

Aug. 4, 1925.

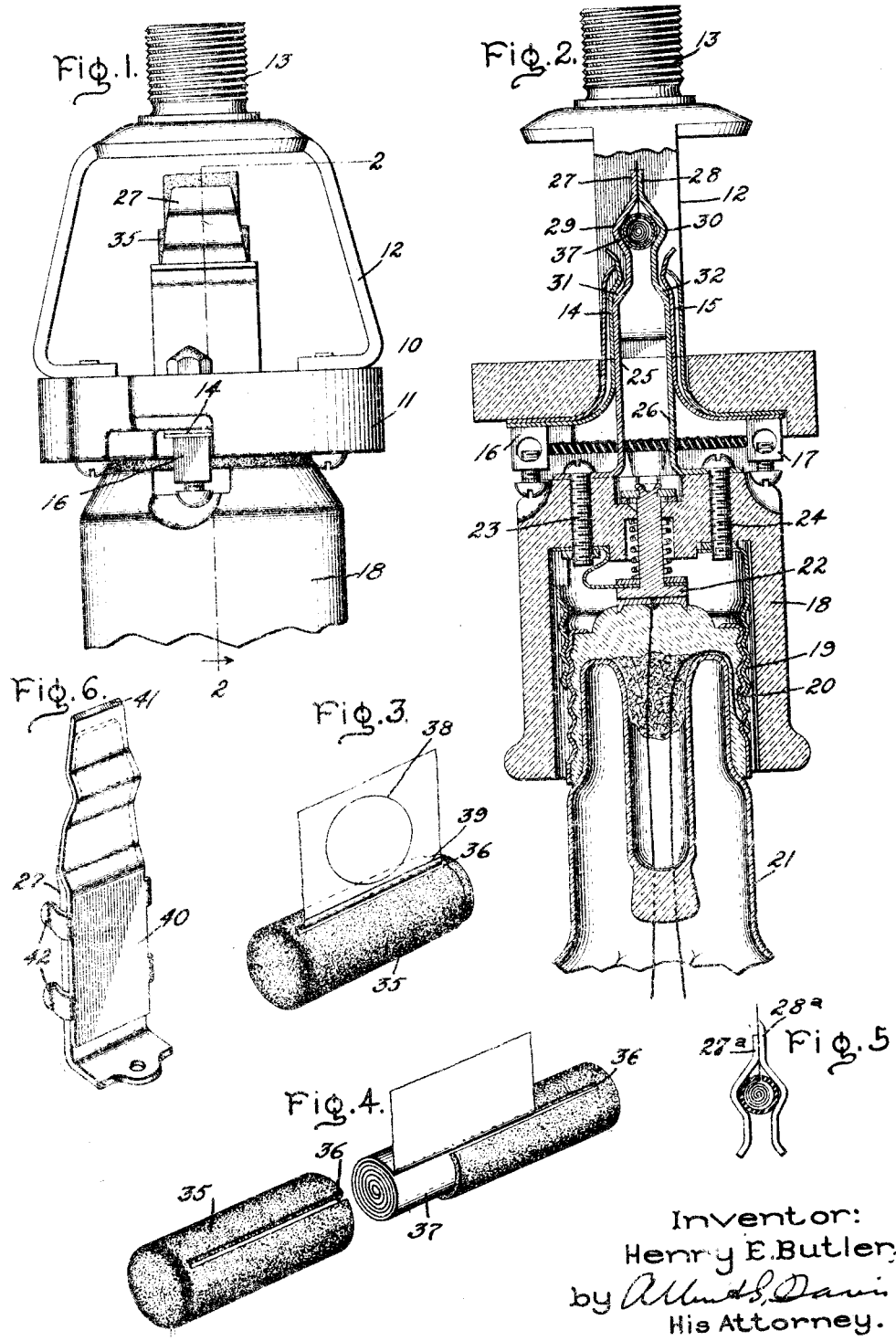
1,548,656

H. E. BUTLER

FILM CUT-OUT

Filed May 5, 1922

2 Sheets-Sheet 1



Inventor:
Henry E. Butler,
by *Alfred S. Davis*
His Attorney.

Aug. 4, 1925.

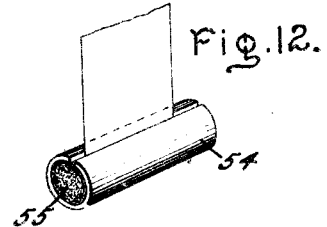
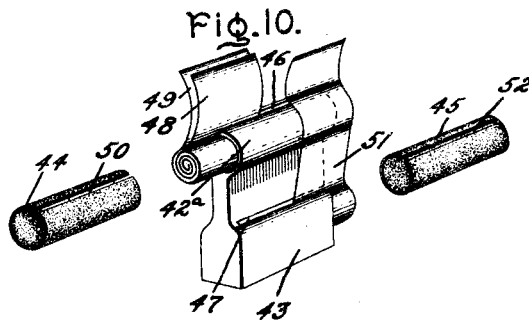
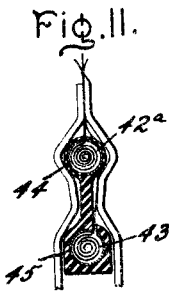
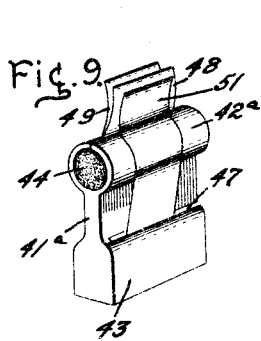
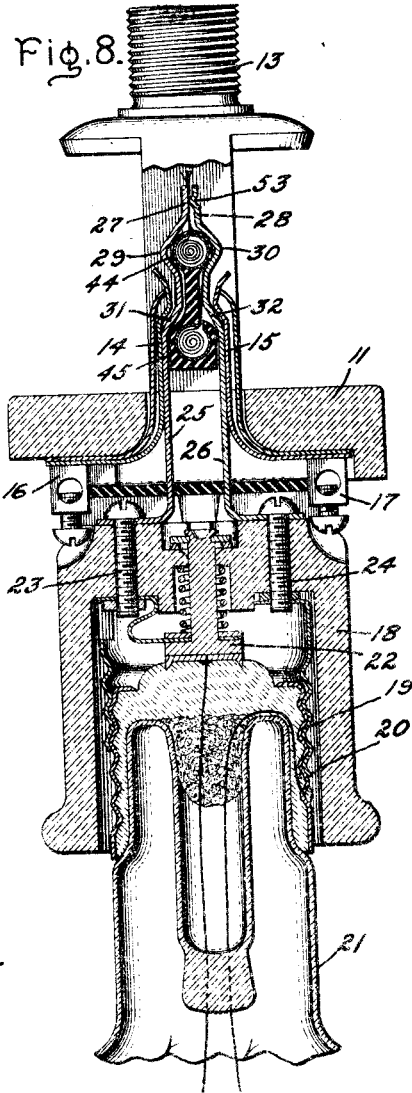
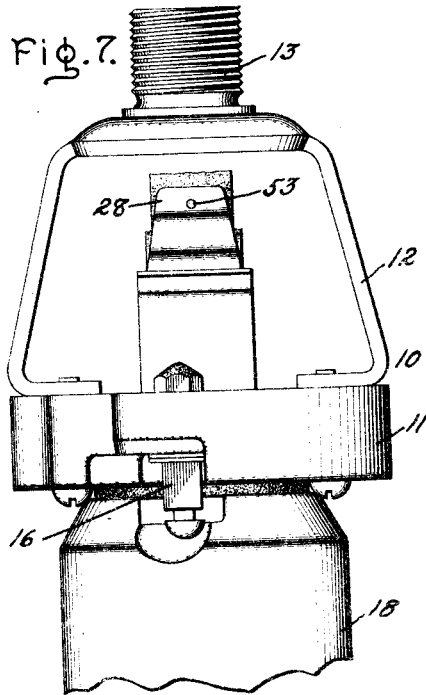
1,548,656

H. E. BUTLER

FILM CUT-OUT

Filed May 5, 1922

2 Sheets-Sheet 2



Inventor:
Henry E. Butler,
by *Alburt S. Davis*
His Attorney.

UNITED STATES PATENT OFFICE.

HENRY E. BUTLER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

FILM CUT-OUT.

Application filed May 5, 1922. Serial No. 558,787.

To all whom it may concern:

Be it known that I, HENRY E. BUTLER, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Film Cut-Outs, of which the following is a specification.

This application is a continuation in part of my application, Ser. No. 435,427, filed January 6, 1921.

The invention relates to film cut-outs for electric circuits such as are in common use in series incandescent street lighting whereby in case the circuit becomes interrupted at any one of the lamps in series the film cut-out acts automatically to open up a new or shunt circuit about the point of interruption and thereby permits current to pass through all the other or unruptured lamps in the series so that the breaking down of one or more of a number of lamps in series does not interfere with the proper functioning of the remaining lamps.

Film cut-outs comprise two conductor terminals arranged in juxtaposition but insulated from each other by a member of such character that when the flow of current through a lamp is interrupted the increased potential of the current resulting from such interruption operates to break down or puncture the member and allows the current to by-pass its disrupted path through the lamp.

Upon renewal of the disrupted lamp it is of course necessary to renew the cut-out film so that current may flow only through the lamp. It is accordingly necessary for the lamp trimmer to manipulate the lamp socket or holder to expose the film cut-out and to then renew the delicate film in addition to removing the disrupted lamp and inserting a new one, and this he ordinarily must do while standing on a ladder and often in inclement and cold weather.

The object of my invention is to provide an improved structure and arrangement in film cut-outs and for a consideration of what I believe to be novel and my invention, attention is directed to the accompanying description and the claims appended thereto.

In the drawing, Fig. 1 is a side elevation of a standard series socket and receptacle with a cut-out film made in accordance with my invention applied thereto; Fig. 2 is an

axial section on line 2—2 of Fig. 1, and with a standard lamp base shown in the socket; Fig. 3 is an enlarged perspective view of a film structure and its protecting encasement embodying one form of my invention; Fig. 4 is a view similar to Fig. 3 but with the parts of the encasement shown separated; Figs. 5 and 6 show modified structures of certain parts; Figs. 7 and 8 are views similar to Figs. 1 and 2 respectively showing a modified form of film structure; Fig. 9 is a perspective view of the film structure shown in Figs. 7 and 8; Fig. 10 is an exploded view thereof; Fig. 11 shows the film structure illustrated in Fig. 9 used in connection with spring contact terminals as shown in Fig. 5, and Fig. 12 illustrates a modified form of casing.

Referring to the drawing, 10 indicates a receptacle having a base 11 and a bracket 12 provided with a threaded end 13 adapted to be connected to a lamp post-bracket. Carried by base 11 are two opposed spring contacts 14 and 15 to which are connected binding posts 16 and 17 which receive the series line terminals. 18 indicates a lamp socket having a threaded shell 19 adapted to receive the threaded end 20 of an incandescent lamp 21. Shell 19 forms one terminal connection for the lamp, the other being formed by a central contact 22. Contact 22 and shell 19 are connected by screws 23 and 24 to terminal spring contacts 25 and 26 which are adapted to be inserted between spring contacts 14 and 15 to form the circuit connections for connecting the lamp into the series circuit and also to form a supporting means for the lamp socket. Spring contacts 25 and 26 have parallel outer ends as indicated at 27 and 28 below which are bowed-out portions 29 and 30 and shoulders 31 and 32. It is between the ends 27 and 28, that a film cut-out is provided.

The foregoing arrangement may be taken as typical of any suitable series circuit arrangement embodying a film cut-out. The specific arrangement shown is a known one and one in extensive use at the present time. It operates as follows:—

With a suitable insulating film between contact ends 27 and 28 and a lamp in the socket, current enters by way of binding post 16, for example, flows through spring contacts 14 and 25 and screw 23 to central contact 22; thence through the lamp fila-

ment to shell 19 and by way of screw 24 and spring contacts 26 and 15 to terminal 17. As long as the lamp is in circuit the potential across spring contact ends 27 and 28 is not sufficient to rupture the insulating film, and hence such ends remain insulated from each other. In case the lamp burns out or is removed, the series circuit is interrupted. This builds up a potential across contact ends 27 and 28 sufficiently high to rupture the film and effect a connection between such ends. A circuit is thereby closed around the burned-out lamp as is obvious and the operation of the remaining lamps in the series circuit is not interfered with. In ordinary street lighting practice, lamps are used until they burn out, which means of course that the insulating films are ruptured. The attendant, when he finds a lamp burned out must, therefore, not only put in a new one but renew the film also.

My invention relates particularly to an improved film structure and film cut-out arrangement and according to my invention, I provide a film structure in the form of a package comprising sufficient insulating material to form a number of films for use between the contacts. This package is mounted adjacent the two contact surfaces which form the cut-out connection and a portion of the material is located between such surfaces to form the insulating film between them. For lighting circuits in common use I have found thin tracing cloth or other flexible material of a similar nature, a suitable material from which to form the package. Such a material has a very uniform dielectric strength. The package is arranged so that when a film is pulled from between the contacts a fresh piece of the material or a new film will be pulled from the package into position between them. With this arrangement, therefore, when a film is punctured and it is desired to renew it, it is only necessary to pull the ruptured film out when a fresh one will take its place. Preferably the package is in the form of a strip or ribbon of the insulating material suitably folded or rolled upon itself to form a compact structure, and this structure is then preferably mounted in a casing or capsule having a slit along its side through which the end of the strip projects. The casing is itself preferably made of insulating material and is moisture proof and serves to protect the insulating material from dirt and moisture and also serves as a holder for it.

Referring particularly to the arrangement shown in the drawing, (Figs. 3 and 4) which is a preferred embodiment of my invention, the film cut-out package comprises a capsule 35 of suitable moisture proof insulating material having a slot 36 along its side.

In the capsule is a roll 37 of the insulating material, the end of which projects through slot 36. The capsule may be formed of two telescoping members as shown in Fig. 4, each member having a slot as shown. In assembling a capsule the roll 37 is slipped into the one member with its end in the slot therein after which the other member is slipped over the first and the two glued together. This forms a compact package which can be easily manufactured at a low cost and which is very convenient to handle.

For use in a fixture as shown in the drawing, the roll is made of a length slightly greater than the width of contacts 25 and 26 and of a diameter to fit nicely between the bowed-out parts 29 and 30 of such contacts. In its application to this fixture, a capsule is slipped between the bowed-out parts 29 and 30 with the slot 36 upward as shown in Figs. 1 and 2, and with the end of the strip between contact ends 27 and 28 and projecting slightly beyond them. Now, in case the film is punctured, to renew it, it is only necessary to pull out on the end of the strip when the punctured portion will be removed from between the contacts and a fresh portion will take its place. The punctured portion may be then torn off, care being taken to tear it slightly beyond contact ends 27 and 28 so as to leave sufficient material projecting to take hold of when the film is to be again renewed.

Under actual operating conditions, the steps in putting in a new lamp for one burned out may be substantially as follows. The attendant may first remove the burned out lamp 21 after which he pulls the lamp socket 18 out of receptacle 10. Then by grasping the two ends of the capsule between the thumb and finger and pushing downward on it, it will push against the lower beveled surfaces of bowed-out portions 29 and 30 and spread slightly the contact ends 27 and 28. With the other hand the attendant may then pull on the end of the strip to pull the punctured portion from between the contacts and a fresh unpunctured portion to a position between them. He then releases his hold on the capsule permitting the contact ends to come together again after which he tears off the punctured end of the strip. A new lamp is then screwed into the socket and the socket pushed back into the receptacle. While it is not necessary that the contact ends be spread in pulling the strip between them it is preferable to do so, as it avoids any danger of tearing or disrupting the strip, a thing which might happen should there be burrs on the contact ends, for example.

If found desirable, I may provide means on the strip or ribbon to indicate how far it should be pulled out in renewing the film

and to this end I may crease or perforate the film transversely at spaced intervals or provide suitable marks on it. In Fig. 3 I have indicated marks in the form of a circle 28, the diameter of a circle being sufficient for a renewal, and also a crease 39. In making a renewal it will be noted that the attendant's hand does not come into contact with the new portion of the strip which is to serve as the film so there is no danger of its becoming dirty or soiled from his hands, thereby affecting the dielectric strength of the film.

A roll or capsule will contain a number of renewals depending on its length. In the arrangement shown I have found that a strip sufficiently long to provide about twenty renewals may be conveniently provided. It will be noted that since the material is of uniform dielectric strength it will always puncture at about the same desired voltage.

A number of capsules may be carried by the attendant and when the material in a capsule in one of the fixtures is used up a new capsule may be substituted. Since the film material is within casing 35, it cannot become soiled or damaged in any way by being carried and handled by the attendant.

A fixture as shown in Figs. 1 and 2 is a standard fixture in extensive use at the present time and one of the most important features of utility in connection with my invention is that it is adapted for use in such fixtures without any change whatever. This means that in applying my invention to present installations, it is only necessary to obtain a film package as shown in Fig. 3. It will be understood, however, that my invention may be carried out in other forms in order to adapt it to other styles of fixtures.

If found desirable, a cutting edge may be provided over which the film may be torn off, and in Fig. 5 I have shown an arrangement wherein one of the spring contact ends 28^a corresponding to contact end 28 of Fig. 2 extends beyond the end of contact end 27^a and presents a sharp edge over which the strip may be torn. In Fig. 6 I have shown a metal strip 40 having a cutting edge 41 at its end and provided with spring arms 42 by means of which it may be attached to a spring contact such as 27 of Fig. 1, the arrangement being such that the cutting edge 41 is a suitable distance beyond the end of contact 27. With either of these arrangements shown in Figs. 5 and 6 it will be noted that when the strip is torn off across the edge a short piece is left projecting which may be grasped by the fingers when the film is to be again renewed.

It is occasionally found in connection with old installations that there are burrs or slight projections on the contact ends 27

and 28 and that such burrs or projections may sometimes cause trouble in that they will project through the film and short circuit the lamp. To take care of this condition, I provide a special film package wherein there are provided protectors for the film in the form of metal ribbons which stand one on each side of the film.

This arrangement is particularly illustrated in Figs. 7 to 10 inclusive.

Referring now to Figs. 7 to 10 the parts of the series socket and receptacle are similar to those shown in Figs. 1 and 2 and corresponding reference numerals have been applied thereto. The film package comprises a holding member 41^a having two longitudinally extending receptacles 42^a and 43 adapted to receive capsules 44 and 45. Holding member 41^a may be made of any suitable material, preferably a waterproof insulating material such as wood, fibre or the like. Receptacles 42^a and 43 are closed at one end and are provided with slots 46 and 47 which extend from the open ends of the receptacles to points adjacent the closed ends thereof. Preferably one receptacle is open at one end of the holding member and the other receptacle is open at the other end of the holding member. Capsule 44 contains a roll comprising a strip or ribbon of insulating material 48 and a metallic protecting strip or ribbon 49, the two being laid one on the other and rolled up together as indicated in the drawing. The material of which strip or ribbon 49 is formed, may be any suitable metal which is easily torn. It is of substantially the same width as the insulating film material 48. Capsule 44 has a slot 50 through which the ends of ribbons 48 and 49 project and when the capsule is inserted in receptacle 42^a slot 50 is made to come into line with slot 46 so that the ribbons 48 and 49 project through slot 46. In capsule 45 is a roll of thin metal ribbon 51 similar to ribbon 49 but it is preferably made narrower than insulating strip 48 and metallic ribbon 49 so that there will be no danger of metallic ribbons 49 and 51 coming into engagement with each other. In capsule 45 is a slot 52 through which the end of ribbon 51 projects and when capsule 45 is inserted into receptacle 43, slot 52 is made to come into line with slot 47 so that the ribbon may project through slot 47 as shown in Figs. 9 and 10. Metal ribbon 51 extends up along the side of holding member 41^a, around receptacle 42^a and alongside the insulating strip or ribbon 48, as shown particularly in Fig. 9. The arrangement shown in these figures is used in substantially the same manner as that illustrated and described in connection with Figs. 1 to 4 inclusive.

With this arrangement it will be seen that between the contact ends 27 and 28

there is a piece of film insulating material 48 protected on each side by the metal ribbons 49 and 51. With this arrangement when the film punctures, it is renewed in exactly the same manner as heretofore described. The operator grasps the ends of ribbons 48, 49 and 51, pulls them all simultaneously up between contact ends 27 and 28 and tears them off along a line just beyond the ends of contact ends 27 and 28. By this arrangement it will be seen that the insulating film material 48 when being renewed is protected by the metal ribbons 49 and 51 from any burrs which may be projecting from contact ends 27 and 28.

In Figs. 7 and 8 I have shown contact end 28 as being provided with a struck-in bead or projection 53 so that it contacts with the insulating film cut-out material only at this point. By this arrangement the film insulating material will puncture at the point opposite bead 53. This arrangement is sometimes desirable in order to insure that the point of puncture occurs at the center of the portion of the film located between the contact ends.

In Fig. 11 I have shown the film cut-out structure of Fig. 9 used in connection with contact ends of the type shown in Fig. 5. The capsules 44 and 45 may be made of suitable material such as waterproof paper and may be of the nature of the capsules shown in Figs. 3 and 4, except that owing to the use of the holding member 41^a I need use but one capsule member instead of two telescoping members as shown in Figs. 3 and 4. In this arrangement the open ends of the capsule members 44 and 45 are closed by the ends of the receptacles in holding member 41^a.

In Fig. 12 I have shown a modified form of capsule comprising a cylinder 54 of suitable material such as waterproof paper, fibre or the like having one or both ends closed by means of small disks 55 which may be glued or otherwise fastened in place. This forms a capsule which may be readily built at a low cost.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a film cut-out, the combination with a pair of contacts adapted to engage each other, of a package mounted adjacent said contacts comprising a casing having a slot in one of its walls and a quantity of insu-

lating material enclosed in said casing sufficient to form a number of films for use between the contacts, the arrangement being such that when one film is moved from between the contacts a fresh one is pulled through said slot to take its place.

2. In a film cut-out, the combination with a pair of contacts adapted to engage each other, of a package mounted adjacent said contacts comprising a casing having a slot in one of its walls, and a strip of insulating material enclosed therein and adapted to be pulled through the said slot, said strip being sufficiently long to form a number of films for use between said contacts.

3. In a film cut-out, the combination with a pair of contacts adapted to engage each other, of a package mounted adjacent said contacts comprising a casing having a slot in one of its walls and a roll of insulating ribbon enclosed therein and adapted to be pulled through said slot, said roll being sufficiently long to form a number of films for use between said contacts.

4. In a film cut-out, the combination with a pair of contacts, of a package comprising a moisture-proof casing having a slot in one of its walls and sufficient insulating material therein to form a number of films for use between said contacts, said material being adapted to be pulled through said slot.

5. In a film cut-out, the combination with a pair of contacts, of a package comprising a moisture-proof casing having a slot in one of its walls and sufficient insulating material therein to form a number of films for use between said contacts, said material being adapted to be pulled through said slot, and means for mounting said package adjacent the contacts.

6. In a film cut-out, the combination with a pair of contacts, of a package comprising a moisture-proof casing having a slot in one of its walls and a continuous strip of insulating material therein, said strip being sufficiently long to form a number of films for use between said contacts, and being adapted to be pulled through said slot.

7. In a film cut-out, the combination of a pair of spring contacts having portions adapted to engage each other and a bowed-out portion adjacent thereto, and a package comprising sufficient insulating material to form a number of films for use between said contacts mounted in said bowed-out portion.

8. The combination with a socket having terminals and adapted to receive an electrical device, of contacts adapted to short circuit said terminals, and a package of insulating material mounted adjacent said contacts, said package containing material sufficient to form a number of films for use between said contacts.

9. The combination with a socket having terminals and adapted to receive an electrical device, of spring contacts adapted to short circuit said terminals, and a package of insulating material held by said contacts and containing material sufficient to form a number of films between them.
10. The combination with a socket having terminals and adapted to receive an electrical device, of spring contacts adapted to short circuit said terminals, and a package of insulating material held by said contacts, said package comprising a roll of insulating material of a length sufficient to form a number of films between the contacts.
11. As an article of manufacture, a package for use in connection with film cut-outs, said package comprising a casing and insulating material therein sufficient to form a number of films, said casing being provided with an opening through which the insulating material may be pulled.
12. As an article of manufacture, a package for use in connection with film cut-outs, said package comprising a casing and a continuous strip of insulating material therein of sufficient length to form a number of films, said casing being provided with an opening through which the insulating material may be pulled.
13. As an article of manufacture, a package for use in connection with film cut-outs, said package comprising a casing and a roll of insulating material therein sufficient to form a number of films.
14. As an article of manufacture, a package for use in connection with film cut-outs, said package comprising a casing having a slot along its side, and a continuous strip of insulating material in said casing with one end projecting through said slot.
15. As an article of manufacture, a roll of insulating material sufficiently long to form a number of films and a casing enclosing the same, said casing having a slot through which the material may be pulled.
16. In a film cut-out, the combination with a pair of contacts adapted to engage each other, of a package mounted adjacent said contacts and comprising a strip of insulating material sufficiently long to form a number of films for use between said contacts, and protecting means to prevent the accidental rupturing of said strip when the film is being renewed.
17. In a film cut-out, the combination with a pair of contacts adapted to engage each other, of a package mounted adjacent said contacts and comprising a strip of insulating material sufficiently long to form a number of films for use between said contacts, and thin metallic protecting ribbons on each side of said strip.
18. In a film cut-out, the combination with a pair of contacts adapted to engage each other, of a package mounted adjacent said contacts and comprising a strip of insulating material sufficiently long to form a number of films for use between said contacts, and thin metallic protecting ribbons on each side of said strip, one of which is of less width than the other.
19. In a film cut-out, the combination with a pair of contacts, of a package comprising sufficient insulating material to form a number of films for use between said contacts, and metallic protecting ribbons for said material.
20. The combination with a socket having terminals and adapted to receive an electrical device, of contacts adapted to short circuit said terminals, a package of insulating material mounted adjacent said contacts, said package containing material sufficient to form a number of films for use between said contacts, and metallic protecting ribbons for said material.
21. As an article of manufacture, a package for use in connection with film cut-outs, said package comprising a casing, insulating material therein sufficient to form a number of films, and protecting means for said insulating material which serves to prevent accidental rupturing of said material when the film is being renewed.
22. As an article of manufacture, a package for use in connection with film cut-outs, said package comprising a holding member, a continuous strip of insulating material, and two continuous strips of protecting ribbon carried thereby.
23. As an article of manufacture, a package for use in connection with film cut-outs, said package comprising a holding member having two receptacles, a continuous strip of insulating material and a continuous strip of protecting material in one of said receptacles, and a continuous strip of protecting material in the other of said receptacles.
24. As an article of manufacture, a package for use in connection with film cut-outs, said package comprising a holding member having two receptacles, a capsule containing a roll formed from an insulating strip and a protecting strip in one of said receptacles, and a capsule containing a roll from a protecting strip in the other of said receptacles.
25. As an article of manufacture, a package for use in connection with film cut-outs, said package comprising a holding member having two receptacles each open at one end, and capsules in said receptacles, one of said capsules containing a strip of insulating material and a strip of protecting material rolled up together, and the

other of said capsules containing a roll of protecting material, said protecting materials lying on each side of the insulating material when they are pulled from the rolls.

26. In a film cutout, the combination of a pair of spring contacts having ends adapted to engage each other, a package comprising a continuous strip of insulating material sufficient to form a number of films for use between said contacts, said package being mounted adjacent said contact ends, and means forming a cutting edge on one

of the contact ends over which the film material may be torn.

27. The combination of two adjacent spring contacts in circuit, one of said contacts being longer and projecting beyond the other; a spool rotatably mounted in operative relation with said contacts; and a destructible film of insulating material coiled upon said spool and passing between said contacts, substantially as described.

In witness whereof, I have hereunto set my hand this 3rd day of May, 1922.

HENRY E. BUTLER.

15

20