

No. 710,339.

Patented Sept. 30, 1902.

H. M. REICHENBACH.

APPARATUS FOR ANIMATED PHOTOGRAPHY.

(Application filed July 27, 1901.)

(No Model.)

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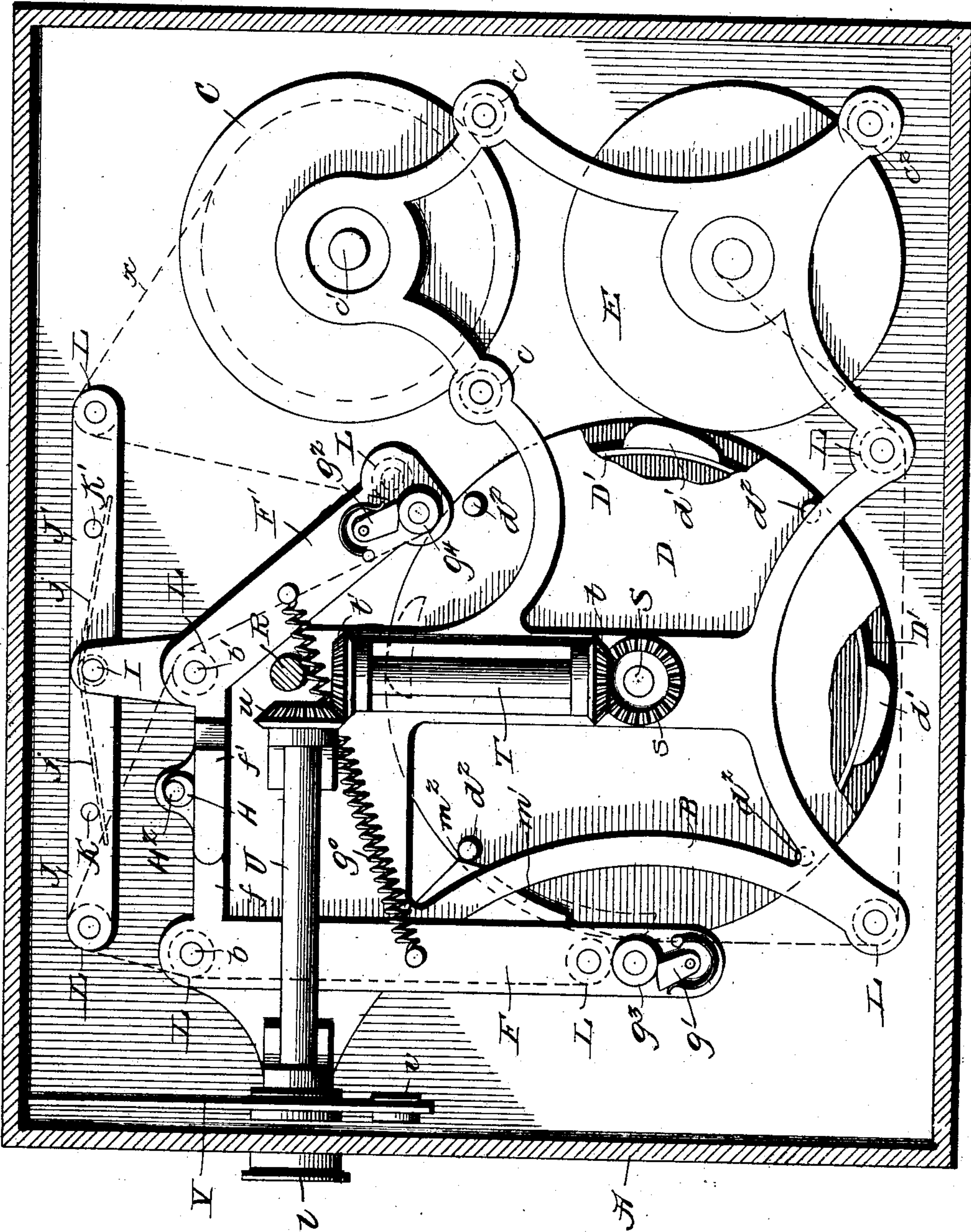


Fig. 1.

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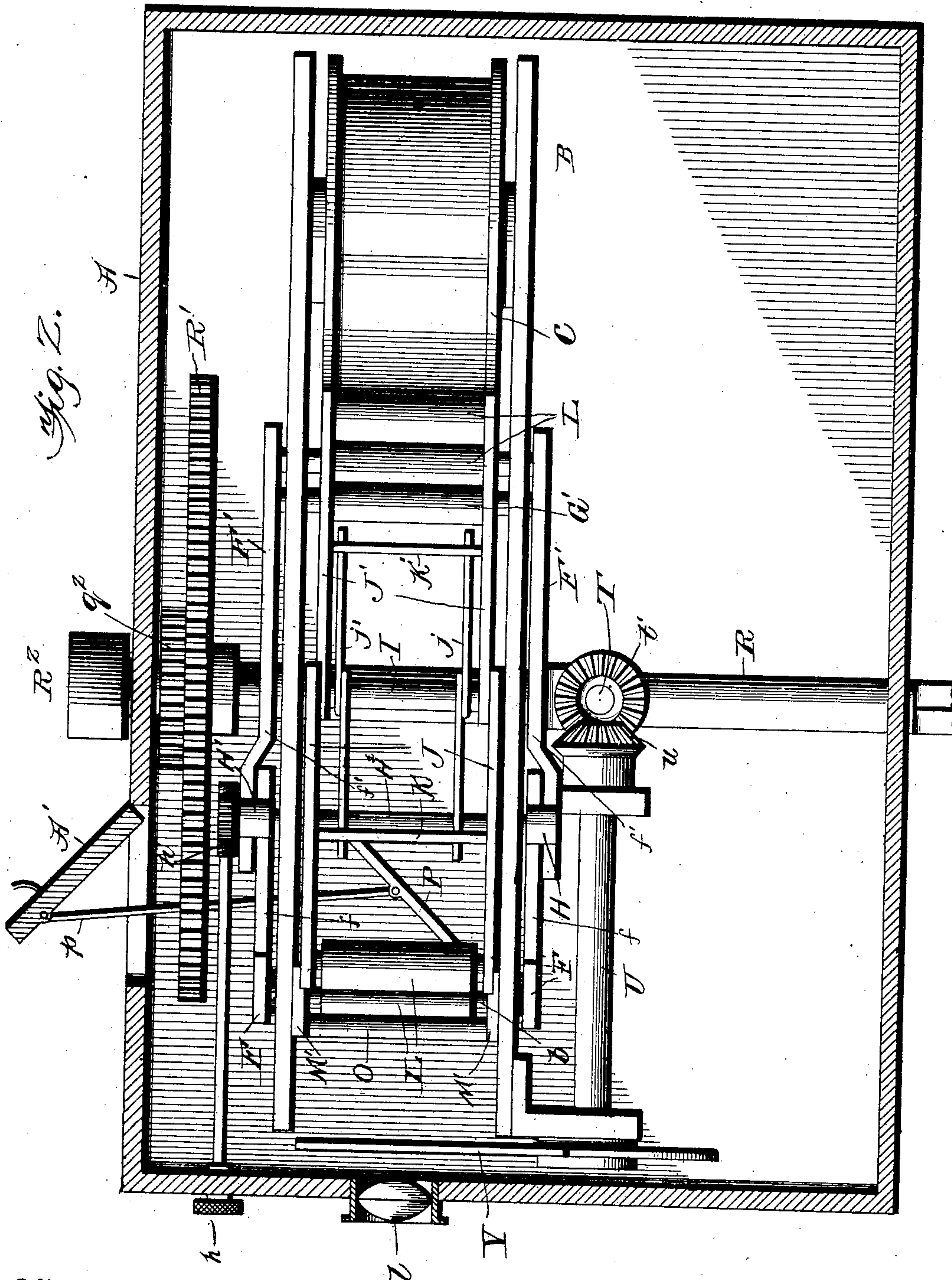
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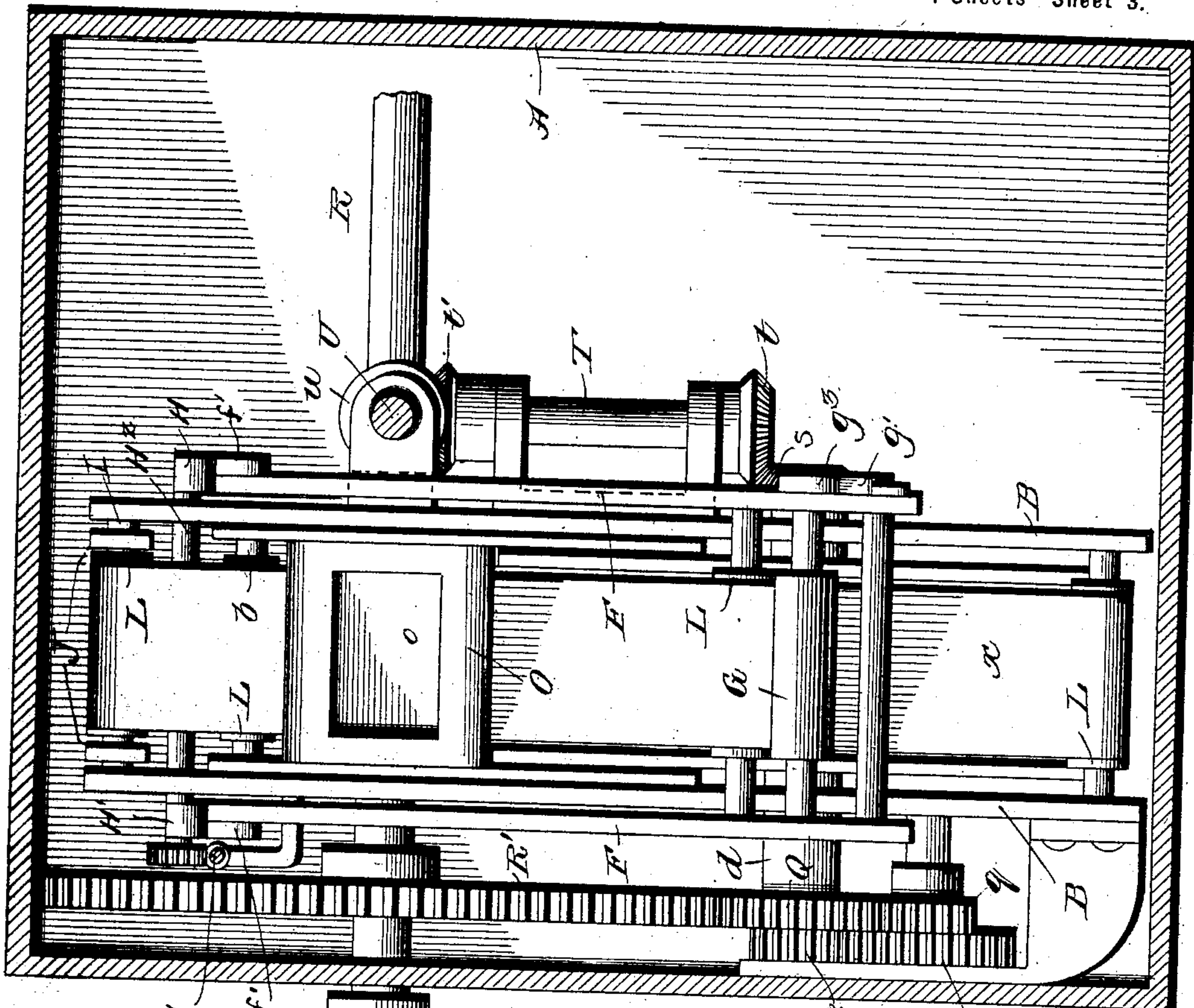


Fig. 3.

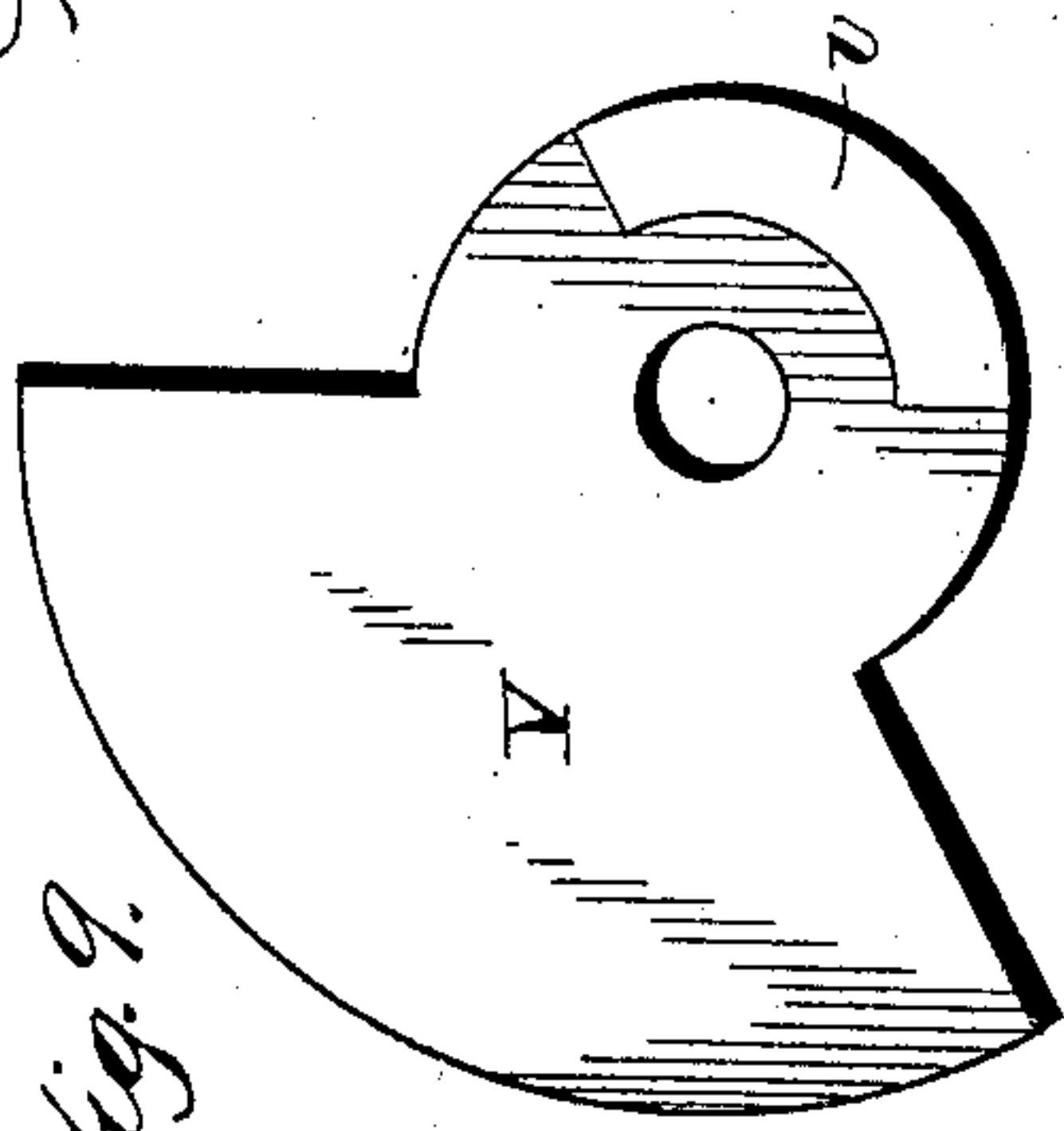


Fig. 9.

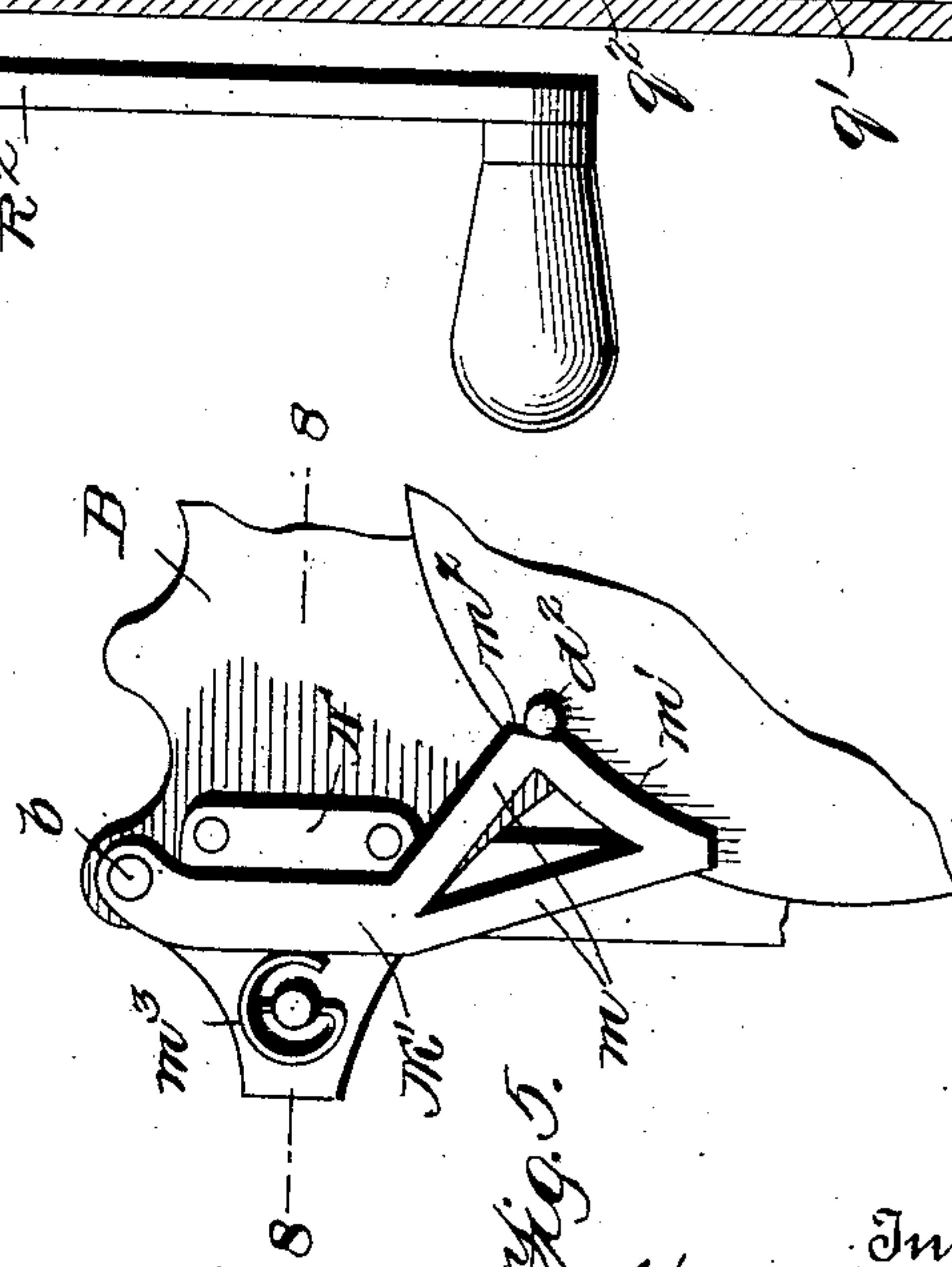


Fig. 5.

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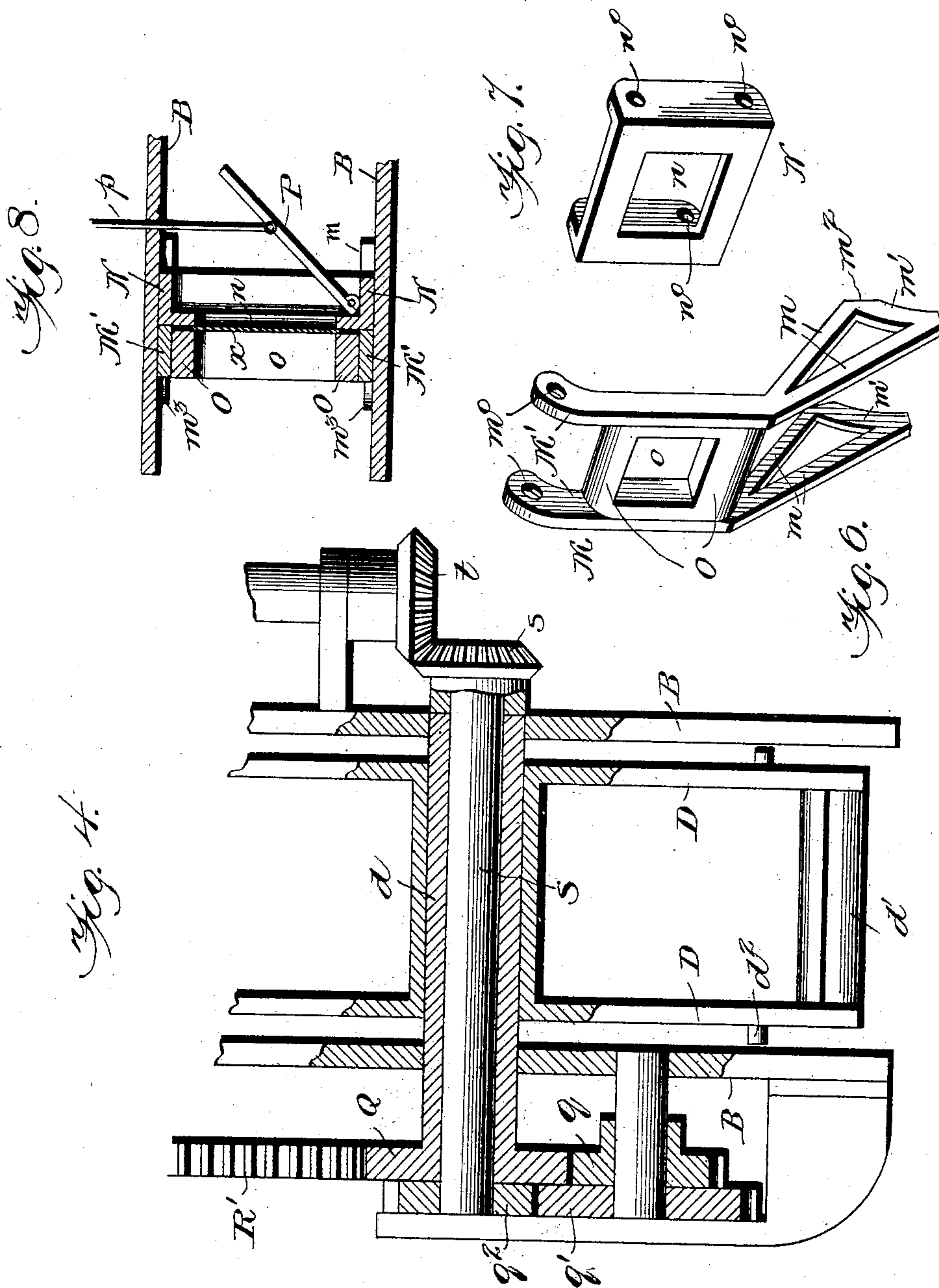
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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR ANIMATED PHOTOGRAPHY.

SPECIFICATION forming part of Letters Patent No. 710,339, dated September 30, 1902.

Application filed July 27, 1901. Serial No. 69,982. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY M. REICHENBACH, a citizen of the United States, residing at Dobbs Ferry, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Apparatus for Animated Photography; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in apparatus for animated photography, and is adapted either for the purpose of taking photographic impressions of moving objects or projecting said impressions successively on a screen or other object for producing an animated picture.

The principal feature of my invention consists in means and mechanism for successively exposing portions of a continuous film when the shutter is open, the tension on said film being so controlled and regulated during its advancement by an equalizing device as to insure a successive but more perfect advancement of the film for exposure.

To more particularly describe my improved apparatus, reference is had to the accompanying drawings, illustrating the same, in which—

Figure 1 represents a vertical sectional view of my improved camera, the operating mechanism being shown in side elevation. Fig. 2 is a horizontal section, the operating mechanism being shown in plan. Fig. 3 is a vertical section, the operating mechanism being shown in front elevation. Fig. 4 is a front elevation of the operating mechanism, partly in section, certain portions being omitted. Fig. 5 is a side elevation of the film-trap for clamping the film in position before the exposure-opening. Fig. 6 is a detail perspective view of the front section of the film-trap. Fig. 7 is a similar view of the back section. Fig. 8 is a sectional view on the line 8 8 of Fig. 5, the drum being omitted; and Fig. 9 is a front view of the shutter.

A is the box or casing.

B is a frame of suitable construction mounted in said casing for supporting the operating parts of the apparatus.

C is the dispensing-reel for the film, sup-

ported on the trunnion-rollers *c*, held against lateral movement by the frame B and from shifting otherwise by a pin passing through the opening *c'* or a lug formed on the sides of the reel.

Mounted in the frame on the sleeve *d* is a drum having its side faces D projecting beyond its annular surface D'. Between the projecting side faces D of the drum the annular surface D' is provided with a plurality of contact-strips *d'*, disposed transversely of the drum and having a rounded receding outer surface, the highest point of which lies in the arc of the side faces of the drum. The outer sides of the drum are provided with a plurality of lugs *d*<sup>2</sup>, properly distanced apart in respect of the transverse pieces *d'*.

E is the receiving-reel, revolubly supported by the trunnion-roller *c*<sup>2</sup> and the side faces D of the drum, and is prevented from shifting laterally or otherwise in a similar manner as the dispensing-reel C.

Fulcrumed on the outside of the frame B on suitable transverse rods *b b'* are two sets of bell-crank levers F F', in one of the arms of which are journaled the feed-rollers G and G', which rollers are adapted to successively engage with the rounded surface of the projections *d'* upon each revolution of the drum through the medium of the spiral spring *g*<sup>0</sup>, which is secured to the long arms F and F' of the levers at a proper distance from their fulcrums *b* and *b'*, thus equalizing the tension and securing an equal pressure of the feed-rollers against the rounded projections *d'* on the drum. These feed-rollers G G' are prevented from turning backward by the spring-operated dogs *g' g*<sup>2</sup>, which act on small disks *g*<sup>3</sup> *g*<sup>4</sup>, fast on the shafts passing through the feed-rollers G G'. The inward movement of the long arms of the levers is limited by the cams H and H', mounted on the shaft H<sup>2</sup> above the short arms *f f'* of the levers, and the short arms *f'* are bent, as shown most clearly in Fig. 2, to overlap the short arms *f*, so that the cams H and H' are in operative contact with the short arms of both sets of levers. The cams H and H' are operated for the purpose of adjustment by the milled cap *h* and worm gear and wheel *h'*, Fig. 2.

It is obvious that the cams H and H' may be so adjusted as to allow the feed-rollers G



and  $G'$  to engage with the rounded projections  $d'$  for but a portion of their length instead of traveling the whole rounded surface, and by this means a longer or shorter portion  
5 of the film may be advanced, as may be desired.

Pivoted to the rod  $I$ , mounted in the frame  $B$  above said levers  $G$  and  $G'$ , are the spring-operated arms  $J J'$ , held in a substantially  
10 horizontal position by the springs  $j j'$ , coiled around the rod  $I$ , their free ends engaging beneath the cross-rods  $K K'$  of the arms  $J J'$ . It is obvious, however, that any other kind of a spring connection might be substituted for  
15 the one above described. In the outer ends of these arms  $J J'$  are mounted the film-guiding rollers  $L$ , and similar guiding-rollers are mounted in various parts of the frame and operating mechanism. (Clearly shown in  
20 dotted lines in Fig. 1.) The path of travel of the film  $x$  is also shown in dotted lines in Fig. 1.

A film-trap (shown most clearly in Figs. 5 to 8) is mounted between the two sides of the  
25 frame  $B$  just back of the lens  $l$  of the camera. This film-trap is composed of two sections  $M$  and  $N$ , the outer section  $M$  consisting of two vertical side pieces  $M'$ , diverging inwardly at their lower ends into two separate strips  $m$ ,  
30 (for lightness of construction,) which strips  $m$  are connected at their ends by a curved piece  $m'$ , having the notched corner  $m^2$ . A box or frame  $O$ , provided with the aperture  $o$ , is secured between the two vertical uprights  
35  $M'$  of the front section  $M$  of the trap, and this front section  $M$  is pivotally supported on the transverse rod  $b$  by means of the apertures  $m^0$  in the uprights  $M'$ . The inner section  $N$  consists of a box or frame having the aper-  
40 ture  $n$ , adapted to aline with the aperture  $o$  in the front section  $M$ . This box or frame  $N$  is bolted to the frame  $B$  through the bolt-holes  $n^0$ , or it may be otherwise suitably affixed to the frame  $B$ .

45 The inner faces of the boxes or frames  $O$  and  $N$  are adapted to engage and clamp the film  $x$ , which passes between them, the film being released in a manner to be hereinafter described, the outer section  $M$  of the trap be-  
50 ing held against the film by a suitable spring  $m^3$ , secured to the frame  $B$ .

To the inside of the box or frame  $N$  is hinged in any suitable manner the mirror  $P$ , which is connected by a rod  $p$  to a door  $A'$   
55 in the casing  $A$ . When the camera is to be used for projecting purposes, the door  $A'$  is opened and the light projected on the mirror  $P$ , which in turn reflects the light through the apertures in the film-trap through the  
60 lens  $l$  and onto the screen.

The sleeve  $d$ , on which the drum  $D$  is mounted, is provided with a gear-wheel  $Q$ , meshing with the gear  $R'$ , mounted on the  
65 shaft  $R$ , which extends transversely through and is journaled in the sides of the casing  $A$ . The shaft  $R$  is squared off at its ends to receive a crank  $R^2$ , or any other suitable driv-

ing means, such as a pulley and belt, might be substituted for the crank.

The gear  $R'$ , through the intermediate 70 gears  $Q q q' q^2$ , also revolves the shaft  $S$ , which passes through the sleeve  $d$  and carries the bevel-gear  $s$ , meshing with the bevel-gear  $t$  on the vertical shaft  $T$ . The vertical shaft  $T$  is provided at its upper end with the 75 bevel-gear  $t'$ , meshing with the bevel-gear  $u$  on the end of the horizontal shaft  $U$ , carrying at its other end the shutter, the major portion of which is cut away, the remaining  
80 portion  $V$  being adapted to shut off the light after the exposure and while a new portion of the film is being advanced. The shutter is provided with the counterbalancing-weight  $v$ .

The operation of the camera is as follows: Motion is imparted to the gear-wheel  $R'$  by 85 the crank  $R^2$  or other suitable driving mechanism, which in turn, through the intermediate gear-wheels  $Q q q' q^2$ , revolves the drum  $D$  and shaft  $S$ , the gearing being so ad-  
90 justed as to revolve the shaft  $S$  four times as fast as the drum. The shaft  $S$ , through the interposition of the bevel-gears  $s t$ , upright shaft  $T$ , bevel-gears  $t'$  and  $u$ , and horizontal shaft  $U$ , revolves the shutter  $V$  at a speed  
95 four times as great as that of the drum, so that for every revolution of the drum the shutter admits of the exposure of four portions of the film. While one portion of the film is being exposed one of the rounded pro-  
100 jections  $d'$  on the drum engages the feed-roller  $G'$ , which draws from the dispensing-reel  $C$  a portion of the film, the arms  $J'$  of the film-tension device being tilted down-  
105 wardly by the pull of the film and correspondingly tilting the other arms  $J$  upwardly by reason of the springs  $j j'$ , thus taking up the  
110 slack in the film which would otherwise occur between the roller  $G'$  and the arms  $J$ . This occurs while one portion of the film is being exposed. Immediately after the ex-  
115 posure, while the shutter is closed, one of the lugs  $d^2$  on the drum engages the notched corner  $m^2$  of the section  $M$  of the film-trap, thus separating the two sections  $M N$ , allowing the  
120 film to pass through, and at the same moment that the lug  $d^2$  engages the film-trap the rounded projection  $d'$  immediately pre-  
125 ceding the one which has just acted on the feed-roller  $G'$  engages the feed-rollers  $G$ , advancing downwardly through the film-trap a  
130 portion of the film equal to that just drawn off the dispensing-reel  $C$ . Immediately the lug  $d^2$  passes out of engagement with the notch  $m^2$  the spring  $m^3$  forces the section  $M$  back against the film and clamps the same in  
135 position, when the next exposure is made. The receiving-reel  $E$ , being in frictional contact with the drum  $D$ , winds up the film as it is advanced through the film-trap.

It is obvious that many modifications might 130 be made in the details of construction of the apparatus without departing from the spirit of my invention.

Having thus described my invention, what



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

1. In an apparatus for animated photography, the combination with a lens, a dispensing and a receiving film-reel, of means interposed between said reels, alternately engaging and advancing portions of the film on opposite sides of the lens, said means when engaging the film on one side of the lens being out of engagement with the film on the opposite side of the lens.

2. In an apparatus for animated photography, the combination with a lens, a dispensing and a receiving film-reel, of means interposed between said reels, alternately engaging and advancing portions of the film on opposite sides of the lens, said means when engaging the film on one side of the lens being out of engagement with the film on the opposite side of the lens, and means for regulating the period of engagement between said interposed means and film on opposite sides of the lens, for controlling the advancement of the film in predetermined lengths.

3. In an apparatus for animated photography, the combination with a lens, a dispensing and a receiving film-reel, of a rotatable disk interposed between said reels, and means on said disk alternately engaging and advancing at different intervals, portions of the film on opposite sides of the lens in predetermined lengths.

4. In an apparatus for animated photography, the combination with a lens, a dispensing and a receiving film-reel, of a rotatable disk interposed between said reels and provided with projections around the periphery thereof alternately engaging and advancing portions of the film on opposite sides of the lens, and means for regulating the engagement between said projections and film for controlling the advancement of said film.

5. In an apparatus for animated photography, the combination with a lens, a dispensing and a receiving film-reel, of a rotatable disk interposed between said reels alternately engaging and advancing portions of the film on opposite sides of the lens, a lever mounted in proximity to said disk provided with a feed-roller adapted to press the film against said disk, and means for limiting the contact between said film and disk for controlling the advancement of said film.

6. In an apparatus for animated photography, the combination with a lens, a dispensing and a receiving film-reel, of a rotatable disk interposed between said reels alternately engaging and advancing portions of the film on opposite sides of the lens, a bell-crank lever mounted in proximity to said disk provided with a feed-roller adapted to press the film against said disk, and a cam operating on one of the arms of said bell-crank lever for limiting the inward movement of said feed-roller.

7. In an apparatus for animated photography, the combination with a lens, a dispens-

ing and a receiving film-reel, of a rotatable disk interposed between said reels provided with a plurality of projections around the periphery thereof alternately engaging and advancing portions of the film on opposite sides of the lens, a lever mounted in proximity to said disk provided with a feed-roller adapted to press the film against said projections, and means for limiting the contact between said film and projections for controlling the advancement of said film.

8. In an apparatus for animated photography, the combination with a dispensing and a receiving film-reel, of a rotatable drum interposed between said reels provided with a plurality of peripherally-tapering projections, a pair of rollers adapted to engage said projections, pivotally mounted in proximity to said drum, means for holding said rollers in frictional contact with said projections, and means for limiting the inward movement of said rollers.

9. In an apparatus for animated photography, the combination with a dispensing and a receiving film-reel, of a rotatable drum interposed between said reels, provided with a plurality of rounded projections around the periphery thereof, a pair of frames carrying rollers engaging said projections pivotally mounted in proximity to said drum, a spring connection between said pivoted frames, and a cam engaging said frames for limiting their inward movement.

10. In an apparatus for animated photography, the combination with a dispensing and a receiving film-reel, of a rotatable drum interposed between said reels, provided with a plurality of rounded projections around the periphery thereof, a pair of bell-crank levers mounted in proximity to said drum, feed-rollers mounted in one set of arms of said levers, adapted to engage said projections, dogs limiting the backward movement of said rollers, and a cam operating on the other arms of said levers for limiting the inward movement of said rollers.

11. In an apparatus for animated photography, the combination with a dispensing and a receiving film-reel and means for advancing the film, of an equalizing device for taking up the slack in said film, comprising a pair of pivoted arms carrying rollers in their free ends over which the film passes and a spring in engagement with said arms for operating one of said arms when the other is moved from its normal position.

12. In an apparatus for animated photography, the combination with a dispensing and a receiving reel and means for advancing the film, of an equalizing device comprising a pair of oppositely-disposed pivoted frames having rollers journaled in their free ends over which the film passes, and a spring in engagement with said frames for operating the opposite frame when one of said frames is moved out of its normal position.

13. In an apparatus for animated photog-



raphy, the combination with a lens, a dispensing and a receiving film-reel and means interposed between said reels for alternately engaging and advancing portions of the film on opposite sides of the lens in predetermined lengths, of means for equalizing the tension on said film during its advancement before exposure, comprising a pair of oppositely-disposed spring-operated pivoted frames having rollers in their free ends over which the film passes.

14. In an apparatus for animated photography, the combination with a lens, a dispensing and a receiving film-reel, of a rotatable disk interposed between said reels adapted to engage and advance portions of the film on opposite sides of the lens, means for regulating the engagement between said disk and film permitting longer or shorter portions of the film to be advanced, and means for equalizing the tension on said film comprising a pair of spring-operated pivoted frames provided with rollers over which the film passes.

15. In an apparatus for animated photography, the combination with a lens, a dispensing and a receiving film-reel, of a rotatable drum interposed between said reels, levers mounted in proximity to said drum provided with feed-rollers adapted to alternately press the film in engagement with said drum on opposite sides of the lens, means for limiting the engagement of said film and drum for controlling the advancement of said film, and a pair of spring-operated arms provided with rollers engaging said film for regulating the tension on said film during its advancement.

16. In an apparatus for animated photography, the combination with a dispensing and a receiving film-reel, of a rotatable drum interposed between said reels, provided with a plurality of projections around the periphery thereof, a lever mounted in proximity to said drum provided with a feed-roller adapted to press the film against said projections, means for limiting the engagement between said film and projections for controlling the advancement of said film, and a pair of spring-operated arms provided with rollers engaging said film for regulating the tension on said film during its advancement.

17. In an apparatus for animated photography, the combination with a lens, a dispensing and a receiving film-reel, of a rotatable drum interposed between said reels provided with a plurality of projections around the periphery thereof for alternately engaging and advancing portions of the film on opposite sides of the lens, a pair of bell-crank levers carrying rollers in one of their arms adapted to press the film against said projections, a cam operating on the other arms of said bell-crank levers limiting the inward movement of said rollers for controlling the advancement of said film, and a pair of spring-operated pivoted arms for regulating the tension on said film during its advancement.

18. In an apparatus for animated photog-

raphy, the combination with a lens, a dispensing and receiving film-reel, of a rotatable drum interposed between said reels, means on said drum for alternately engaging and advancing at different intervals portions of the film on opposite sides of the lens in predetermined lengths, a film-trap adapted to engage and clamp the film before the lens when open, and means on said drum for opening said film-trap after exposure.

19. In an apparatus for animated photography, the combination with a lens, a dispensing and a receiving film-reel, of a rotatable drum interposed between said reels, means on said drum for alternately engaging and advancing at different intervals portions of the film on opposite sides of the lens, means for equalizing the tension on said film during its advancement, a film-trap located in proximity to said drum, for clamping said film during its advancement, and means for exposing said film when clamped.

20. In an apparatus for animated photography, the combination with a lens, a dispensing and a receiving film-reel, of a rotatable drum interposed between said reels, means on said drum for alternately engaging and advancing at different intervals portions of the film on opposite sides of the lens in predetermined lengths, means for equalizing the tension on said film during its advancement, comprising a pair of spring-operated frames over which the film passes, a film-trap adapted to engage and clasp the film before the lens when open, and means on said drum for opening said film-trap after exposure.

21. In an apparatus for animated photography, the combination with a lens, a dispensing and a receiving film-reel, of a drum interposed between said reels provided with projections around the periphery thereof adapted to engage and advance portions of the film on opposite sides of the lens, means for regulating the engagement between said projections and film for controlling the advancement of said film, means for equalizing the tension on said film during its advancement, and a film-trap for clamping said film before the lens during each successive advancement.

22. In an apparatus for animated photography, the combination with a dispensing and a receiving film-reel, of a film-advancing drum provided with a plurality of rounded projections around the periphery thereof, a pair of rollers adapted to press the film in engagement with said projections pivotally mounted in proximity to said drum, means for controlling the advancement of said film between said rollers and said rounded projections, means for equalizing the tension on said film during its advancement, a film-trap comprising two sections for clamping said film before the exposure-opening when open, and means on said drum engaging one section of said film-trap for opening the same against a spring tension, substantially as described.

23. In an apparatus for animated photog-



raphy, the combination with the box or casing, the lens, and the film and film-advancing means, of a mirror pivotally supported behind said film, a door in said casing, and a connection between said door and mirror for simultaneously adjusting said mirror behind the lens and admitting of the projection of light on the mirror.

24. In an apparatus for animated photography, the combination with a lens, a dispensing and a receiving film-reel, a drum alternately engaging and advancing portions of the film on opposite sides of the lens in pre-

determined lengths, a film-trap adapted to engage and clamp the film before the lens when open, means on said drum for opening said film-trap after exposure, and a mirror behind said film-trap for projecting light through the film when the lens is open. 15

In testimony whereof I affix my signature 20  
in presence of two witnesses.

HENRY M. REICHENBACH.

Witnesses:

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CHARLES I. ROSKOPH.