April 11, 1944. A. L. RAVEN 2,346,274

PROJECTION SCREEN STAND

Filed Jan. 15, 1941

Fig. 1.

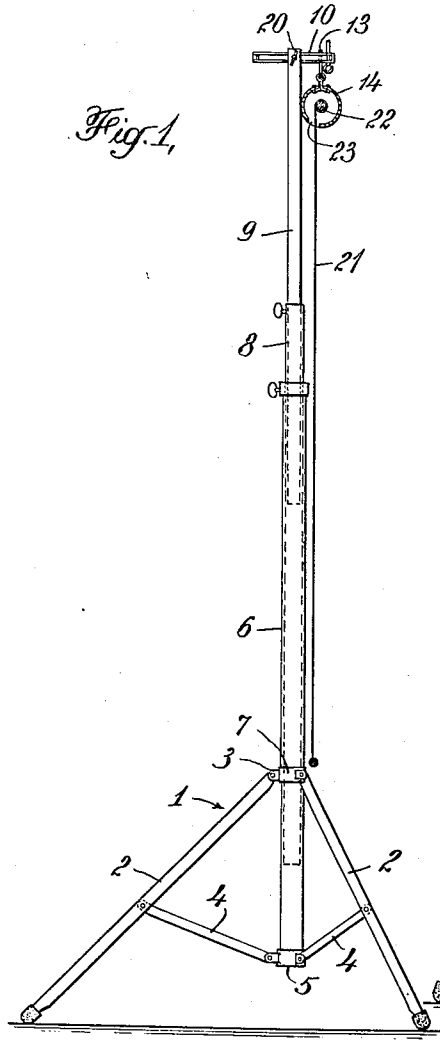


Fig. 3.

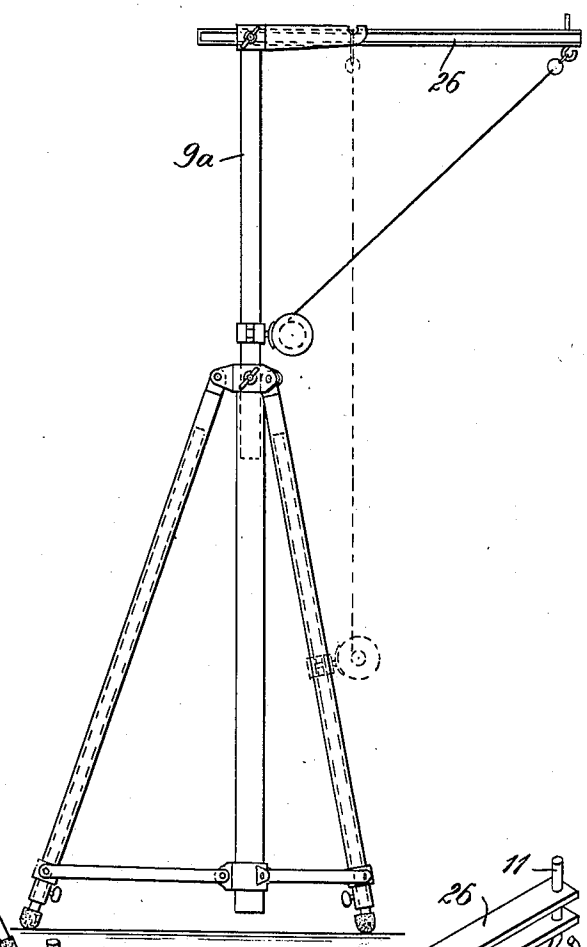


Fig. 2.

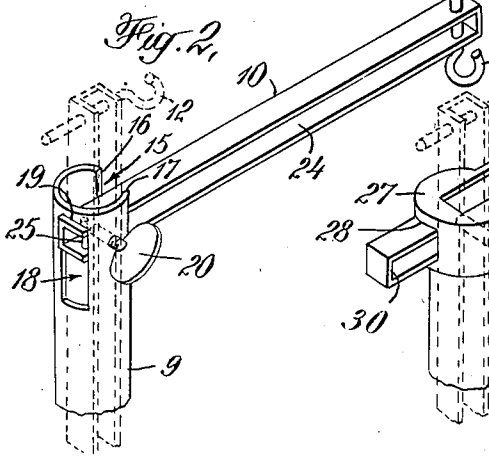
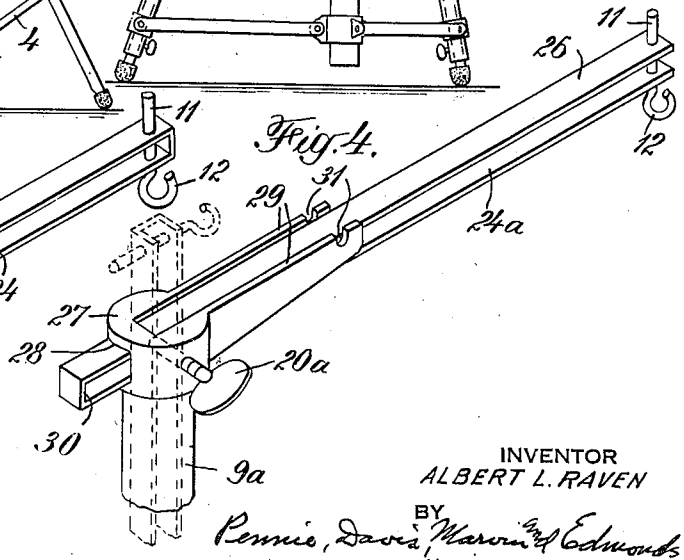


Fig. 4.



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PROJECTION SCREEN STAND

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4 Claims. (Cl. 248—121)

This invention relates to portable stands for supporting portable projection screens in proper relation for showing pictures projected thereon.

More particularly, the present invention relates to the construction of the upper portion of these portable stands, that is to say, the part thereof to which the screen is connected and which must therefore bear the entire weight to be supported. As this weight may amount to as much as 100 pounds or even more, the construction in ordinary use, which consists of a small laterally projecting hook, is inadequate and the problem cannot be solved merely by increasing the size of this hook since that makes a clumsy construction and one which does not lend itself to easy stowing away.

In using screen stands it is sometimes desirable to support a small screen high above the floor so that it may be seen above the heads of a group of people. At other times it may be desirable to support a fairly large screen, say 6 feet by 8 feet or 8 feet square, in which case the entire screen is supported on one stand. At still another time it may be desirable to support a very large screen, say 10 feet by 12 feet, or even 12 feet by 15 feet, in which case two stands may be used, one at each end of the screen.

These screens are usually wound on spring rollers mounted within a suitable casing so that when not in use the screens may be rolled up on the roller and protected from accumulating dust. The screen casings vary considerably in size, and also in shape, some being round and others square, and whether a large or a small screen is being supported on the stand, it is desirable to support the screen casing in such a way that the screen as it is unrolled therefrom will not scrape upon the edges of the slot through which it emerges. It is also desirable to have the back of the screen as close as possible to the upright standard or mast of the screen support so as to reduce swaying.

In order to do this it is necessary to support the screen casing in laterally adjustable relation to the upright standard and the object of the present invention is to provide a supporting device or mechanism at the top of the standard which will overcome the difficulties above mentioned, which is readily adjustable laterally and which is capable of sustaining the heavy loads imposed by large screens, sometimes amounting to as much as 80 pounds or more for a screen supported by a single stand and 100 pounds or more for the very large screens supported by two stands.

It is also an object of the invention to provide a screen stand of this kind in which the screen supporting device at the top can be easliy stowed away when the stand is not in use.

A still further object of the invention is to provide a portable or folding screen stand of the kind referred to which is of rugged, yet simple, construction and which therefore can be manufactured at reasonable cost.

The invention also aims to provide a screen stand which is readily portable because of its light weight, because of its compactness when folded up and because of the facility with which it can be taken down, or set up ready for use.

The invention will be better understood by considering the accompanying drawing which illustrates, by way of example, two embodiments of the invention. In the drawing:

Fig. 1 is a side view of my improved projection screen stand with its adjustable standard or mast in position to support a screen, though not extended to its full height;

Fig. 2 is a perspective view of the screen supporting device at the top of the upright mast, illustrating the details of construction;

Fig. 3 is a view similar to Fig. 1 of a modification; and

Fig. 4 is a perspective view similar to Fig. 2 of the screen supporting device of the form of stand shown in Fig. 3.

Referring now to the drawing, and first to Figs. 1 and 2, my improved screen supporting device or stand comprises a supporting standard 1 in the form of a tripod having legs 2 which are hinged to a crown 3 and tied together below by means of collapsible spreaders 4. These spreaders are hinged at their inner ends to a spider 5 and at their outer ends to the legs 2. Vertically slidable within crown member 3 is an upright mast 6 in the form of a tubular member. The legs 2 are spread in the usual way to the desired extent and held in place by a set screw 7 in the crown member 3 which engages mast 6.

The mast 6 is made extensible in height by means of two telescoping members 8 and 9 which enables the mast to be extended so that its upper end is 12 to 15 feet from the floor and still permits the entire stand to be folded to a length which is short enough to be easily portable.

At the upper end of upright tubular member 9 is a screen supporting member or arm 10 which may be placed in either of two positions, namely, the horizontal position shown in full lines in Fig. 2 and the vertical position indicated by dotted lines in Fig. 2 telescoped axially within tubular

member 9. The outer end of arm 10 is provided with a cross pin 11 which, when the arm is in horizontal position extends upwardly therefrom and which may, if desired, be formed with a hook member 12 in its lower portion beneath arm 10. The ring 13 of screen casing 14 which is to be supported on the standard can be placed either in the hook 12 or directly on the arm 10, as shown in Fig. 1, depending upon the weight of the screen to be supported. Although the device is intended primarily to be used with arm 10 in its horizontal position, a screen may be supported from the hook 12 with arm 10 telescoped within tubular member 9 and extending upwardly therefrom, thereby increasing the height at which the screen may be supported.

In order to provide a rugged connection and support of the screen supporting arm 10 by upright tubular member 9, this member is provided at its upper end with a U-shaped recess 15 having vertical walls 16 and 17 and a horizontal surface joining walls 16 and 17 at their lower ends which is at the level of the bottom of arm 10 and forms a shoulder for supporting this arm from beneath.

In the wall of tubular member 9 opposite to U-shaped recess 15 there is an elongated and preferably rectangular aperture 18 which is spaced slightly from the top of member 9 and has an upper and preferably horizontal surface 19 which forms a shoulder engaging the upper surface of arm 10. Consequently arm 10 when in its horizontal position is supported by these two horizontally and vertically spaced shoulders, namely, the bottom of U-shaped recess 15 and the top 19 of aperture 18. A set screw 20 is threaded into the side of tubular member 9 and its end bears against screen supporting arm 10 and clamps one side of this arm against vertical surface 16 of recess 15 and one of the vertical sides of aperture 18.

By this arrangement the screen supporting arm 10 is connected or supported at the upper end of tubular member 9 in such a way as to safely carry the weight of the heaviest screen, even though this may amount to as much as 100 pounds or more. In addition the arm 10 may be adjusted laterally with respect to the upright member 9 to suit the size of the casing 14 for the screen and permit this casing to hang in its intended position so that the screen 21 can be unwound from its spring roller 22 passing through the slot 23 in the casing without causing either the rear or the front surface of the screen to scrape either edge of this slot.

The screen supporting member 10 is preferably provided with a channel 24 into which the clamping set screw 20 enters and a stop pin 25 is provided near the left hand end of this channel with the result that, assuming arm 10 is in the dotted or vertical position and it is desirable to move it to the horizontal or full line position, set screw 20 is loosened slightly and arm 20 is lifted until stop pin 25 engages the set screw. Then the arm is rotated about the set screw as a pivot until the arm is in its horizontal position and engages its supporting shoulders as described. Stop pin 25 is positioned inwardly from the left hand end of arm 10 a sufficient amount to insure that this end of the arm engages shoulder 19. The aperture 18 is elongated downwardly a sufficient distance below the bottom of U-shaped recess 15 to permit arm 10 to turn about set screw 20 as a pivot.

Not infrequently when projection screens are used to illustrate lectures given before small groups of people, such as a sales force gathered together to receive information and instructions, the projection apparatus is located on the same level as the audience. The screen is above their heads and the axis of projection has to be tilted upward in order to frame the picture on the screen. Hence, in order to avoid the so-called "keystone" effect, the screen has to be tilted forward at the top. This can be done by reversing the position of the screen casing as shown in Fig. 3, mounting the casing upon the lower part of the projection screen stand, on the tripod as shown in Fig. 3 or the lower part of the upright member, and then stretching the screen upwardly and supporting its free edge by the cross arm or screen supporting arm 26 which is longer than supporting arm 10, so that the screen can, if desired, be tilted to an extreme angle as shown in Fig. 3.

It will be understood that, if desired, the screen casing 14 of Fig. 1 can be reversed in its position and mounted upon the lower part of the stand after the manner of Fig. 3, in which case the arm 10 can be adjusted to give a limited degree of tilt to the screen.

In the modified form of the invention the upright tubular member 9_a has a bracket 27 fixed to its upper end. This bracket has in one side a square aperture 28 corresponding to the dimensions of the cross arm or spreading arm 26. Opposite this aperture bracket 27 has a pair of parallel arms 29 forming between them a U-shaped recess similar to recess 15. Arm 26 is supported by the bottom of this recess and the top of aperture 28 which constitute shoulders spaced both horizontally and vertically, one bearing up on the bottom of arm 26 and the other one bearing down on the top of the arm. Arm 26 is held in any position to which it may be adjusted by means of set screw 20_a. This arm is also provided with a channel 24_a into which the set screw projects, this channel being closed at its left hand end 30 to act as a stop against the end of set screw 20_a.

Arm 26 is telescoped within upright tubular arm 9_a when the screen is folded to collapsed condition for transportation, or for stowing away. With this form of screen when the screen is to be used in vertical position as shown in dotted lines in Fig. 3, the ring at the upper edge of the screen can be placed in notches 31 in the extensions 29 of bracket 27, thus making it unnecessary to shift arm 26 from its telescoped position shown in dotted lines in Fig. 4.

By means of this invention there has been provided a projection screen stand of simple, rugged construction capable of supporting large screens with safety and convenience.

This application is a continuation in part of my co-pending application, Ser. No. 137,338, filed April 16, 1937, entitled Projection screen stand, now Patent No. 2,229,472, dated January 21, 1941.

I claim:

1. A portable projection screen stand comprising a supporting standard, an upright tubular member extending from the upper part of the supporting standard, said tubular member having a U-shaped recess in one wall thereof extending downwardly from its upper end, the opposite wall having an elongated aperture therein, the bottom of said recess and the top of said aperture forming vertically spaced shoulders, a screen supporting arm adapted when partially telescoped within said tubular member to be swung to a laterally

extended position with respect thereto, moving into the said U-shaped recess and the lower end of said arm moving into said aperture to be supported by said shoulders, the screen supporting arm having a longitudinal channel in one side thereof, a clamping screw threaded into the wall of said upright tubular member and extending into said channel to clamp the arm and tubular member together, a stop within said channel to engage said screw to limit the extent of withdrawal of the arm from telescoping relation with the upright tubular member and to form with said screw a pivot for swinging the arm to laterally extended position.

2. A portable projection screen stand comprising a supporting standard, an upright tubular member extending from the upper part of the supporting standard, said tubular member having a U-shaped recess in one wall thereof extending downwardly from its upper end, the opposite wall having an aperture therein, the bottom of said recess and the top of said aperture forming vertically spaced shoulders, a screen-supporting arm adapted when partially telescoped within said tubular member to be swung to a laterally extended position with respect thereto, moving into the said U-shaped recess and the lower end of said member being moved into said aperture to be supported by said shoulders, a clamping device for clamping the arm and tubular member together, and combined stop and pivot means to limit the extent of withdrawal of the arm from telescoping position with the upright tubular member and to facilitate the swinging of the arm to laterally extended position.

3. A portable projection screen stand comprising a supporting standard, an upright tubular member extending from the upper part of the supporting standard, said tubular member having a recess in one wall thereof extending downwardly from the upper end of said wall, the opposite wall having an elongated aperture therein, the lower part of sair recess and the top of said aperture forming vertically spaced shoulders, a screen supporting arm adapted when partially telescoped within said tubular member to be swung to a laterally extended position with respect thereto, moving into the said recess and the lower end of said arm moving into said aperture to be supported by said shoulders, the screen supporting arm having a longitudinal channel in one side thereof, a clamping screw threaded into the wall of said upright tubular member and extending into said channel to clamp the arm and tubular member together, a stop within said channel to engage said screw to limit the extent of withdrawal of the arm from telescoping relation with the upright tubular member and to form with said screw a pivot for swinging the arm to laterally extended position.

4. A portable projection screen stand comprising a supporting standard, an upright tubular member extending from the upper part of the supporting standard, said tubular member having a recess in one wall thereof extending downwardly from the upper end of said wall, the opposite wall having an aperture therein, the lower part of said recess and the top of said aperture forming vertically spaced shoulders, a screen-supporting arm adapted when partially telescoped within said tubular member to be swung into laterally extended position with respect thereto, moving into the said recess and the lower end of said member being moved into said aperture to be supported by said shoulders, a clamping device for clamping the arm and tubular member together, and combined stop and pivot means to limit the extent of withdrawal of the arm from telescoping position with the upright tubular member and to facilitate the swinging of the arm to laterally extended position.

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