May 3, 1932. J. B. GLOWACKI 1,857,096

CARTRIDGE FUSE

Filed Aug. 11, 1927

Fig. 1

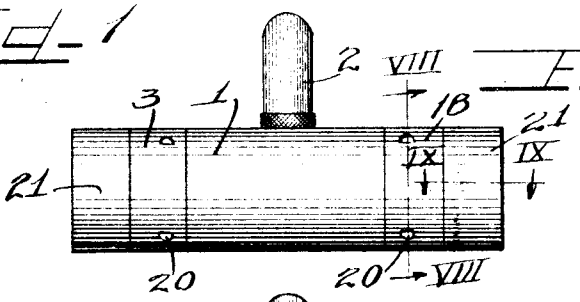


Fig. 2

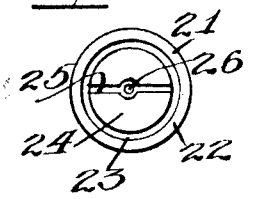


Fig. 5

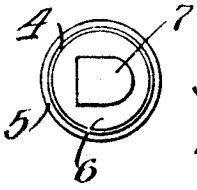


Fig. 3

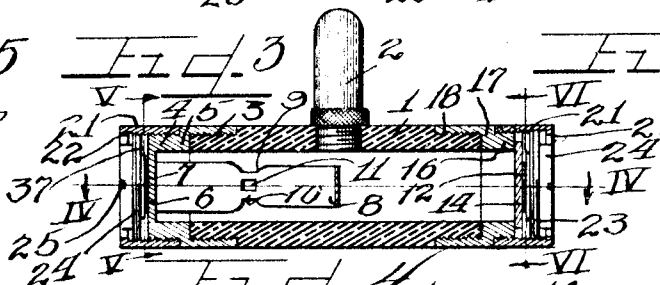


Fig. 6

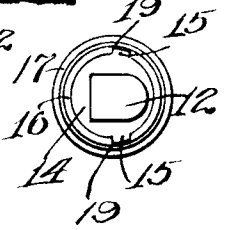


Fig. 4

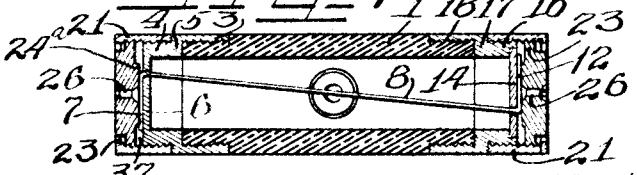


Fig. 10

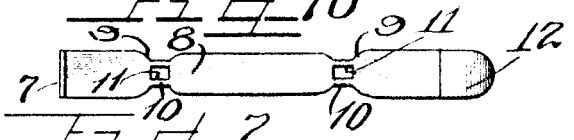


Fig. 11

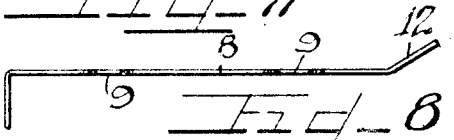


Fig. 8

Fig. 7

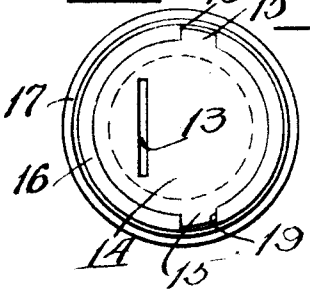


Fig. 9

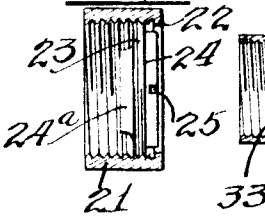


Fig. 13

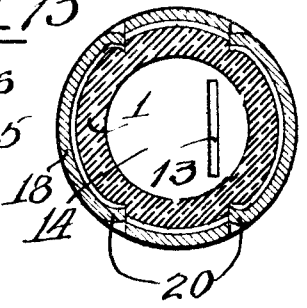
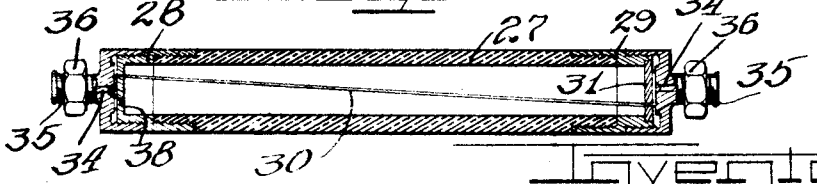


Fig. 12



Inventor

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Charles Hill

by Attys

Patented May 3, 1932 1,857,096

UNITED STATES PATENT OFFICE

JOHN B. GLOWACKI, OF CHICAGO, ILLINOIS

CARTRIDGE FUSE

Application filed August 11, 1927. Serial No. 212,240.

This invention relates to improved fuses of the cartridge type provided with a renewable diagonally positioned fuse element and with adjustable clamping or contact members positioned in removable end collars whereby tight contacts may be obtained between the projecting tips of the fuse element and the metal thimbles engaged on the ends of a fibre body or sleeve.

It is an object of this invention to provide a cartridge fuse in which a renewable fuse element is adapted to be held in place by end collars having means adjustably mounted therein to insure tight contacts at the ends of the fuse elements.

It is also an object of this invention to provide a cartridge type fuse wherein the end caps or closure members are provided with an adjustable head for insuring proper contact with the ends of the fuse element and the thimble members of the cartridge fuse and furthermore permitting fuse elements of different current capacities to be tightly secured in place.

It is a further object of this invention to provide a cartridge type fuse wherein a Z-shaped fuse element is adapted to be removably mounted in but a single predetermined position.

It is an important object of this invention to provide an improved fuse of the cartridge type in which a fibre body portion has metal thimble members rigidly engaged thereon for the purpose of renewably receiving a fuse element diagonally disposed within the casing, with the ends thereof projecting in opposite directions and clamped tightly in contact with the thimble members by means of adjustable apertured end caps.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a side elevation of an improved cartridge fuse embodying the principles of this invention.

Figure 2 is an end view of the cartridge fuse.

Figure 3 is a longitudinal vertical section of the cartridge fuse with parts broken away and with parts shown in elevation.

Figure 4 is a longitudinal section of the cartridge fuse taken on line IV—IV of Figure 3 showing the fuse element in elevation.

Figure 5 is an end elevation of the fuse taken on line V—V of Figure 3 with the cap removed.

Figure 6 is an end view of the cartridge fuse taken on line VI—VI of Figure 3 with the cap removed.

Figure 7 is an enlarged detail view of one end of the cartridge fuse with the cap removed and with the fuse element omitted.

Figure 8 is an enlarged transverse detail section of the fuse taken on line VIII—VIII of Figure 1.

Figure 9 is a section through one of the end caps of the fuse removed from the fuse and showing the adjustable head in elevation.

Figure 10 is a plan view of the renewable fuse element removed from the fuse.

Figure 11 is a side view of the fuse element.

Figure 12 is a longitudinal section of a modified type of cartridge fuse showing the fuse element in elevation.

Figure 13 is a section taken through one of the end caps of the modified cartridge fuse showing parts in elevation.

As shown on the drawings.

The improved cartridge fuse comprises a cylindrical body or sleeve 1 constructed of fibre or other suitable nonconducting material and having an opening in the middle portion of the wall thereof to receive an indicator designated as a whole by the reference numeral 2 for the purpose of providing a suitable indication when the fuse element has blown. The indicator 2 forms no part of the present invention and is therefore, not described in detail. Both ends of the body 1 are reduced in diameter and exteriorly threaded. Mounted on one end of the body 1 is a metal thimble comprising an interiorly threaded sleeve 3 and an exteriorly threaded sleeve 4 of reduced diam-

eter and connected with the interiorly threaded sleeve 3 by a shoulder 5. The outer end of the thimble sleeve 4 is closed by means of an integral closure plate 6 having a slot provided therein to one side of the center of said closure plate to receive one end 7 of a renewable fuse element. The renewable fuse element consists of a strip 8 of fusible conducting material having a plurality of notches 9 in the longitudinal margins thereof to form a plurality of spaced narrow connecting necks or links 10 each having an opening 11 therein. The apertured necks 10 are provided so that the points at which fusion will taken place are definitely located. The opposite end of the fuse strip 8 is provided with an end piece 12 which normally is slightly bent at a slight angle, as indicated in Figure 11, to facilitate mounting of the fuse element in the cartridge sleeve or body 1. The fuse element is inserted through the opening in the thimble plate 6, permitting the end 7 to lie flat against the outer face of the thimble plate 6, as indicated in Figures 4 and 5. The fuse strip 8 projects diagonally through the body 1 with the end 12 of the fuse projecting through a slot 13 provided to one side of the center of a removable thimble plate 14 against the outer face of which the end or tip 12 of the fuse element is adapted to be bent, thereby giving the fuse element a Z-shape when mounted in position within the cartridge fuse, as clearly illustrated in Figure 4. The thimble closure plate 14 is provided with a pair of oppositely disposed lugs or ears 15 positioned to one side of the center of the closure plate 14 and in a line parallel to the slot 13, as shown in Figure 7. The thimble closure plate 14 is adapted to be removably seated in a recess formed in the outer end of an exteriorly threaded sleeve 16 which is integrally joined by means of a shoulder 17 to an interiorly threaded thimble sleeve 18 which is threaded on the second end of the cartridge fuse body 1. The outer end of the exteriorly threaded thimble sleeve 16 is provided with a pair of notches at 19 to one side of a center line of said thimble plate to removably receive the ears 15 of the thimble closure plate 14 in but a single predetermined position so that the slot 13 is definitely located with respect to the slot in the closure plate 7 of the opposite thimble and diagonally opposite thereto for the purpose of definitely positioning the renewable fuse element 8 in a diagonal predetermined position within the cartridge fuse body 1.

For the purpose of rigidly holding the thimbles on the opposite ends of the cartridge fuse body 1 after they have been threaded into position thereon each of the thimble sleeves 3 and 18, respectively, are provided with a plurality of inwardly directed pairs of oppositely directed circumferentially disposed arc shaped indents or gripping teeth 20 which grip or bite into the fibre body 1 to rigidly hold the thimbles clamped or locked in position on the body 1 against removal.

Removably threaded on the exteriorly threaded sleeve of each of the metal thimbles is a metal cap comprising an interiorly threaded collar 21, the inner end of which is adapted to seat against the shoulder of the thimble, leaving the outer end projecting beyond the outer end of the respective thimble. The outer end of each of the cap collars 21 is open and is provided with an inwardly directed stop flange 22 to serve as a stop for limiting the outward movement of a peripherally threaded closure plate or head 23 which is adjustably mounted within the cap collar 21. Each of the adjustable cap closure heads 23 is provided with an exterior boss 24 having a diametric groove 25 therein to receive a screw driver or other suitable tool to permit the head 23 to be threaded downwardly or outwardly within the cap collar 21. Each of the cap closure heads 23 is provided with a central aperture or opening 26. An interior boss 24*a* is integrally formed on the inner face of each of the adjustable cap heads 23 and is apertured to register with the opening 26. The cap heads 23 are adjustably mounted, as described, to permit said heads to be threaded downwardly within their respective collars 21 after the collars have been engaged on a fuse thimble tightly seated against the shoulder of said thimble. By applying a screw driver or other suitable tool in the groove 25 of a cap head 23, said head may be screwed downwardly until the inner boss 24*a* thereof is brought into contact with the bent end of the renewable fuse element to tightly press said end of the fuse element into close contact with the end plate of the fuse thimble.

The diameter of the inner boss 24*a* is equal to the width of the fuse element end member or tip for the purpose of providing a circular space or chamber 37 between the end plate of a thimble and the respective cap head 23, so that any dust or fuse particles resulting from the blowing of a fuse element which might pass through the slots in the thimble end plate will be permitted to settle on the inner face of the adjustable cap heads and, therefore, will not enter and clog the spiral thread passage between the cap head and the interior of the cap collar.

It will thus be noted that the improved cartridge fuse provides an easy and convenient means for removing and renewing the fuse element when the same has blown. The element may be removed by merely unthreading the caps from the respective thimbles, pulling out the halves of the blown fuse element, and inserting a new fuse element through the slot in the thimble closure plate 6 while the opposite end 12 of the fuse ele-

ment is inserted through the slot 13 of the removable thimble closure plate 14 after which the fuse element end 12 is bent over, as indicated in Figure 6, so that the opposite ends of the fuse element are directed in opposite directions, causing the fuse element to assume a Z-shape with the main portion of the fuse strip positioned diagonally within the housing or body 1 of the cartridge fuse. After the new fuse element has been placed in position the end caps are threaded onto the exteriorly threaded sleeves of the thimbles until said cap collars seat against the shoulders of the thimbles. A screw driver may now be used to thread the adjustable heads of the caps inwardly with the bosses 24*a* tightly pressing the ends of the fuse elements against the respective end plates of the fuse thimbles.

Figures 12 and 13 illustrate a modified type of cartridge fuse particularly adapted for telephone work and comprising a fibre body or sleeve 27 the ends of which are reduced and exteriorly threaded to receive thimbles 28 and 29 on the ends thereof. The thimble 28 is provided with an integral end closure plate 38 provided with an offset slot for the purpose of receiving one end of a fuse element 30, the other end of which projects through an offset slot in a removable closure plate 31 provided in the thimble 29 and constructed similar to the thimble closure plate 14 illustrated in Figure 7. When in position the main portion of the fuse element 30 is diagonally positioned in a predetermined position within the body of the fuse body 27 with the ends of the fuse element projecting in opposite directions and disposed to the outside of the closure plates for the end thimbles. For the purpose of rigidly and tightly holding the bent ends of the fuse element against the thimble closure plates an interiorly threaded cap 32 is removably engaged on the outer exteriorly threaded ends of each of the thimbles 28 and 29 to permit a boss 33 integrally formed within the cap to engage against an end of the fuse element to tightly press the same against the closure plate of a fuse thimble. Each of the closure caps 32 is provided with an outlet passage or opening 34 which continues through an exteriorly threaded shank or screw 35 having a nut 36 engaged thereon. The outlet apertures or passages in the caps 32 are provided to permit escape of the products resulting from the blowing of the fuse element within the cartridge fuse. The outer ends of the threaded shanks 35 are upset to prevent removal of the nuts 36.

The modified form of cartridge fuse illustrated in Figures 12 and 13 affords a convenient arrangement whereby a blown fuse element may be quickly and readily removed from the housing or body 27 and a new fuse element inserted in place thereof by simply unscrewing the end caps, pulling out the halves of the blown fuse element and inserting a new fuse element in the predetermined position made possible by the location of the offset slots in the closure heads provided in the fuse thimbles. Tight contacts of the ends of the fuse element with the closure plates of the thimbles is assured by the provision of the bosses 33 within the removable caps 32 provided on the ends of the cartridge fuse.

I am aware that many changes may be made, and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted hereon, otherwise than necessitated by the prior art.

I claim as my invention:

1. A cartridge fuse comprising a body, a thimble rigidly secured on one end thereof, a plate integral therewith and having an offset slot therein closed at both ends, an open notched thimble rigidly secured on the opposite end of said body and countersunk at one end, a removable closure plate seated in the countersunk end of said thimble and having an offset slot therein closed at both ends, a pair of oppositely positioned offset projections formed on said closure plate on the ends of a secant line and adapted to seat in offset notches provided in said open thimble, a fuse element removably positioned diagonally within said body with the ends of said fuse element projecting through the slots in said plates and projecting in opposite directions from one another, said fuse element having a cross-section sufficient to substantially fill up said slots and contact caps removably engaged on said thimbles for pressing the respective ends of the fuse element in tight contact with said plates to insure positive contacts.

2. A fuse device of the class described comprising a body, a thimble rigidly secured on one end thereof and having a fuse element receiving slot closed at both ends positioned to one side of the center of an integral closure plate of said thimble, an open countersunk thimble rigidly secured on the opposite end of said body and having a pair of notches therein positioned opposite one another to one side of a center line of said open thimble and on a secant line parallel to said slot, a closure plate seated in the countersunk end of said open thimble having a fuse element receiving slot closed at both ends and positioned to one side of the center thereof, a pair of oppositely positioned lugs integrally formed on said thimble closure plate to one side of the center line thereof and adapted to seat in the notches of said open thimble to permit the thimble closure plate to be seated in a predetermined position only within the notched end of the open thimble, a fuse element renewably engaged in said body with

the ends of said element projecting through and substantially filling said slots with said ends of the fuse element projecting in opposite directions from one another to hold the main portion of the fuse element diagonally positioned within the fuse body, and closure caps removably engaged on the thimbles for pressing the projecting ends of the fuse element tightly against said thimble plates.

3. In a fuse of the class described the combination with a hollow body, of a closed thimble rigidly secured on one end thereof and having an offset slot therein with said slot closed at both ends, an open thimble rigidly secured on the opposite end of said body and having a countersunk seat and a pair of offset notches therein, a closure plate seated in said countersunk seat of said open thimble having an offset slot therein with said slot closed at both ends, and a pair of offset lugs integrally formed on said closure plate on a secant line parallel to said slot and adapted to seat in the offset notches of said open thimble to receive said closure plate in said seat in a predetermined position only with the slot in said closure plate positioned diagonally opposite to the slot in the closed thimble.

4. In a fuse device of the class described the combination with a body, of thimbles threaded on the ends thereof, and a plurality of pairs of oppositely directed indents circumferentially cut inwardly from said thimbles and wedged into said body to rigidly lock the same against removal on said body.

5. In a fuse device of the class described, the combination with a body, of thimbles threaded on the ends thereof, members cut circumferentially from said thimbles and arranged in pairs with the members of each pair projecting toward one another and wedged into said body to afford a positive double locking arrangement between the thimbles and said body, said double locking arrangement being afforded by the threaded engagement between said thimbles and the body and the additional wedged locking arrangement afforded by said wedged members.

6. In a fuse device of the class described, the combination with a fiber body externally threaded at both ends, metal thimbles threaded on the ends of said body, a plurality of members struck and cut from said thimbles and wedged into the threaded portions of said body, said members arranged circumferentially in opposite pairs with the members of each pair directed toward one another and spaced closer together than the members on the same side of opposite pairs.

7. In a fuse of the class described, the combination with a body, of thimbles engaged on the ends thereof, and having a plurality of members struck and cut circumferentially therefrom with the cut ends of said members wedged into said body, said members arranged with adjacent members grouped in pairs and deflected toward one another with the pairs of said members alternately arranged with the members of one pair positioned closer together than the members of an adjacent pair.

In testimony whereof I have hereunto subscribed my name at Chicago, Cook County, Illinois.

JOHN B. GLOWACKI.