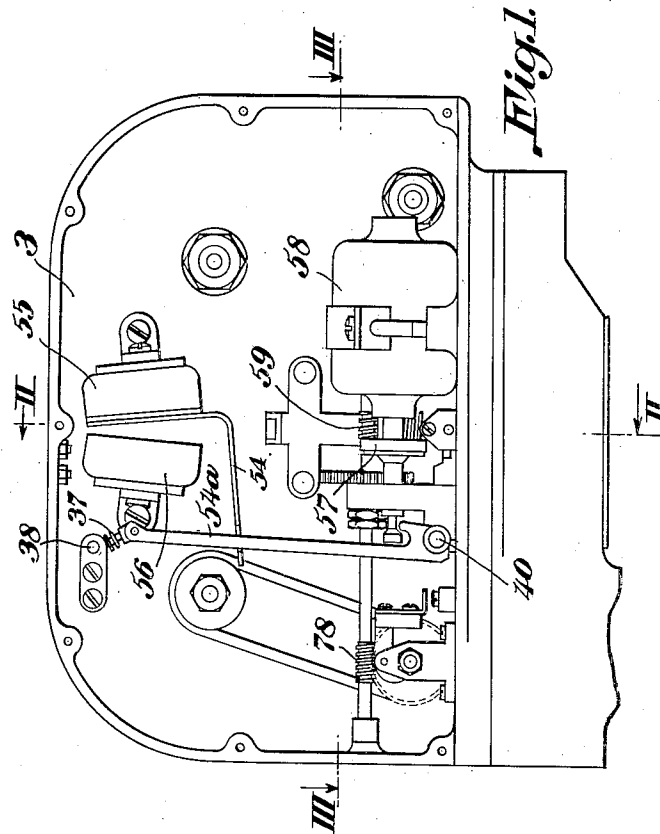
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2,269,373

REMOTE CONTROL FOR SERIAL CAMERAS

Original Filed April 21, 1937

2 Sheets-Sheet 1



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