Nov. 20, 1945. E. G. FORSSELL 2,389,495

FILM HOLDER

Filed Jan. 12, 1945

Fig. 1

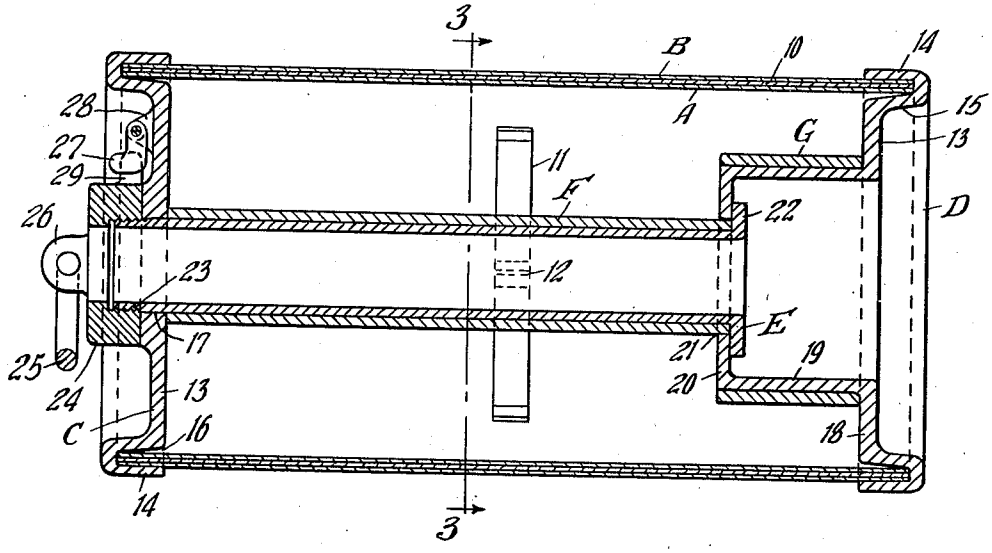


Fig. 2

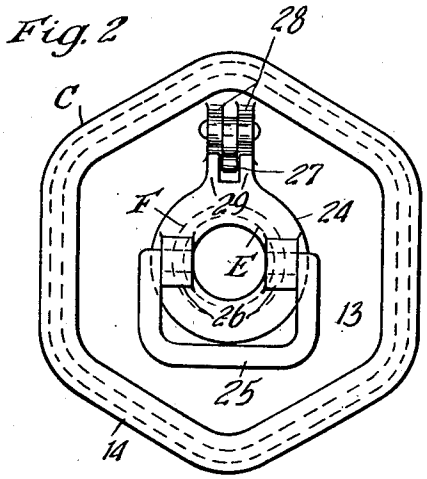
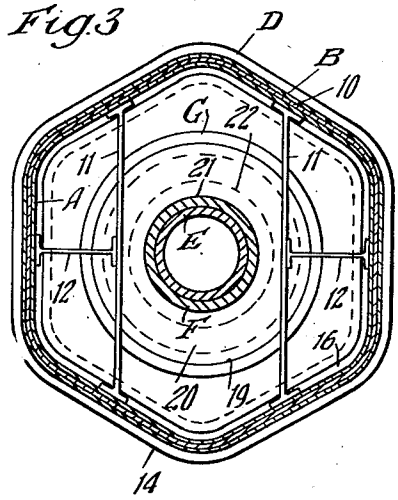


Fig. 3



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FILM HOLDER

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7 Claims. (Cl. 250—66)

This invention relates to improvements in film holders employed in X-ray photographing steel castings, and more particularly film holders adapted for use in connection with steel castings in the form of tubular casings or shells.

One object of the invention is to provide a film holder of the character indicated designed to fit the interior of a tubular casing to be X-ray photographed and adapted to hold a continuous film extending entirely around the inner side of the casing.

A further object of the invention is to provide a tubular film holder comprising inner and outer, tubular shells adapted to enclose a tubular photographic film therebetween, wherein the portions of the tubular film at the side of the holder opposite to that being exposed to the effect of the X-rays is protected against said rays by suitable screening means.

A more specific object of the invention is to provide a film holder, as set forth in the preceding paragraph, wherein the screening means is in the form of a lead core enclosed within the inner tubular shell and arranged lengthwise of the film holder.

A still further object of the invention is to provide a simple and efficient film holder of the character indicated, comprising inner and outer tubular shells adapted to enclose a tubular photographic film therebetween, caps at opposite ends of said inner and outer shells, fitting within the opposite ends of the inner shell and having flange portions engaged over the outer shell at the corresponding ends thereof to clamp said inner and outer shells together, a removable central retaining or anchoring member extending from one cap to the other and having shouldered engagement therewith for holding the film holder assembled, and a tubular lead member surrounding said anchoring member forming a screen for preventing X-rays from penetrating from one side of the film holder to the other.

Another object of the invention is to provide a film holder as set forth in the preceding paragraph, wherein the inner tubular shell is made of flexible material so that it may be contracted to receive the tubular film and expanded to hold the film against the outer shell, and wherein readily accessible and convenient manually actuated means is provided for contracting said inner shell.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawing forming a part of this specification, Figure 1 is a longitudinal, vertical sectional view of my improved film holder. Figure 2 is a front elevational view of Figure 1, looking from left to right. Figure 3 is a transverse, vertical sectional view, corresponding substantially to the line 3—3 of Figure 1.

As shown in the drawing, my improved film holder comprises broadly an inner tubular shell A of flexible material; an outer tubular shell B of flexible material; a front cap C; a rear cap D; a retaining element E; a tubular screen element F; and a screen element in the form of a collar G.

The shells A and B are of elongated, tubular form and made of flexible material, preferably fiber, and in assembled condition provide a casing. The shells A and B are preferably made of hexagonal, transverse cross section, but may be of other contours to fit the particular steel casing or shell to be X-rayed. The inner shell fits within the outer shell with sufficient space therebetween to accommodate a single thickness of sensitized photographic film. The film, which is indicated by 10, may be either in the form of a tubular member or a continuous sheet or strip. When a tubular film member is used, it is preferably in the form of a cylinder and is pressed to hexagonal shape when enclosed between the shells A and B. The inner shell A has the diverging top and bottom walls at opposite sides thereof connected by vertically extending, flexible strips 11—11, which are fixed to said walls. The strips 11—11 are connected to the vertical side walls of the inner hexagonal shell by horizontally extending, flexible strips 12—12 secured respectively to said vertical side walls and the strips 11—11. The strips 11—11 form convenient means for contracting the shell A in applying the film to the same, the strips 11—11 being gripped between the fingers and pulled together, thereby contracting the shell, the strips 11 pulling the top and bottom walls inwardly and the strips 12 pulling the side walls inwardly. When contracted, the shell A may be readily inserted within the cylindrical film. After the shell A with the film thereon has been telescoped within the shell B, the operator's grip is released from the strips 11—11, thus permitting the shell A to expand, assuming its hexagonal shape and thus shaping the film to hexagonal form by pressing the same against the inner sides of the outer shell B.

The caps C and D are of similar design, except as hereinafter pointed out. Each cap is in the form of a hexagonal disc having an inwardly cupped portion 13 of hexaongal shape, which fits within the inner shell A. The disclike cap is pro-

vided with a peripheral flange 14 which surrounds the cup-shaped portion 13 thereof and extends in the same direction as the wall 15 of said cup-shaped portion. A groove 16 is thus defined between the flange 14 and the wall 15 which forms a seat in the form of a hexagonal channel, which receives the corresponding ends of the inner and outer shells A and B. The wall 15 is preferably slightly inclined to provide a flaring opening to facilitate engaging over the ends of the shells A and B. The seat of the cap C receives the front end portions of the shells A and B, and the seat of the cap D the rear end portions of said shells. The cap C has a central opening 17 adapted to accommodate the front end of the retaining element E. The inner, transverse wall 18 of the cup-shaped portion 13 of the cap D is provided with an inwardly projecting, central, hollow boss 19 of cylindrical, transverse cross section. The boss 19 is closed at its front end by a transverse, vertical wall 20, which is provided with an opening 21 to accommodate the rear end portion of the retaining element E. The opening 21 is concentric with the opening 17 of the front cap C but of slightly greater diameter.

The retaining element E is in the form of an elongated, tubular sleeve having a laterally outwardly projecting, annular flange 22 at the rear end thereof which shoulders against the wall 20 of the boss 19. The sleeve E is threaded, at its forward end, as indicated at 23, to receive a nut 24 for clamping the caps C and D together. The nut 24 is provided with a hand grip 25, which is pivoted to spaced, outstanding ears 26—26 on said nut. A pivoted latch 27 is provided, adapted to engage the nut to lock the same against rotation. The latch 27 is pivoted to spaced ears 28—28, projecting from the cap C. The nut is provided with laterally outstanding, spaced lugs 29—29 between which the latch member 27 is engageable.

The tubular screen element F is in the form of an elongated sleeve of cylindrical, transverse cross section surrounding the retaining element E and having its front end abutting the inner side of the front cap C. The rear end of the sleeve F is seated in the opening 21 of the wall 20 of the boss 19 and abuts the flange 22 of the sleeve E. This sleeve is constructed of any suitable material which prevents the passage of X-rays, preferably being made of lead.

The collar G, which is also made of lead, surrounds the boss 19 and extends from the cap D to the front end of the boss. The sleeve F and the collar G together provide continuous screening means extending from end to end of the film holder, thereby shielding that portion of the film which is located in the film holder at the side of the latter which is diametrically opposite to that exposed to the X-rays, thus preventing clouding of the film.

In loading the film holder, the film is placed about the shell A in contracted condition, as hereinbefore stated. The shell A, with the film disposed thereabout, is passed into the shell B and the shell A is then permitted to expand, shaping the film to hexagonal form and clamping the same against the interior of the shell B. The caps C and D are then applied over the ends of the shells A and B. The retaining element E is then attached and the caps clamped together by applying the nut 24. The nut is then locked in position against accidental removal by the latch 27.

The hexagonal film holder illustrated is especially adapted for use in X-ray photographing steel draft gear friction casings of hexagonal, interior cross section and the film holder is designed to closely fit the interior walls of such a casing. Removal of the film holder from the draft gear friction casing is greatly facilitated by the use of the hand grip 25 by which it may be withdrawn.

I claim:

1. In a film holder, the combination with a casing comprising inner and outer, tubular shells between which the film is adapted to be held; of a front cap and a rear cap closing the ends of said casing; and a retaining clamping element clamping said caps.

2. In a film holder, the combination with a casing comprising inner and outer, tubular shells between which the film is adapted to be held; of front and rear caps engageable over the ends of said tubular casing; and an elongated retaining element extending from one cap to the other for clamping the same.

3. In a film holder, the combination with a casing comprising inner and outer, tubular shells between which the film is adapted to be held; of front and rear caps closing the ends of said casing; and a lengthwise extending screening element within said inner shell.

4. In a film holder, the combination with a casing comprising inner and outer, tubular shells between which the film is adapted to be clamped; of front and rear caps closing the ends of said casing; and a central screening core in said holder within said inner shell extending from one cap to the other.

5. In a film holder, the combination with a casing comprising inner and outer, tubular shells between which the film is adapted to be held; of front and rear caps engaged over the ends of said casing; a lengthwise extending, central retaining member connecting said caps; and a tubular lead sleeve surrounding said retaining member.

6. In a film holder, the combination with a casing comprising inner and outer, tubular shells between which the film is adapted to be held; of front and rear caps engaged over the front and rear ends of said casing, said rear cap having an inwardly extending central boss; a central lead sleeve within said inner shell extending from the front cap to said boss; a lead collar surrounding said boss and extending the entire length of the same; and a retaining element extending through said sleeve and into the hollow boss of the rear cap, said retaining element having shouldered engagement with said boss and the front cap to clamp said caps.

7. In a film holder, the combination with a casing comprising inner and outer, tubular shells of flexible material between which the film is adapted to be held; of means connected to the inner walls of said inner shell for contracting the same; front and rear caps engaging over the front and rear ends of said casing; and a retaining element connecting said front and rear caps and clamping the same.

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