

No. 881,597.

C. E. LORD.
PROJECTOR.

PATENTED MAR. 10, 1908.

APPLICATION FILED OCT. 19, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

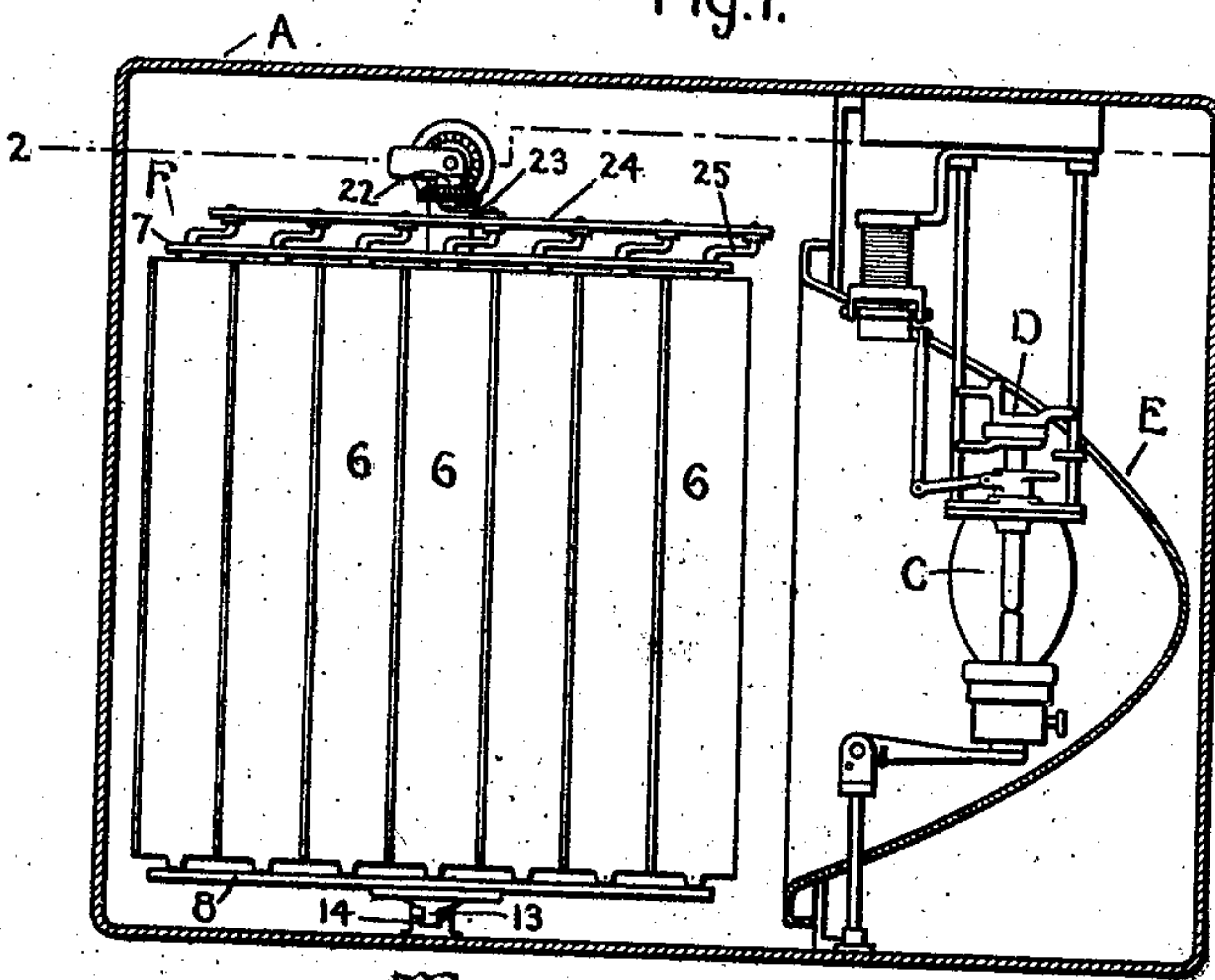


Fig. 3.

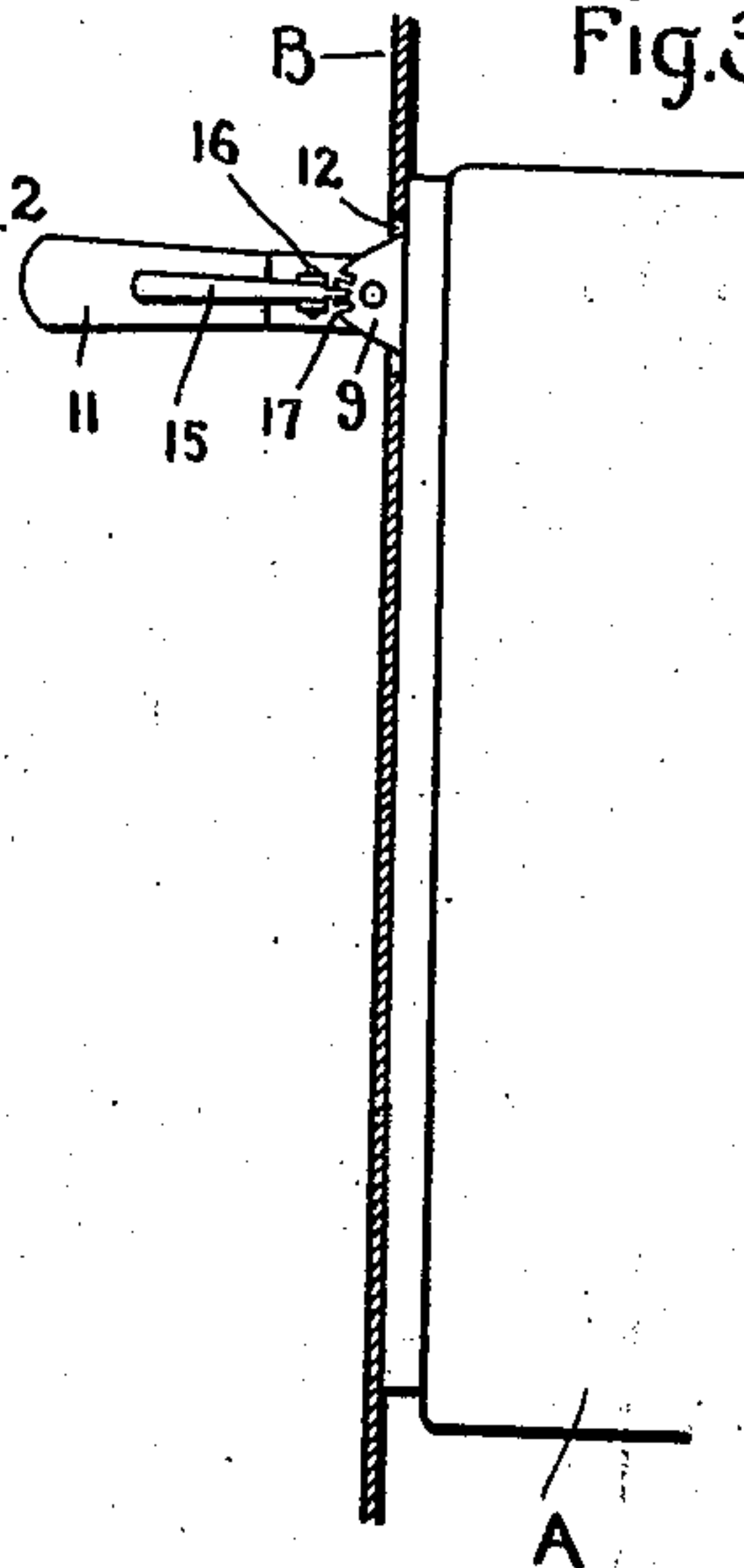
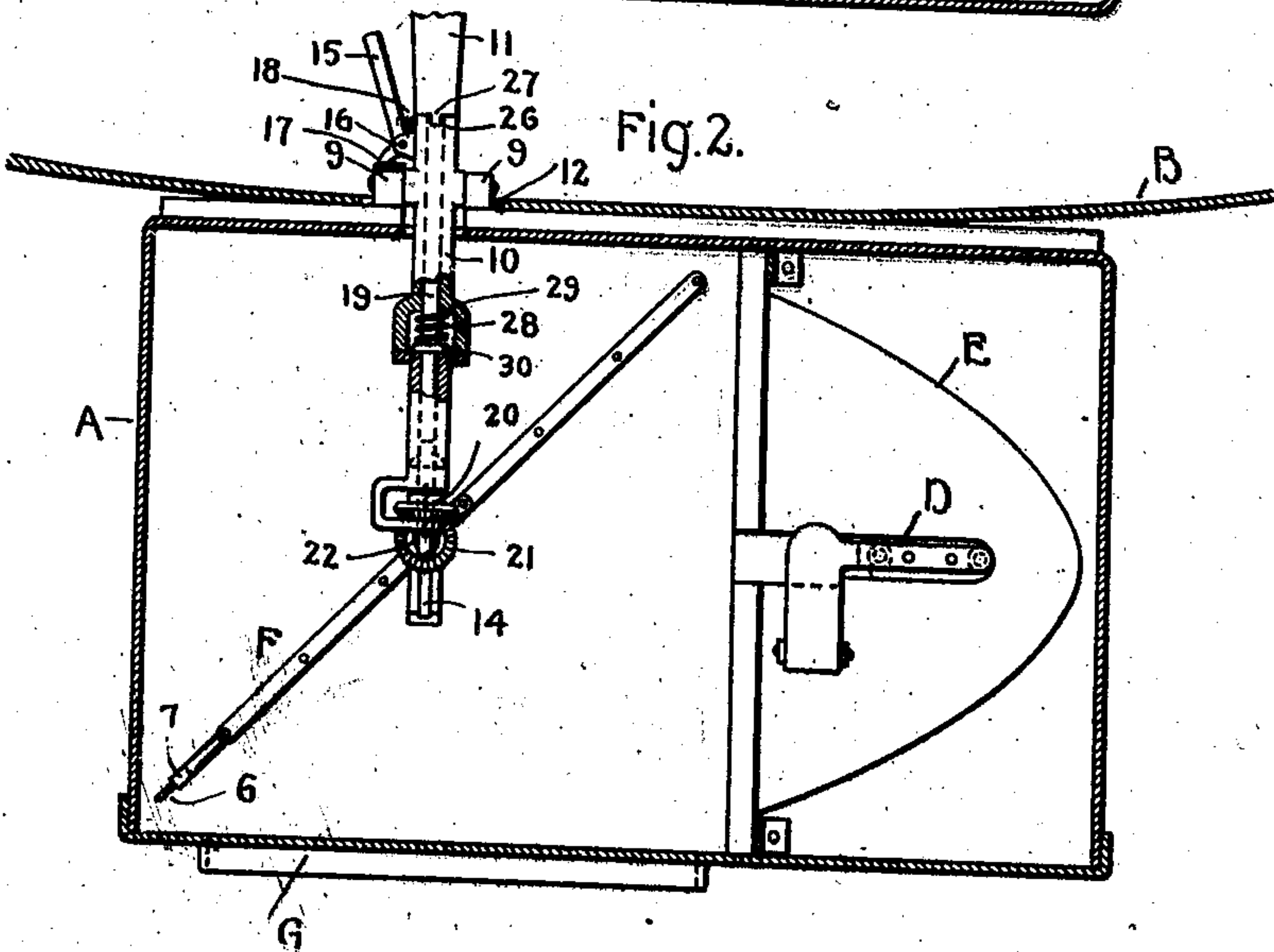


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 4.

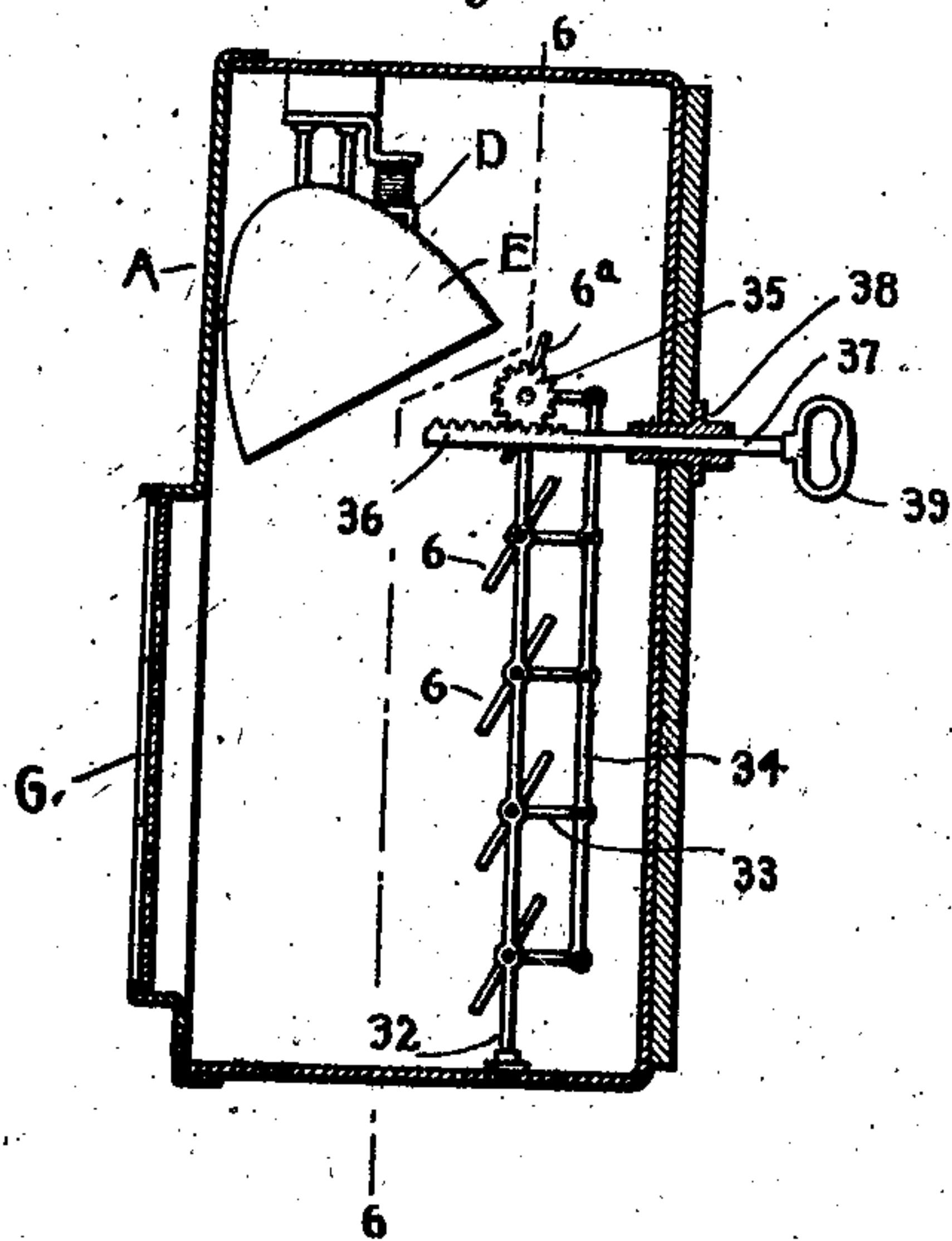


Fig. 5.

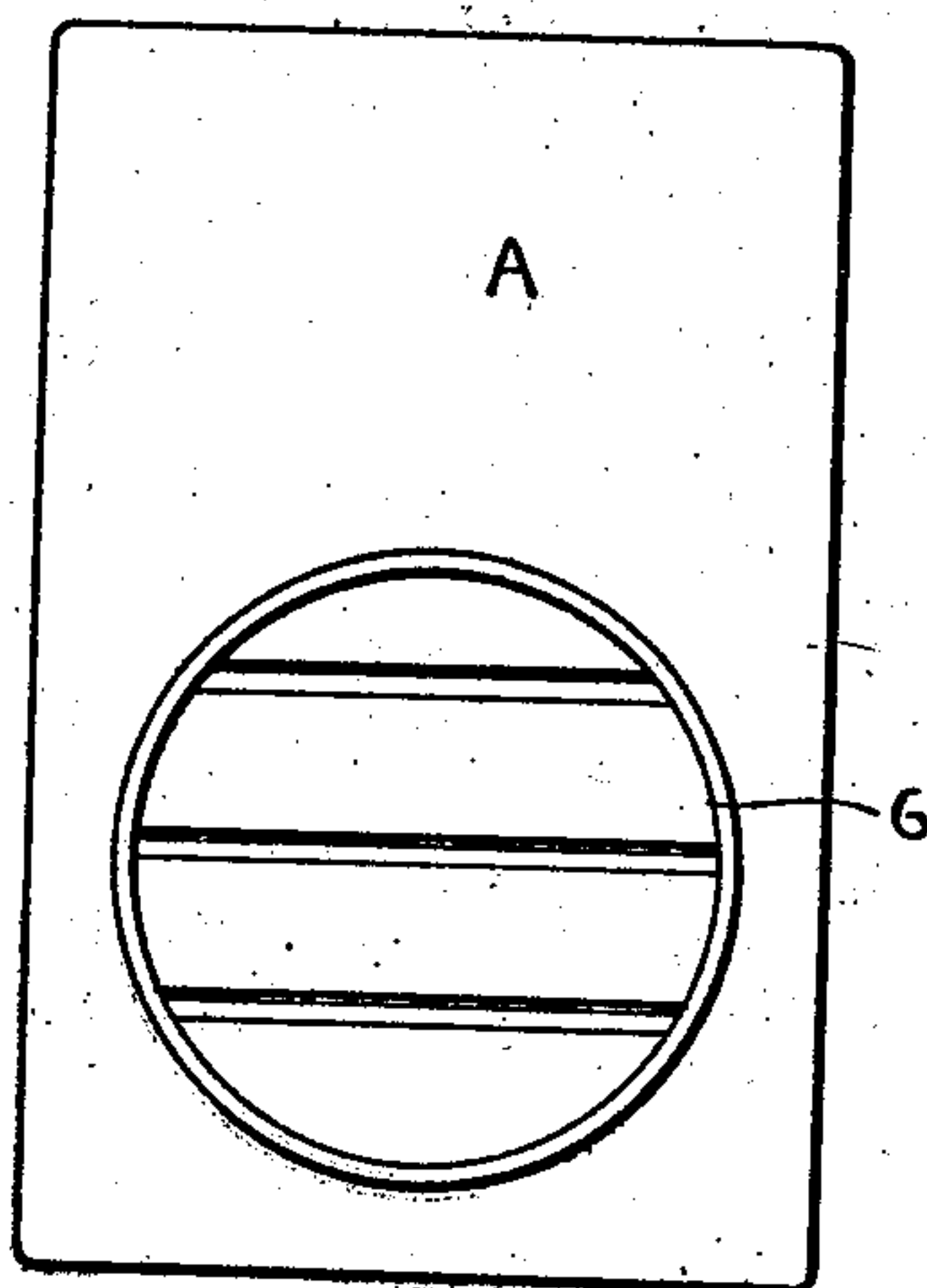
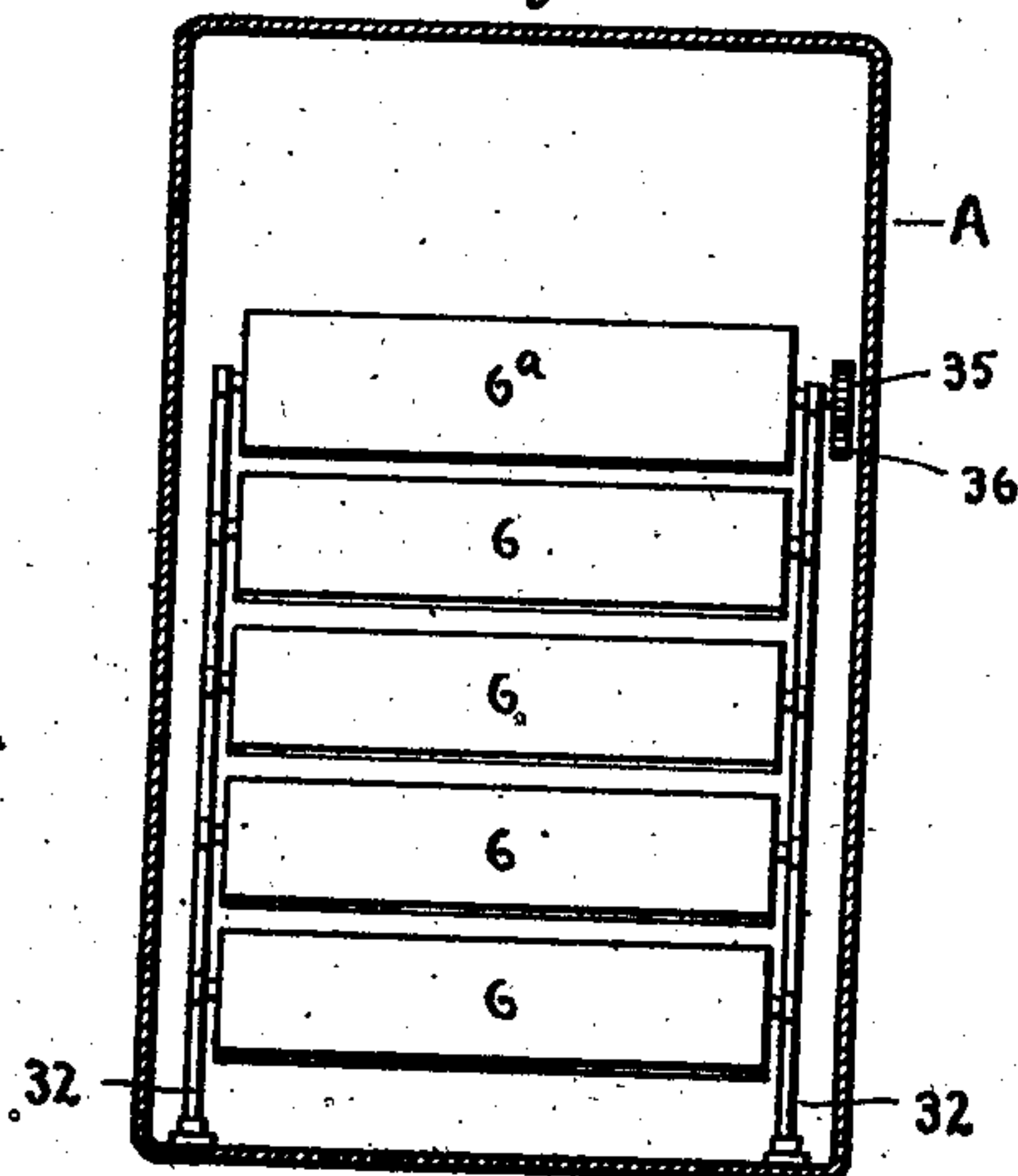


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES E. LORD, OF CINCINNATI, OHIO, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

PROJECTOR.

No. 881,597.

Specification of Letters Patent.

Patented March 10, 1908.

Application filed October 19, 1904. Serial No. 229,108.

To all whom it may concern:

Be it known that I, CHARLES E. LORD, a citizen of the United States, residing at Cincinnati, county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Projectors, of which the following is a specification.

My invention relates to improvements in the construction of projectors or head-lamps with especial reference to such head-lamps as employ an electric arc of high candle-power as the source of illumination.

It is at present customary on high speed interurban roads to use head-lights of high candle-power so that the engineer or motor-man may be able to distinguish objects and examine the condition of the tracks a great distance ahead of the car or train. While running the cars or trains through the thoroughfares of cities, it is advisable and sometimes required as the result of a city ordinance to reduce the intensity of the head light from its full power which is employed on the suburban and interurban sections of the road to a power merely sufficient to illuminate the roadbed a few feet in front of the car. This reduction in intensity of illumination is usually accompanied by stopping the car at the city limits and placing in front of the lamp a screen of translucent or opaque material. This is an unsatisfactory, time-consuming operation annoying alike to the motor-man and passengers. Another means for accomplishing this end is a combined arc and incandescent head-lamp with controlling mechanism for connecting the arc lamp in circuit when the car is outside the city limits and for connecting the incandescent lamp in circuit when the car is within the said limits. This is an expensive construction, difficult to maintain in working condition and unsatisfactory in operation.

The object of my invention is to control the intensity of illumination of a projector or head-lamp, and also the direction of the beam of light from said lamp by compact, efficient and readily operated means. To this end, I employ in connection with the source of illumination in the head-lamp, a movable reflector which when in one position presents to the beam of light a polished, mirrored surface or surface of high reflecting quality capable of reflecting the full intensity of the beam, and when in another position presents a rough, dead white surface or sur-

face of low reflecting quality capable of absorbing the greater part of said beam of light. This reflector is preferably so constructed and arranged that it may be employed to project the concentrated beam of light thrown upon it from the source of illumination in any desired direction and change its intensity at will.

My invention comprises further details of construction and combination of parts that will be hereinafter explained and more specifically set forth in the appended claims.

In the accompanying drawings, Figure 1 represents a front sectional elevation of a head-lamp embodying the preferred form of my invention; Fig. 2 is a sectional plan view on the line 2 2, Fig. 1; Fig. 3 is a side elevation showing the operating handle; Fig. 4 is a side sectional elevation of a modification of my invention; Fig. 5 is a front elevation of the head-lamp shown in Fig. 4; and Fig. 6 is a sectional elevation on the line 6 6, Fig. 4.

Referring to Figs. 1 and 2, A represents the casing of the head-lamp which is fastened in any desired manner to the dash-board or other support B. Mounted within said casing is an arc lamp C provided with automatic feeding mechanism D. The lamp is also provided with a parabolic mirror E which concentrates the light from the arc and projects it in a beam of parallel rays at right angles to the direction of travel of the car. The said concentrated beam has its direction changed by a reflector F which projects the beam in any desired direction through the opening G in the front wall of casing A. The reflector F as shown in Figs. 1 and 2 is formed of a plurality of slats 6 pivotally mounted in the upper and lower cross pieces 7 and 8, respectively, so as to rotate about a vertical axis 180 degrees. One side of each of the slats is provided with a highly polished or mirrored surface capable of reflecting the full intensity of the beam of light from lamp C. The opposite side of each of said slats is provided with a light-absorbing surface being preferably painted with a dull white paint. As shown in Figs. 1 and 2, the slats 6 are in alignment forming a flat reflecting surface at an angle of 45 degrees with the beam of light from the lamp. When this reflecting surface is exactly vertical the beam of light will be projected through the opening G in a direction perpendicular to the direction of the beam emanating from the parabolic mirror E;

that is, in a direction parallel to the track or rails. The direction of this beam of light can, however, be changed by the mechanism which will now be described.

5 Pivoted on lugs 9 which project from the back wall of the casing A is an arm 10 to which the operating handle 11 is attached. This handle and lugs 9 project through an opening 12 in the dash-board B and said handle is located within easy reach of the
10 motorman. The frame carrying slats 6 is suspended from the forward end of the arm 10 and is provided at its lower extremity with a projecting lug 13 which operates in the slot 14 and forms a guide for the reflector as the latter is moved by a movement of the
15 handle 11 in a vertical plane. The guide is so arranged that the frame does not change its 45 degrees angle with respect to the beam of light from lamp C. Means are provided for locking the handle and arm in certain definite positions, said means comprising a
20 spring-pressed locking lever 15, pivoted at 16, and having one arm adapted to engage notches 17 in one of the lugs 9, and having its other arm in such a position as to be readily gripped by the motorman. The latter arm is moved toward the handle 11 against the
25 action of spring 18 whenever it is desired to change the position of the frame. The handle 11 is mounted on the outer end of a rod 19 which passes through the entire length of the arm 10. The other end of said rod 19 has mounted thereon a bevel-gear 20 which is
30 splined on said rod and rotates therewith when the handle 11 is rotated. Meshing with said bevel-gear 20 is a bevel-gear 21 carried by a bearing 22 supported by arm 10. This bevel-gear is connected through the
35 crank shaft 23 directly with the middle slat 6. A connecting rod 24 connects the crank 23 to the crank 25 formed on each slat 6, whereby a rotary movement of the bevel-gear 21 caused by a rotary movement of the
40 handle 11 is communicated to all of the rotatably-mounted slats. The gearing and connections are so proportioned that a movement of the handle 11 180 degrees will cause the slats to rotate in the frame 180 degrees.
45 The handle 11 as shown in Fig. 2 is provided with means for indicating certain definite positions of the slats 6. These means comprise recesses 26 with which the projection 27 formed on the handle 11 registers. The said
50 projection 27 is forced into recess 26 by means of the spring 28 which surrounds the rod 19 and is mounted between the shoulder 29 and the collar 30 fastened to the rod 19. The said rod is thus capable of a reciprocatory and a rotary movement within the
60 arm 10.

In the operation of my preferred modification, when it is desired to project a beam of light at full intensity directly ahead of the
65 car, the reflector is in the position shown in

Fig. 2. When it is desired to reduce the intensity of the light, the handle 11 is grasped by the motorman and pulled outwardly so as to remove the projection 27 from the recess 26 against the action of the spring 28. The
70 handle 11 is then rotated 180 degrees or less, depending upon the ratio of the gears 20 and 21. This rotates the slats 6 180 degrees so as to present the light-absorbing surface of said slats to the rays of light from the lamp C.
75 When it is desired to change the direction of the beam of light, the handle 11 and handle 15 are grasped at the same time, so as to release the locking lever 18 and permit the handle to move in a vertical plane thereby
80 moving the reflector F into such an angle about a horizontal axis that it will project the beam of light in an upward or downward direction. If the handle 11 is rotated so as to change slightly the angle of the slats 6 in
85 the frame F, the direction of the beam of light in a horizontal plane may be governed as desired. A combination of the two movements of handle 11, v.z., the rotary and the movement in a vertical plane will serve to
90 govern the beam of light so that it may be thrown in any desired direction within the range of the apparatus.

Referring now to Figs. 4, 5 and 6, in which I have illustrated a simple modification of
95 my invention, A represents, as before, the head-light casing provided with the opening G. The parabolic mirror E which contains the head-lamp is suspended from the roof of the casing A. The feeding mechanism is indicated as before by D. The beam of light from the parabolic mirror E is projected
100 downwardly at a slight angle and is received by the rotatably-mounted slats 6 which project the beam through the opening G in a direction dependent upon the angle of said slats in the vertical frame 32. With the slats
105 6 in the position shown in Fig. 4, the beam of light will be projected through the opening G in a horizontal direction. A small portion of the rays will be reflected by the mirrored slat 6^a in a downward direction through the opening G so as to illuminate the track and roadbed directly in front of the car. Each
110 of the slats 6 is provided with a mirrored side and a light-absorbing side as before described. The slat 6^a may be provided with a mirrored surface on both sides if desired. This slat 6^a may also be fixed in position if it is advisable and may be formed with a convex reflecting surface. Each of the rotatably-mounted slats has fastened thereto, a
115 crank or arm 33, said arms being connected together by the connecting rod 34. One of the said slats, shown in Fig. 4 as 6^a, is provided with a pinion 35 with which the rack 36 meshes. The rack 36 is attached to the rod 37 slidably mounted in the bearing 38 formed in the back wall of the casing A. This rod 37 is provided with a handle 39 by
120 125 130

means of which the position of the slats 6 and therefore the direction of the beam of light may be governed.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. In a projector, a source of illumination, a surface of high reflecting quality, a surface of low reflecting quality, and means for changing the position of said reflecting surfaces so as to project a beam of light of high or low intensity in the direction desired.

2. In a projector, a source of illumination, a surface of high reflecting quality, a surface of low reflecting quality, and means for changing the relative position of the reflecting surfaces and said source of illumination so as to project a beam of light of high or low intensity in the direction desired.

3. In a projector, a source of illumination, a reflector adapted to receive the beam of light from said source and project it in the desired direction, said reflector being provided with surfaces of high reflecting and low reflecting qualities, and means for changing the position of said reflector so as to bring one or the other of said reflecting surfaces into play when a beam of high or low intensity is desired.

4. In a projector, a source of illumination, a reflector built up of a plurality of rotatably-mounted slats each having a surface of high reflecting quality and a surface of low reflecting quality, and means for rotating said slats.

5. In a head-lamp, a source of illumination, a reflector comprising a plurality of movable slats having surfaces of different reflective qualities constructed and arranged to receive a beam of light from said source and project it in the desired direction, means for adjusting said reflector to change the direction of the beams of light, and means for adjusting the position of said slats to vary the intensity of said beam.

6. In a head-lamp, a source of illumination, a parabolic mirror for collecting the light from said source and projecting it in parallel rays, a reflector comprising a plurality of movable slats constructed and arranged to receive said rays and project them in the desired direction, and means for changing the position of said reflector.

7. In a head-lamp, a source of illumination, a parabolic mirror for collecting the light from said source and projecting it in parallel rays, a reflector constructed of a plurality of slats each having a reflecting surface and a light-absorbing surface, and means for rotating said slats about one axis and the reflector as a whole about an axis at right angles to the first axis to change the direction and intensity of the beam of light.

8. A head-lamp, comprising a casing provided with an opening in its front side, a source of illumination within said casing out

of alinement with said opening, a reflector 65 comprising a plurality of movable slats constructed and arranged to receive the rays of light from said source and project them through said opening, a handle projecting through said casing and attached to said reflector for rocking the reflector as a whole 70 and changing the direction of the beam of light.

9. A head-lamp, comprising a casing provided with an opening in its front side, a source of illumination within said casing out of alinement with said opening, a reflector 75 comprising a plurality of movable slats constructed and arranged to receive the rays of light from said source and project them through said opening, a handle projecting through said casing and attached to said reflector for rocking the reflector as a whole and changing the direction of the beam of light, 80 and means for locking the handle in any desired position. 85

10. A head-lamp, comprising a casing provided with an opening in its front side, a source of illumination within said casing out of alinement with said opening, a reflector 90 constructed and arranged to receive the rays of light from said source and project them through said opening, said reflector being rotatably mounted and provided with a light reflecting surface, and a light-absorbing surface, 95 a handle attached to said reflector and projecting through said casing, and means whereby a rotary movement of the handle will cause a rotary movement of the reflector so that the intensity of light projected 100 through said opening may be changed.

11. In a projector, a source of illumination, a reflector built up of a plurality of parallel rotatably-mounted slats, and means for rotating said slats. 105

12. In a projector, a source of illumination, a reflector built up of a plurality of parallel movable slats, means for moving said slats, and means for moving said reflector to change the direction of the projected beam of 110 light.

13. In a reflector, a source of illumination, a reflector having a plurality of surfaces differing in their reflective quality, and means for adjusting the reflector to bring any one of 115 these surfaces into use to give beams of different intensities.

14. In a projector, a source of illumination, a reflector therefor, and means for changing the surface to change the intensity 120 of the beam of light reflected therefrom.

In witness whereof, I have hereunto set my hand this 8th day of October, 1904.

CHARLES E. LORD.

Witnesses:

SANFORD KLEIN,
FRED J. KINSEY.