

Oct. 20, 1942.

I. K. RYSTEDT  
PORTABLE PROJECTOR  
Filed Oct. 12, 1940

2,299,657

4 Sheets-Sheet 1

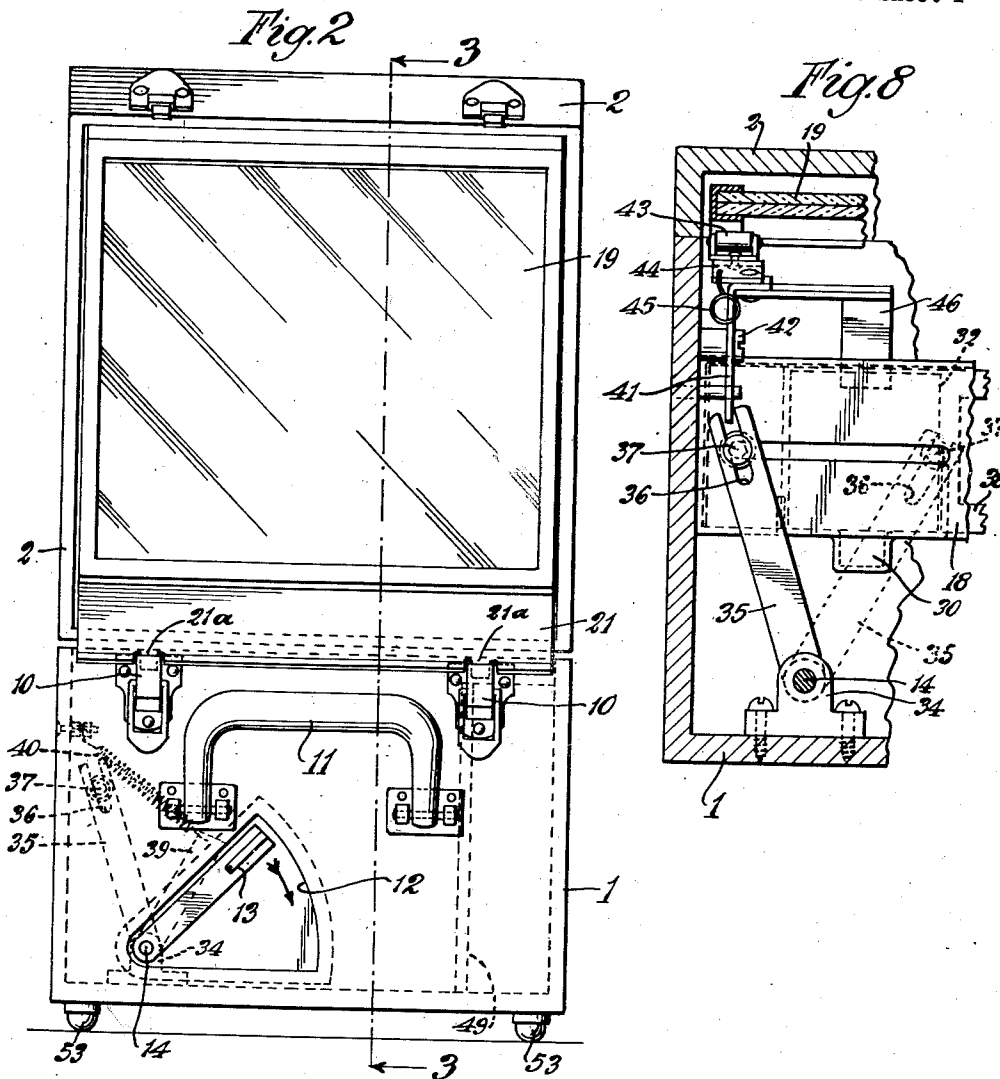
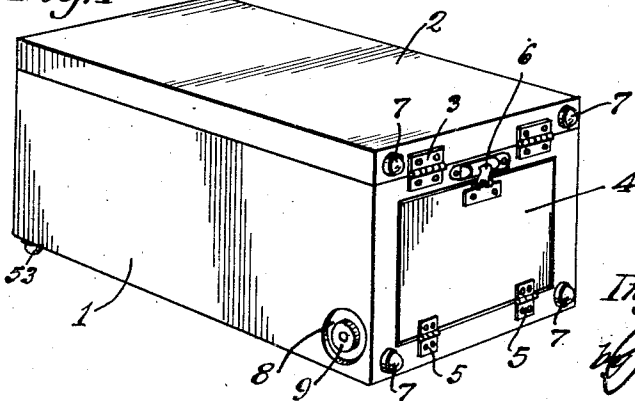


*Fig. 1*



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4 Sheets-Sheet 2

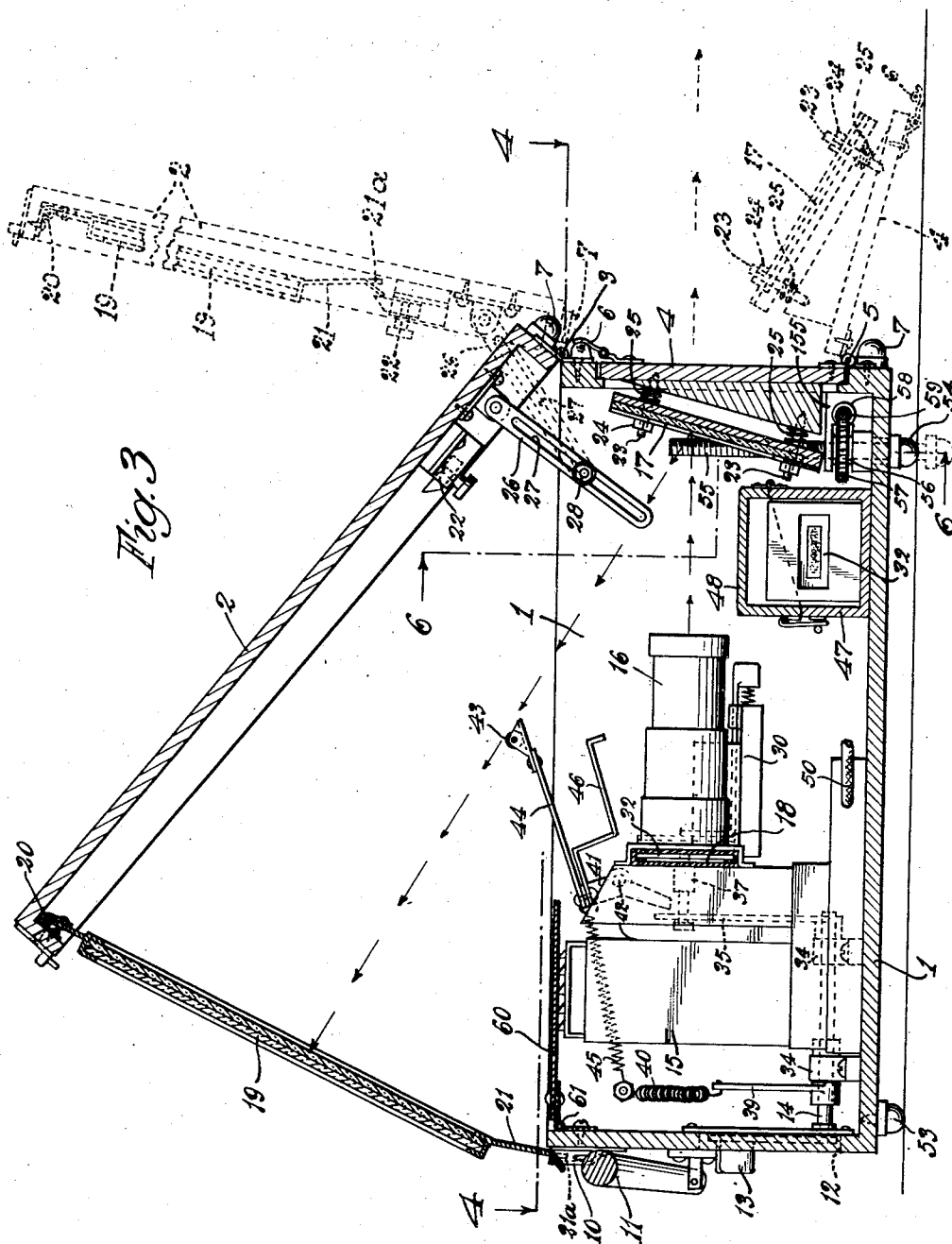


Fig. 3

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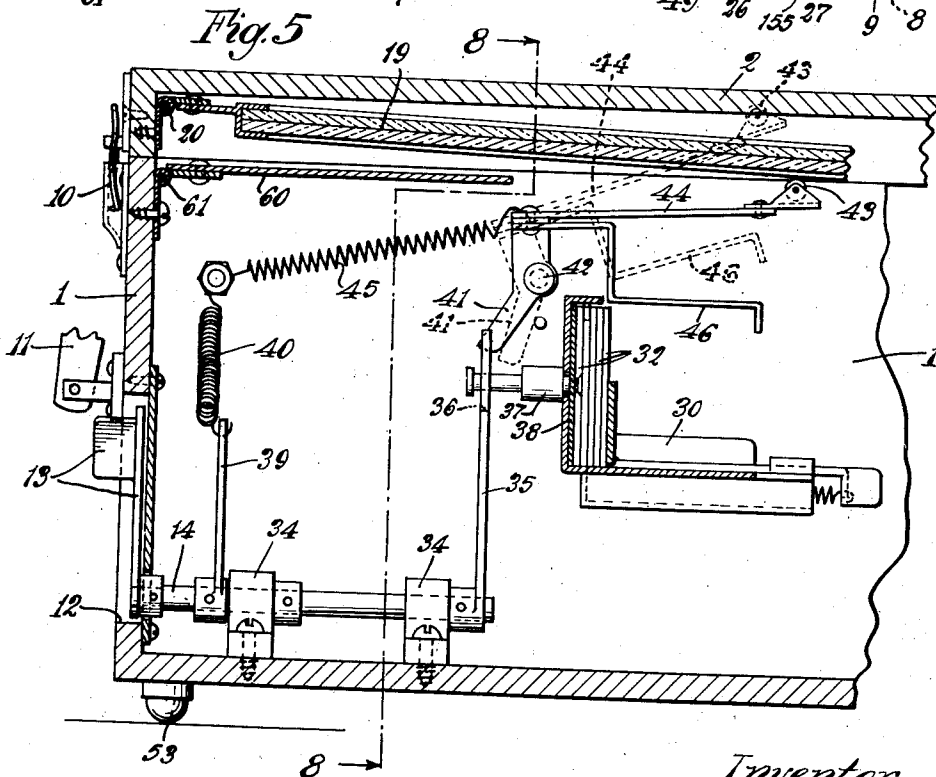
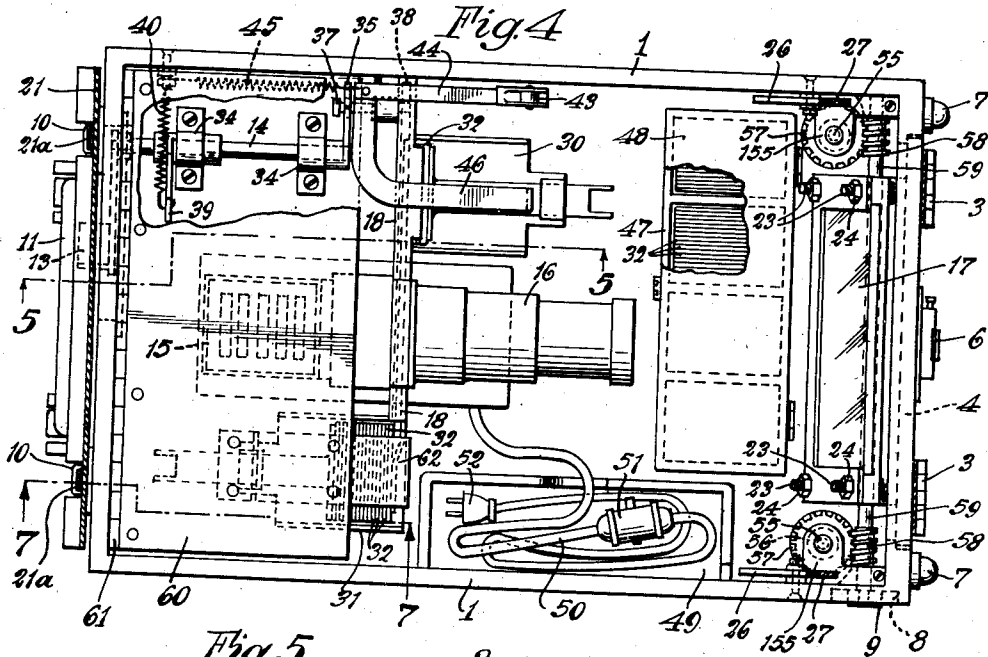
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4 Sheets-Sheet 3



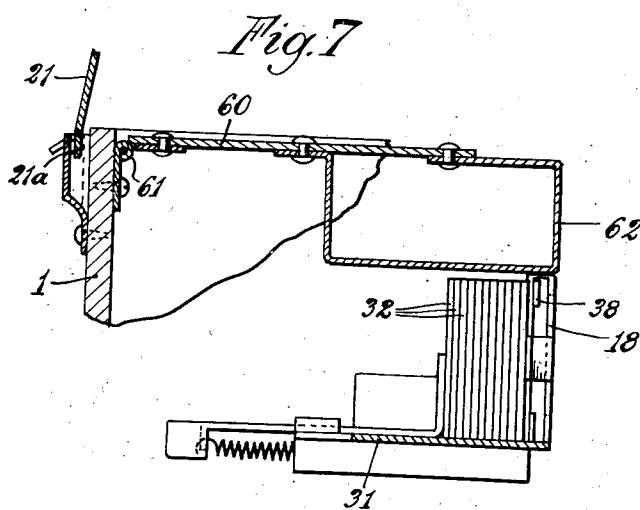
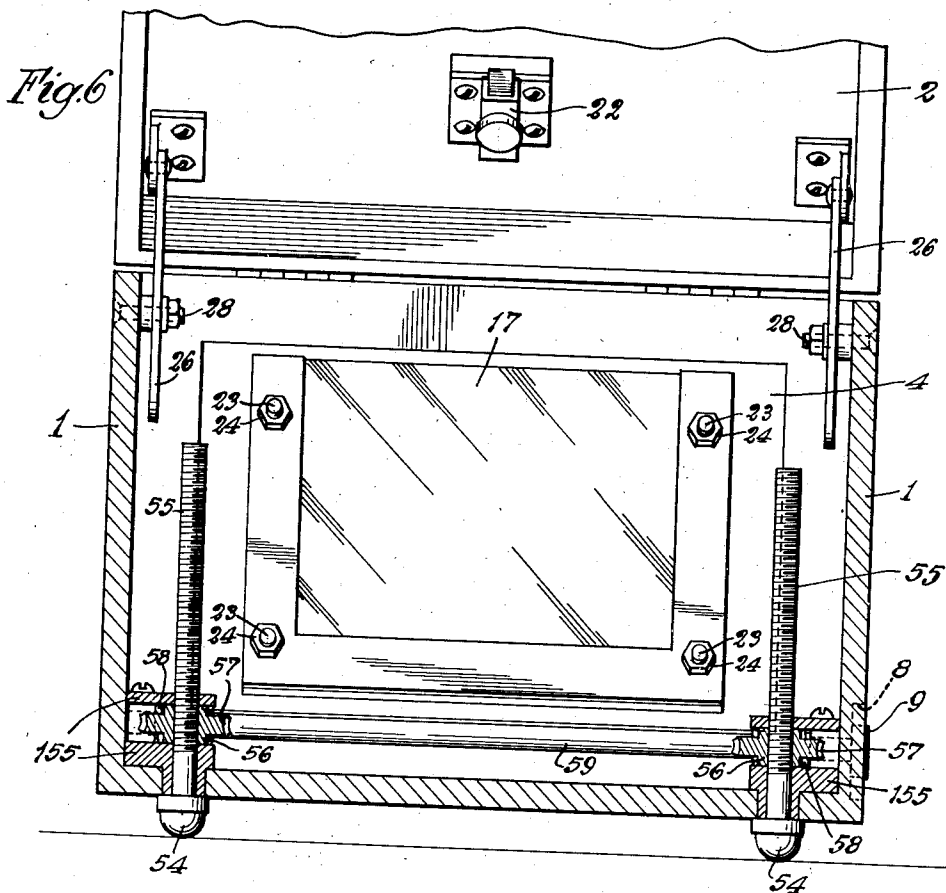
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2,299,657

4 Sheets-Sheet 4



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## UNITED STATES PATENT OFFICE

2,299,657

## PORTABLE PROJECTOR

Ingemar K. Rystedt, Chicago, Ill., assignor to  
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Application October 12, 1940, Serial No. 360,921

16 Claims. (Cl. 88—28)

My invention relates to improvements in portable projectors and has for one object to provide a new and improved form of collapsible portable projector or stereopticon. I propose to use a generally rectangular box or housing adapted when closed to be carried like a suitcase and adapted when open to stand on a desk or any other suitable support for use. The housing will contain the projector, the slides in the magazine ready for use, a supply of additional slides in a storage magazine, electric wires for making connection with a suitable power source and a translucent screen on which the picture is to be projected.

Another object of my invention is to provide a portable stereopticon which may be interchangeably used as a desk instrument to show the projected image on a screen contained within the apparatus or to project an image on a screen widely spaced from the projector.

Other objects of my invention will appear from time to time in the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a perspective of the device in the closed or collapsed position;

Figure 2 is a rear elevation in the open working position;

Figure 3 is a section along the line 3—3 of Figure 2;

Figure 4 is a section along the line 4—4 of Figure 3;

Figure 5 is a section on an enlarged scale along the line 5—5 of Figure 4;

Figure 6 is a section on an enlarged scale along the line 6—6 of Figure 3;

Figure 7 is a section along the line 7—7 on an enlarged scale, of Figure 4;

Figure 8 is a section on an enlarged scale along the line 8—8 of Figure 5 with parts omitted.

Like parts are indicated by like characters throughout the specification and drawings.

1 is a rectangular housing or box having a cover 2, hinged at 3. 4 is a door hinged at 5, and provided with a latch 6 closing the same end of the housing as that on which the cover 2 is hinged. 7 are supporting feet whereby the box may stand on end without interfering with the hinges 3 and 5 or latch 6. 8 is a recess on the side wall of the housing which contains a hand wheel 9, the purpose of which will hereinafter appear. 10, 10 are latches adapted to latch the cover 2 in the closed position.

11 is a handle. 12 is a recess in the handle end

of the housing. 13 is a finger lever pivoted for rotation in the recess and mounted on a shaft 14, the purpose of which will hereinafter appear. The apparatus is closed for carriage as shown in Figure 1. 15 is a projector mounted on the bottom of the box and having a projector tube 16 adapted when the light, not shown, contained within the projector 15 is lighted to project an image upon the mirror 17, the image being defined by the slide 18, which in the usual manner is adapted to be so placed as to be in the path of the light beam. 19 is a translucent panel pivoted at 20 on the underside of the cover 2 and having a supporting flange 21 formed with fingers 21-a adapted to engage the latches 10 as indicated in Figure 3. 22 is a latch adapted to hold the translucent panel 19 in the inoperative position as indicated in dotted lines. The image reflected from the mirror 17 is projected upon the translucent panel 19 and so is visible from the rear.

The mirror 17 is mounted on screws 23, associated with nuts 24 and springs 25 so that the mirror is yieldingly supported and the angle of the mirror may be adjusted to properly position the image on the screen 19. 26 are stop arms hinged on the cover 2, slotted as at 27 and slidably engaging stop pins 28 on the interior of the housing 1.

The projector is provided with a supply magazine 30 and a receiving magazine 31 on opposite sides thereof adapted to contain slides 32. The shaft 14 is rotatably mounted in the bearings 34 on the bottom of the housing and carries a lever arm 35 slotted at 36 to engage a pin 37 on the cover slide 38 so that every time the lever 13 is moved in the direction of the arrow in Figure 2, the slide is moved from the magazine 30 into the position in line with the projector, the preceding slide being moved thereby into the magazine 31. 39 is a spring arm associated with a spring 40 which insures a spring return of the lever 13 to the starting position whenever the operator releases it.

41 is a latch lever pivoted at 42 on the wall of the box and adapted to engage the slot 36 of the lever 35 when in the full line position in Figure 5 thereby positively holding the lever 13 against movement when the box cover 2 is in the closed position. This is accomplished because the box cover 2 engages the roller 43 on the end of the arm 44 which arm projects from the latch lever 41, the spring 45 normally holding the lever 41 in the dotted line position so that the lever 13 may be manipulated whenever the box cover

2 is open. 46 is an arm associated with the lever 41. When the lever is in the full line position, the arm 46 is in the full line position and overlies the magazine 30, thereby holding all the slides therein in position. When the box door is open, the latch 41 and arm 46 are both rotated to free the lever 13 for operation and release the slides in the magazine 30. The need for this is, of course, obvious in that it protects the device against manipulation except when opened and in that it insures that the slides will be kept in the magazine and not fall out if the box happens to be turned over.

47 is a storage magazine having a latched cover 48 whereby a series of slides may be stored. These are located beneath the projection line of the projector so that they do not interfere with the operation of the device.

49 is a receptacle for the electric wire 50 and switch 51 and outlet plug 52 whereby the device may be connected to any suitable electric power source. 53, 53 are a pair of feet fixed in position on the handle end of the box. 54 are a pair of feet each mounted on a screw 55 projecting upwardly through the floor of the box. The screws 55 are each associated with nuts 56 surrounded by worm wheels 57 engaged by worms 58 on the shaft 59 on the end of which is the hand wheel 9 so that the front end of the box may be raised or lowered to change the point of impact of the projected image when the door 4 is in the open position shown in Figure 3 and it is desired to project the image upon a distant screen. The screws 55 and shaft 59 are supported in suitable bearings 155.

60 is a panel hinged as at 61 adapted to cover the part of the projector which contains the light source. The panel 60 is also provided with a holding member 62 in alignment with the receiving magazine 31, thereby holding the slides therein in position when the device is carried around.

It will be evident that while I have shown in my drawings an operative device, still many changes might be made in the arrangement, shape, size and disposition of parts without departing materially from the spirit of my invention and I wish therefore that my showing be taken in a large sense as diagrammatic.

The use and operation of my invention are as follows:

When in the collapsed condition adapted for transportation, the cover is closed, the translucent reflecting screen is in its latched position on the inside of the cover, the interlocking mechanism controlled by the cover will engage the control lever on the inside so that it is impossible to manipulate the slide feed lever, the yielding arms will engage the slides in the magazines so that the box may be roughly handled as by baggage men and the like without in any way interfering with the operation or utility of the device.

When the demonstrator wishes to use the box he unlatches the cover, raises it up, unlatches the glass or translucent panel frame, swings it down and interlocks the fingers thereon with the latches which previously held the box closed. This makes a triangular structure consisting of the box, the cover and the translucent screen and disengages the automatic cut out so that the control lever on the outside is free to operate. He then takes the electric cord out of the compartment in which it is stored in the case, makes the connection, turns on the switch and the apparatus is ready for use.

Each complete movement of the operating lever will feed a new slide from the unused magazine into position to be projected. The image will be projected upon the inclined mirror in the end of the box and thence reflected by it upon the translucent screen where it can be seen for demonstration and the like. Each time the lever is manipulated a new slide is moved into projecting position, forcing the previous slide into the receiving magazine. This can continue until all the slides have been shown.

If it is desired to project the image on a larger screen at a greater distance for display to a larger company, the end of the box carrying the inclined mirror is unlatched and swung down so that the mirror is no longer in line with the axis of the projector. The projector then throws the image out through the open end of the box where the mirror is upon any suitable screen. The device is provided with adjustable legs to align the projector with the screen.

Because the means for holding the slides in position in the magazine engaging the top of the slides are associated with the box cover, these means are withdrawn when the cover is open, thus it is easy to refill the magazine from one of the other slide receptacles in the bottom of the box and if it is desired, as will usually be the case, to set the box up ready for demonstration before moving it, the slides may be put in place and will be held in the magazine even though the box be turned upside down when the cover is closed.

I claim:

1. In combination a portable housing, a projector fixed therein, a magazine adapted to contain a plurality of slides, means for propelling successive slides from the magazine into projecting relationship with the projector, manually operated means having a portion thereof permanently positioned outside of the housing for actuating the slide propelling means, a cover for the housing and means carried thereby for automatically preventing operation of the slide propelling means when the cover is in the closed position.

2. In combination a portable housing, a projector therein adapted to project light toward one end thereof, a door adapted to close that end of the housing, an inclined mirror on the door adapted to reflect the light from the projector, a cover hinged on the housing adjacent the door, a translucent screen hinged on the underside of the cover at the free end thereof, a latch adapted to releasably hold the free end of the screen against the underside of the cover, and means associated with the free end of the screen adapted to interlock with it and the housing for holding the housing, the cover and the screen in angular relationship, with the screen in the path of the projected light reflected by the mirror, the door being hinged on the housing for rotary movement to take the mirror out of line with the projected light and a releasable latch adapted to hold the door in the closed position.

3. In combination a portable housing, a projector therein adapted to project light toward one end thereof, a door adapted to close that end of the housing, an inclined mirror on the door adapted to reflect the light from the projector, a cover hinged on the housing adjacent the door, a translucent screen hinged on the underside of the cover at the free end thereof, a latch adapted to releasably hold the free end of the screen against the underside of the cover, a latch

adapted to hold the door closed and means associated with the free end of the screen adapted to interlock with the latch to hold the housing, the cover and the screen in angular relationship with the screen in the path of the projected light reflected by the mirror, the door being hinged on the housing for rotary movement to take the mirror out of line with the projected light and a releasable latch adapted to hold the door in the closed position.

4. In combination a portable housing, a projector therein adapted to project light toward one end thereof, a door adapted to close that end of the housing, an inclined mirror on the door adapted to reflect the light from the projector, a cover for the housing, a translucent screen, means for connecting the cover, the screen and the housing to hold them in angular relationship with the screen in the path of the projected light reflected by the mirror, the door being hinged on the housing for rotary movement to take the mirror out of line with the projected light and a releasable latch adapted to hold the door in the closed position.

5. In combination a portable housing, an inclined mirror in one end thereof, a projector permanently fixed within the housing, adapted to project light upon the mirror, a translucent screen extending upwardly from the housing above the projector in the path of the light reflected by the mirror and an opaque screen interposed directly between the projector and the translucent screen, the opaque screen being hinged on the housing, the free end of said screen overlying the projector the opaque screen masking the translucent screen against any light from the projector except the image projected against the mirror, the screen being mounted for pivotal movement into a horizontal position to overlie the reflector and into a vertical position to permit access to the reflector.

6. In combination a portable housing, an inclined mirror in one end thereof, a projector permanently fixed within the housing, adapted to project light upon the mirror, a translucent screen extending upwardly from the housing above the projector in the path of the light reflected by the mirror, a cover for the housing in hinged relationship therewith at one end, the translucent screen being hinged to the other end of the cover, interlocking means between the free end of the translucent screen and the housing and releasable means for holding the translucent screen in collapsed position against and parallel with the under side of the cover.

7. In combination a portable housing, an inclined mirror in one end thereof, a projector permanently fixed within the housing, adapted to project light upon the mirror, a translucent screen extending upwardly from the housing above the projector in the path of the light reflected by the mirror and an opaque screen interposed directly between the projector and the translucent screen, the opaque screen being hinged on the housing, the free end of said screen overlying the projector, a cover for the housing in hinged relationship therewith at one end, the translucent screen being hinged to the other end of the cover and interlocking means between the free end of the translucent screen and the housing and releasable means for holding the translucent screen in collapsed position against and parallel with the under side of the cover.

8. In combination a generally rectangular portable housing having a handle on one end, an op-

erating lever on the end of the housing adjacent the handle, a projector contained within the housing, a magazine adapted to contain slides, means for propelling successive slides from the magazine into projecting relationship with the projector, a connection interposed between said lever and the propelling means, a door hinged in the end of the housing opposite to the handle, an inclined mirror on the inner wall of the door in the path of the light from the projector, a releasable latch adapted to hold the door closed and maintain the mirror in its reflecting position, a cover hinged on the housing adjacent the door, means for releasably latching the cover in closed position, a translucent screen hinged on the underside of the cover adjacent its free end, interlocking means between the free edge of the translucent screen and the housing adjacent the handle whereby the translucent screen is maintained in the path of the reflected light.

9. In combination a generally rectangular portable housing having a handle on one end, an operating lever on the end of the housing adjacent the handle, a projector contained within the housing, a magazine adapted to contain slides, means for propelling successive slides from the magazine into projecting relationship with the projector, a connection interposed between said lever and the propelling means, a door hinged in the end of the housing opposite to the handle, an inclined mirror on the inner wall of the door in the path of the light from the projector, a releasable latch adapted to hold the door closed and maintain the mirror in its reflecting position, a cover hinged on the housing adjacent the door, means for releasably latching the cover in closed position, a translucent screen hinged on the underside of the cover adjacent its free end, interlocking means between the free edge of the translucent screen and the housing adjacent the handle whereby the translucent screen is maintained in the path of the reflected light, an opaque screen hinged on the housing adjacent the handle and adapted to overlie the projector and to be interposed between it and the translucent screen.

10. In combination a portable housing, a projector therein adapted to project light toward one end thereof, a door adapted to close that end of the housing, an inclined mirror on the door adapted to reflect the light from the projector, a cover hinged on the housing adjacent the door, a translucent screen hinged on the underside of the cover at the free end thereof, a latch adapted to releasably hold the free end of the screen against the underside of the cover, and means associated with the free end of the screen adapted to interlock with it and the housing for holding the housing, the cover and the screen in angular relationship, with the screen in the path of the projected light reflected by the mirror, the door being hinged on the housing for rotary movement to take the mirror out of line with the projected light and a releasable latch adapted to hold the door in the closed position, adjustable means associated with that end of the housing closed by the door for raising and lowering the end of the housing to adjust the angle at which the light is projected.

11. In combination a portable housing, a projector fixed therein, a magazine adapted to contain a plurality of slides, means for propelling successive slides from the magazine into projecting relationship with the projector, said means including a rotatable shaft, a crank handle on

the shaft outside of the housing, a lever on the shaft inside the housing, a member adapted to engage successive slides, the lever inside the housing being in pivotal relationship therewith.

12. In combination a portable housing, a projector fixed therein, a magazine adapted to contain a plurality of slides, means for propelling successive slides from the magazine into projecting relationship with the projector, said means including a rotatable shaft, a crank handle on the shaft outside of the housing, a lever on the shaft inside the housing, a member adapted to engage successive slides, the lever inside the housing being in pivotal relationship therewith, the housing having an open side, a cover therefore, a latch lever, a yielding means adapted to extend the latch lever into the path of the cover, an arm connected to the latch lever adapted to interlock with the lever inside the housing to hold against movement when the cover is closed.

13. In combination, a portable housing, a projector fixed in place therein, a plurality of slide magazines on opposite sides of the projector, one for used and the other for unused slides, and manually operated means for moving selected slides from one magazine into projecting relationship with the projector and then into the other magazine, an opening in the wall of the housing, a removable closure therefor, the magazines being open at their tops toward the closure and means pivoted on the housing and adapted to be engaged by and held in position by the closure for closing the magazine openings to prevent loss of slides.

14. In combination, a portable housing, a projector fixed in place therein, a plurality of slide magazines on opposite sides of the projector, one for used and the other for unused slides, and manually operated means for moving selected slides from one magazine into projecting relationship with the projector and then into the other magazine, an opening in the wall of the housing, a removable closure therefor, the magazines being open at their tops toward the

closure and means pivoted on the housing and adapted to be engaged by and held in position by the closure for closing the magazine openings to prevent loss of slides, means associated with one of said magazine closing means for masking the projector from above.

15. In combination, a portable housing, a projector fixed in place therein, a plurality of slide magazines on opposite sides of the projector, one for used and the other for unused slides, and manually operated means for moving selected slides from one magazine into projecting relationship with the projector and then into the other magazine, an opening in the wall of the housing, a removable closure therefor, the magazines being open at their tops toward the closure and means pivoted on the housing and adapted to be engaged by and held in position by the closure for closing the magazine openings to prevent loss of slides, means associated with one of said magazine closing means for automatically locking the slide moving means against operation when the closure is closed.

16. In combination, a portable housing, a projector fixed in place therein, a plurality of slide magazines on opposite sides of the projector, one for used and the other for unused slides, and manually operated means for moving selected slides from one magazine into projecting relationship with the projector and then into the other magazine, an opening in the wall of the housing, a removable closure therefor, the magazines being open at their tops toward the closure and means pivoted on the housing and adapted to be engaged by and held in position by the closure for closing the magazine openings to prevent loss of slides, means associated with one of said magazine closing means for masking the projector from above, means associated with one of said magazine closing means for automatically locking the slide moving means against operation when the closure is closed.

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