C. A. WALHOF.

PROJECTOSCOPE.

APPLICATION FILED JULY 25, 1910.

1,028,803.

Patented June 4, 1912.

4 SHEETS—SHEET 1.

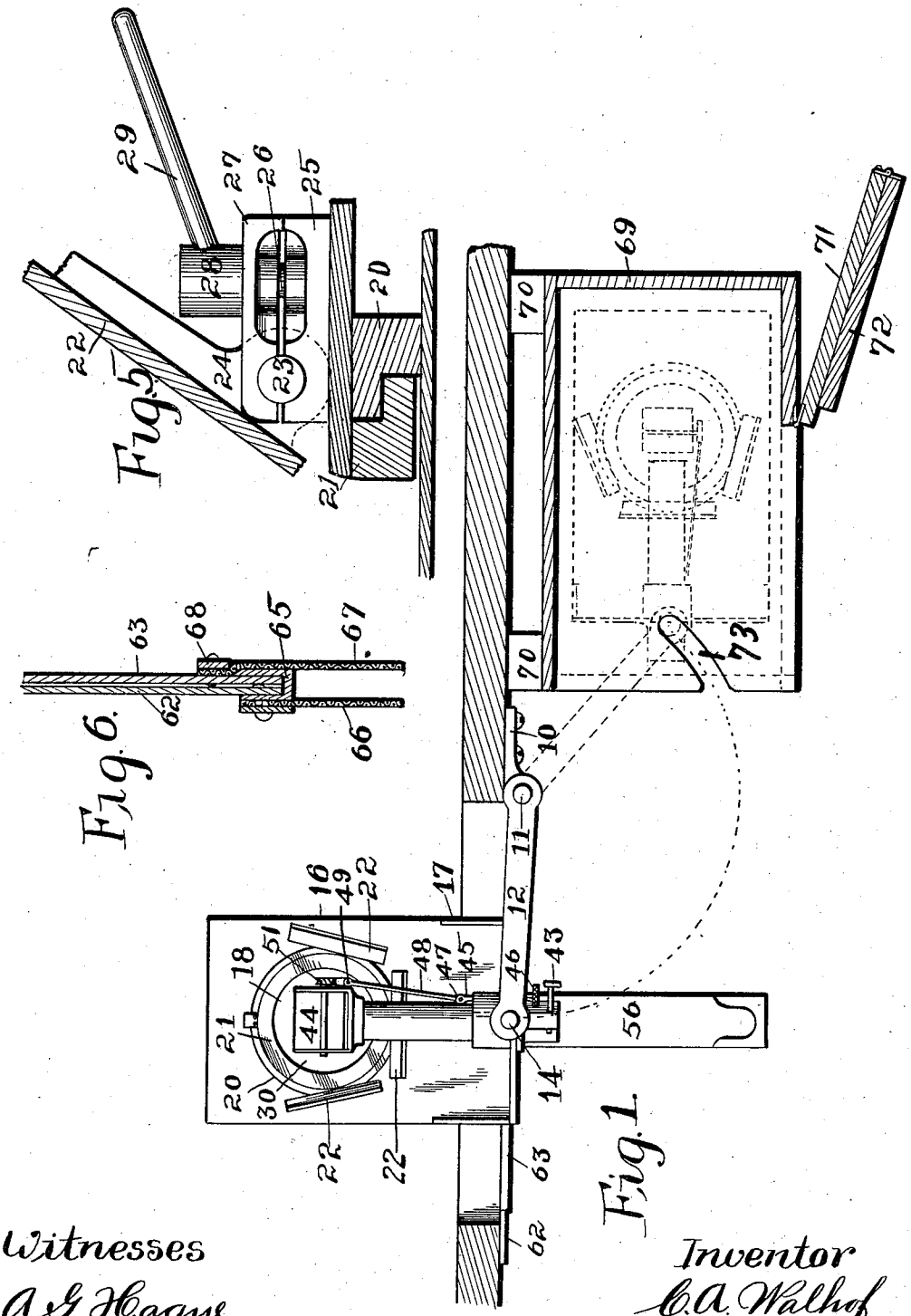

Fig. 5.

Fig. 6.

Fig. 1.

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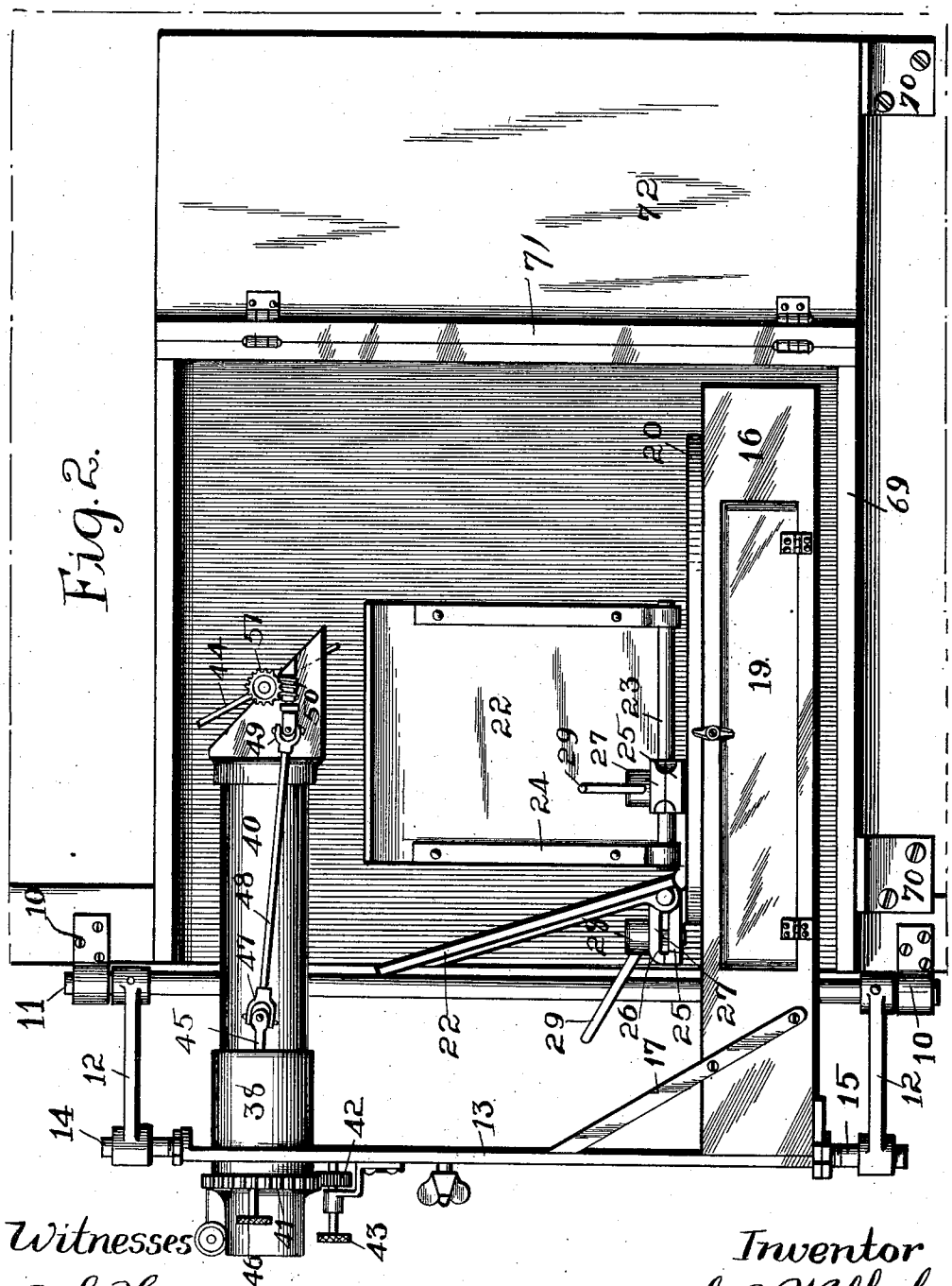
4 SHEETS—SHEET 2.

Fig. 2.



Witnesses
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4 SHEETS—SHEET 3.

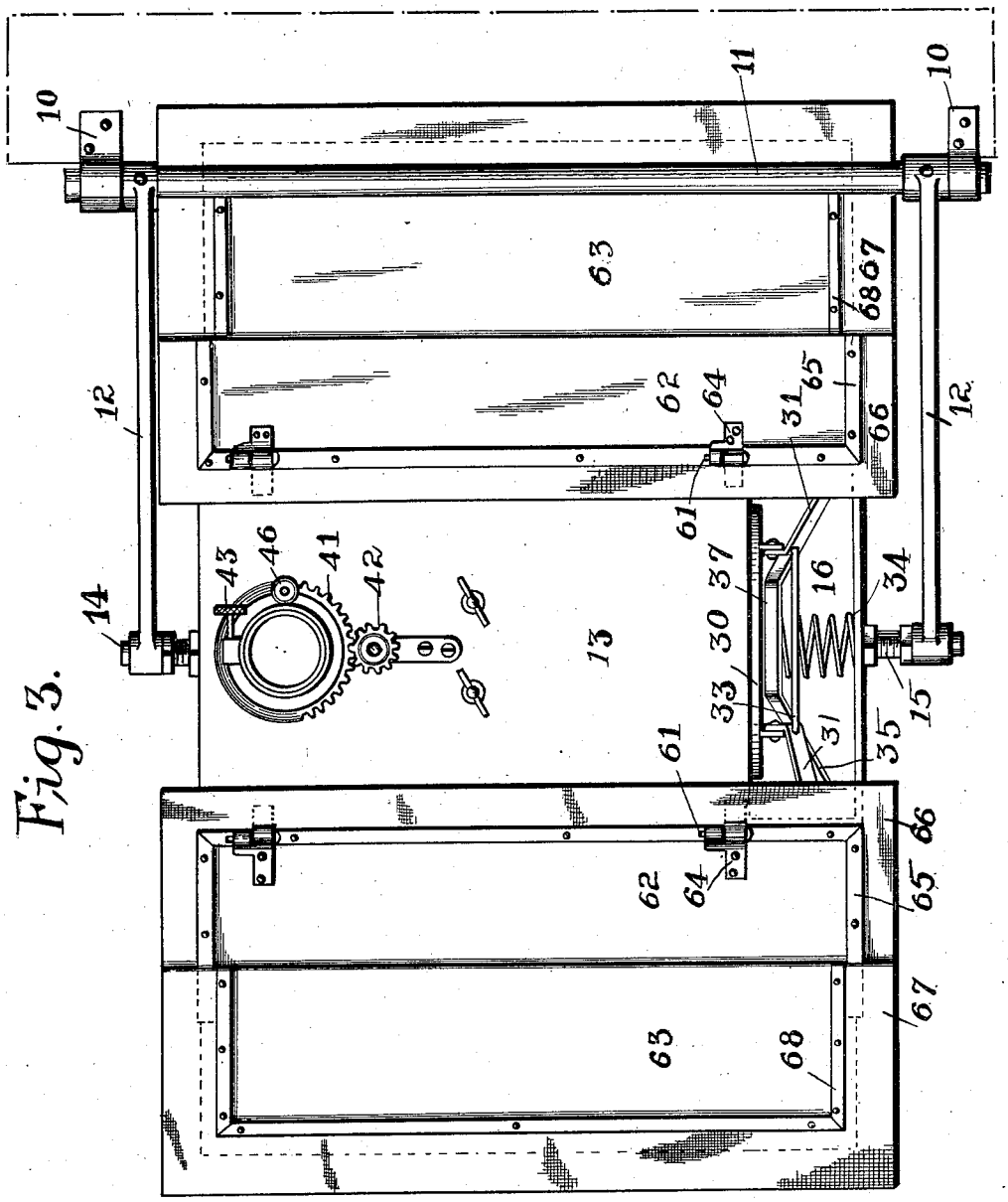

Fig. 3.

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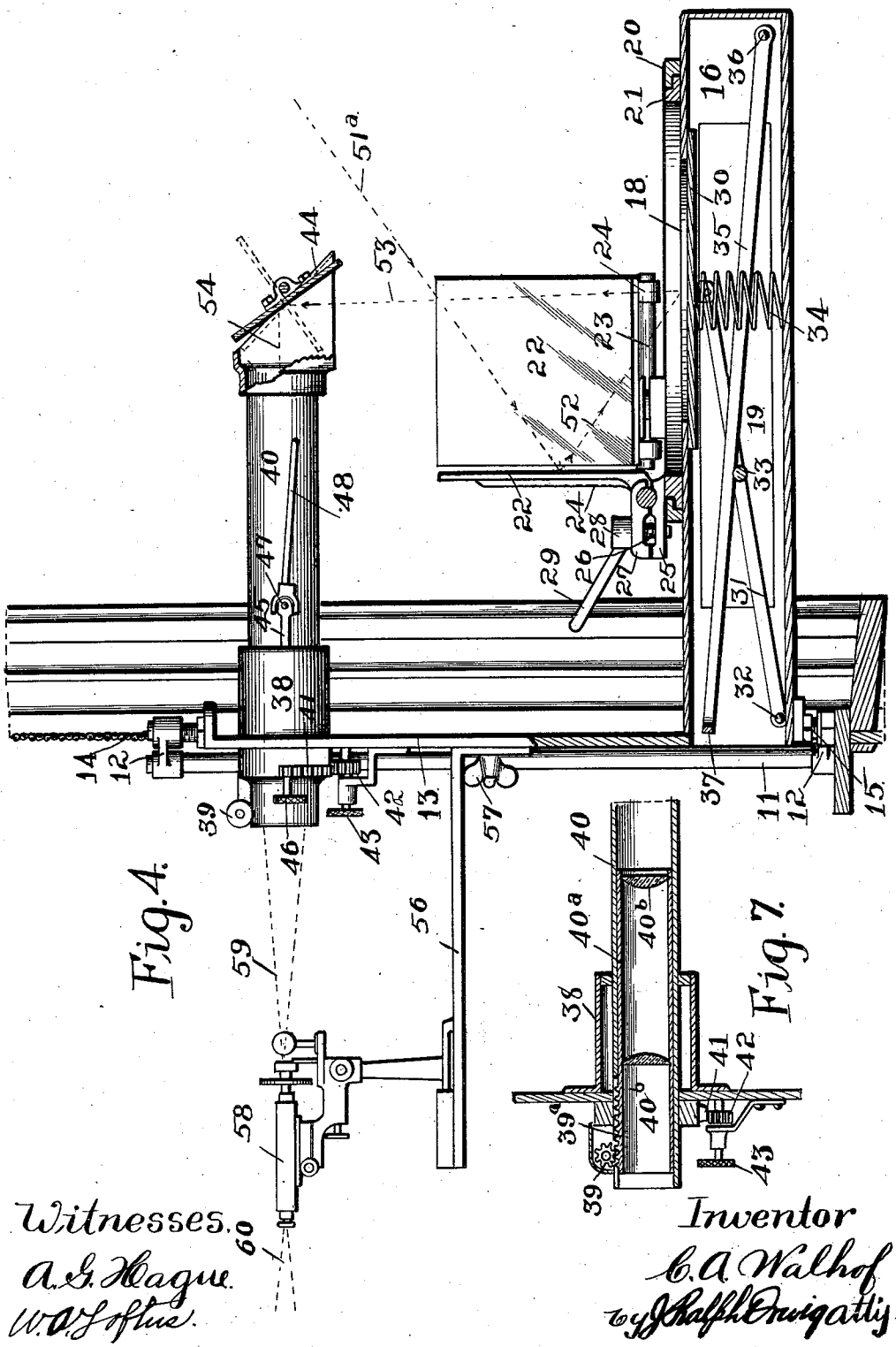

Fig. 4.

Fig. 7.

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UNITED STATES PATENT OFFICE.

CHARLES A. WALHOF, OF ROCK VALLEY, IOWA, ASSIGNOR OF ONE-HALF TO I. S. LARGE, OF ROCK VALLEY, IOWA.

PROJECTOSCOPE.

1,028,803. Specification of Letters Patent. Patented June 4, 1912.

Application filed July 25, 1910. Serial No. 573,736.

To all whom it may concern:

Be it known that I, CHARLES A. WALHOF, a citizen of the United States, residing at Rock Valley, in the county of Sioux and State of Iowa, have invented a certain new and useful Projectoscope, of which the following is a specification.

My invention relates to that class of projectoscopes designed to concentrate and reflect rays of sunshine upon any object placed in the apparatus, whereby an image of said object may be greatly magnified and may be reflected through a suitable lens device in its true color, upon a screen.

My objects are to provide a device of this kind of simple, durable and inexpensive construction that may be permanently supported on the interior of a building adjacent to a window opening and capable of being readily, quickly and easily swung on its permanent supports to a position extending through the window opening with the mirrors and reflectors outside of the building in position to receive sunlight.

A further object is to provide an improved casing that may be permanently connected to the interior of a building adjacent to a window opening and into which the projectoscope may be readily and easily moved and the casing inclosed to protect and conceal the apparatus when not in use.

A further object is to provide improved means for supporting and adjusting the reflecting mirrors adjacent to the image platform.

A further object is to provide improved means for supporting pictures, natural objects or other images to be projected and in this connection to provide means whereby said images may be readily and easily placed in propor position within the image platform by a person standing within the room inside of the window opening through which the device is extended.

A further object is to provide improved means for adjusting the mirror connected with the lens tube whereby said mirror may be adjusted in any position desired by a person within the room adjacent to the window opening through which the device is extended.

A further object is to provide improved means for closing the spaces at the sides of the window opening adjacent to the device to thereby exclude light and in this connection to provide means whereby said window closing device may be readily and easily adjusted to fit the window openings of various sizes.

A further object is to provide an improved microscope attachment for the device adjustably and detachably connected therewith and so arranged that when in use it may stand in position within the room adjacent to the window opening and be readily accessible to an operator.

My invention consists in certain details, in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, in which:

Figure 1 shows a horizontal, sectional view through the wall of the building and through a window opening therein with my improved projectoscope applied thereto, the stationary casing being shown in section with its door open and the projecting apparatus being shown in position extended through the window opening. The dotted lines in said figure indicate the position that the projecting apparatus assumes when contained within the stationary casing. Fig. 2 shows a side elevation of the projecting apparatus arranged partially within the casing which is shown with its door in an open position. Fig. 3 shows an end elevation of my improved projecting device as it will appear from the interior of the building with the projecting apparatus extended through a window opening therein, the casing being omitted. The dot and dash line indicates the broken edge of the wall of a building. Fig. 4 shows a vertical, sectional view of a wall taken through a window opening therein with my improved projecting apparatus shown in position extended through the window opening and shown partially in section and also showing a microscope attachment applied thereto. Fig. 5 shows an enlarged, detail, sectional view illustrating the reflecting mirror clamping device and also the rotary support for the reflecting mirrors on the image platform. Fig. 6 shows an enlarged, detail, sectional view illustrating the sliding shutter device for excluding light from the window

opening, and Fig. 7 shows a detail, sectional view through the lens 2 and connected parts.

Referring to the accompanying drawings, I have used the reference numeral 10 to indicate two hinge members applied to the inner surface of the wall of a building adjacent to a window opening therein. An upright shaft 11 is rotatably mounted in said hinge members, and two arms 12 are fixed to said upright shaft.

The numeral 13 indicates the main supporting frame of the projecting apparatus having at its upper central portion a journal 14 pivotally connected to the end of the upper arm 12 and also having at its lower central portion a journal 15 pivotally connected to the lower arm 12. In the following description the side of the frame which is adjacent to the exterior of the window opening when the device is in position for use will be termed the outer side. Fixed in position to the outer side of the frame 13 is a box-like frame 16 inclosed all around except at its inner end, there being an opening in the frame 13 at the inner end of said box-like structure, as shown in Fig. 3. The part 16 is preferably supported by braces such as 17 illustrated in Fig. 2 or any other suitable way. There is also a round opening 18 in the top of the part 16 which will be hereinafter termed the object casing. At the sides of said object casing are two hinged doors 19 by means of which access may be had to the interior of the object casing.

On top of the object casing is the mirror platform which comprises a stationary circular rim 20 and a rotatable circular rim 21 having an annular rib at its periphery to engage the corresponding groove in the part 20. Mounted upon the rotatable mirror platform member 21 are three mirrors, each of which comprises a mirror body portion 22 having a shaft 23 fixed in position at its lower edge by means of the brackets 24, and mounted upon the mirror platform 21 is a stationary gripping bar 25 having a screw threaded opening and also having a semicircular groove to receive the shaft 23. A second gripping member 27 is provided above the gripping member 25 and a screw 26 is passed through it and seated in the lower gripping member. It is also provided with a semicircular groove to receive the shaft 23. A head 28 is mounted on the upper end of the said screw 26 and is provided with a handle 29. By this arrangement the upper gripping member 27 may be firmly clamped to the lower gripping member 25 to thus hold the shaft 23 against rotation. By this arrangement it is obvious that any one of the mirrors may be readily and quickly tilted to any desired angle and there firmly held, and any mirror may be also moved longitudinally on the shaft 23 and clamped in any position of its adjustment. I preferably provide three mirrors arranged around the object platform in the manner clearly illustrated in Fig. 1. It is obvious that by rotating the mirror platform 21, all of the mirrors will be jointly moved without changing their positions relative to each other. This is desirable in readjusting the mirrors to properly collect and reflect rays of sunshine as the sun changes its position.

In order to securely hold articles to be projected in position within the object casing, I provide a flat plate 30 within the object casing having pivoted to its lower surface two arms 31 which extend inwardly and are pivotally supported at the inner end of the object platform at 32. A cross piece 33 is connected to said arms at about their central portions. An extensible coil spring 34 is connected to the lower surface of the part 30 and engages the bottom of the object casing. In order to draw the plate 30 downwardly to receive an article, I have provided a rod 35 with its ends pivoted at 36 to the outer end of the object casing and its central portion arranged adjacent to the upper inner end of the casing as shown at 37 in Fig. 4. The sides of the bar 35 are arranged to rest upon the rod 33 so that an operator may grasp the part 37 and by pushing it downwardly may draw the plate 30 downwardly so that an article may be extended through from the inner end of the object platform to a point on top of the plate 30 and then when the operator releases the part 35 the spring 34 will elevate the plate 30 and any objects upon said plate. In this way articles may be placed in position to be projected by an operator on the inside of the building and without removing or changing the shutter devices, hereinafter described, at the sides of the frame 13.

At the upper portion of the frame is a stationary lens tube casing 38 and slidingly and rotatably mounted within it is a tube 40 and within the tube 40 is a tube 40^a in which the lenses 40^b are fixed. The tube 40 is arranged for rotation by means of a gear 41 fixed thereto and a pinion 42 in mesh with the gear and provided with an operating head 43 by which the pinion may be rotated and the tube 40^a is arranged for movement longitudinally of the tube 40 by means of a pinion 39 in mesh with a rack 39^a on the tube 40^a. By this arrangement it is obvious that the tube 40 may be rotated about its longitudinal axis or that the tube 40^a containing the lenses may be moved longitudinally for focusing purposes. Pivotally supported on the outer end of the tube 40 is a reflecting mirror 44. I have provided for adjusting this mirror 44 as follows: Extended through the tube 38 is a

shaft 45 having an operating head 46 at its inner end and also having a universal or flexible joint 47 at its outer end. A rod 48 is connected to the universal joint 47 and is provided with a universal joint 49 at its outer end. The universal joint 49 connects to a worm 50 and this worm is in mesh with a pinion 51 connected to the pivotal center of the mirror 44 so that an operator may, by manipulating the operating head 46, adjust the angle of the mirror 44 in a vertical plane and by a manipulation of the operating head 43 he may tilt the mirror from side to side and all of this adjustment may be readily and easily accomplished by a person within the room adjacent to the window opening.

Referring to Fig. 4 of the drawings, and assuming that the device is to be used in connection with an object placed upon the plate 30, the central mirror 22 is adjusted so that rays of sunlight striking at the angle, illustrated by the dotted line 51^a, will be reflected to the center of the plate 30 along the line 52 and the other mirrors will also be so positioned that the rays of light will be centered at the same point. From the center of the plate 30 the rays of light will be projected upwardly along the dotted line 53 to the mirror 44 which will be set to such position that the light rays coming from the object will be reflected straight inwardly through the tube 40 along the dotted line 54. However when it is desired to use the device in connection with a microscope to be hereinafter described, the mirror 44 is set to the position shown by dotted lines in Fig. 4 and the direct rays of sunlight are reflected through the lenses.

My improved microscope attachment comprises a bracket 56 detachably connected with the inner face of the frame 13 by means of a bolt 57 and on this bracket I place a microscope 58 of ordinary construction and so positioned that rays of light coming through the tube 40 and through the lenses therein will be focused upon the object holder of the microscope, as shown by the dotted lines 59 in Fig. 4, so that the image of the object on the object holder of the microscope will be projected through the microscope and magnified thereby and projected beyond the microscope along the dotted lines 60 to a suitable screen.

In order to provide means for shutting out the light through the window opening at the sides of the projecting device, I provide on the inner face of the frame 13, stationary hinge pintles 61, there being two of these pintles on each side of the frame 13 to support two independent shutters. Each shutter consists of two sheet metal plates 62 and 63 arranged in overlapping positions. The plate 63 is provided with hinge members 64 to coact with the pintles 61. Riveted to the plate 62 is a channel bar 65 which also overlaps the plate 63 and is slidingly connected therewith. A similar channel bar is provided at the upper end of the plate 62. Secured to the channel bar 65 is a flexible shutter margin 66 which may be made of felt or similar material and fixed to the plate 63 is a strip of felt 67 held in place by the metal strip 68. By this arrangement it is obvious that the shutter member 62 may slide in and out relative to the shutter member 63, and thus be adjusted to fit window openings of different sizes and these shutters may be readily and easily detached and placed in the casing in which the projectoscope is contained when not in use.

The casing is indicated generally by the reference numeral 69 and is permanently secured by brackets 70 to the wall surface adjacent to the window opening. The end of the casing adjacent to the window opening is open as shown in Fig. 1. A hinged door member 71 is provided for closing the inner side of the casing and a second hinged door member 72 is hinged to the door member 71 to close the open end of the casing. The bottom and top of the casing are provided with slots of the kind indicated at 73 in Fig. 1 to receive the journals 14 and 15. In replacing the projectoscope within the casing I first swing the arms 12 inwardly, as shown by dotted lines in Fig. 1, and then turn the projectoscope completely around on the journals 14 and 15 and insert it in the casing with the outer end of the projectoscope adjacent to the closed end of the casing. Then the casing doors may be shut and the device will be securely supported and inclosed within the casing.

In practical use, it is obvious that the device may be contained within the casing which is permanently secured to a wall adjacent to a window opening and when so contained will be protected and concealed. When it is desired to use the projectoscope, the casing doors are opened and the arms 12 are swung outwardly and then the projectoscope is extended through the window opening in the manner shown in Fig. 1. It will not in any way engage the window frame as it is supported wholly upon the arms 12. Then after the projectoscope is extended as stated, the shutters are applied and adjusted and then the device is ready for use. The mirror platform is first turned to position where the rays of sunlight will be reflected upon the center of the object plate 30 and the mirror 44 is adjusted so that the reflection from the object plate 30 will be reflected straight through the tube 40 to the lenses. Then the lenses are adjusted to focus the image upon a screen. The operator, on the interior of the building, may readily

and easily have access to the object plate 30 by pressing the part 37 downwardly and then inserting his arm through the object casing may replace or remove articles from the object plate. If it is desired to utilize the device in connection with a microscope then the mirror 44 is so adjusted as to reflect the rays of sunlight through the tube 40. The lenses within the tube 40 concentrate the rays of light upon the object holder of the microscope which is supported on the bracket 57.

It is obvious from the foregoing description that all of the parts of the projectoscope are of simple, durable and inexpensive construction and that the device may be conveniently and easily placed in position for use or returned to its casing and that it is adapted for use in projecting images from the object plate or for use in connection with a microscope, and in both instances the image will be projected upon the screen and be faithfully reproduced as to outline and coloring.

I claim as my invention:

1. In a device of the class described, the combination of arms designed to be pivotally supported adjacent to a window opening, a frame pivotally mounted in said arms, an object casing carried by said frame, mirrors mounted on said object casing, a projecting tube also carried by said casing, and a mirror mounted on the projecting tube, said frame and the parts connected with it being capable of being extended through a window opening or of being moved to position alongside of a wall adjacent to a window opening.

2. In a device of the class described, the combination of arms designed to be pivotally supported adjacent to a window opening, a frame pivotally mounted in said arms, an object casing carried by said frame, mirrors mounted on said object casing, a projecting tube also carried by said casing, and a mirror mounted on the projecting tube, said frame and the parts connected with it being capable of being extended through a window opening or of being moved to position alongside of a wall adjacent to a window opening, and a stationary casing in position to receive the frame and parts connected with it when moved to position adjacent to the wall to which the arms are pivoted.

3. In a device of the class described, the combination of arms designed to be pivotally supported adjacent to a window opening, a frame pivotally mounted in said arms, an object casing carried by said frame, mirrors mounted on said object casing, a projecting tube also carried by said casing, a mirror mounted on the projecting tube, said frame and the parts connected with it being capable of being extended through a window opening or of being moved to position alongside of a wall adjacent to a window opening, and a stationary casing in position to receive the frame and parts connected with it when moved to position adjacent to the wall to which the arms are pivoted, said casing being provided with a double door at one end and side, for the purposes stated.

4. In a device of the class described, the combination of arms designed to be pivotally supported adjacent to a window opening, a frame pivotally mounted in said arms, an object casing carried by said frame, mirrors mounted on said object casing, a projecting tube also carried by said casing, a mirror mounted on the projecting tube, said frame and the parts connected with it being capable of being extended through a window opening or of being moved to position alongside of a wall adjacent to a window opening, and a casing inclosed except on one side and one end, and being provided with slots at the open end, means for permanently securing said casing in position, a double door connected with the casing to close the side end and end, said arms being designed to swing to position above and below the casing, and journals carried by the arms and fixed to said frame and designed to enter said slots, for the purposes stated.

5. In a device of the class described, the combination of a frame, an object casing fixed to and supported by the frame, and open at its end adjacent to the frame and also having an opening at its top, an object plate in the casing below said opening, a spring for yieldingly holding the plate adjacent to the opening, arms pivoted at the inner end of the casing and also pivoted to said plate, a cross piece connecting said arms, and a bar pivoted within the casing designed to engage said cross piece and extended to position adjacent to the inner end of the casing, for the purposes stated.

6. In a device of the class described, the combination of a frame, means for supporting same in a window opening, an object casing on the outer side of the frame, a tube extended through the frame, lenses within said tube, a mirror at the outer end of the lens tube, mirrors on the object casing, means for adjusting the mirrors on the object casing to position where they will reflect sunlight toward the center of the object casing, and means for adjusting the mirror on the said tube from position for reflecting the rays of light from the center of the object casing through the lenses, or to position for reflecting direct rays of sunlight through the lenses.

7. In a device of the class described, the combination of a rotatable mirror platform, a number of mirrors thereon each having a shaft fixed thereto, and a clamping device

for each shaft comprising a clamping member fixed to the rotatable platform, a second clamping member on top of the first, said clamping members having said shaft between them, a bolt extended through the clamping members, said clamping members being so arranged as to permit the shaft to be moved either longitudinally or to be rotated and to be clamped in any position of its adjustment.

8. In a device of the class described, the combination of a holder, a tube rotatably mounted in the holder, means for rotating the tube, lenses longitudinally movable within the tube, means for longitudinally adjusting the lenses, a mirror pivotally supported at the outer end of said tube and capable of being adjusted from position to reflect the rays of light from below through the lenses and also to reflect direct rays of sunlight from above through the lenses, and means mounted in said holder for adjusting said mirror.

9. In a device of the class described, the combination of a frame designed to be supported adjacent to a window opening, a holder mounted in the frame, a tube detachably mounted in the holder, a gear on said tube, a pinion mounted in the frame and in engagement with said gear for rotating the tube, a tube having lenses therein mounted within the aforesaid tube and capable of longitudinal movement, a rack and pinion device for moving the lenses for focusing purposes, a mirror pivotally mounted at the outer end of said tube, a shaft rotatably mounted in the holder, a worm gear device on said shaft for operating the mirror, said shaft being provided with flexible joints, for the purposes stated.

10. In a device of the class described, the combination of a frame, means for supporting it within a window opening, and shutters at the sides of the frame for excluding light, each shutter comprising two sheet metal plates, one being connected to the frame and the other being slidingly mounted beyond the first, and flexible margins on both plates, for the purposes stated.

11. In a device of the class described, the combination of a frame, means for supporting it within a window opening, and two shutters mounted on the frame, each comprising a metal plate, means for detachably connecting it with said frame, a second metal plate overlapping the first, a channel bar at the upper and lower ends of the second plate fixed thereto and overlapping the edges of the first plate, and flexible margins on both plates arranged in overlapping positions at the points where the edges overlap, whereby the last mentioned plates may be adjusted in and out relative to the first mentioned plates to adjustably fit window openings of different sizes.

Des Moines, Iowa, May 7, 1910.

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