W. H. STAVENHAGEN.

FOLDING PROJECTION FRAME.

APPLICATION FILED FEB. 14, 1918.

1,283,590.

Patented Nov. 5, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

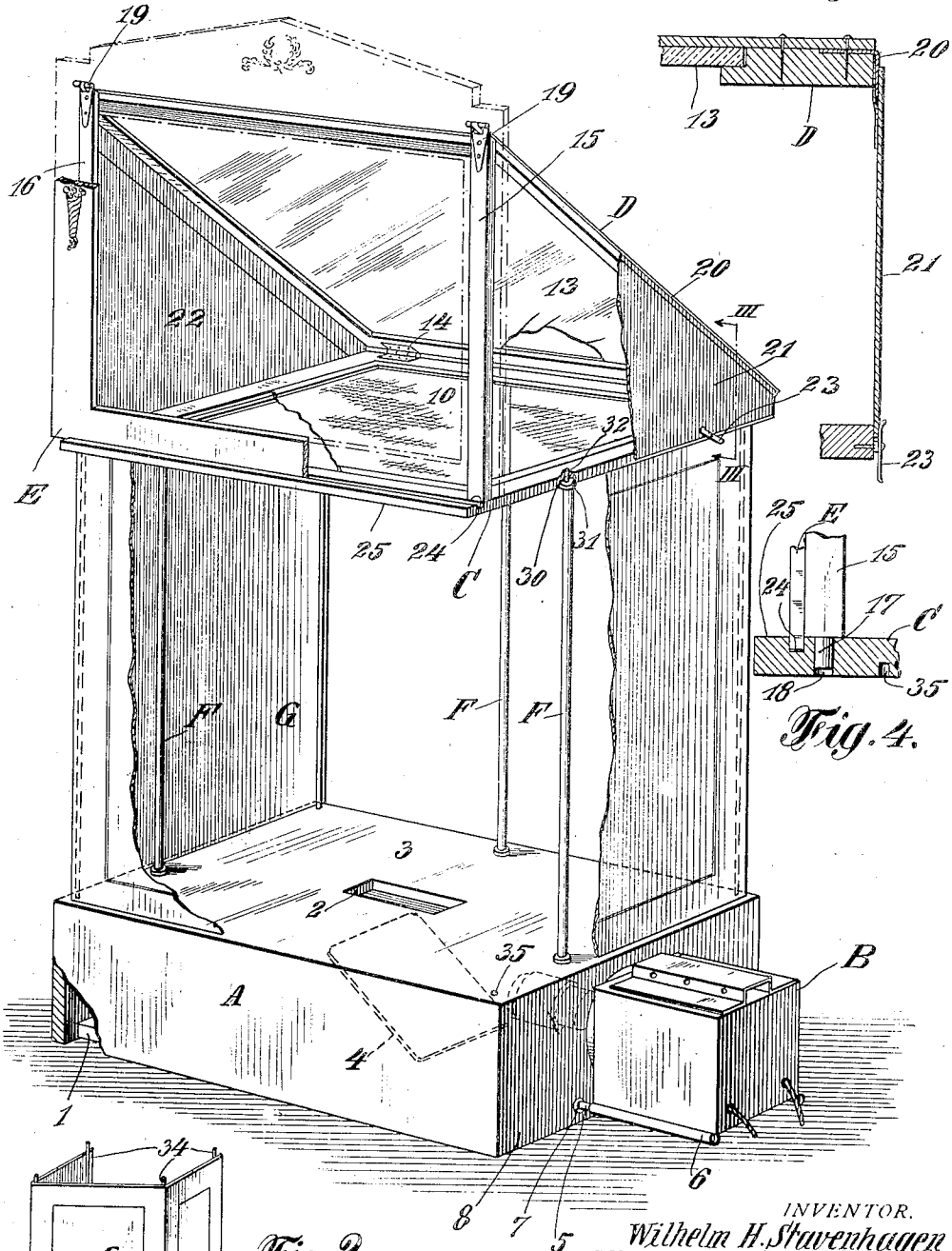



Fig. 3.







Fig. 4.




Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 5.

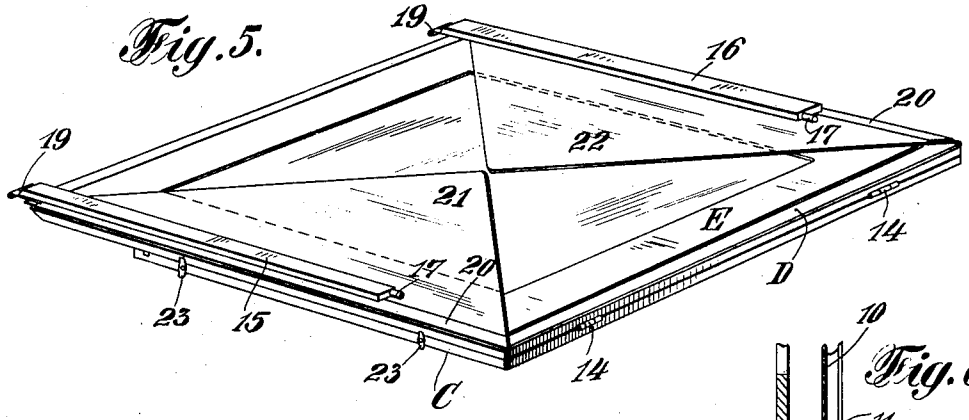



Fig. 6.

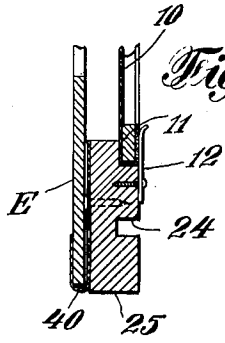



Fig. 7.

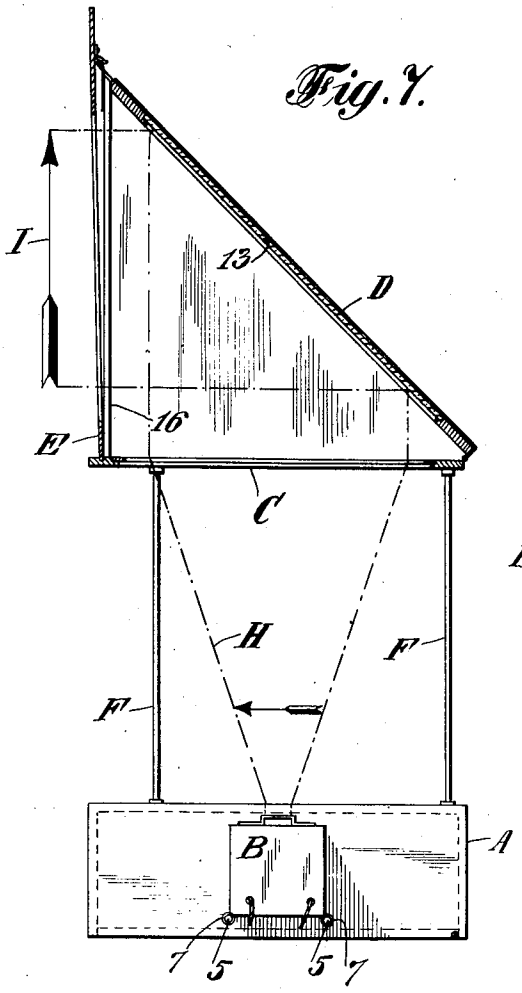
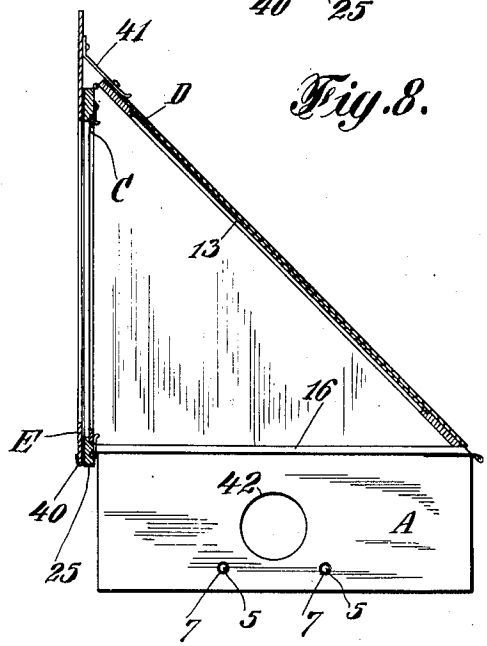



Fig. 8.




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# UNITED STATES PATENT OFFICE.

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## FOLDING PROJECTION-FRAME.

1,283,590. Specification of Letters Patent. Patented Nov. 5, 1918.

Application filed February 14, 1918. Serial No. 217,034.

*To all whom it may concern:*

Be it known that I, WILHELM H. STAVENHAGEN, a citizen of the United States, and a resident of New York city, county, and State of New York, have invented certain new and useful Improvements in Folding Projection-Frames, set forth in the following specification.

This invention relates to portable apparatus for displaying projected images. The object of the invention is to facilitate the carrying from one place to another, in public means of conveyance such as street-cars, all the frame-work and mechanism necessary to effect the display of projected images, usually for advertising purposes in store show-windows and the like. Heretofore apparatus including cabinets have been used for the purpose of displaying motion pictures and other intermittent projected images in show-windows, but this apparatus has been so bulky as to require little short of a moving van to transport the apparatus from one store to another or to the central office.

I have carried out the general object of my invention by a novel combination of knock-down and folding parts which may be collapsed into a bundle approximating a dress-suit case in size and contour.

Further objects of my invention are to improve the structural details of a cabinet suitable for use in connection with the projection of images.

My invention will better be understood by reference to the accompanying drawings which form a part hereof, and in which like characters designate corresponding parts in the several figures. In the drawings

Figure 1 is a perspective view, with parts broken away and parts shown in section, of the complete apparatus;

Fig. 2 is a perspective view, drawn to a smaller scale, of the intermediate hood;

Fig. 3 is a detail section taken along line III—III of Fig. 1 and drawn to an enlarged scale;

Fig. 4 is a detail section with parts shown in elevation taken transversely at the locality of one of the struts of the projection hood;

Fig. 5 is a perspective view showing the screen and mirror hood collapsed;

Fig. 6 is a detail section through the supporting frame for the translucent screen;

Fig. 7 is a cross section, with parts shown in elevation, through the structure of Fig. 1; and

Fig. 8 is a view similar to Fig. 7 with the translucent screen shifted to vertical position.

It is to be understood that this invention relates primarily to the cabinet and frame-work structure therefor in connection with the display of projected images which are to be projected through the medium of any suitable mechanical mechanism as, for example, such mechanism as is described in my copending application for an intermittent projector, Ser. No. 201,906, filed Nov. 14, 1917.

A strong box-like structure A is provided, having an inset, openable hinged cover 1, so that the edge walls of the box A can rest directly upon a table or the floor of a show-window while the projecting apparatus and the apparatus for causing intermittent display may be mounted interiorly of the box A directly upon the inner face of the cover 1. An opening 2 of suitable contour for the emission of the projected beam is formed in the wall 3 of the box A, beneath which is the deflecting mirror 4, operable to bend the beam from the lantern B directly upwardly through the opening 2. The lantern B is provided with a pair of slip-pins 5, embraced in folds 6 formed as extensions of the walls of the lantern so that the pins 5 may be inserted in suitable sockets 7 formed in the edge wall 8 of the box A to insure the proper position of the lantern.

Projected images may be made visible in two ways, namely (1) the image may be thrown upon a translucent screen occupying a horizontal position and the image upon this screen may be viewed through the medium of horizontal vision in a mirror arranged at an angle of 45° and inclining upwardly from the rear edge of the translucent screen, or (2) an upwardly directed image beam may be bent forward horizontally by a mirror mounted at an angle of 45° so that the image is thrown forward where it may be viewed upon a vertical translucent screen in a forward position. The first method of displaying projected images is preferable for daylight display because much of the neutralizing daylight may be kept away from the translucent screen through the me-

dium of a hood. This invention provides in one apparatus for both the first and second methods of displaying projected images.

To this end I have a rectangular frame C with a rabbet for mounting a translucent screen 10, preferably formed out of any suitable oiled textile fabric which may be stretched upon an individual frame 11 and held in position by suitable clips 12, although of course a translucent screen of any kind is contemplated, for example, a sheet of frosted glass. A second frame D mounts a mirror 13 and is foldably secured as by hinges 14 to one edge of the frame C. A pair of struts 15 and 16, each provided with a pin 17 at its lower end to seat in a socket 18 formed in the frame C, is each hinged at its other end by a hinge 19 to the mirror frame D. The hinges 19 are so mounted and formed as to permit the struts 15 and 16 to fold back against the mirror frame D, as shown in Fig. 5. Hinged in a suitable manner to the inclined edges of the mirror frame D as by a strip of textile fabric 20 are two side flaps 21 and 22, of right-triangular shape, to cover the end spaces when the frames C and D are arranged as shown in Figs. 1, 7 and 8. These flaps 21 and 22 may be anchored in closed position in any suitable manner as by clips secured to the frame C. A groove 24 is formed in the ledge 25, which is a part of the frame C, and serves to mount a window frame E. This frame E is preferably of an ornamental character to simulate the proscenium arch in a theater, and may be formed in a satisfactory manner of fiber board, which may be embossed with ornamental designs, if desired. The flaps 21 and 22 likewise may be of fiber board or any cheap, stiff material, while the other structural parts of the frames C and D are most conveniently formed of wood. A number of removable posts, preferably three posts F, all of the same length, and provided at each end with a pin 30 and flange 31, are adapted to fit into sockets 32 formed in symmetrical positions both in the top 3 of the box A, and in the frame C, so that the frame C can be supported at an elevation above the box A and parallel to the top 3. If desired, a three-ply screen G, having pins 34 to fit into sockets 35, may be provided to close the space beneath the frame C. The use of this screen G, however, is by no means necessary and its omission is desirable provided the space between the frame C and the box top 3 is to be employed for the display of merchandise, which may be done provided clear space for the image beam H is left.

With the apparatus arranged as in Figs. 1 and 7, the image beam is thrown in a manner well known in the art upon the translucent screen 10, upon which is reproduced the image projected. The entire apparatus is arranged in a store window, with the window frame E facing the audience which views the reflection of the image on the screen 10 in the mirror 13, as indicated by the arrow I.

The apparatus, however, may be employed in a different manner. The posts F are removed and the frames D and C are mounted directly upon the box A with the struts 15 and 16 directly engaging the top of the box A, so that the translucent screen carried by the frame C is vertical and may be given a finished appearance by the application of the window frame E, which may be mounted in a clip 40, secured to the ledge 25 and by one or more clips 41. When the apparatus is employed thusly and as indicated in Fig. 8, the image beam is thrown first against the mirror 13, from which it is reflected against the translucent screen 10, upon which the actual image is reproduced and can be viewed through the opening of the window frame E. When thus employed the posts F are not necessary on account of the projection distance gained by having a translucent screen located at the viewing opening through the frame E instead being located as shown in the diagram of Fig. 7. In the apparatus proportioned as shown in the figures, however, the viewable image with the apparatus as arranged in Fig. 8 will be slightly smaller than that with the apparatus as arranged in Fig. 7. In Fig. 8 the opening 42 in the box A indicates the opening where the beam from the lantern B enters the apparatus.

When it is desired to move the apparatus from one place to another, the frames C and D and the struts 15 and 16 and also the flaps 21 and 22 are folded flat against one another, as indicated in Fig. 5. The window frame E may be placed flat upon the folded structure shown in Fig. 5 and likewise the three-ply screen G may be folded up and arranged as a part of the same flat package. The lantern B may be disconnected merely by slipping the pins 5 out of the socket 7 and placed within the box A. Likewise the posts F, when removed, may be placed within the box A. The entire structure, therefore, knocks down into two compact packages, one the bundle of the folded screens as shown in Fig. 5 plus the window frame E, if it is employed, and plus the screen G, if it is employed, and second, the single box A. It has been found that one man may without difficulty transport these two packages from place to place and that the entire apparatus may be set up or knocked down with ease and despatch.

Although I have described in detail the preferred form of my knock-down apparatus, I desire it to be understood that this has been done merely as illustrative of two ways in which my invention may be prac-

tised, and I realize that many modifications are within the scope of my invention, to which the following claims are directed.

What I claim and desire to secure by United States Letters Patent is:—

1. In combination, a box-like structure for containing image projecting mechanism having a beam opening at the top; a mirror frame; a screen frame hingeable to the edge of said mirror frame; and struts for holding said mirror frame at an angle to said screen frame.

2. In combination, a box-like structure for containing image projecting mechanism having a beam opening at the top; a mirror frame; a screen frame hingeable to the edge of said mirror frame; struts for holding said mirror frame at an angle to said screen frame; and removable posts for holding said screen frame at an elevation above said box-like structure.

3. In combination, image projecting mechanism; a collapsible display hood comprising a mirror-frame and a screen frame and struts and edge-attaching means for foldably securing together said struts and frames whereby the mirror frame may be held at an angle to said screen frame or the entire structure folded together and be transported as a thin, flat package.

4. In image projection apparatus, a collapsible hood comprising a mirror frame; a screen frame hinged to said mirror frame; triangular flaps hinged to one of said frames; and hinged struts for holding said mirror frame and said screen frame substantially at an angle of 45° to each other.

In testimony whereof I have signed my name to this specification, this 14th day of January, 1918.

WILHELM H. STAVENHAGEN.