May 6, 1952 J. S. MESSER ET AL 2,595,688

FUSE

Filed March 31, 1948

Fig. 1

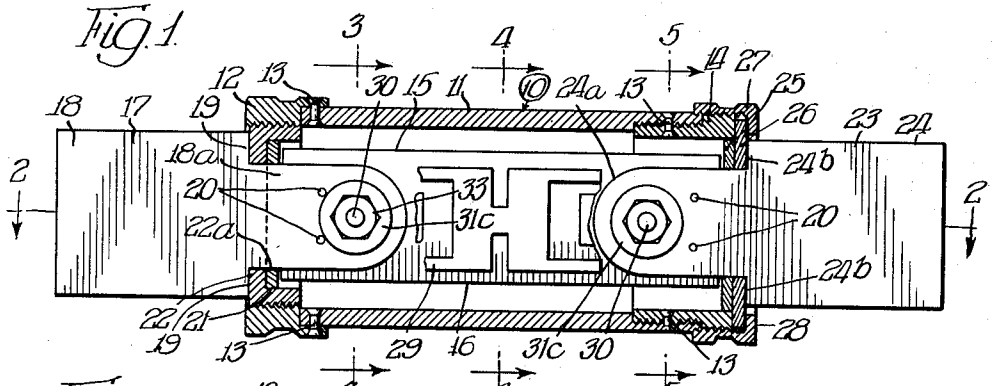


Fig. 2

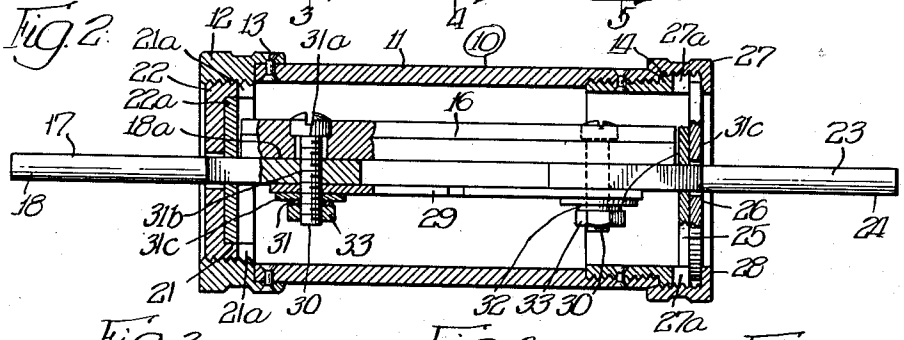


Fig. 3

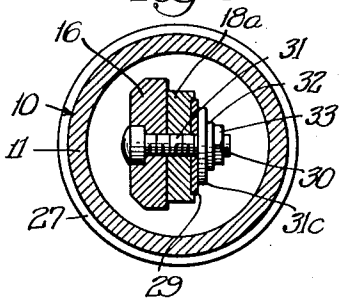


Fig. 4

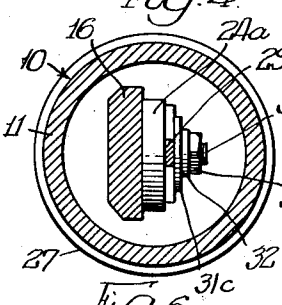


Fig. 5

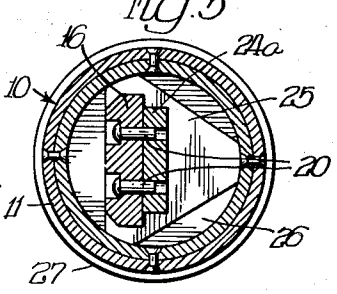
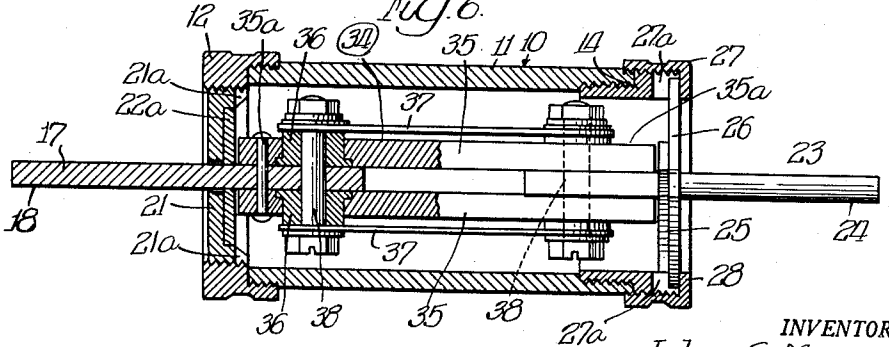


Fig. 6



INVENTORS.
John S. Messer,
BY David L. Davis,
Wilkinson, Huxley, Byron & Hume.
Attys.

Patented May 6, 1952

2,595,688

UNITED STATES PATENT OFFICE

2,595,688

FUSE

John S. Messer and David L. Davis, Chicago, Ill., assignors, by mesne assignments, to Economy Fuse and Manufacturing Co., Chicago, Ill., a corporation of Illinois

Application March 31, 1948, Serial No. 18,165

4 Claims. (Cl. 200—131)

1

The present invention relates to improvements in fuses.

More particularly, the present invention relates to fuses of the cartridge type having broad flat terminals located substantially in a single plane.

This application is a continuation in part of the application filed by the present applicants on November 30, 1946, Serial No. 713,358, now Patent No. 2,497,227, which is a continuation in part of the now abandoned application filed by the present applicants on May 30, 1945, Serial No. 596,636.

An object of the present invention is to provide a fuse of the kind referred to having sturdy mounting means for said terminals and which may be readily assembled and disassembled for the mounting of a fuse link therein or the removal of the remains of a fuse link.

A further object is to provide a fuse of the kind referred to having the advantage of sturdiness, combined with the advantage that in the event of shrinkage in the enclosing cylinder such shrinkage may be readily compensated for without modifying the proper venting of the fuse.

A further object is to provide a fuse having aligned terminals having the advantage that in the event of shrinkage of the enclosing casing, parts of the fuse may be turned up to compensate for such shrinkage without disturbing the alignment of the terminals.

A further object is to provide a fuse having an enclosing casing and a fuse holding unit adapted to be positioned within said enclosing casing in a state of tension, said casing and said fuse holding member having co-operating relatively rocking parts so that in the event of distortion, within limits, the parts may be readily assembled without interfering with the proper venting of the fuse, with the advantage that the fuse terminals will always be positioned in proper alignment with each other.

A further object is to provide a fuse which is sturdy, simple and well adapted to meet the needs of ordinary service.

Further objects will appear as the description proceeds.

Referring to the drawings—

Figure 1 is a cross sectional view illustrating a fuse embodying the principles of the present invention;

Figure 2 is a cross sectional view taken along the plane indicated by the arrows 2—2 of Figure 1;

Figure 3 is a cross sectional view taken along the plane indicated by the arrows 3—3 of Figure 1;

Figure 4 is a cross sectional view taken along the plane indicated by the arrows 4—4 of Figure 1;

Figure 5 is a cross sectional view taken along the plane indicated by the arrows 5—5 of Figure 1; and

2

Figure 6 is a cross sectional view similar to Figure 2 but illustrating a modification embodying mounting means for two fuse links.

Referring first to Figures 1 and 2, the numeral 10 indicates a casing including the cylindrical member 11 of fiber or the like. To one end of said cylindrical member 11 is secured an internally threaded collar 12, said collar having a shoulder disposed internally thereof, against which is bottomed one end of said cylindrical member 11. To accomplish a close fit, the end of the cylindrical member 11 may be threaded into the adjacent end of the collar 12. Rivets 13—13 may be employed to securely hold the cylindrical member 11 and the collar 12 in fixed relationship with each other. The cylindrical member 11 and the collar 12 constitute a cylindrical casing having a threaded extremity. At the other end of the cylindrical member 11 is the annular member 14 having a sleeve portion disposed interiorly of and preferably threaded into the cylindrical member 11, said member 11 being recessed to provide an annular shoulder for receiving an end of said annular member 14. Rivets 13—13 may be employed to securely hold the cylindrical member 11 and the annular member 14 in fixed relationship with each other. Said annular member 14 is threaded exteriorly at the region beyond the adjacent extremity of the cylindrical member 11.

Disposed within the cylindrical member 11 is the fuse holding unit indicated as a whole by the numeral 15. Said unit 15 includes the strut or bridge 16, which should be a relatively sturdy member which is non-inflammable and a non-conductor of electricity. Secured to one extremity of the strut 16 is the terminal unit 17 including the broad flat blade portion 18 of a form common in cartridge fuses. Said terminal 17 includes a tongue portion 18*a*. The blade portion 18, adjacent to the tongue portion 18*a*, is defined by the aligned edges 19—19. Said tongue portion 18*a* is secured to one extremity of the strut 16, drive screws 20 being provided for this purpose. Loosely carried by the fuse holding unit 15 is the externally threaded cup-shaped member 21 provided with a plurality of notches 21*a*—21*a* spaced around the inner edge of the cylindrical wall thereof and having the bottom wall 22 provided with a slot to receive the tongue portion 18*a* of the terminal 17. Located between the adjacent extremity of the strut 16 and the bottom portion 22 of the member 21 is the baffle plate 22*a* having a slot for snugly receiving the tongue portion 18*a*. The slot in the bottom portion 22 is slightly larger than the cross-sectional contour of the tongue portion 18*a* to permit a slight tilting rocking movement of the cup-shaped member 21 relative to the strut 16. The strut 16 will preferably be spaced from the aligned edges 19—19 of the blade portion 18 a distance slightly

greater than the thickness of the bottom wall 22 plus the thickness of the washer 22*a*, to provide for play of the membeer 21 and of the washer 22*a* longitudinally with respect to the strut 16 and the blade portion 18 whereby to facilitate the tilting rocking action just mentioned. Otherwise stated, the member 21 and the baffle plate 22*a* are mounted upon the terminal 17 to have a tilting or universal rocking movement relative to the strut 16 and said terminal 17. The baffle plate 22*a* will have as close a fit with said tongue portion 18*a* as practicable while permitting such rocking action. The internal diameter of collar 12 is only slightly greater than the width of the blade portion 18 of the terminal 17, whereby said blade portion 18 functions to pilot the threaded cup-shaped member 21 into the internally threaded collar 12. The member 21 may be screwed into the collar 12 indefinitely except as limited by means located at the other end of the strut 16, as will appear presently.

The co-operating threads on the member 21 and the collar 12 will be of the type (as, for example, a truncated thread on the member 21) to provide a tortuous passageway permitting the escape of gases from the interior of the fuse when a fuse link blows. As noted above, the member 21 at its inner extremity will be provided with notches 21*a*—21*a* extending radially thereacross. This structure has the advantage of providing a relatively long screw engagement between the member 21 and the collar 12 while permitting access of the gases to the threaded cavity through a plurality of notches 21*a*—21*a* reaching well into the cylindrical wall of the member 21. The advantage is attained that the escape of gases is permitted without loss of strength in the fuse structure.

The opposite extremity of the strut 16 is provided with the terminal 23, which includes the broad flat blade portion 24 of usual contour and the tongue portion 24*a*. The blade portion 24, adjacent to the tongue portion 24*a*, is defined by the aligned edges 24*b*. Said tongue portion 24*a* is secured to the adjacent extremity of the strut 16 by means of drive screws 26—26.

Located between the blade portion 24 of the terminal 23 and the adjacent extremity of the strut 16 are a pair of plates 25 and 26, each of said plates being provided with a slot for receiving the tongue 24*a* of the terminal 23. The plates 25 and 26 should be capable of a slight tilting rocking movement relative to the tongue portion 24*a* and the strut 16. To accomplish this purpose, the slot in the plate 26 may be slightly larger than the cross-sectional contour of the tongue portion 24*a*. The slot in the plate 25 should receive the blade portion 24 as closely as practicable while permitting the rocking movement referred to. The strut 16 will preferably be spaced from the aligned edges 24*b*—24*b* of the blade portion 24, a distance slightly greater than the thickness of the plate 26 plus the thickness of the plate 25 to provide for play of said plates 25 and 26 longitudinally with respect to the strut 16 and the blade portion 24 whereby to facilitate the rocking movement just referred to. Otherwise stated, the plates 25 and 26 are mounted upon the terminal 23 to have a tilting or universal rocking movement relative to the strut 16 and said terminal 23. Said plate 25 is shown as being generally triangular in contour, as illustrated in Figure 5, though the triangular contour is not important. Said plate 25 has corner portions

adapted to fit within the annular member 14 to hold the fuse holding member 15 in proper alignment within the cylindrical member 11. The plate 26 has a diameter greater than the diameter of the plate 25, and the outer portion of said plate 26 is adapted to abut longitudinally against the end of the annular member 14 to limit screwing movement of the member 21 through the collar 12 and accordingly to limit turning movement of the fuse holding member 15 toward the left with respect to the casing 10 as the parts are viewed in Figures 1 and 2.

The numeral 27 indicates an internally threaded collar member adapted to be turned up upon the external screw-threads of the annular member 14. Said collar 27 has the end wall 28 adapted to abut against the right-hand extremity of the plate 26 as the parts are viewed in Figures 1 and 2.

The right-hand extremity of the annular member 14 may be notched as indicated by the numeral 27*a*. There may be several of these notches to provide passageways from the interior of the cylindrical member 11 to the region of the threads on the exterior of the annular member 14 and on the interior of the collar 27. The threads on the member 14 will be truncated or otherwise designed to co-operate with the thread on the member 27 to provide a tortuous passageway for gases escaping from the interior of the fuse.

A fuse link is indicated by the numeral 29 and is illustrated as being releasably secured to the tongues 18*a* and 24*a* of the terminals 17 and 23, respectively, by means of binding posts 30—30.

The details of the particular fuse link chosen for illustration form no part of the present invention, such details being the invention of Gustav Rensner as disclosed and claimed in his application for United States Letters Patent Serial No. 596,772 filed May 30, 1945, now Patent No. 2,489,501.

Each of the binding posts 30—30 includes the screw 31 having the head portion 31*a* adapted to be seated upon the side of the strut 16, the strut 16 being provided with an aperture of sufficient diameter to take freely the shank of the screw 31.

The tongue portion 18*a* and the tongue portion 24*a* are each provided with a hole 31*b* threaded for engagement with the thread of the corresponding screw 31. The adjacent extremity of the fuse link 29 is apertured to take freely the shank of the screw 31. A washer 31*c* is adapted to engage the adjacent face of the fuse link 29, and a spring washer 32 and a nut 33 co-operate to removably secure the adjacent extremity of the fuse link 29 in firm electrical contact with the adjacent tongue portion 18*a* or the adjacent tongue portion 24*a*.

Inasmuch as the head portion 31*a* of the screw 31 may be turned down into firm engagement with the strut 16, movement of the corresponding nut 33 will have no practical effect in loosening the screw 31 from the strut 16.

The construction illustrated in Figure 6 need not be described in detail, since it is similar in many respects to the construction illustrated in Figures 1 and 2. It will be sufficient to state that the fuse holding member 34 includes two struts 35—35, which have the terminals 17 and 23 secured to their extremities, rivets 35*a* being provided for that purpose. Each of said struts 35 is provided with a pair of annular studs 36—36 extending therethrough, said studs having good contact with the corresponding terminals 17 and 23 and extending beyond the surface of the corresponding strut 34 to provide a good electrical

bearing surface for a corresponding fuse link 37. Bolts 38 are provided having broad bearing washers and lock washers for releasably securing said fuse links 37—37 in good electrical contact with the studs 36 and with the corresponding terminals 17, 23.

According to the present invention, the removable fuse holding member 15 of Figures 1 and 2 and the removable fuse holding member 34 of Figure 6 may be readily screwed into the corresponding cylindrical member 11, the blade portion 18 of the terminal member 17 piloting the cup-shaped member into position in the collar 12, the cup-shaped member 21 having sufficient rocking action to find its way readily into the collar 12. The plate 25 having corners conforming to the internal diameter of the annular member 14 will definitely align the fuse holding member with the cylindrical member 11, and the plate 26 engaging the extremity of the annular member 14 will definitely limit the inward movement of the movable member into the cylindrical member 11. The member 27 will be screwed up upon the threaded exterior of the annular member 14 until the flange 28 engages the plate 26. The rocking action of the plates 25 and 26 relative to the strut 16 and the blade portion 24 serves the useful purpose that even though the strut 16 be bowed, the plates 25 and 26 may seat, respectively, exactly in and on the end of the member 14 to provide the proper seal. The notches 27*a* in the annular member 14, together with the tortuous course between the external threads on the member 14 and the internal threads on the member 27, will provide a tortuous passageway permitting the escape of gases from the interior of the fuse when a fuse link blows. The baffle plate 22*a*, since it has snug engagement with the tongue portion 18*a* of the terminal 18, is effective in stopping a violent escape of gas along said tongue portion 18*a*. The plates 25 and 26 perform a like function with respect to the tongue portion 24*a* of the terminal 23.

Not only do the illustrated embodiments of the present invention provide sturdiness, convenience and certainty of action, but in addition they have the advantage that in the event of shrinkage of the cylindrical member 11, it is only necessary to turn the fuse holding member 15 (Figs. 1 and 2) or 34 (Fig. 6) relative to the cylindrical member 11, bringing the plate 26 into engagement with the end of the annular member 14, after which the member 27 may be turned to its home position. The strut 16 and the struts 35—35 are always in tension. All adjustments may be made without disturbing the alignment between the terminals 17 and 23.

Though certain preferred embodiments of the present invention have been described in detail, many modifications will occur to those skilled in the art. It is intended to cover all such modifications that fall within the scope of the appended claims.

What is claimed is:

1. A fuse construction embodying a cylindrical casing, one end of said casing having an internally threaded collar secured thereto, an externally threaded cup-shaped member engaged in said collar and being free to move by screwing action therein axially of said casing throughout the limits of engagement of the threading therebetween, a slot in the bottom of said cup-shaped member which forms an end closure for said casing, a baffle plate disposed in said cup-shaped member interiorly of said casing adjacent said slot in free-

moving relation thereto, a smaller slot in said baffle plate, a flat terminal element having shoulder portions bearing against the exterior of said cup-shaped member and a tongue contiguous to said shoulder portions extending in loose fitting relation through the slot in said cup-shaped member and in tight fitting relation through the smaller slot in said baffle plate, said terminal and baffle plate having limited universal movement relative to said cup-shaped member during assembly with said collar, and being effective substantially to close the slot in said cup-shaped member as assembled.

2. The invention of claim 1, further including the opposite end of said casing having an externally threaded annular member affixed thereto, a closure plate engaging the end face of said annular member, an internally threaded collar member engaged upon said annular member having a flange to confine and secure said closure plate thereto, a slot in said closure plate, a second baffle plate disposed adjacent said closure plate interiorly of said casing, a smaller slot in said second baffle plate, a second flat terminal element having shoulder portions bearing against the exterior of said closure plate and a tongue contiguous to said shoulder portions extending in loose fitting relation through the slot in said closure plate and in tight fitting relation through the smaller slot in said second baffle plate, said internally threaded collar being turnable relative to said second flat terminal for screwing action with said annular member during assembly, said second baffle plate and associated terminal being effective substantially to close the slot in said closure plate as assembled.

3. The invention of claim 2 in which the tongue portions of said flat terminals oppose each other interiorly of said casing, a strut lying within said casing having a long dimension that is of less extent than the distance between said opposed baffle plates, binding posts connecting said opposed tongues to said strut in spaced relation, and a fuse link bridging said binding posts.

4. The invention of claim 3 in which said cup-shaped member and said annular member are provided with slots communicating with the interior of the casing on the one hand and with their threaded interengaging portions on their associated internally threaded collars, respectively, on the other, said threaded portions being constructed to afford sinuous passages from the interior to the exterior of said casing for the relief of gaseous pressure therein.

JOHN S. MESSER.
DAVID L. DAVIS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,231,364	Huxley	June 26, 1917
1,559,890	La Mar	Nov. 3, 1925
1,744,019	Anderson	Jan. 14, 1930
1,860,313	La Mar	May 24, 1932
1,958,366	La Mar	May 8, 1934
2,036,177	La Mar	Mar. 31, 1936
2,079,097	Wood	May 4, 1937
2,113,170	Carney	Apr. 5, 1938
2,168,791	Carney	Aug. 8, 1939
2,195,147	Griffith	Mar. 26, 1940
2,280,565	Wood	Apr. 21, 1942