

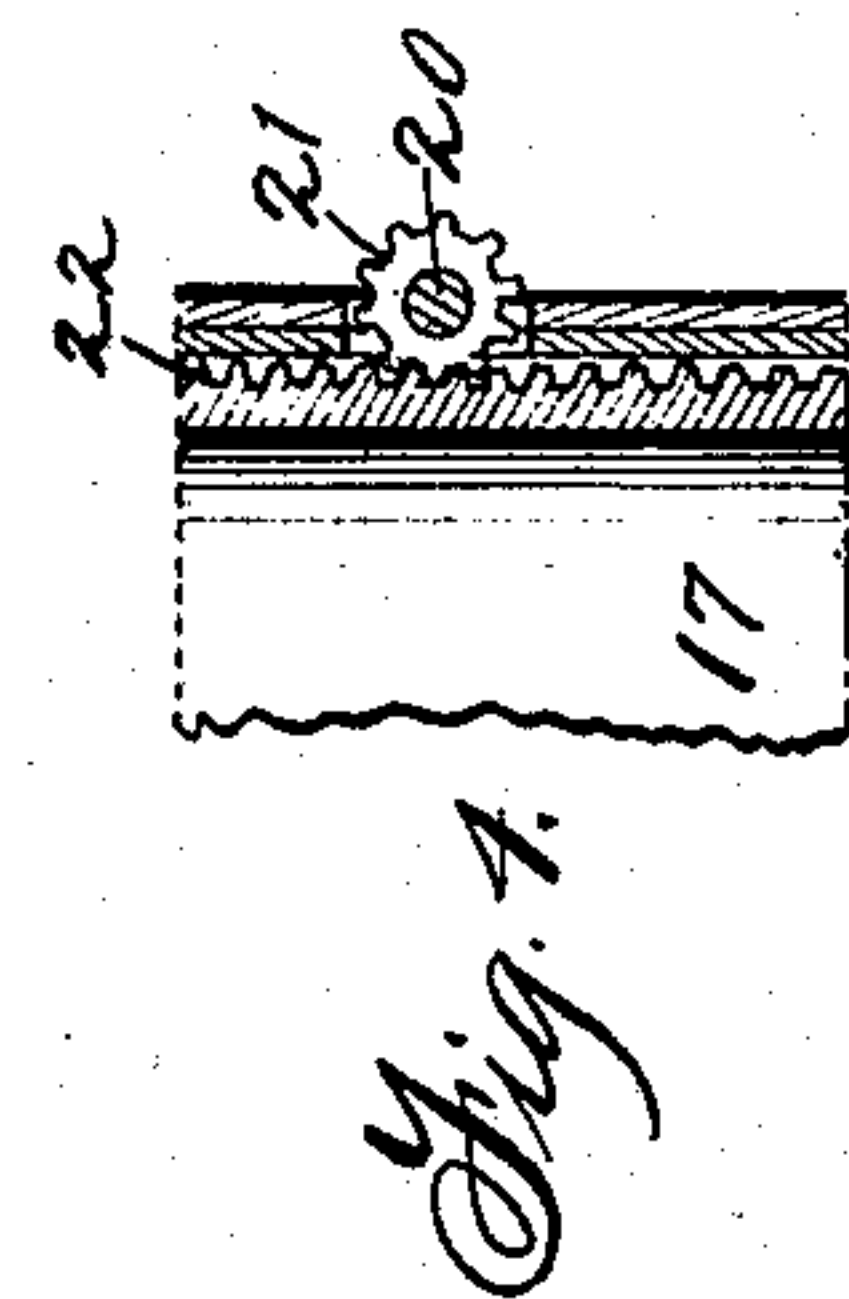
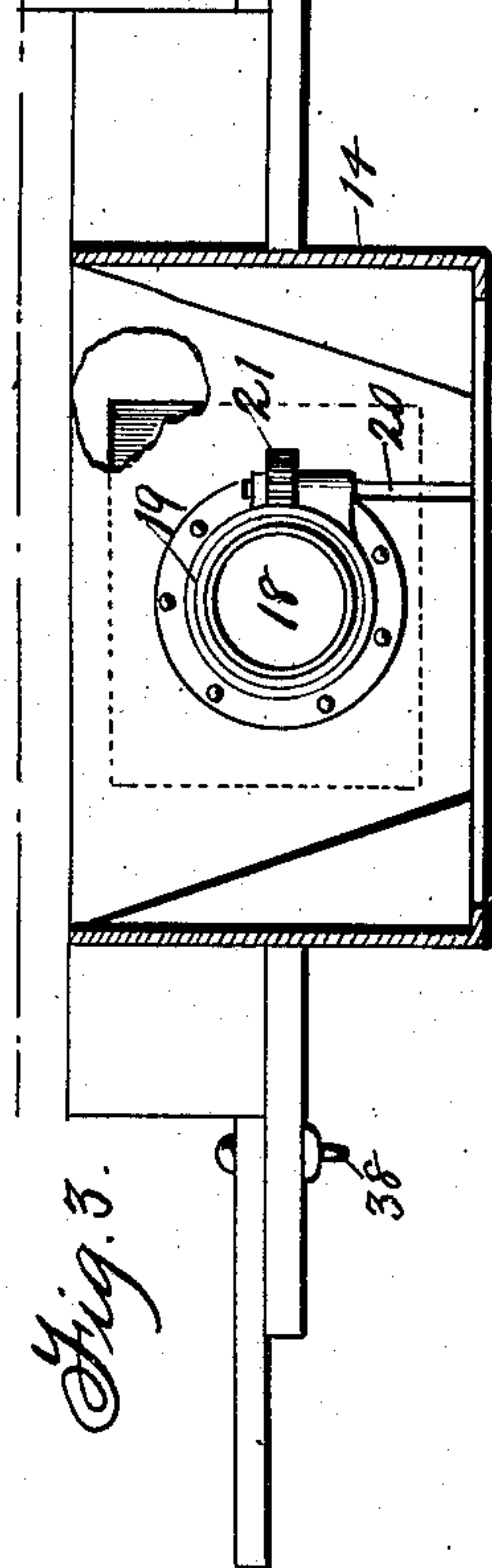
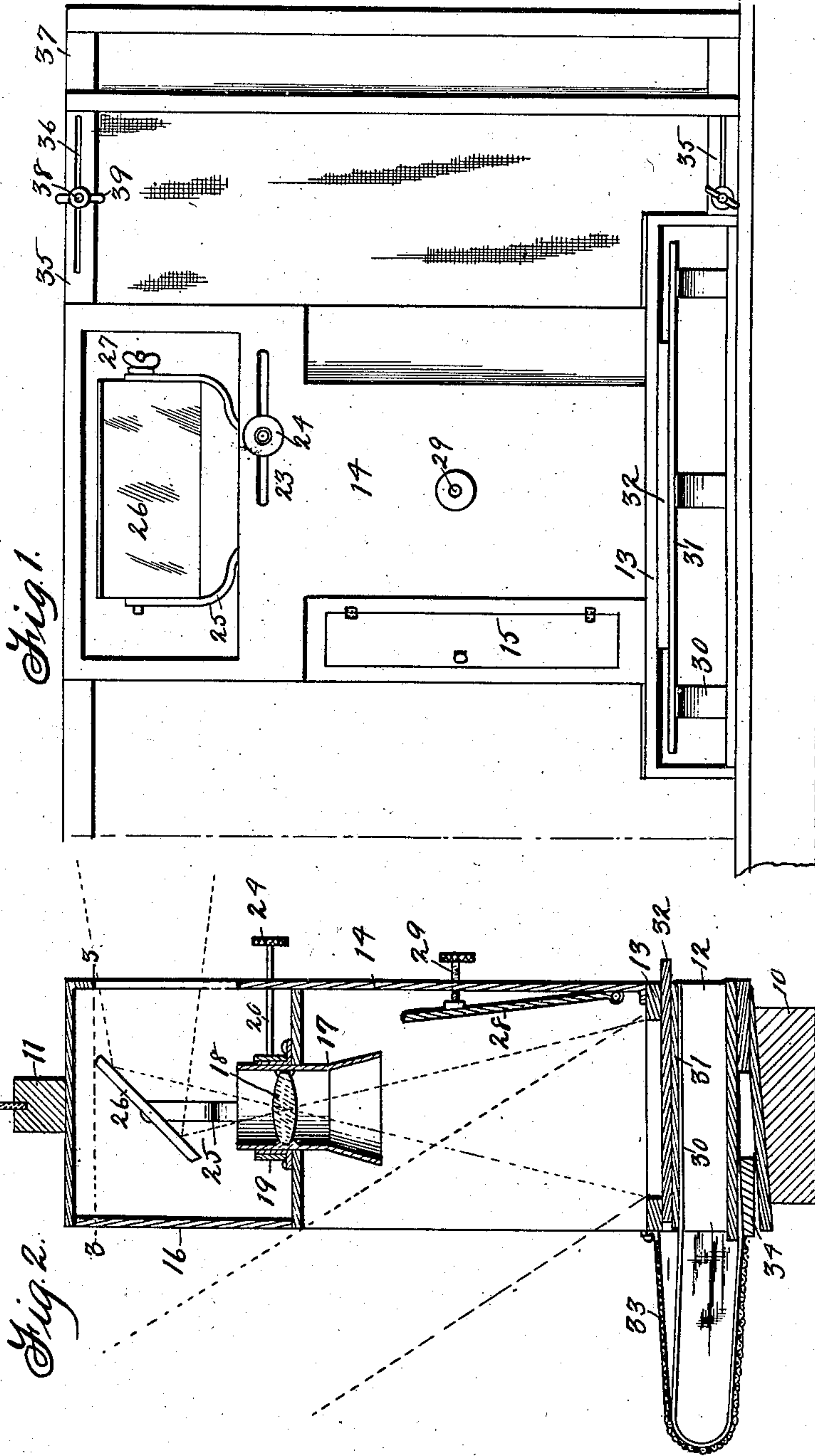
No. 847,982.

PATENTED MAR. 19, 1907.

E. P. CROCKER & C. A. WALHOF.  
PROJECTING APPARATUS.

APPLICATION FILED SEPT. 27, 1905.

2 SHEETS-SHEET 1.



Witnesses  
A. S. Hague  
R. L. Spencer.

Inventors E. P. Crocker  
and C. A. Walhof  
by Orwig Lane attys

No. 847,982.

PATENTED MAR. 19, 1907.

E. P. CROCKER & C. A. WALHOF.

PROJECTING APPARATUS.

APPLICATION FILED SEPT. 27, 1905.

2 SHEETS—SHEET 2.

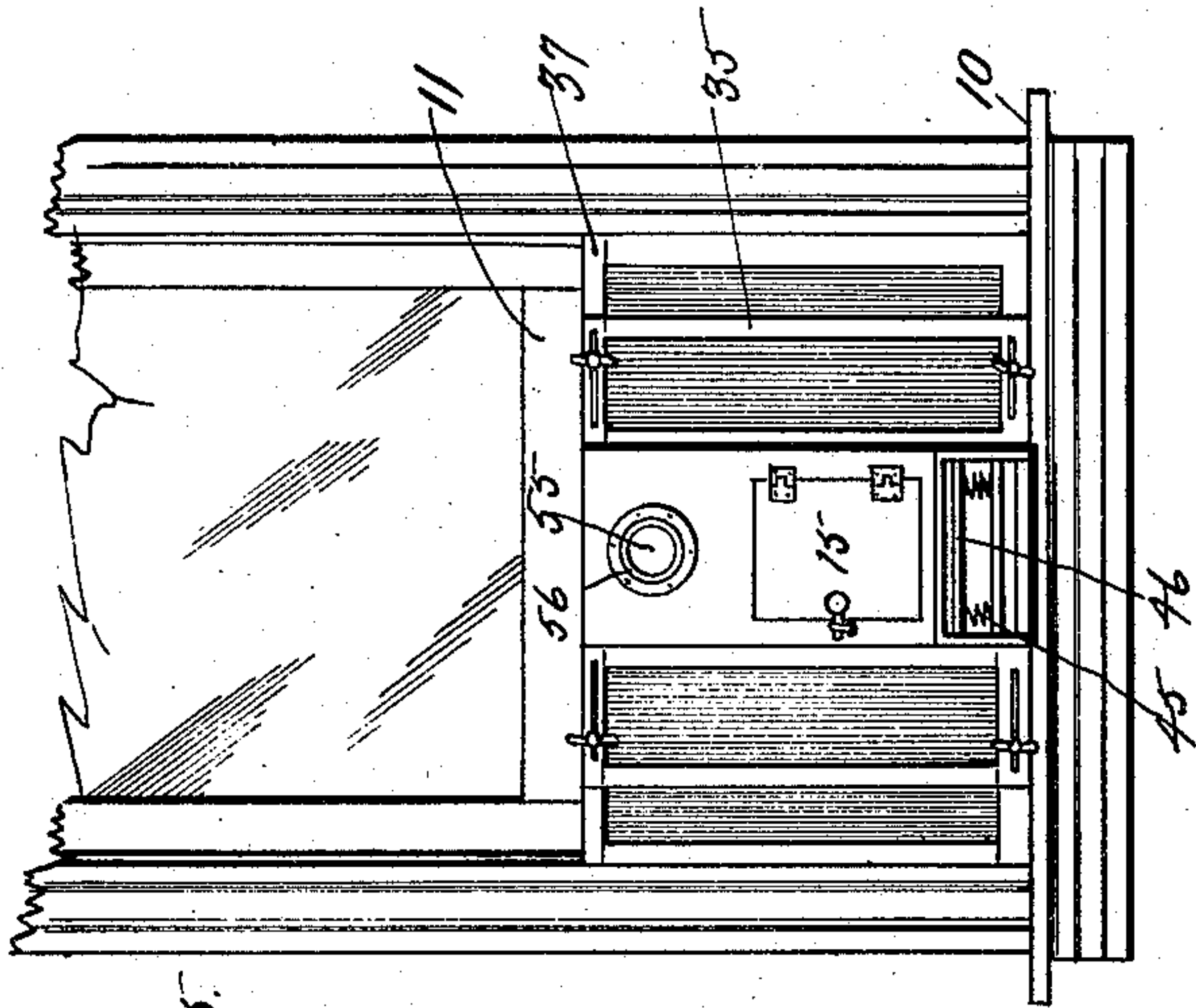


Fig. 5.

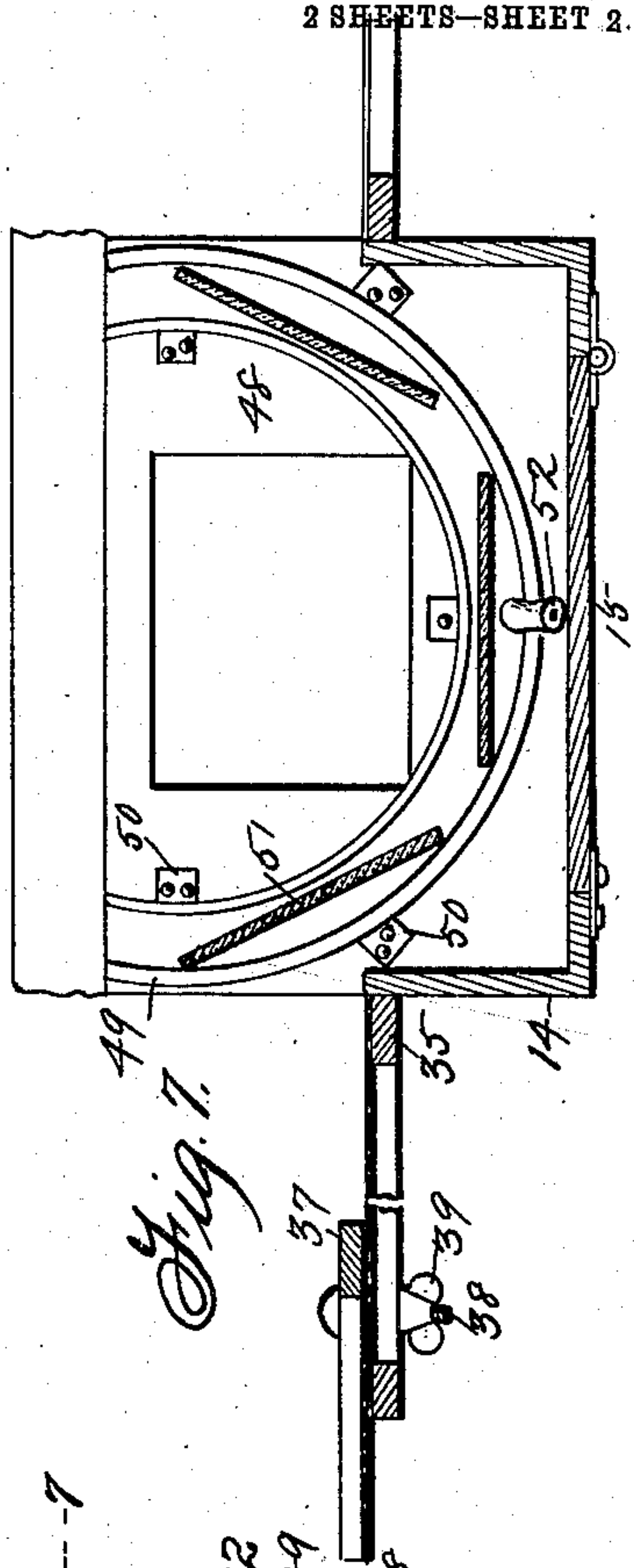


Fig. 7.

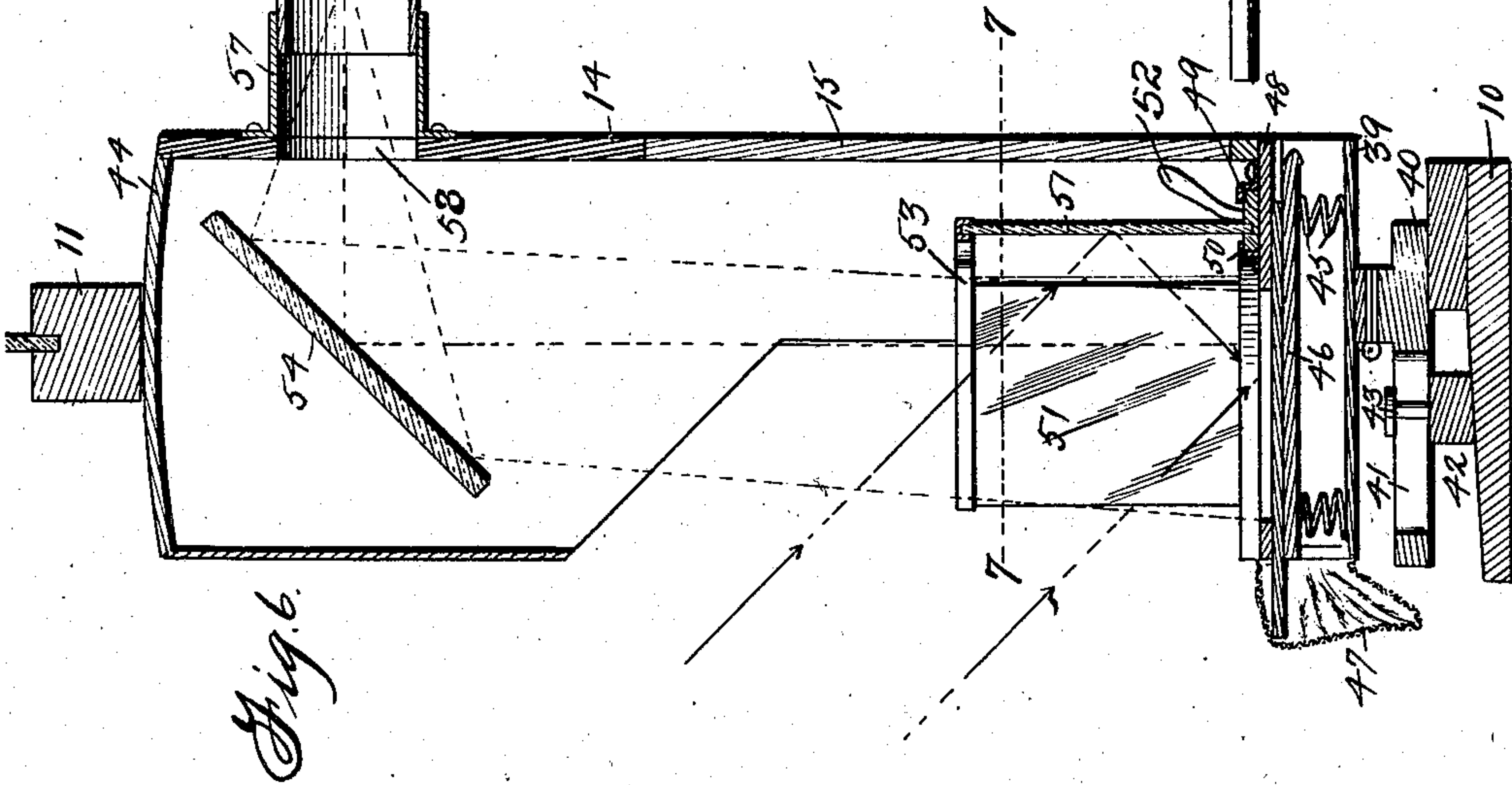


Fig. 6.

Witnesses,  
A. S. Hague  
R. L. Spencer.

Inventors, E. P. Crocker  
and C. A. Walhof.  
by Orwig & Lane attys



# UNITED STATES PATENT OFFICE.

EDWIN P. CROCKER AND CHARLES A. WALHOF, OF ROCK VALLEY, IOWA,  
ASSIGNORS OF ONE-THIRD TO I. S. LARGE, OF ROCK VALLEY, IOWA.

## PROJECTING APPARATUS.

No. 847,982.

Specification of Letters Patent.

Patented March 19, 1907.

Application filed September 27, 1905. Serial No. 280,347.

*To all whom it may concern:*

Be it known that we, EDWIN P. CROCKER and CHARLES A. WALHOF, citizens of the United States, residing at Rock Valley, in the county of Sioux and State of Iowa, have invented a certain new and useful Projecting Apparatus, of which the following is a specification.

The object of our invention is to provide a projecting apparatus of simple, durable, and inexpensive construction especially designed to utilize sunlight in projecting an image upon a screen and, further, to provide a device of this class that may be quickly and easily fitted into a window-frame and supported between the bottom of the frame and the sash, where it will take the place of a window-screen, and be readily attached or detached and fitted to window-frames of various sizes.

Our invention consists 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 our claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows a rear elevation of the projecting apparatus. Fig. 2 shows a central vertical sectional view of same. Fig. 3 shows a horizontal sectional view on the line 3 3 of Fig. 2. Fig. 4 shows a detail sectional view illustrating the means for adjusting the lens. Fig. 5 shows an elevation of the interior of a window-frame with a modified form of our improved projecting apparatus in position therein. Fig. 6 shows an enlarged central vertical sectional view of the same modification, and Fig. 7 shows a horizontal sectional view on the line 7 7 of Fig. 6.

Referring to the accompanying drawings, we have used the numeral 10 to indicate the portion of the window-frame shown, and 11 the window-sash. The projecting apparatus comprises a casing divided into three compartments, the lower one being the image receiving and supporting compartment and being open on the inside of the casing. This compartment is indicated by the numeral 12. The partition at its top (indicated by the numeral 13) is provided with an opening through which the image contained in the lower compartment may be projected upwardly into the compartment above. This middle compartment is indi-

cated by the numeral 14 and is open only on its outer side. The inner side, however, is provided with a narrow door 15. The top compartment is indicated by the numeral 16 and is open only on the inner side. In the partition between the compartments 14 and 15 is a vertically-adjustable tube 17, containing a lens 18. This tube is slidably mounted in a collar 19, which collar is provided with a shaft 20, bearing a pinion 21, and this pinion is in mesh with a rack 22, formed on the tube 17. The shaft 20 is projected through an opening 23 on the inner side of the casing, and on its inner end is a disk 24, by which the shaft may be rotated to raise and lower the lens 18. Mounted within the upper compartment are the standards 25, in which a mirror 26 is adjustably mounted directly over the lens 18. Said mirror may be fixed at any angle by the winged nut 27. Mounted within the middle compartment is a mirror 28, hinged at its lower end to the inner wall of the compartment, its upper end being adjustably supported by the screw-threaded rod 29, seated in the inner wall of the middle compartment, so that the angle of the mirror 28 may be adjusted. Fixed beneath the casing is a number of leaf-springs 30, projected outwardly from the casing and then inwardly across the top of the lower compartment. Supported on these springs is the flat base 31, designed to receive and support a card containing an image to be projected. The card is indicated by the numeral 32 and is placed in position by first forcing the base 31 downwardly, then inserting the card, and then permitting the springs to hold the base upwardly against the card, clamping the card firmly between the parts 31 and 13. We also provide a screen 33, attached to the partition 13, extended forwardly and downwardly and attached to a cross-strip 34, which cross-strip is designed to enter between the bottom of the casing or frame of the device and the window-sill, as shown in Fig. 2. By means of this cross-strip the frame may be adjusted to and supported in a vertical position and there held by the window-sash 11 on top of the frame. Attached to each side of the casing is a screen-frame section 35, provided with slots 36, and adjacent to each of said frames 35 is an auxiliary screen-frame 37, provided with bolts



38, passed through the slots 36. These screen-frames may be adjustably connected to each other by the nuts 39, the frame 37 being thus made capable of sliding movement relative to the frame 35, as required to fit window-frames of different sizes. In practical use with this form of our invention the casing is supported in a window-frame by placing it upon the window-sill, adjusting the strip 34 so that the casing stands upright, then lowering the sash till it rests upon the top of the casing and supports the casing in position. The adjustable side screens are then moved until they engage the window-frame. Then a card bearing an image is placed upon the platform 31 with the image uppermost. The sunlight will enter through the outer side of the middle compartment and strike directly upon the image-card. The sunlight may be intensified and directed to the image-card by adjusting the mirror 28 to proper position. The image will be reflected upon the lens 18, and this lens will invert and project it upon the mirror 26, and the mirror will deflect it inwardly through the casing to a screen located at a point distant from the projecting apparatus. By moving the lens 18 upwardly or downwardly the image may be easily focused. In this way an image may be projected upon the screen within a building by the use of sunlight unaided by artificial light of any kind.

In the modified form of our invention illustrated in Figs. 5, 6, and 7 we employ a casing with screen-sections at the sides and adjustable screen-sections attached thereto in the same manner as previously described. Hinged to the bottom 39 of the casing is a base-board 40, slotted at 41 and provided with an adjustable cross-strip 42, supported on a screw 43, passed through the slot 41. By this means the casing may be adjusted to different angles relative to the window-frame. The top 44 of the casing is segmental in shape, and the window-sash 11 will engage it and hold it at any angle in which it may be placed. Within the lower compartment of the casing is a number of extensible coil-springs 45, supporting the image-platform 46. The outer side of the lower compartment is incased in a screen 47, and the image-card is held between the platform 46 and the partition 48 by the springs 45. On top of the partition 48 is a segmental mirror-supporting frame 49, capable of rotary movement thereon and guided by the brackets 50. Fixed to this mirror-supporting frame are three mirrors 51, standing in substantially upright positions and arranged at such angles that sunlight thrown upon them through the outer side of the casing will be deflected by the mirrors upon the image-supporting platform. A handle 52 is provided for the mirror-supporting frame, by which the operator may ad-

just it to center the reflection of the sunlight from the mirrors upon the image-platform as the sun changes its position. The tops of the mirrors 51 are supported by a brace 53. Mounted in the casing near its top is a mirror 54, arranged to reflect the image upon a lens 55, which lens is mounted in a tube 56, slidably supported in another tube 57, surrounding an opening 58 at the inner side of the casing near its top. In practical use with this form of the projecting apparatus the image-bearing card is positioned in the casing in the same way as in our preferred form, and the mirrors 51 are so adjusted that they will center the light reflected from them upon the image-platform. The entire casing may be tilted vertically throughout a limited degree to assist in centering the rays of sunlight upon the image-platform. The image on the card will be thrown upon the mirror 54 and reflected by said mirror to the lens 55 and from the lens will be thrown upon a screen at a point distant to the projecting apparatus. With this form of the invention it is obvious that no artificial light is required and that the apparatus may be placed in an ordinary window and there securely held and the image-bearing cards readily and easily inserted or removed.

Having thus described our invention, what we claim, and desire to secure by Letters Patent of the United States therefor, is—

1. A projecting apparatus comprising a casing, an image-platform within the casing, a mirror arranged to direct rays of sunlight upon the image-platform, said mirror adjustable in a horizontal plane around the image-platform, a mirror for changing the direction of the projected image and a focusing-lens coacting with the latter mirror.

2. A projecting apparatus comprising a casing, an image-platform within the casing, a mirror arranged to direct rays of sunlight upon the image-platform said mirror adjustable in a horizontal plane around the image-platform, a mirror for changing the direction of the projected image, a focusing-lens coacting with the latter mirror and means for tilting the casing in a vertical plane.

3. A projecting apparatus comprising a casing designed to be placed upon a window-sill and to have a window-sash resting against its upper end for supporting it in position, adjustable window-screen sections fixed to the sides of the casing to fill the space between the sides of the casing and the sides of a window-sill below the sash, an image-platform within the casing, a mirror and a focusing-lens.

4. A projecting apparatus comprising a casing opened at its outer side, a base portion hinged to the casing, a strip adjustably connected with the base portion to rest on a window-sill whereby the casing may be tilted relative to a vertical line, a segmental top



portion for the casing to be engaged by a window-sash, an image-platform in the casing, a mirror and a focusing-lens.

5 In a projecting apparatus, a casing, a horizontal partition in the casing having an opening therein, an image-platform below the partition, yielding pressure devices for holding the image-platform upwardly toward the partition and a screen-covering for the  
10 outer side of the space below the horizontal partition.

6. A projecting apparatus comprising a casing open at its outer side, a base portion hinged to the under surface of the casing, a  
15 cross-piece adjustably mounted beneath the outer end portion of the base, a number of coil-springs within the lower portion of the casing, an image-platform on top of the springs, a horizontal partition above the

image-platform having an opening therein, a  
20 screen-covering for the outer end of the space between the partition and the bottom of the casing, a segmental frame on top of said horizontal partition, guides for supporting said frame to permit it to be rotated around the  
25 center of the image-platform, a number of mirrors supported by said frame, window-screen sections fixed to the sides of the casing, window-screen sections adjustably fixed to the said screen-sections, a mirror supported  
30 near the top of the casing and an adjustable lens adjacent to the mirrors, for the purposes stated.

EDWIN P. CROCKER.  
CHARLES A. WALHOF.

Witnesses:

JOHN J. LARGE,  
J. A. HUIZENGA.