

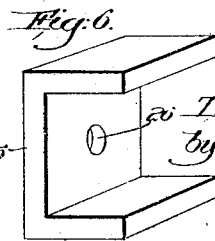
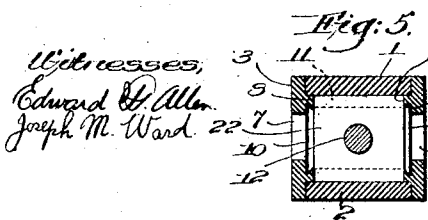
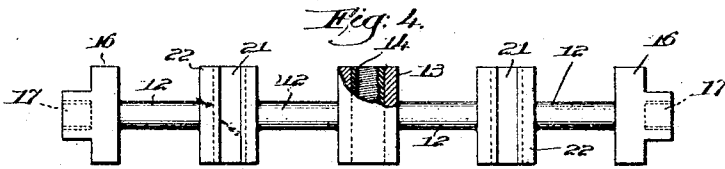
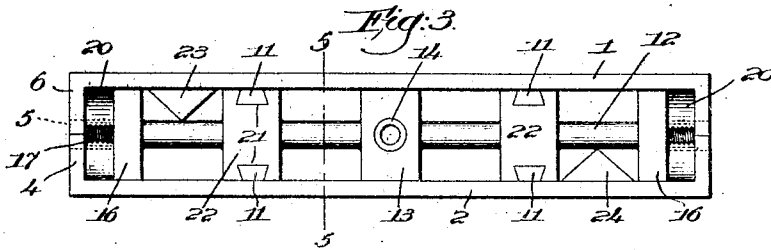
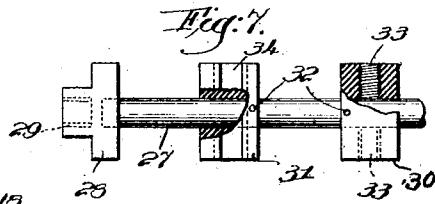
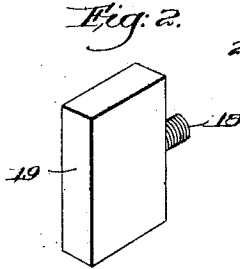
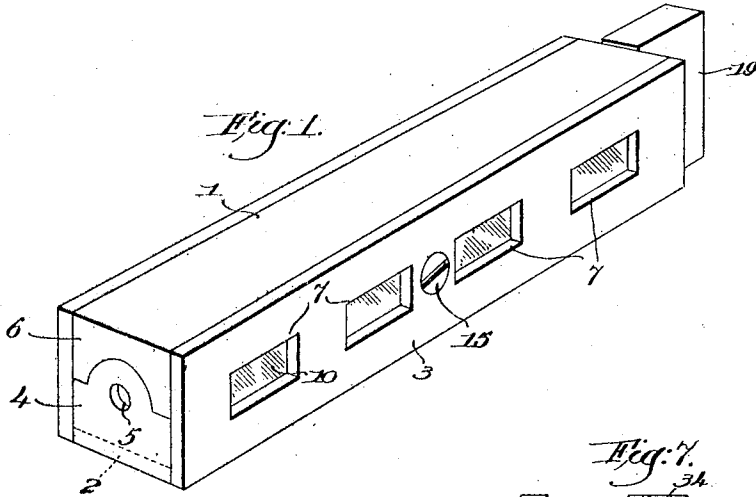
T. A. MILLER.

RECHARGEABLE AND NON-INTERCHANGEABLE INCLOSED THERMAL CUT-OUT.

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931,947.

Patented Aug. 24, 1909.



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UNITED STATES PATENT OFFICE.

THOMAS ALEXANDER MILLER, OF SOUTH HINGHAM, MASSACHUSETTS.

RECHARGEABLE AND NON-INTERCHANGEABLE INCLOSED THERMAL CUT-OUT.

931,947.

Specification of Letters Patent.

Patented Aug. 24, 1909.

Application filed June 13, 1908. Serial No. 438,325.

To all whom it may concern:

Be it known that I, THOMAS A. MILLER, a citizen of the United States, and resident of South Hingham, county of Plymouth, State of Massachusetts, have invented an Improvement in Rechargeable and Non-Interchangeable Inclosed Thermal Cut-Outs, of which the following description, in connection with the accompanying drawing, is a specification, like numerals on the drawing representing like parts.

This invention has for its object the production of an efficient, novel and simple inclosed fuse plug so constructed and arranged that when the fuse has blown a new one can be quickly and easily substituted without the employment of skilled labor.

I have so arranged the case or box in which the fuse is inclosed that only the proper fuse can be used with any particular case, as the latter is held together by the fuse, and thereby I prevent over or under fusing. That is, it is impossible to use a 150 ampere fuse in a 100 ampere case, or any other than a 100 ampere fuse. These and other novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a perspective view of a fuse plug embodying one form of my invention, one of the contact or terminal lugs being removed; Fig. 2 is a similar view of a contact or terminal lug; Fig. 3 is a side elevation of the case and the fuse therein, the nearer side of the case being removed; Fig. 4 is a top plan view of the fuse, detached. Fig. 5 is a transverse section of the case and fuse, on the line 5-5, Fig. 3, looking toward the left; Fig. 6 is a perspective view of another form of terminal, to be referred to. Fig. 7 is a modification to be referred to.

In accordance with my present invention the fuse plug comprises a fuse proper, and a separable case in which the fuse is inclosed, the parts of the case being held together only by the presence and cooperation of the fuse. The case is made of any suitable insulating material, such as vulcanite, fiber, etc., and as herein shown comprises four separate pieces, to wit:—top 1, bottom 2, and opposite, like sides 3, the ends being made integral or rigid with the top and bottom, the part 4 of one end having an

aperture 5, Fig. 1, at its center, said part 4 being shaped as shown to fit closely the complementary end part 6 on the top 1. The sides 3 are shown as provided with sight openings 7, and on their inner faces the sides are longitudinally ribbed or flanged at 8, Fig. 5, to fit snugly between the top and bottom members of the case, the flanges being grooved or undercut at 9 to receive a sheet of mica or similar material 10 extending the length of the case, and indicated in Fig. 5 by a heavy line. On the inner faces of the top and bottom members I form a plurality of dove-tailed or undercut, transverse locking and positioning ribs 11, two of such ribs being shown on the top and two oppositely located ribs on the bottom of the box. These ribs enter with a sliding fit correspondingly shaped grooves in the fuse, as will be described.

The fuse itself is cast, stamped or otherwise formed in a single piece of suitable fuse metal, and as herein shown comprises five rectangular enlargements or blocks of the requisite size to snugly fit within the case, integrally connected by bar portions 12 of the fuse metal and of such size as will carry a predetermined current, said portions 12 being the actual fusing points. The central enlargement 13 has extended through it a bushing 14 of insulating material, internally screw-threaded, to receive the shanks of screws, one of which is shown at 15, Fig. 1, by which the sides 3 are held in place. The two endmost enlargements 16 are tapped at 17 to receive the screw-shanks 18 of the terminals or contact lugs 19, shown separately in Fig. 2, the shank being passed through the aperture 5 in the end of the case, and the enlargements are cut away or concaved at 20 to intersect the threaded sockets 17, in order that a drop of solder may be used to unite the terminal shank and the fuse.

Undercut transverse grooves 21 are formed in the top and bottom faces of the intermediate enlargements 22 of the fuse, to receive the locking ribs 11 previously described, on the top and bottom of the case, as shown in Fig. 3, and also in Fig. 5, whereby the top and bottom members 1 and 2 are locked together by the fuse itself.

I have shown the sight openings 7 in the sides of the case as located opposite the fusing portions 12 of the fuse, so that if the

case is not filled with powdered mica or the like a glance will indicate the condition of the fuse.

When it becomes necessary to renew a fuse a sharp twist of the terminals will release them, or the application of a hot soldering iron to the soldered portion of the terminal shank will suffice. Said terminals are made of brass or other suitable metal.

In recharging my novel fuse plug the fuse is first applied to the top and bottom members of the case by means of the locking ribs 11 and the grooves 21 of the fuse enlargements 22, after which the terminals are screwed into place and soldered. One of the sides is then fitted into place and secured by a screw 15 screwed into the bushing 14 of the central enlargement 13, and if required the case is filled with asbestos, mica or other non-inflammable, insulating powder, and finally the remaining side 3 is fitted into place and secured by its screw 15. The fuse plug is now ready for use, the fuse being inclosed completely in a tight case, and the case is held together solely by the presence of the fuse, as will be apparent, the whole operation of charging occupying but a few seconds and at the cost of a few cents, viz.:—the cost of the fuse.

The fuses are made non-interchangeable by slightly changing the position of the locking ribs on the top and bottom of the case, with a corresponding change in the grooves in the adjacent enlargements 22 of the fuse. That is, if a 150 ampere case is arranged to fit a 150 ampere fuse, the locking ribs on the case for a 100 ampere fuse will be slightly changed as to position, so that they will fit a 100 ampere fuse, but no other. No substitution of an improper fuse can be made, obviously, for if the fuse does not fit the members of the case cannot be assembled and locked together in operative condition.

Referring to Fig. 3 I have shown V-shaped abutments 23, 24, on the top and bottom, respectively, of the case, between the end and intermediate blocks or enlargements 16, 22, said abutments extending to the fuse portions 12, in order to prevent the interposition of any extraneous metallic connection between said enlargements on the fuse, obviating any possibility of overfusing.

When it is impractical to use contact lugs or terminals such as shown in Figs. 1 and 2 I may employ the form shown at 25, Fig. 6, to fit over the end and opposite sides of the case, and held in place by a suitable contact screw passed through the hole 26 of the terminal and into the socket 17 of the fuse, and soldered as before.

Ordinarily a fuse plug is worthless after being blown, as it can only be recharged by sending it to the factory at considerable cost, usually more than it is worth in time and money, but my novel fuse plug can be re-

charged as often as necessary, at a purely nominal cost, and by any person in a few seconds.

Were it not for the fact that in the majority of cities the regulations prescribe a fixed connection between the terminals and the fuse, (which I attain by the solder hereinbefore referred to), obviously the case could be made with a single removable part for the insertion of the fuse, the remainder of the case being a fixture, the cooperating ribs and grooves on the case and fuse respectively preventing the use of fuses of improper capacity, as described, and the removable part would then be held in place only by connection with the fuse, so that the case could not be closed unless a fuse, and the proper one, were first inserted.

It is not necessary that the enlargements be cast integral with the fuse itself, nor are such enlargements necessarily metallic, for they may be made as separate pieces of the proper dimensions and attached to the fuse bar, as shown in Fig. 7. In said figure the fuse bar 27 is provided at each end with a metallic enlargement 28, tapped at 29 as hereinbefore described, but the central and intermediate enlargements, as 30 and 31, Fig. 7, can be conveniently made of insulating material, such as vulcanite, bored to receive the fuse bar and secured thereon by suitable pins 32. The central enlargement is provided with opposite threaded holes 33 to receive the screws 15 previously described, and the enlargements 31 are provided with undercut grooves 34 to receive the locking ribs 11. Should this arrangement be adopted at least one of the metallic end enlargements 28 would have to be made separate from the fuse bar to permit the central and intermediate enlargements to be applied, and a soldered joint or connection would then be made between the bar 27 and the enlargement 28 as a final step in assembling.

Various changes or modifications in different details of construction and arrangement may be made by those skilled in the art without departing from the spirit and scope of my invention as set forth in the appended claims.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a device of the class described, a fuse, an inclosing case therefor comprising a plurality of members separable throughout the entire length of the fuse, and means to maintain the members of the case in assembled condition solely by cooperation with the fuse between the ends thereof.

2. In a device of the class described, a fuse, an inclosing case therefor comprising separable top and bottom members and sides, means to connect and position the top and bottom members by cooperation with the

fuse, and separate means to connect the sides with the fuse and maintain them in operative relation to the top and bottom members.

3. In a device of the class described, a fuse, 5 a case therefor having removable sides, means to position the fuse in the case, and separate fastenings coöperating with the fuse and the sides to maintain the latter in position to close the case.

10 4. In a device of the class described, a case comprising separable top and bottom members having rigid thereon complemental end-forming portions, removable sides, a fuse, means to lock said fuse and the top and bottom members together, and independent 15 means to attach the sides and maintain them in operative position closing the case only when the fuse is in position.

5 5. In a device of the class described, a case having a removable side, means to position 20 the fuse in the case and also prevent the use of a fuse of improper capacity, the fuse, and means coöperating solely with the fuse itself to maintain the removable side in position 25 closing the case.

6. In a device of the class described, a fuse having a plurality of rectangular enlargements, threaded terminal sockets in the end-most enlargements, a multi-part inclosing 30 case for the fuse, means to lock together the top and bottom parts of the case and two of the fuse enlargements, and separate means to connect the side parts of the case with the central enlargement of the case, the end-most fuse enlargements being concaved to 35 intersect the terminal sockets.

7. In a device of the class described, a fuse having a plurality of integral, separated enlargements, a separable inclosing case for the 40 fuse, means to connect the terminals with the endmost enlargements of the fuse, and means to connect the parts of the case with the other enlargements and maintain the case

assembled and closed solely by coöperation with said enlargements.

8. In a device of the class described, a fuse 45 having a plurality of integral enlargements, undercut, transverse grooves on the opposite faces of some of said enlargements, a separable case for the fuse, transverse internal 50 ribs on the top and bottom thereof to coöperate with the grooves and lock the fuse and said top and bottom together, and separate means to connect the sides of the case and the fuse and maintain the case closed. 55

9. In a device of the class described, a fuse having a plurality of rectangular enlargements, integral therewith, a separable rectangular case to receive and inclose the fuse, means on the top and bottom parts of the 60 case to coöperate with and lock together the fuse enlargements and said parts of the case, other means to coöperate with the fuse and the case sides to maintain the latter in position to close the case, and safety abutments 65 on the interior of the case to extend between a pair of fuse enlargements and prevent an extraneous metallic connection between said enlargements.

10. In a device of the class described, a 70 multi-part case adapted to receive a fuse of a predetermined capacity and comprising members separable throughout the entire length thereof, and means to maintain the members of the case assembled in closed 75 form only by direct coöperation with an inclosed fuse, said means also preventing such coöperation with a fuse of a different capacity.

In testimony whereof, I have signed my 80 name to this specification, in the presence of two subscribing witnesses.

THOMAS ALEXANDER MILLER.

Witnesses:

EMILY C. HODGES,

THOMAS J. DRUMMOND.