

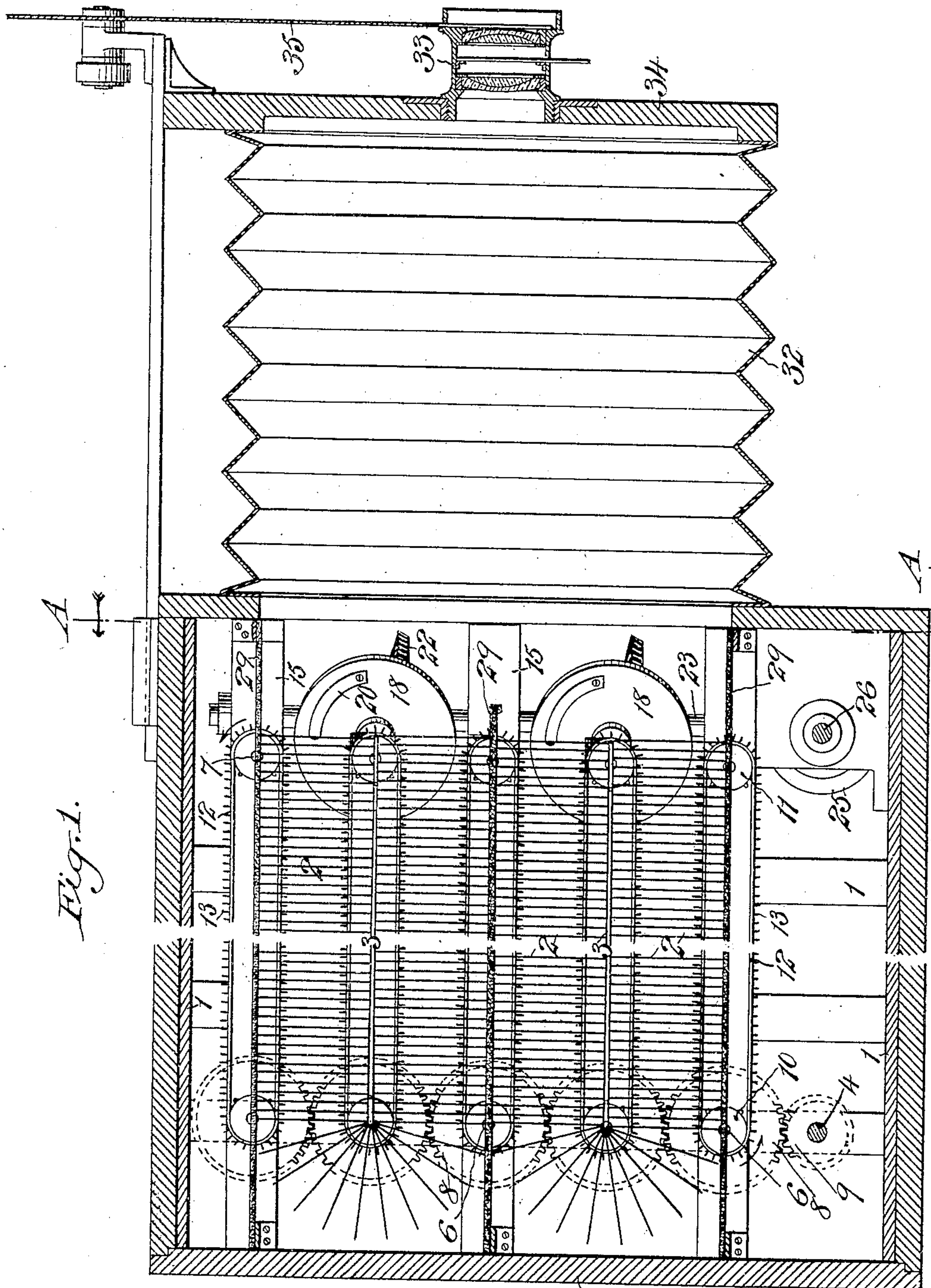
No. 815,584.

PATENTED MAR. 20, 1906.

H. A. FARRAND.
CAMERA.

APPLICATION FILED OCT. 6, 1904.

4 SHEETS—SHEET 1.



Witnesses:
J. George Barry
Henry Thiele.

Inventor:
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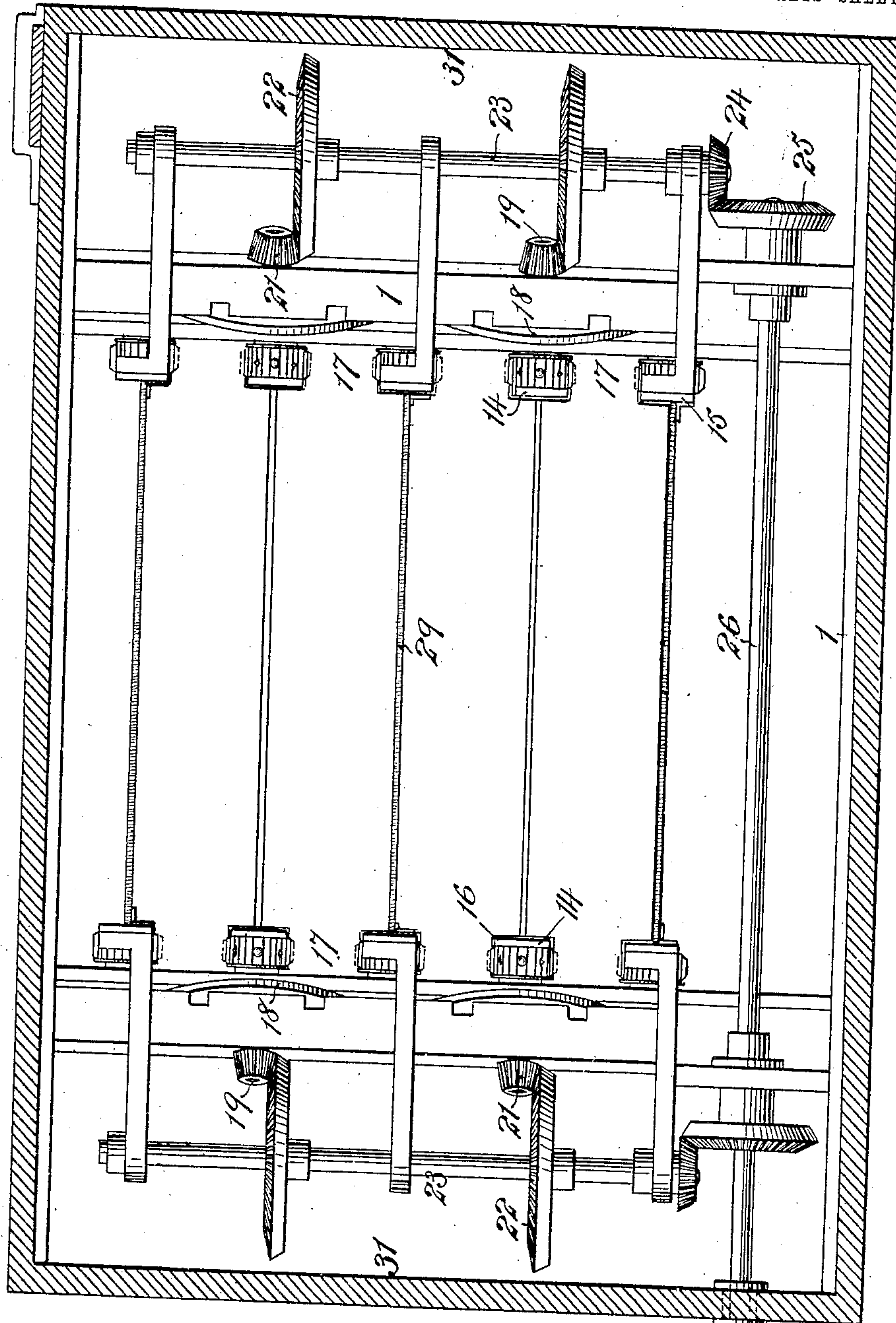
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4 SHEETS—SHEET 2.

Fig. 2.



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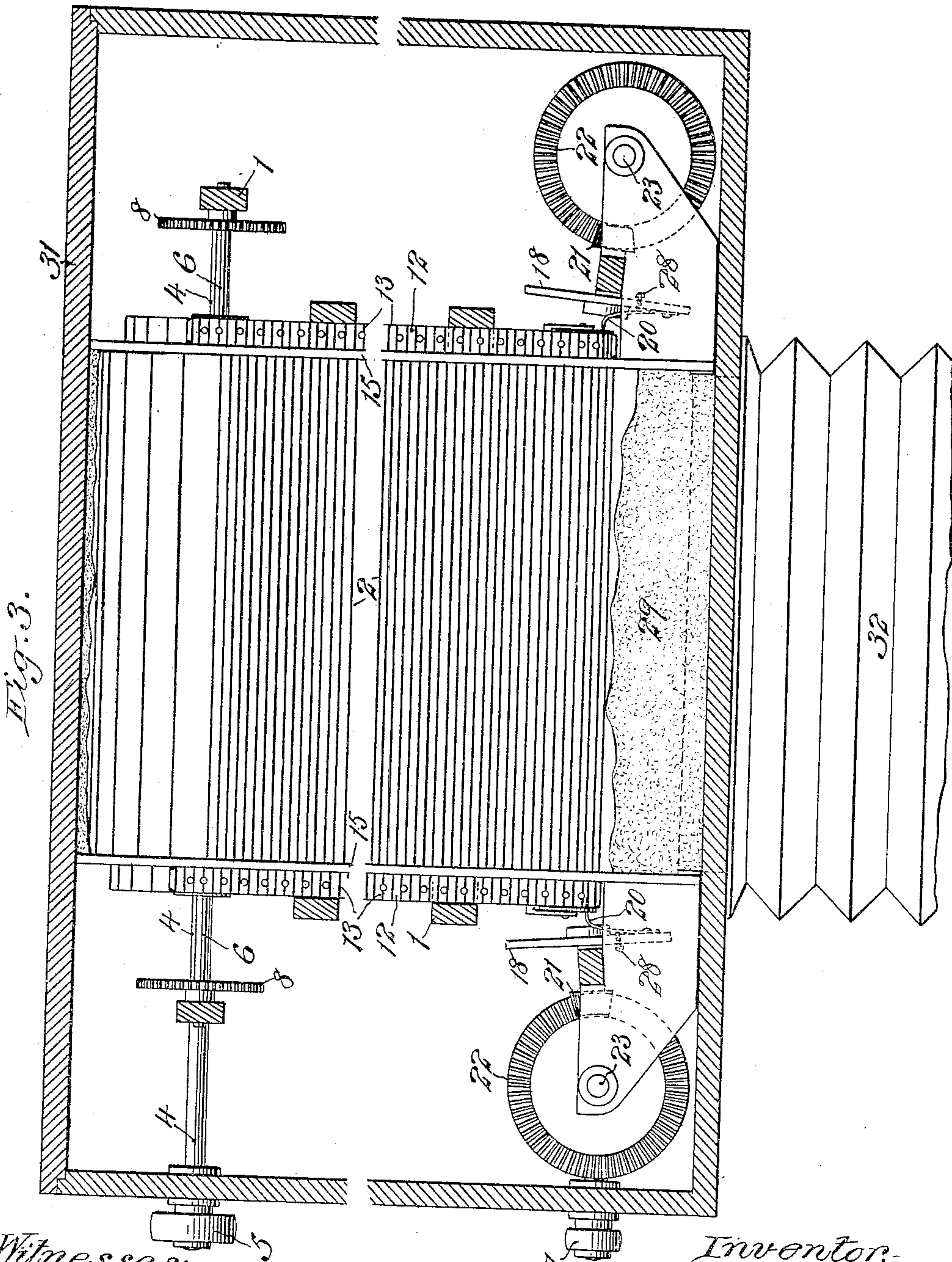
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

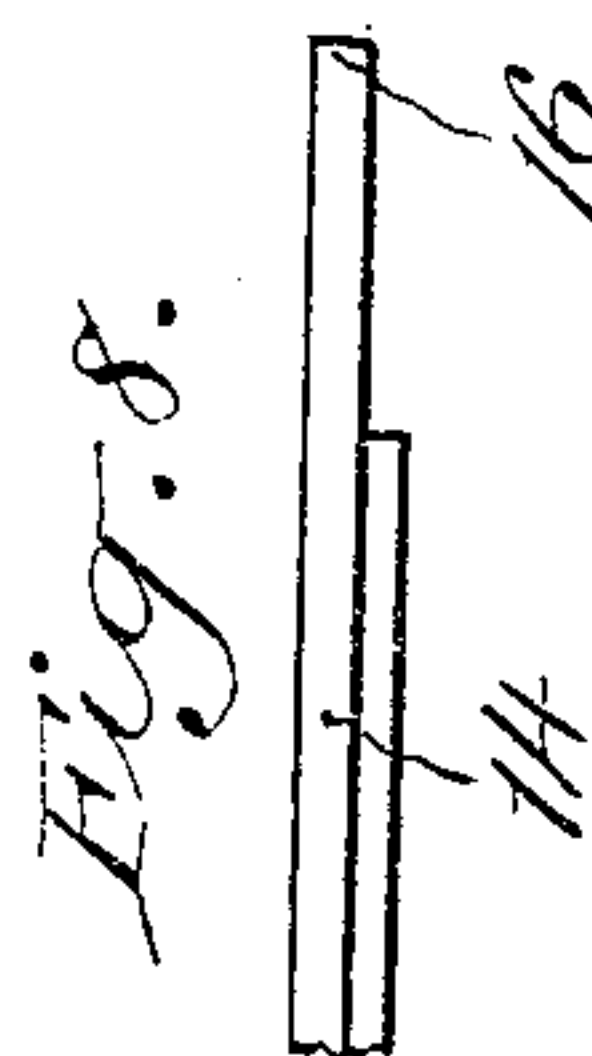
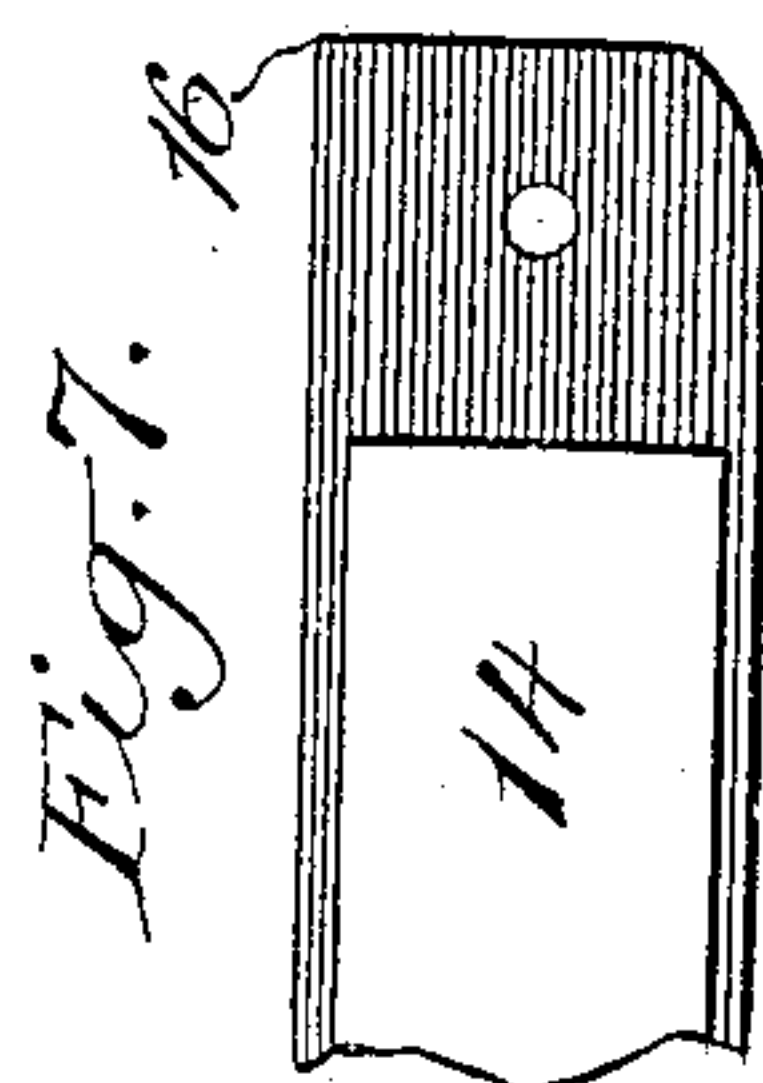
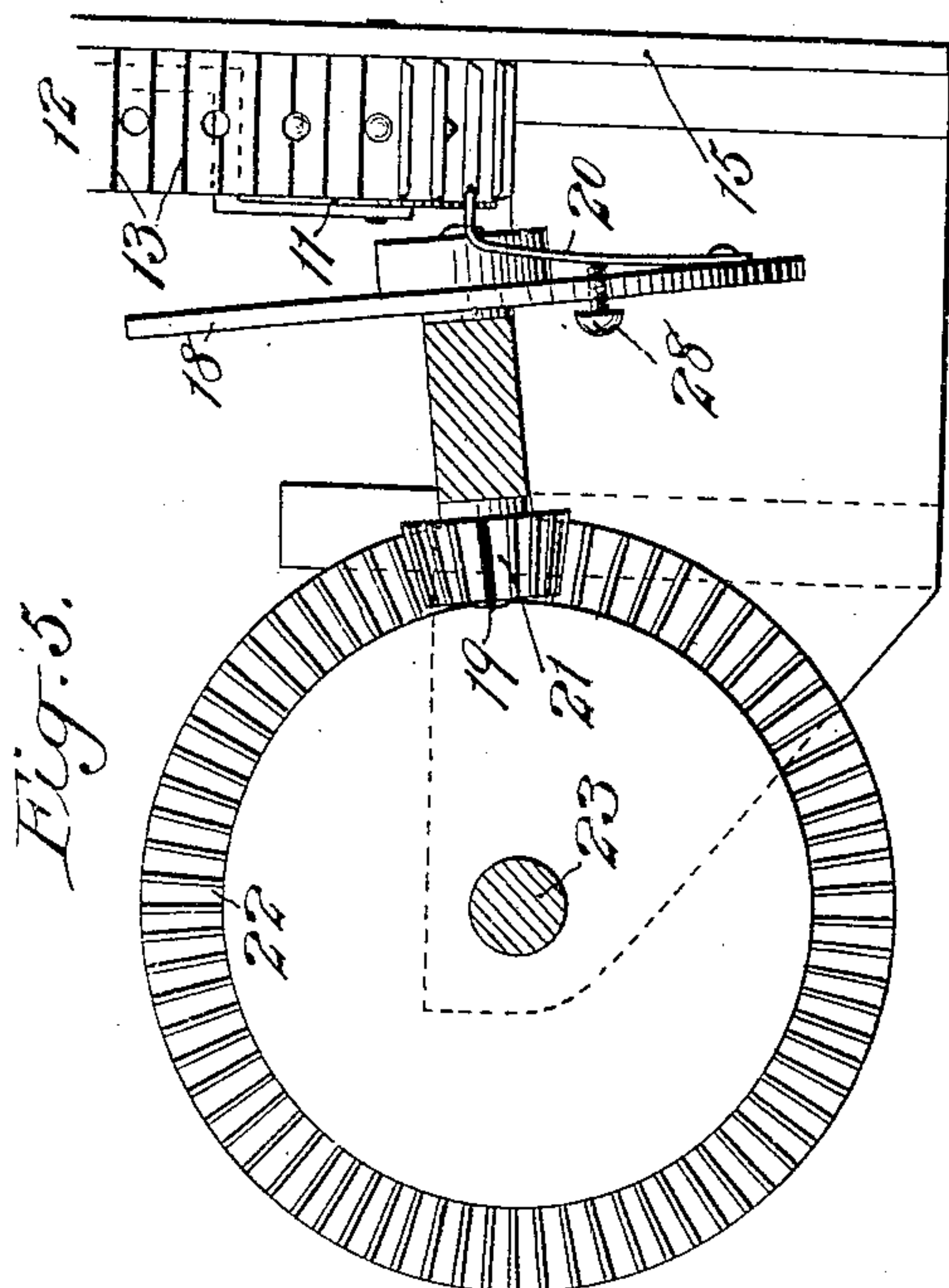
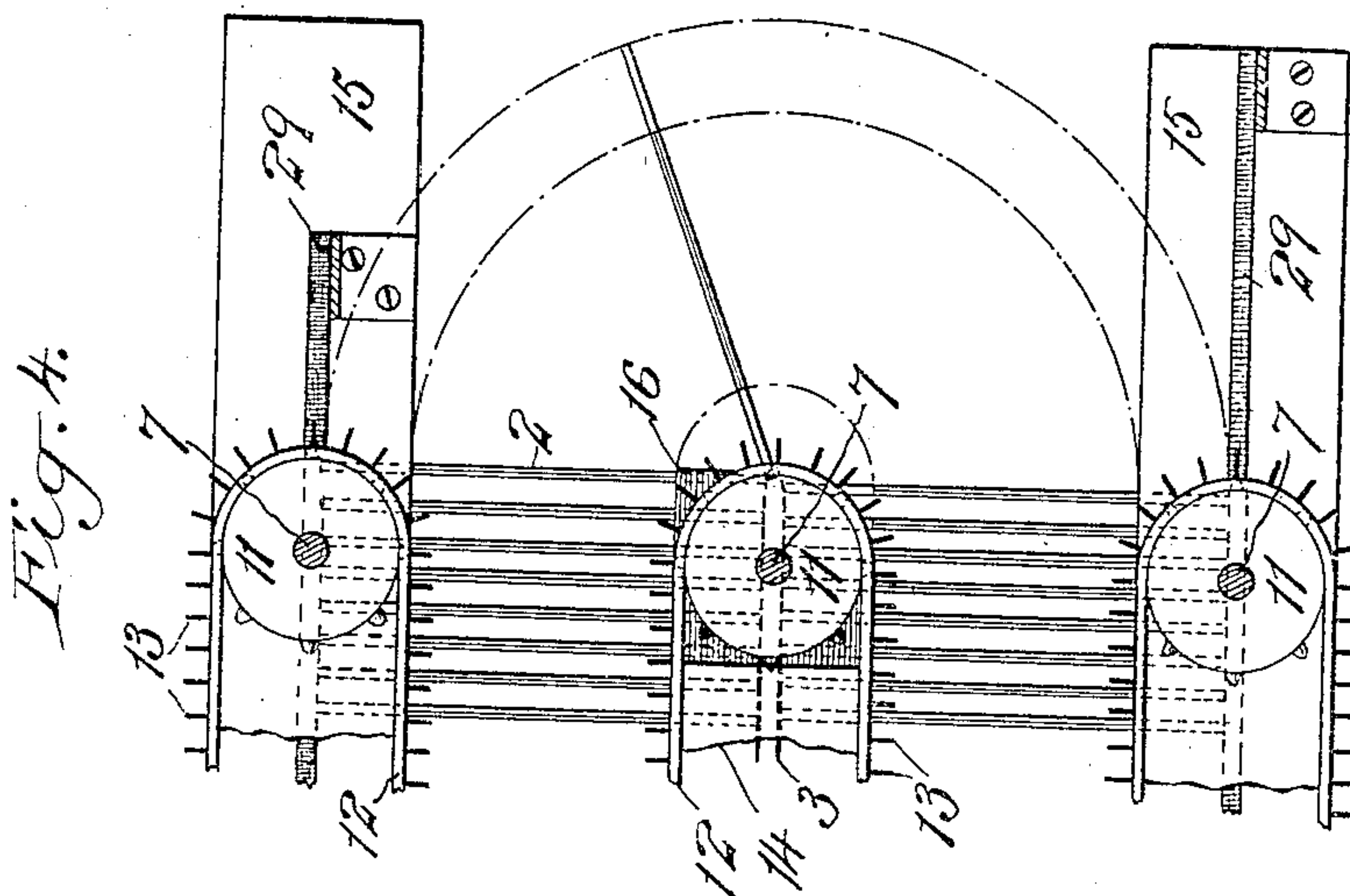
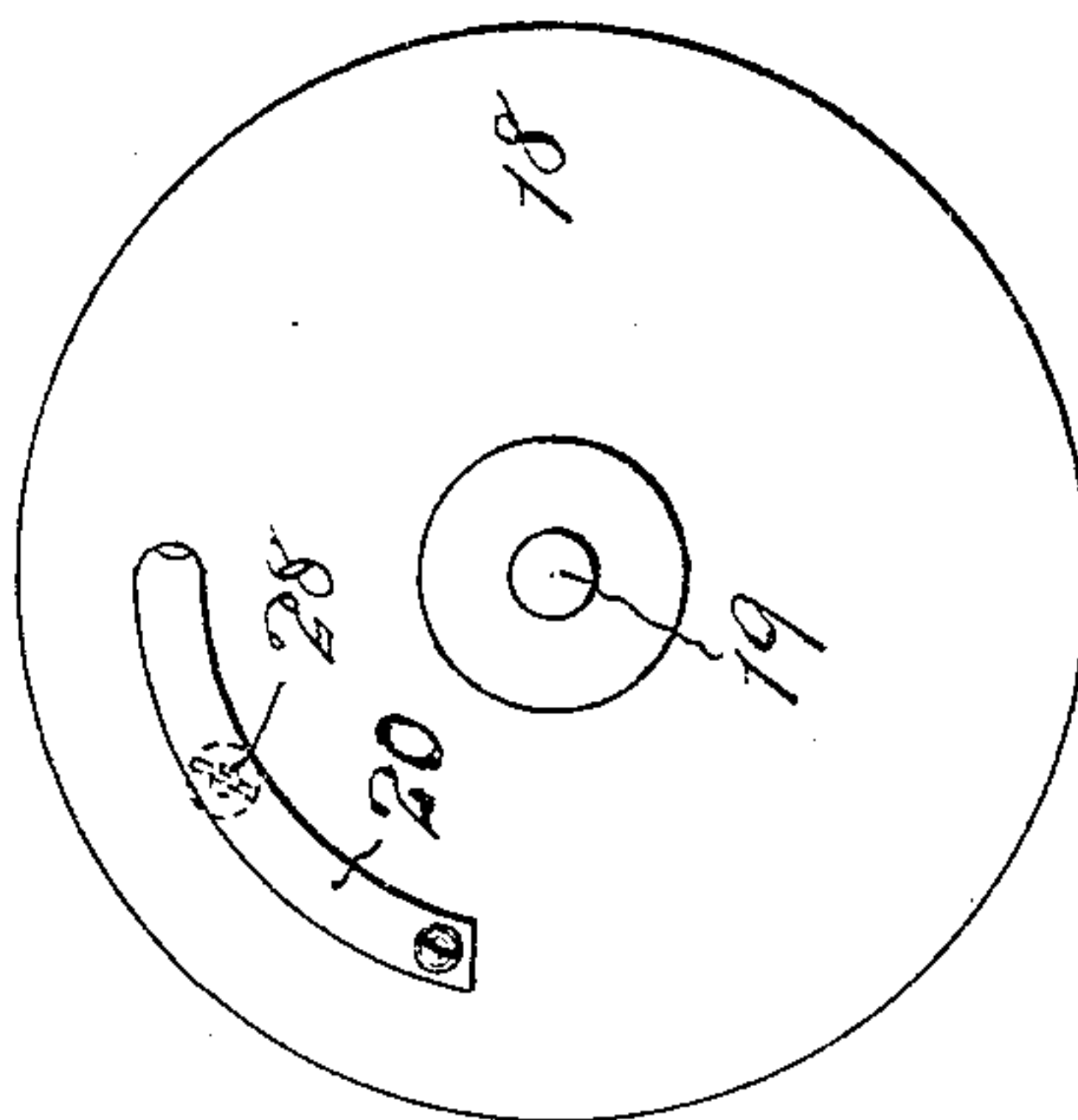


Fig. 6.



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UNITED STATES PATENT OFFICE.

HIRAM A. FARRAND, OF NEW YORK, N. Y.

CAMERA.

No. 815,584.

Specification of Letters Patent.

Patented March 20, 1906.

Application filed October 6, 1904. Serial No. 227,380.

To all whom it may concern:

Be it known that I, HIRAM A. FARRAND, a citizen of the United States, and a resident of the borough of Manhattan, in the city and State of New York, have invented a new and useful Improvement in Cameras, of which the following is a specification.

The object of this present invention is to provide an apparatus in which a plurality of sensitized flat surfaces—such, for instance, as cards having sensitized surfaces—may be brought into and out of an exposure-plane for the purpose of having pictures imprinted thereon.

A further object is to provide an apparatus in which a plurality of series of these cards with sensitized surfaces may be brought into and out of an exposure-plane.

This apparatus is primarily intended for use in the production of negatives intended to be treated for future use in apparatus for producing moving pictures—such, for example, as that shown in my copending application entitled "Apparatus for producing moving pictures," filed September 29, 1904, Serial No. 226,530.

In the accompanying drawings, Figure 1 represents my improved apparatus as applied to a camera, the view being taken in longitudinal vertical section. Fig. 2 is a transverse vertical section taken in the plane of the line A A of Fig. 1 looking in the direction of the arrow. Fig. 3 is a top plan view of my apparatus, the camera-box being shown in section. Fig. 4 is an enlarged detail view, in longitudinal vertical section, showing one of the cards which bear the sensitized surfaces in a position intermediate its upper and lower portions. Fig. 5 is an enlarged detail view of the means for accelerating the reversing movement of the cards. Fig. 6 is a detail face view of one of the accelerator disks or wheels. Fig. 7 is an enlarged view, in side elevation, of the front end of one of the card-supporting bars; and Fig. 8 is a top plan view of the same.

The camera which I have shown herein comprises a rear box portion 31, a bellows portion 32, and a lens-casing 33 in the front 34. A shutter 35 is driven from any suitable source of power (not shown) at the required speed.

This invention contemplates the use of a plurality of series of cards having sensitized front and back surfaces, which cards are so arranged that corresponding cards of the dif-

ferent series may be brought into a common plane to expose the sensitized surfaces. It is also intended that the cards may be continuously moved into and out of the exposure-plane, so as to take a succession of impressions upon their sensitized surfaces for the purposes of developing and reproducing moving-picture effects. Means are also provided for accelerating the reversing movement of each card.

Two series of cards having sensitized front and back surfaces are represented in the accompanying drawings; but it is to be understood that a greater number of series may be employed as required.

A suitable framework 1 is located within the rear portion 31 of the camera, which framework is arranged to support the two series of cards provided with sensitized surfaces, as will be hereinafter described.

The cards are denoted by 2 and are provided with sensitized surfaces on their fronts and backs for the purpose of receiving the impression of the object or objects which it is desired to imprint thereon. These cards are permanently secured at their inner ends to an endless band 3 of flexible material at the proper distances apart.

The main drive-shaft 4 is suitably mounted transversely across the apparatus at the rear thereof, which shaft is provided exterior to the camera-box with a pulley 5, through which rotary movement may be imparted to the shaft at the desired speed from any suitable source of power. (Not shown herein.) A back series of stud-shafts 6 is mounted in each side of the framework at the rear of the apparatus, and a corresponding vertical series of front stud-shafts 7 is mounted in the framework at each side of the front of the apparatus. Each vertical back series of shafts 6 is geared together by gearing 8, so that each shaft rotates in the opposite direction to its adjacent shaft and at the same speed. The lowermost gear 8 meshes with a gear 9 on the drive-shaft 4. Each pair of front and back side shafts 6 and 7 in the same horizontal plane is provided with a sprocket 10 on the rear shaft and a sprocket 11 on the front shaft. The endless belt 12 passes around the sprockets 10 and 11, which belt is provided with a plurality of teeth 13, spaced the same distance apart as the cards 2 on the band 3. It will thus be seen that the teeth on the adjacent sides of two adjoining belts travel in the same direction—rear-

wardly, for instance—while the adjacent teeth on a third belt and one of the above-named belts will travel in the reverse direction. These teeth on the belts 12 serve to bring successive
 5 cards into a predetermined plane for exposing the sensitized surfaces on the fronts of the cards, release the cards, permitting them to fall to expose the sensitized surfaces on the backs of the cards, and then move the
 10 cards back out of the plane. This is accomplished as follows: Horizontal guide-bars 14 and 15 are secured to the sides of the framework 1 of the apparatus and extend from the back to the front of the same. The guide-
 15 bars 15 alternate with the guide-bars 14 and project a considerable distance to the front of their adjacent sprockets 11.

The front ends of the guide-bars 14 have sharp corners 16 in a vertical line with the
 20 fronts of their adjacent sprockets 11. The cards themselves are provided with reduced ends 17, which project into the space between each pair of horizontal guide-bars 14 15. The cards in the upper group of cards when
 25 released will rest at their ends upon the top of the short guide-bar 14, and the reduced ends of the cards of the lower group of the same series will rest upon the top of the long
 30 guide-bar 15, just below the guide-bar 14, above referred to. It will thus be seen that the weight of the cards is taken upon the guide-bars and not upon the belts which move the cards into and out of the plane.

The abrupt corners 16 at the front ends of
 35 the short guide-bars 14 are so arranged that when a card has been brought into the exposure-plane its reduced ends will be shoved off from engagement with the two short guide-bars which supported the card as the
 40 card was moved forward, thus permitting the card to fall from a front position in the upper group to a front position in the lower group of its series.

I have provided means for accelerating the
 45 dropping of the front card in the upper group of each series, so as to prevent a blurred effect on the front sensitized surface of the card when the apparatus is used for taking moving pictures, which means is constructed, arranged, and operated as follows:
 50 Upon each side of the apparatus, adjacent to the front ends of the short guide-bars 14, I mount accelerator disks or wheels 18, on short shafts 19, at a slight angle to the shafts
 55 7, on which the sprockets 11 are mounted. On the face of each disk or wheel 18 I provide a card-engaging finger 20, the end of which is brought back of the front card of the upper group of a series as the card
 60 reaches a position to drop. This wheel or disk is rotated at a predetermined speed with respect to the movement of the card-moving belt 12, so that the finger 20 will rapidly swing the card down into position to be en-
 65 gaged by the proper teeth to be moved rear-

wardly out of the exposure-plane. The shafts 19 of the accelerators are provided with bevel-gears 21, which mesh with bevel-gears 22 on a vertical shaft 23. The lower
 70 ends of the vertical shafts are provided with bevel-gears 24, which mesh with bevel-gears 25 on a horizontal cross-shaft 26. One end of this cross-shaft extends through the camera-box and is provided with a pulley 27,
 75 which may be driven at the high speed desired from a suitable source of power. (Not shown herein.) The finger 20 on the accelerator-disk 18 may be accurately adjusted, so as to engage the card at the right time by
 80 means of a screw 28.

To prevent the sensitized surfaces from becoming light-struck by the passage of light around the free edges of the cards, I provide a plurality of horizontal partitions 29—as, for instance, flat strips which engage the free
 85 edges of the said cards.

What I claim is—

1. An apparatus having a series of cards provided with sensitized fronts and backs and means for successively moving the cards
 90 into an exposure-plane, reversing the cards and moving them out of the plane.

2. An apparatus having a series of cards provided with sensitized fronts and backs, means for successively moving the cards into
 95 an exposure-plane, reversing the cards and moving them out of the plane and means for accelerating the reversing movement of the cards.

3. An apparatus having a plurality of separate sensitized flat surfaces forming a continuous common exposure-plane and means for moving the surfaces into and out of the
 100 said exposure-plane.

4. An apparatus having a plurality of series of flat sensitized surfaces the corresponding surfaces of the several series forming a continuous common exposure-plane and means for moving the corresponding surfaces
 105 of the different series into and out of the said exposure-plane.

5. An apparatus having a plurality of series of cards provided with sensitized surfaces the corresponding cards of the several series forming a continuous common exposure-plane and means for moving the corresponding cards of the different series into and
 110 out of the said exposure-plane.

6. An apparatus having a plurality of series of cards provided with sensitized surfaces and means for simultaneously moving corresponding cards of the several series into
 120 an exposure-plane, reversing them and moving them out of said plane.

7. An apparatus having a plurality of series of cards provided with front and back sensitized surfaces and means for moving corresponding cards of the different series
 125 into an exposure-plane, reversing the cards and moving them out of the said plane.

8. An apparatus having a plurality of series of cards provided with sensitized surfaces, means for simultaneously moving corresponding cards of the several series into an exposure-plane, reversing the cards and moving them out of said plane, and means for accelerating the reversing movement of the cards.

9. An apparatus having an endless band, a plurality of cards permanently secured thereto provided with sensitized surfaces and a separate belt having teeth engaging the cards for moving them successively into and out of an exposure-plane.

10. An apparatus having a plurality of endless bands each having a series of cards permanently secured thereto and provided with sensitized surfaces and a plurality of separate belts having teeth engaging the cards for moving them successively into and out of an exposure-plane.

11. An apparatus having a plurality of series of cards provided with sensitized surfaces, means for simultaneously moving corresponding cards of the several series into and out of an exposure-plane and guide-bars extending to the said plane for supporting the cards during their forward movement.

12. In a camera obscura, the combination with a lens, of a plurality of series of cards provided with sensitized surfaces and means for simultaneously moving corresponding cards into and out of the focal plane of the lens.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 3d day of October, 1904.

HIRAM A. FARRAND.

Witnesses:

FREDK. HAYNES,
C. S. SUNDGREN.