Oct. 18, 1949. F. H. TURNHAM ET AL 2,485,221

ELECTRIC LOW AND HIGH VOLTAGE FUSE

Filed Jan. 21, 1948 3 Sheets-Sheet 1

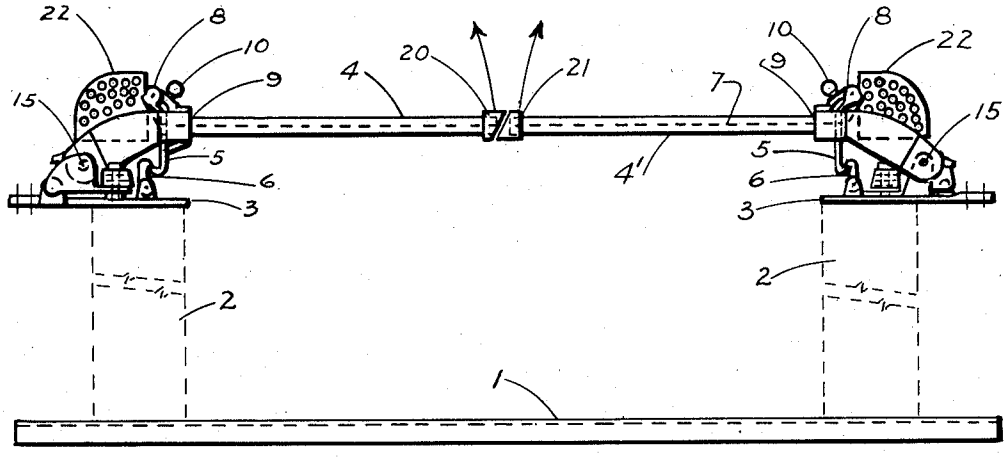


Fig-1

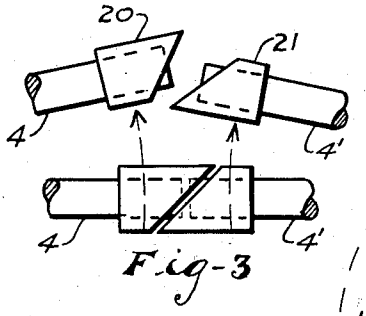


Fig-3

Fig-2

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ELECTRIC LOW AND HIGH VOLTAGE FUSE

Filed Jan. 21, 1948 3 Sheets-Sheet 2

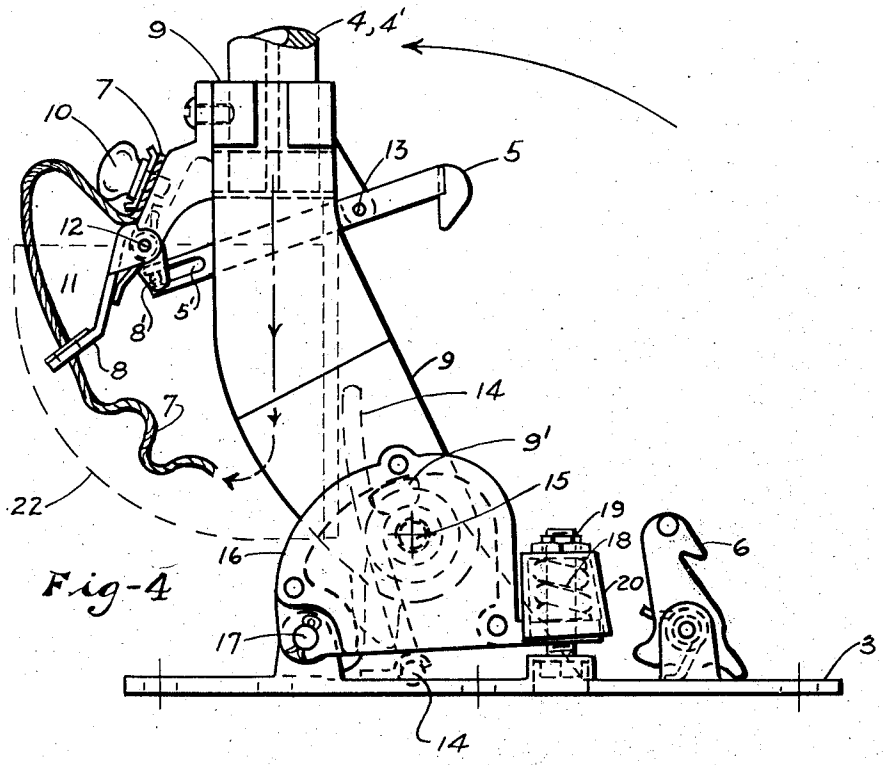


Fig-4

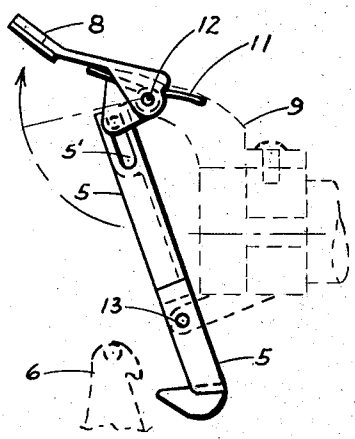


Fig-5

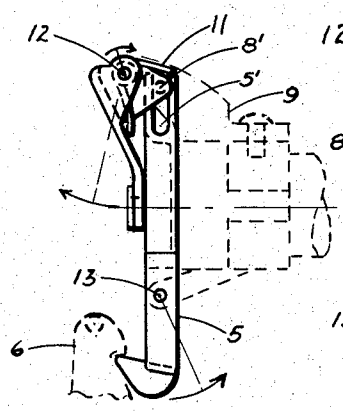


Fig-6

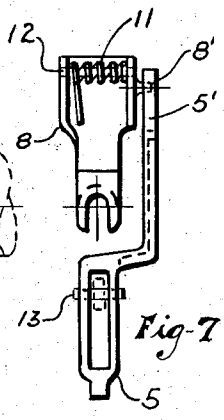


Fig-7

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ELECTRIC LOW AND HIGH VOLTAGE FUSE

Filed Jan. 21, 1948 3 Sheets-Sheet 3

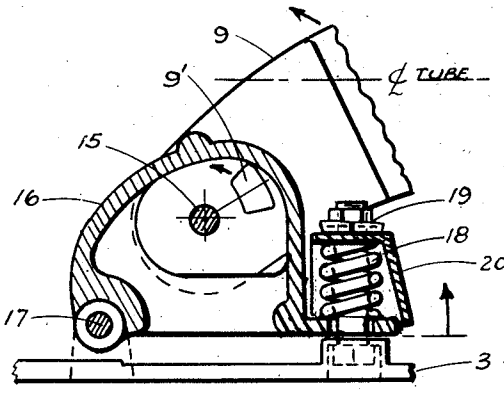


Fig-8

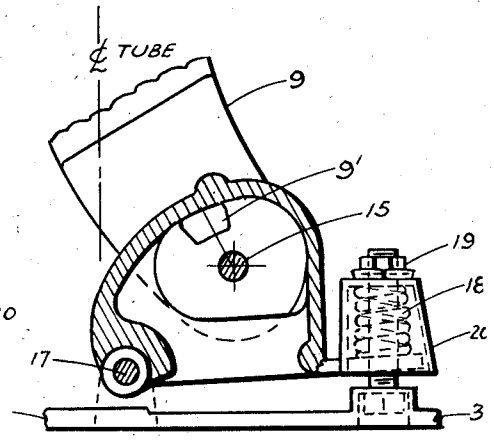


Fig-9

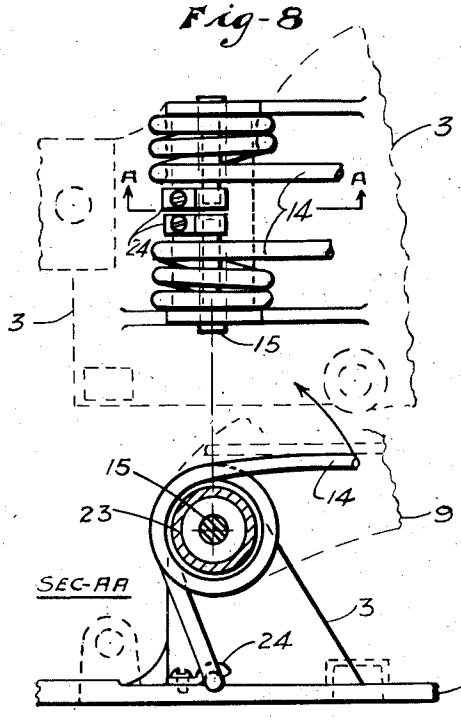


Fig-10

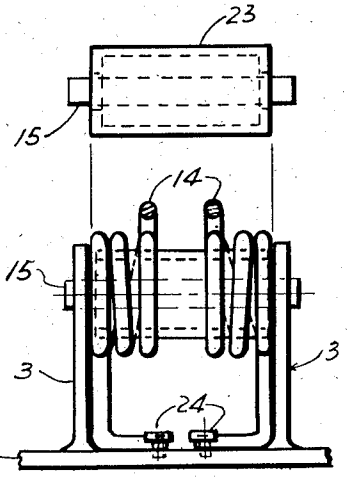


Fig-11

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Patented Oct. 18, 1949

2,485,221

UNITED STATES PATENT OFFICE

2,485,221

ELECTRIC LOW AND HIGH VOLTAGE FUSE

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Application January 21, 1948, Serial No 3,618

2 Claims. (Cl. 200—114)

REISSUED

AUG 14 1951

RE 23400

This invention relates to low and high voltage electric fuses. It has for its main objects to provide such a fuse that will be highly efficient for its purpose, simple in structure, comparatively cheap to manufacture, and very durable.

A further object is to provide a double breaking fuse, latched at both ends, this being a novel idea in such devices. The use of two tubes that break at the center of the span, results in a great advantage in the springing means for moving the two short tubes into the open position, rather than lifting one long tube equal in length to the two short tubes.

A further object is to provide a latch on the hinge ends of the double breaking fuse that is so designed that when the tube is swung to the closed position the impact of latching the fuse imposes no stress or strain on the fuse link. A further advantage of the invention is that the two tubes are latched on the mechanism ends and a fuse link is drawn through the two tubes to the latches. The fusion of any part of the link will automatically unlatch both tubes and the springs in the mechanism will swing the tubes from closed to open position. When the tube is in motion a cam binds on a spring-pressured brake that stops the two part tube with a minimum of shock or impact on the supporting insulators.

Other objects and advantages will appear from the drawings and description.

By referring to the drawings part of this application, it will be observed that Fig. 1 is an elevational view of the double breaking horizontal fuse; Fig. 2 is an elevation of the hinge mechanism assembly in closed position; Fig. 3 is an enlarged detail view of the connecting portions of the two tubes; Fig. 4 is an elevation of the hinge mechanism assembly in open position, tube broken away; Figs. 5 and 6 are elevations of the latch assembly in open and closed positions; Fig. 7 is an end view of the latch assembly in closed position; Fig. 8 is a detail view showing braking mechanism, with cover removed, in closed position; Fig. 9 is a detail view showing braking mechanism, with cover removed, in open position; Figs. 10 and 11 are detail cross sectional views showing spring arrangement with tube in closed position.

Similar reference numerals refer to similar parts throughout the several views.

Referring to the drawings in detail it will be seen that the device comprises a main metal base 1 supporting insulators 2 carrying individual bases 3. The two fuse tubes 4 and 4' are latched in closed position by latches being engaged to catch members 6. The fuse link 7 is stretched through both tubes 4 and 4' and attached in slots of link ejectors 8 and there held securely to the tube supports 9 by thumb screws 10. Springs 11 tend to stretch the fuse link through the two tubes, and upon rupture of the link the springs 11 rotate the ejectors 8 about pins 12 thus moving the pins 8' on an arc around pins 12. The pins 8' of the ejectors 8 fit in slots 5', and when the arcs of the pins 8' are completed the latches 5 are moved or pivoted about pins 13 to the unlatched position. Thus this latch arrangement exerts no stress upon the fuse link 7 except pressure of the springs 11. After the tubes 4 and 4' are unlatched the springs 14 swing them around pins 15 to the open position. The main tube castings 9 have cam arms 9' that move in arcs about pins 15; each brake housing 16 is moved up in an arc about the pins 17 by the cam arm 9' binding on the inner curved surface of the housing 16. As the housing 16 is pivoted about pin 17 the spring 18 is compressed. Adjusting bolt 19 is stationary with the base 3 and can be loosened or tightened on the spring cover 20 to give the required pressure on the spring 18 to provide an easy and shockless movement of the tubes 4 and 4'. Non-metallic covers 21 are connected to the ends of the tubes, and are mitered to a semi-weather proof condition for the ends of the tubes.

The open position of the mechanism as shown in Fig. 4 shows the latch and link ejector at rest in the completed, unlatched position. Note that the fuse link 7 has been drawn from the fuse tube, upon the fusion of the link, by the link ejector 8, and the frayed ends of the link are resting in the basket 22 shown in broken lines. Spring 18 is in compression because cam arm 9' has completed its arc and raised the brake housing 16 about pin 17.

When the fuse link is threaded through the fuse tube the link ejector 8 is pulled down to the latched position. In this position any pressure applied to the latch 5 by catch member 6 does not exert any strain on the fuse link. As the link ejector 8 has to move in arc about pin 12, any pressure trying to move pin 8' will exert resulting force directly into pin 12. Spring 11 flipping link ejector 8 around pin 12 moves pin 8' engaged in slot 5'. The latch 5 pivots about pin 13 resulting in a counterclockwise move-

ment at point of contact of latch 5 to catch member 6, this being the unlatching motion.

When the main tube casting member 9 is in closed position cam arm 9' is engaged to curved surface of the friction housing 16 at all times, but the pressure of spring 18 is negative and the friction is slight. The friction being applied at all times, increasing as the fuse tube swings to the open position, reduces the shock of the sudden stopping of the fuse tube.

The spring arrangement for swinging the fuse tube to the open position has the springs 14 in series, thus the pressure tending to move the tube casting member about pin 15 has the advantage of both springs applied. The springs are supported by a mandrel 23 (spacer) on pin 15. The stationary end of the spring assembly is held attached by a clamp bolt 24 to the mechanism base 3, while the other end presses on the main tube casting member 9.

The various parts of the fuse may be made of any material suitable for the purpose, but we prefer to use such metals and other materials generally used in the manufacture of such electrical equipment. Also the device may be made in various sizes and capacities. The invention resides in the arrangement and combination of the parts, not the materials of which they are made.

While we have shown and described the preferred embodiment of our invention, we do not wish to limit same to the exact and precise details of structure, but reserve the right to make all modifications and changes so long as they remain within the spirit and scope of the following claims.

Having described our invention, we claim:

1. In an electric fuse of the character described comprising; a main supporting base 1, two insulators 2 mounted and spaced apart upon said base 1, a separate mechanism supporting base 3 mounted upon each of the said insulators, two duplicate tube assemblies mounted one on each of the bases on the insulators, each assembly consisting of a fuse containing tube 4 with one end thereof attached in a housing 9 that is swingable on a shaft 15 supported in a second housing 16 that is swingable on a shaft 17 supported on a base 3; a latch arm 5 mounted on a shaft 13 supported on the housing 9, said arm 5 having an L-shaped end, a latch member 6 supported on the base 3, a coil spring attached to said latch member and positioned normally disposed to urge the free end of the latch away from the housing 16, the L-shaped end of the arm 5 being adapted to make contact with the latch 6 when the tube 4 is positioned parallel to the base 1; a fuse inserted through said tubes, each end of the fuse attached by thumb screws 10 to part of the housing 9, said fuse in taut condition being adapted by

trigger means on the end of arm 5 to retain said tubes in parallel position with relation to base 1, and being adapted to allow the free ends of the tubes to move away from the center portion of base 1 as a result of rupture of the fuse; spring means mounted in each said housing 16 and being adapted to urge the free ends of said tubes away from the center portion of base 1 when said fuse is in ruptured condition.

2. In an electric fuse of the class described comprising; a main supporting base 1, two insulators 2 mounted and spaced apart upon said base 1, a separate mechanism base 3 mounted upon each of said insulators, attached to each mechanism base a swingable latch assembly consisting of a metal housing 9, a latch arm 5 mounted on a shaft 13 through the housing swingable portion, an ejector 8, a coil spring 11 mounted on a shaft 12 and positioned normally to urge the ejector 8 away from the latch arm 5; an L-shaped extension integral with the latch arm 5, a stud 8' integral with the ejector 8, said stud 8' positioned slidable in a slot 5' in the latch arm 5; the housing having a round hole therein, a tube 4 attached by one end thereof in said round hole, an electric fuse 7 threaded through said tube 4 and over the ejector 8 and attached to the swingable housing 9 by a thumb screw 10; said fuse also threaded through a similar tube attached to the other companion similar latch assembly, said fuse positioned in taut condition being adapted to hold said tubes in parallel position with relation to the plane of the base 1, a latch hook member 6 mounted on each mechanism base and positioned to engage the L-shaped extension of each latch arm 5 when the fuse is in threaded taut condition; springs 14 mounted on a shaft 15 in each mechanism fixed portion, the swingable portions of the housings mounted on said shafts, the springs in the housing fixed portions normally set to urge the swingable portions of the assemblies to a position away from the center portion of the base 1; said two tubes being approximately equal in length, the free end of each tube being mitered and adapted to coact and fit adjacent each other when the threaded fuse is in taut condition and adapted to separate and swing apart upon rupture of the said fuse threaded through the two tubes.

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