Jan. 6, 1959 C. G. PADGETT 2,867,161

FILM HOLDER

Filed Feb. 14, 1956

Fig. 1.

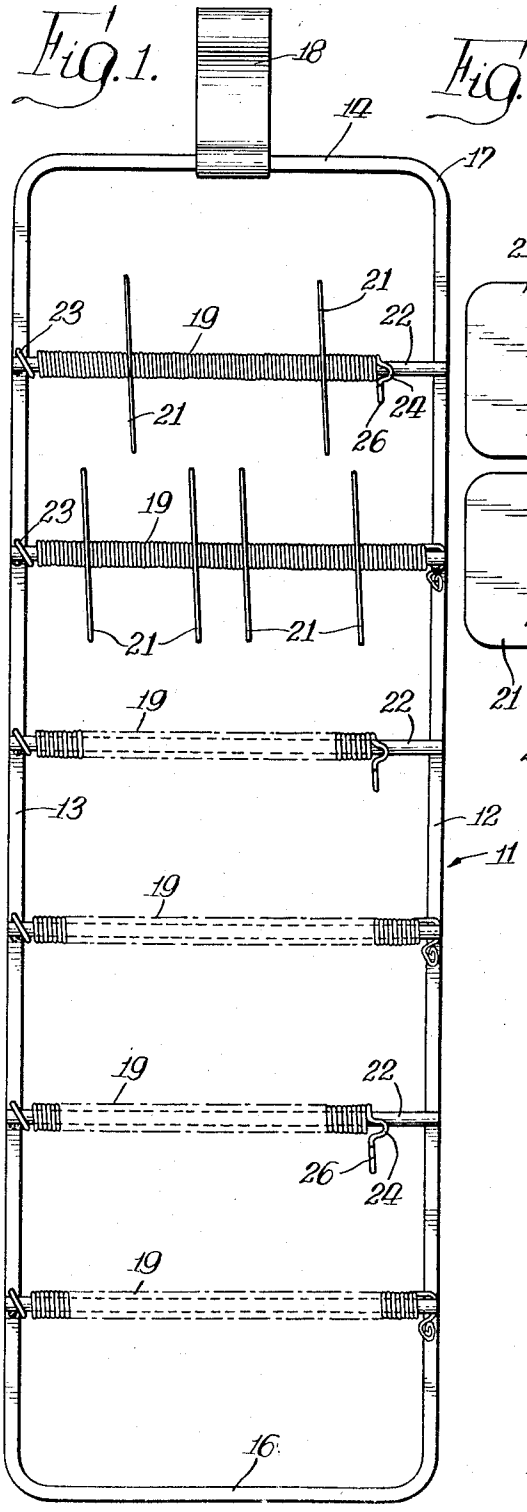


Fig. 2.

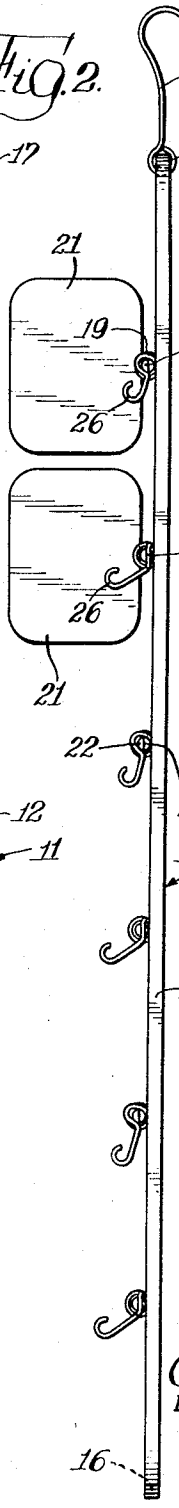


Fig. 3.

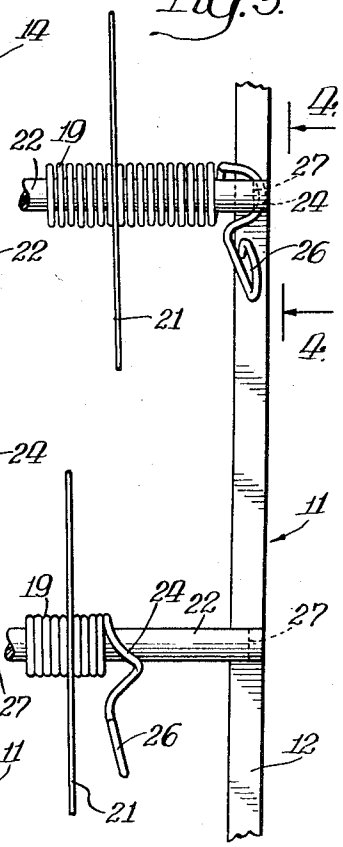
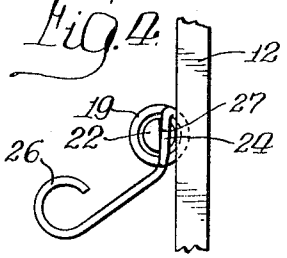


Fig. 4.



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FILM HOLDER

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4 Claims. (Cl. 95—100)

This invention relates generally to film holding devices and particularly to an improved holder for dental X-ray film, or the like.

Dental offices are generally provided with dental X-ray machines in order that X-ray photographs may be readily made for diagnostic purposes. X-ray pictures taken by these machines are normally developed on the premises by the dentist or his assistants, and the process employed for their development is similar to that normally employed in developing photographs, in that the X-ray film is first immersed in a developing solution, washed, immersed in a fixing solution, washed and finally dried, as is well understood in the art. A number of types of dental X-ray film holders, for supporting the film during the development process, have been utilized, and those devices heretofore furnished the profession have often been found to be of inadequate capacity and to require undue manipulation for loading and unloading of film.

It is, therefore, a primary object of this invention to provide a novel X-ray film holder.

A further object is to provide a novel X-ray film holder of large capacity yet which is compact.

Another object is to provide a novel film holder that is provided with means for facilitating the loading and unloading thereof.

A further object is to provide a novel film holder that will not physically harm the image on the film supported thereby.

Other objects and advantages of the invention will become apparent from the subsequent description taken in conjunction with the accompanying drawing wherein:

Fig. 1 is a front elevational view of a specific embodiment of the film holder;

Fig. 2 is side elevational view of the device shown in Fig. 1;

Fig. 3 is a front elevational view on an enlarged scale of a portion of the device shown in Fig. 1, illustrating the relationship of its parts during loading and after being loaded with film; and

Fig. 4 is an end elevational view of a portion of the device shown in Fig. 3 as seen along line 4—4 of Fig. 3.

In general the objects of the invention are accomplished by providing a rack which is adapted to support a large number of sheets of X-ray film, or the like, by utilizing one or more tension springs to grip the edges of the sheets. The springs are the primary film holding elements and are provided with means for releasably securing them in extended condition for facilitating the loading of the film. After the device has been loaded the springs are released to clamp or tightly grip the film.

Referring to the drawing, the device comprises a generally rectangular rack 11, which is the main supporting member of the device. The rack is shown as having a vertical dimension greater than its width in this instance, so that it may be accommodated in the developing and washing tanks that are currently being used in a number of dental offices. It is shown having a pair of vertical

side rails 12 and 13, a top rail 14 and a bottom rail 16. The corners of the frame are shown rounded, as at 17, for reducing their tendency to catch on objects and thus facilitating the insertion of the device into developing tanks. In the present instance, the frame 11 is shown as being made of bar stock having a square cross section.

Inasmuch as the film must be dried after being developed, fixed and washed, the device is provided with a means for suspending it. In this embodiment the suspension means comprises a sheet metal hook 18 rigidly secured around top rail 14 and which is adapted to be hooked over a suitable projection to suspend the device during drying. Hook 18 also provides a handy means for supporting the device while it is being loaded and unloaded.

This device relies upon the gripping forces existing between adjacent turns of a coil tension spring for supporting sheets of film, or the like. In this embodiment a plurality of identical coil tension springs 19 are disposed parallel to each other and transversely between side rails 12 and 13 of the frame. Springs 19 are shown spaced one from the other sufficiently far apart so that sheets of film 21 may be interposed edgewise between adjacent turns of a spring 19 and transversely between it and an adjacent spring 19, without touching that adjacent spring, as best seen in Figs. 1 and 3. Springs 19 when unextended are shorter than the distance between side rails 12 and 13. It is thus seen that when a spring 19 is extended to bridge the space between rails 12 and 13, its adjacent turns are slightly spaced from each other, to facilitate the edgewise insertion of a sheet 21 therebetween. In the preferred embodiment, the spring is dimensioned relative to the distance between rails 12 and 13 so that it can be stretched only sufficiently to permit insertion of a sheet 21 but will still grip the sheet, i. e. the spaces between adjacent turns, when the coil is stretched between the rails, are normally just slightly less than the thickness of the film to be inserted, as shown in the top portion of Fig. 3. Hence, a sheet 21 may be easily inserted between the adjacent turns, but enough force remains between the sheet and the adjacent turns to retain the sheet in place until forcibly removed.

The advantages of this arrangement are several. The coil spring affords a means for holding a large number of sheets of film at any one time with each sheet of film being spaced from adjacent sheets by one or more turns of the coil therebetween, the coil frictionally grips the edge of the sheet without punching holes in it or otherwise mutilating it, and during loading and unloading, even when the spring is extended the sheets of film are frictionally retained in place until either firmly gripped by the spring or forcibly removed.

Each spring 19 is in this embodiment supported by and telescoped over an elongated rod 22. Rods 22 are carried by and extend between rails 12 and 13 and in this instance rods 22 are welded to rails 12 and 13. Rods 22 serve not only as supports for the springs 19 and as stiffeners for frame 11 but also, by virtue of their being disposed within the springs, rods 22 act as guards for preventing undue insertion of sheets 21 into the spaces between adjacent turns of springs 19. Inserting of film to the extent that more than its mere border extends between the adjacent turns and within the coil possibly would prevent proper development of part of the image. Helically wound coils, inherently prevent a sheet of material from being completely inserted through the coil, and by utilizing a coil having a diameter less than the border width of the film, such undue insertion of the sheet would be avoided but in that case only a very small area of the film would be gripped. Where greater gripping between coil and sheet is desired than can be obtained by a small

diameter spring, the use of rods **22** in conjunction with telescoped springs **19** permits the use of larger diameter springs having correspondingly greater gripping area, without sacrificing limitation of the depth to which the sheet may be inserted. Thus, rods **22** provide a practical means for eliminating a source of damage to the image on a film by limiting the gripping by spring **19** to the border of sheet **21**. The elimination of this chance of damage thus simplifies loading by an operator.

To facilitate the extending of spring **19** one end of each is anchored in fixed position relative to the frame while the other end is free. Thus each of the springs **19** in this embodiment has one end **23** anchored to frame **11** by welding it along with rod **22** to side rail **13**. To extend the spring and releasable secure it in extended condition, the end opposite fixed end **23** is bent to form a hook **24** which terminates in a suitable handle portion **26**. A hook-receiving slot **27** is formed adjacent the juncture between rod **22** and side rail **12**, and after extending spring **19** longitudinally along rod **22**, hook **24** may be slightly turned about the axis of the spring and engaged in the slot **27**. The tension of spring **19** exerted through hook **24** thus releasably secures the spring in extended condition for loading. Upon disengagement of hook **24** after loading, and on release of the spring, the hook **24** swings out of alignment with the slot **27** and the spring shortens to move the hook **24** along the rod. Thus the tension in the spring tightly clamps or grips the edge of sheets **21**, as is shown in Fig. 1 and the lower portion of Fig. 3.

From the foregoing it is seen that this device affords an improved means for supporting a plurality of sheets of X-ray film, or the like, that it is adapted to support a large number of sheets of film, is easily manipulated to facilitate loading and unloading and will frictionally support the film without possibility of harm to the image thereon.

Although the invention has been described in connection with a certain specific structural embodiment of the invention, it is to be understood that various modifications and alternative structures may be resorted to without departing from the scope of the invention as defined in the appended claims.

I claim:

1. A device of the character described comprising a generally rectangular frame having a means for suspending said frame in a fluid, an elongated cross member extending between and carried by opposite sides of said frame and having a slot in one end, and an elongated coiled wire tension spring disposed telescoped over said cross member and having one end permanently fixed relative to said frame and its other end free, said free end having means for longitudinally extending said spring along said cross member, said last-mentioned means comprising a hook formed from the wire of the spring, said hook being rotatable about the axis of the spring and thereby movable into said slot for releasably holding said spring in extended condition for holding the adjacent turns of said spring spaced one from another for easy insertion of an edge of a sheet of photographic film material or the like therebetween, said spring being adapted to support a plurality of sheets of such material by gripping the edges thereof between the respective turns upon release of said holding means.

2. A device of the character described comprising a frame, and an elongated coiled tension spring bent at one end to provide a hook, said frame having a means for suspending the device in a fluid, a spring supporting cross member having a hook receiving slot adjacent one end of said cross member, said spring being disposed around a portion of said cross member and having the end opposite said hook permanently secured to said frame, said spring having a normal length requiring longitudinal extension of said spring to engage said hook with said slot, said hook upon engagement with said slot releasably holding said spring in extended condition for holding the adjacent turns of said spring spaced one from another for easy insertion of an edge of a sheet of photographic film material or the like therebetween, and said spring being adapted to support a plurality of sheets of such material by gripping the edges thereof between the respective turns upon release of said hook.

3. A device of the character described comprising a generally rectangular frame, and an elongated coiled tension spring having one end bent to form a hook extending crosswise of the spring and terminating in a handle portion for extending said spring, said frame having means for suspending the device in a fluid, a spring supporting cross rod having a hook receiving slot adjacent one end of said cross rod, said spring being disposed around a portion of said cross member and having the end opposite said hook permanently secured to said frame, said spring having a normal length requiring longitudinal extension of said spring to engage said hook with said slot, said hook being engageable with said slot for releasably holding said spring in extended condition for holding the adjacent turns of said spring spaced one from another for easy insertion of an edge of a sheet of photographic film material or the like therebetween, and said spring being adapted to support a plurality of sheets of such material by gripping the edges thereof between the respective turns upon release of said hook.

4. A device of the character described, comprising a frame including a cross member, a coiled spring mounted on said cross member and secured at one end to said cross member at one side of said frame, the other end of said spring being formed into a hook and releasably engageable at the opposite side of said frame with said cross member to hold the spring extended for insertion of an edge of photographic film material or the like between adjacent turns of the spring, said spring being solidly wound whereby the turns tend to abut each other when the spring is released and thereby firmly grip said material, said cross member limiting said spring to a predetermined extended length such that the spacing between adjacent turns is slightly less than the thickness of said material whereby the material is frictionally held by the turns when the spring is extended.

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