

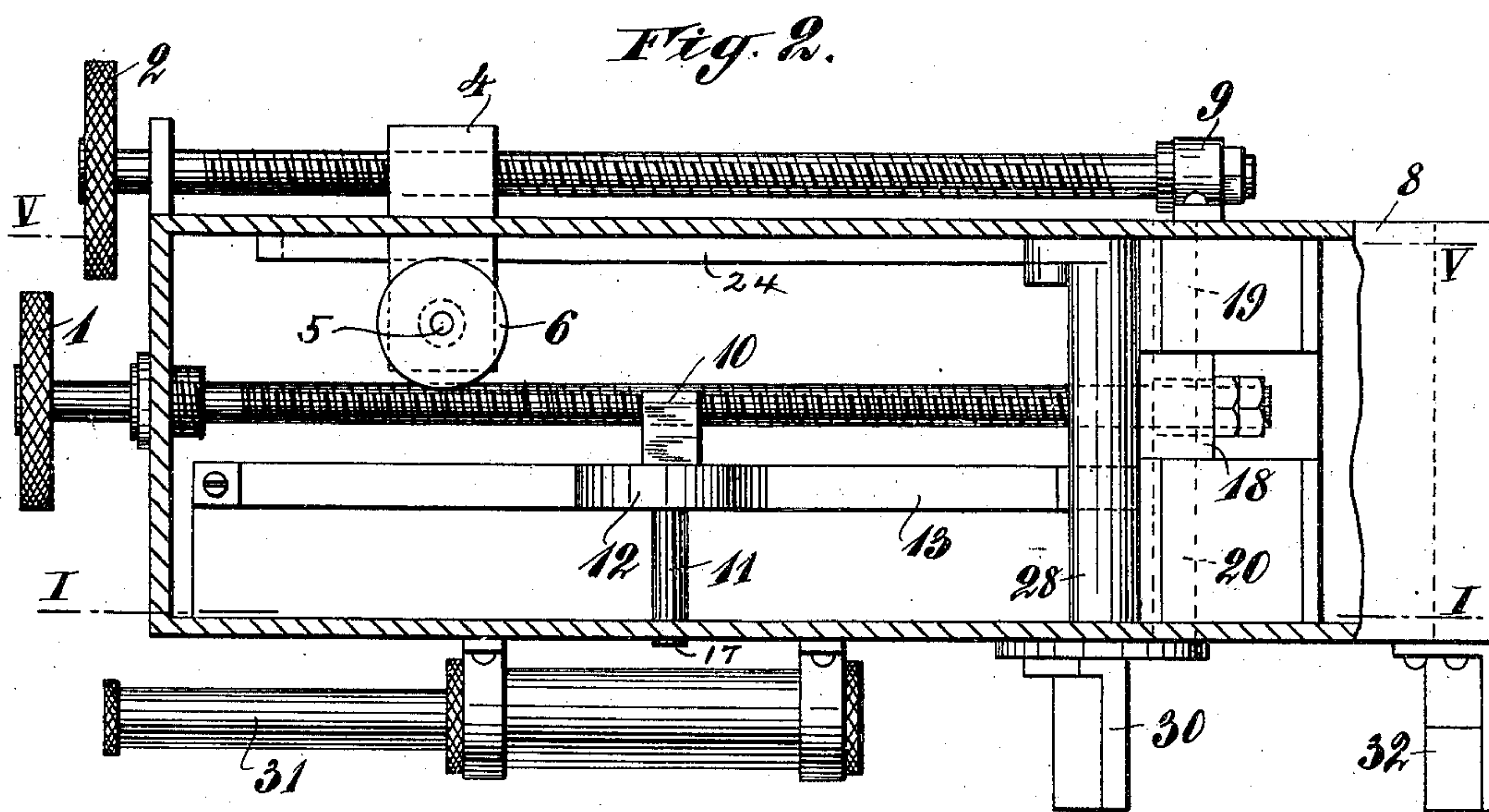
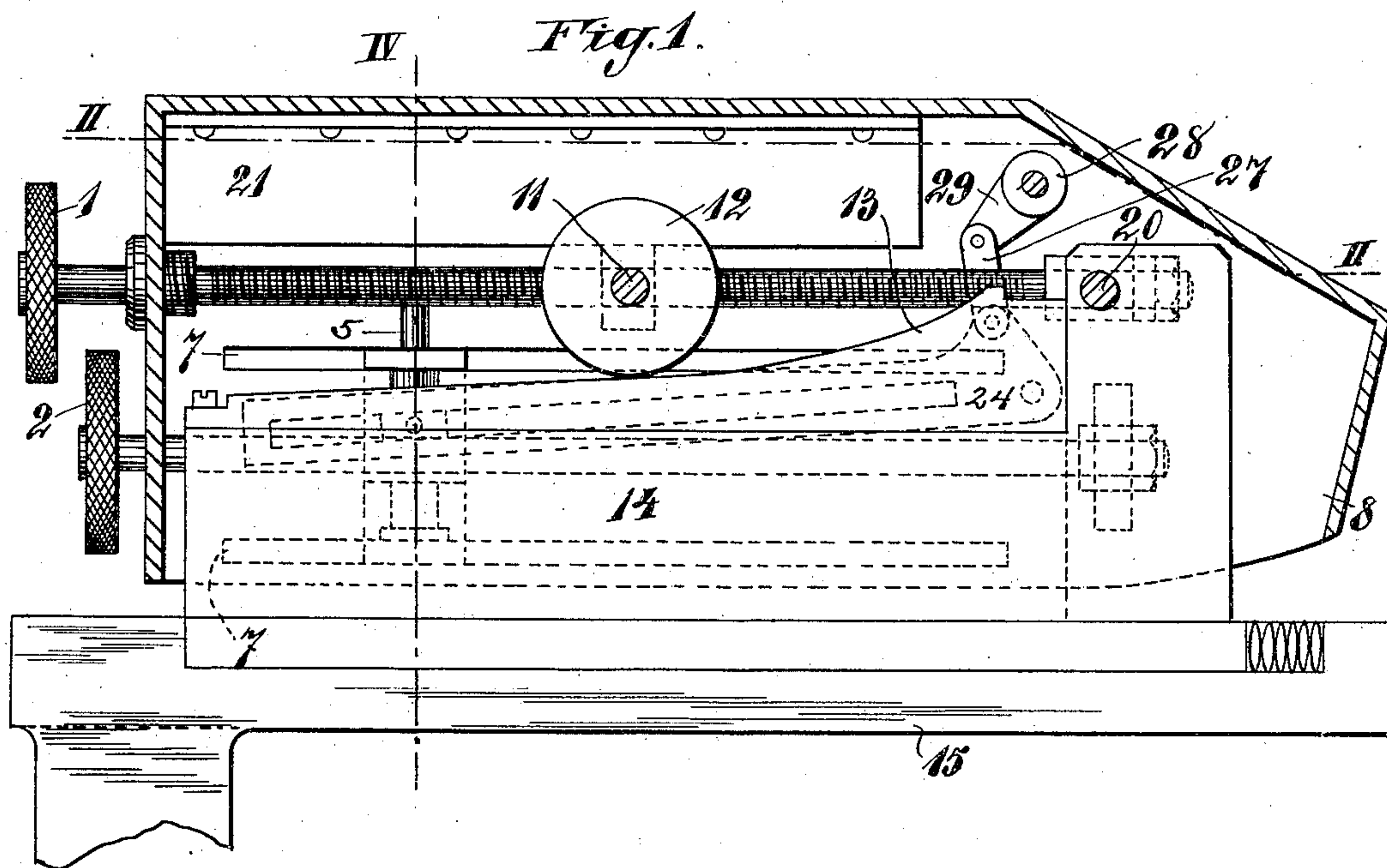
No. 789,783.

PATENTED MAY 16, 1905.

N. E. ANDERSSON.
SIGHTING DEVICE FOR GUNS OR THE LIKE.

APPLICATION FILED APR. 12, 1902.

4 SHEETS—SHEET 1.



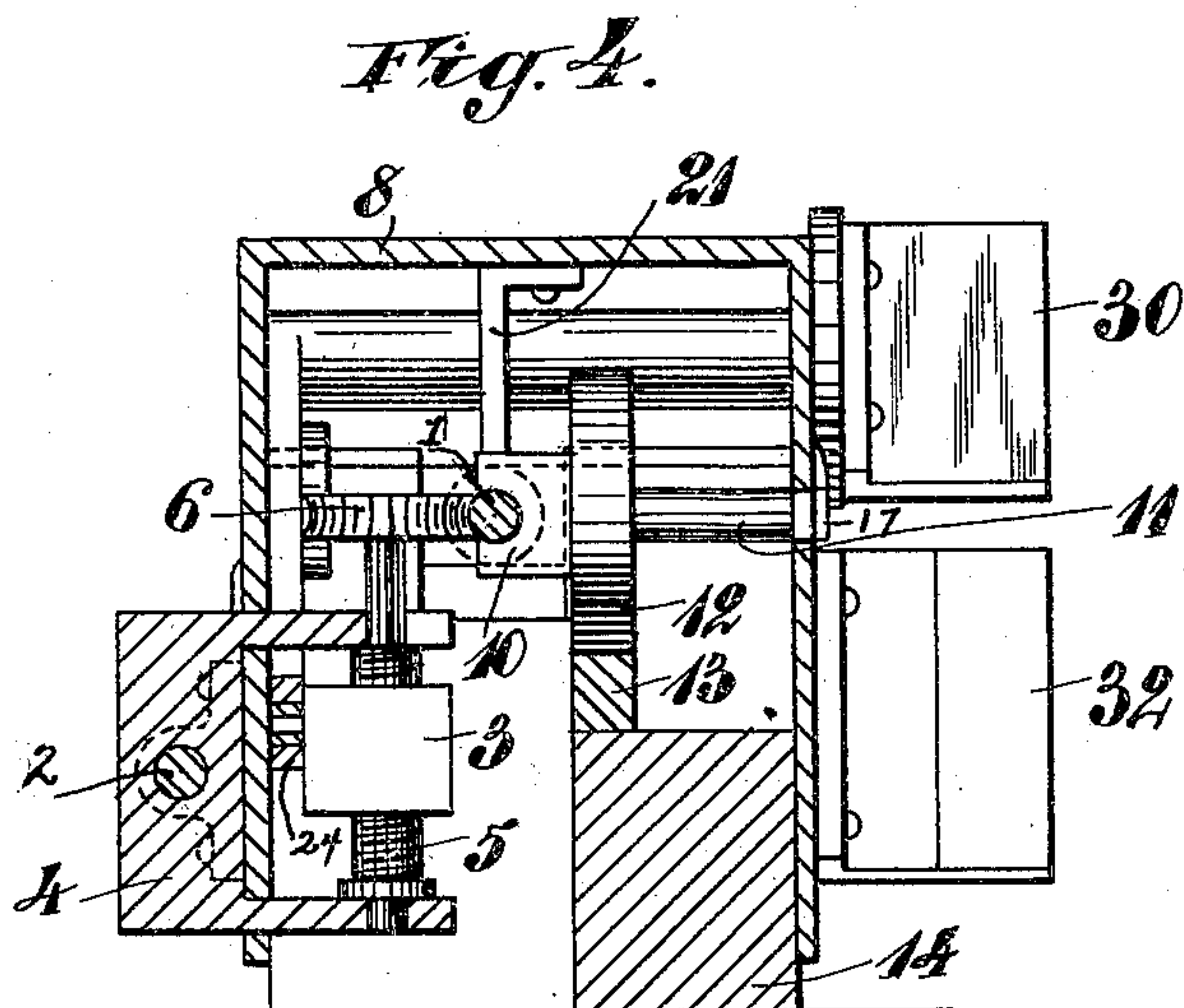
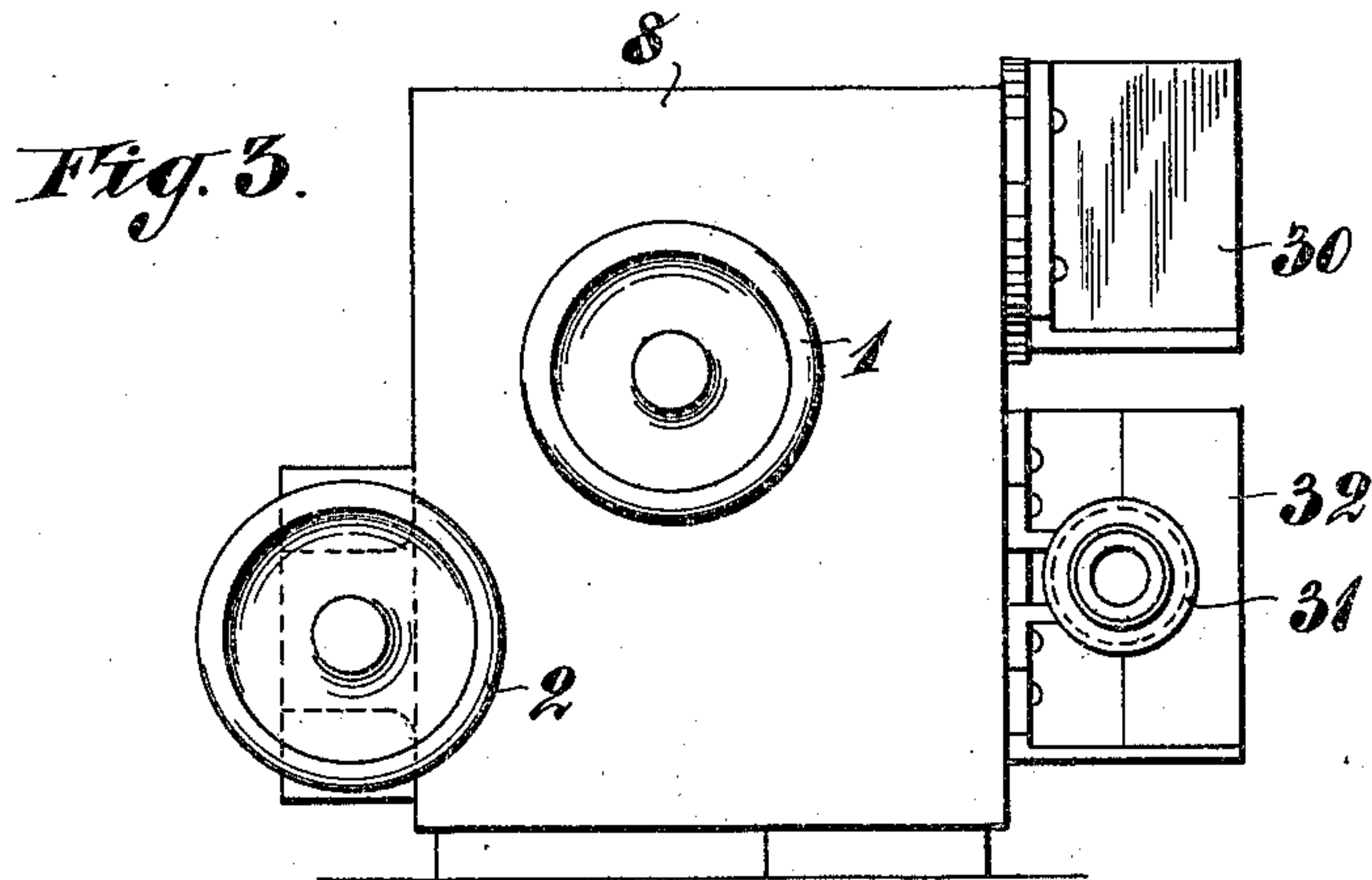
Witnesses:
Lustafekfält
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Inventor:
N. E. Andersson
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4 SHEETS—SHEET 2.



Witnesses:
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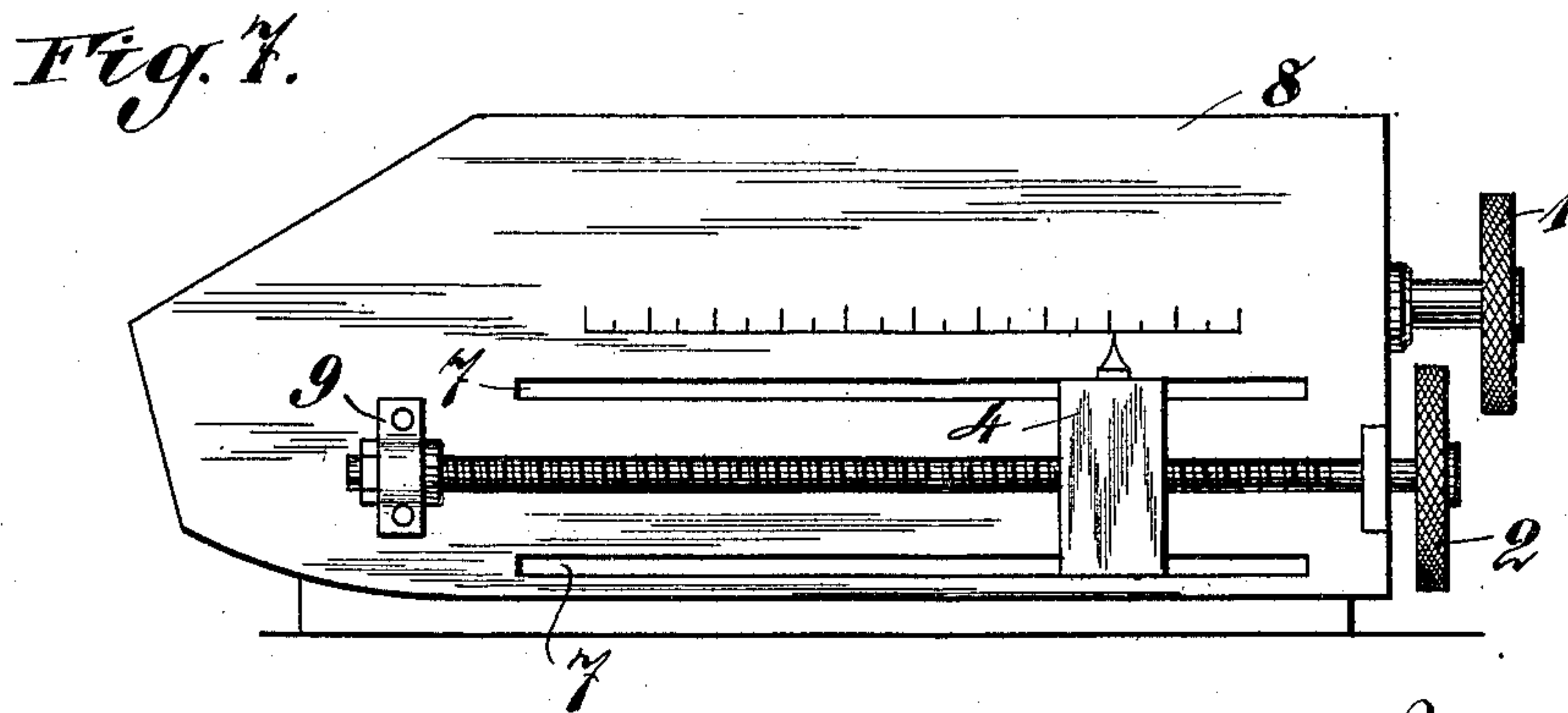
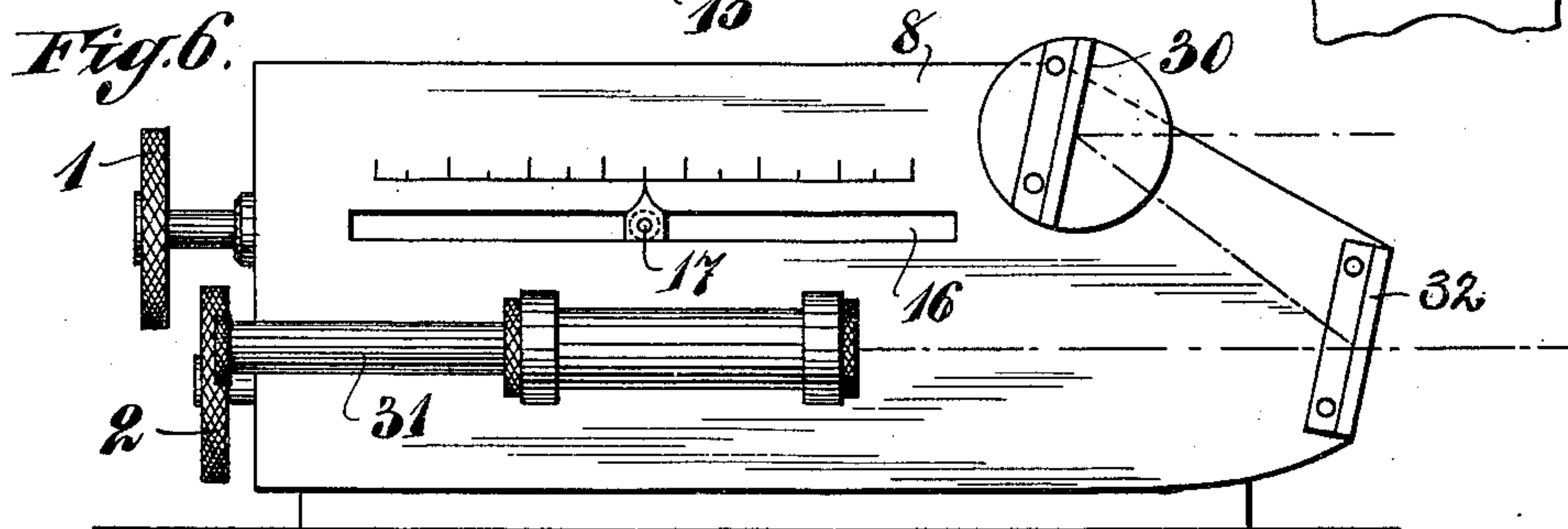
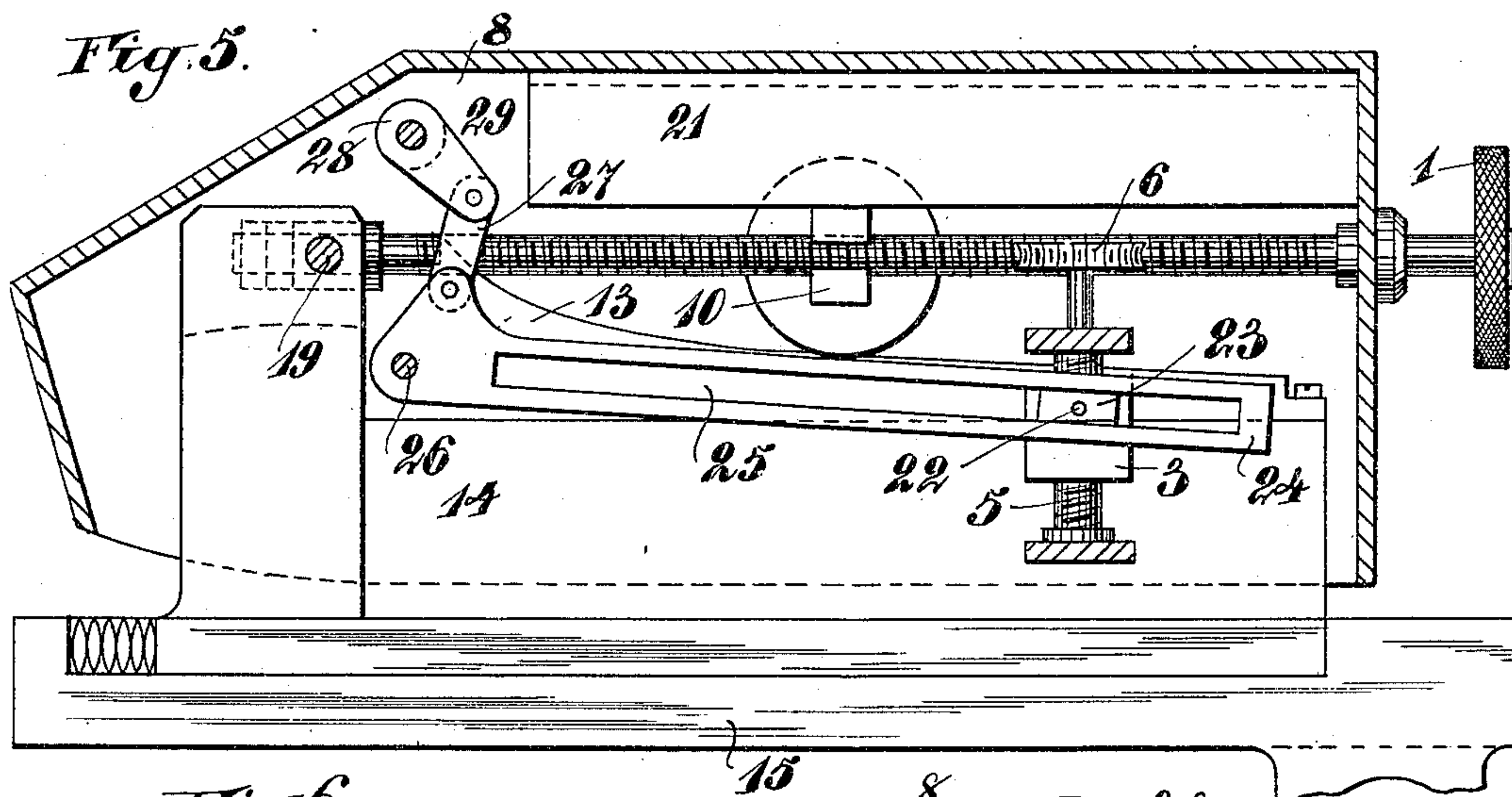
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4 SHEETS—SHEET 3.



Witnesses:

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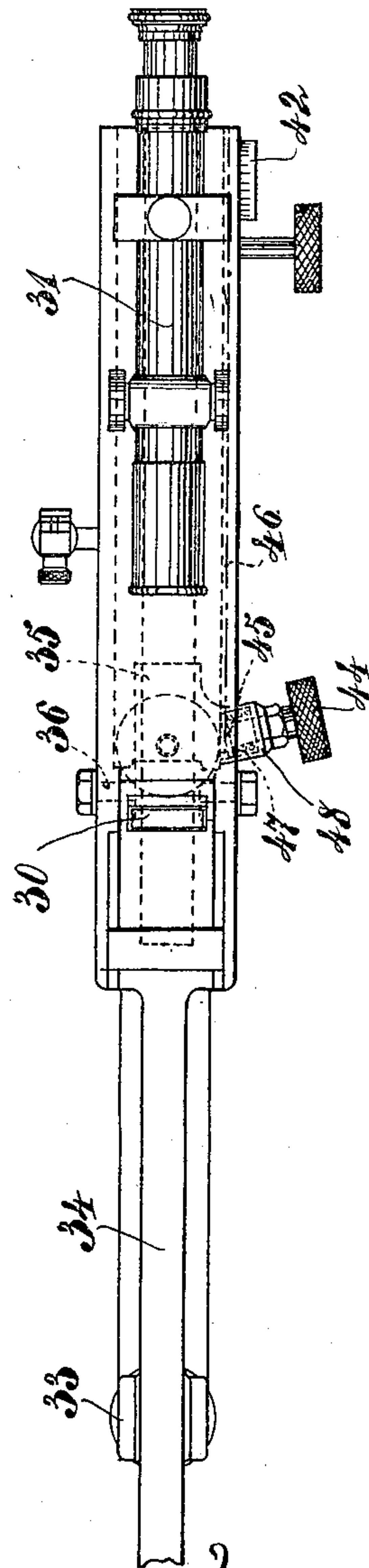
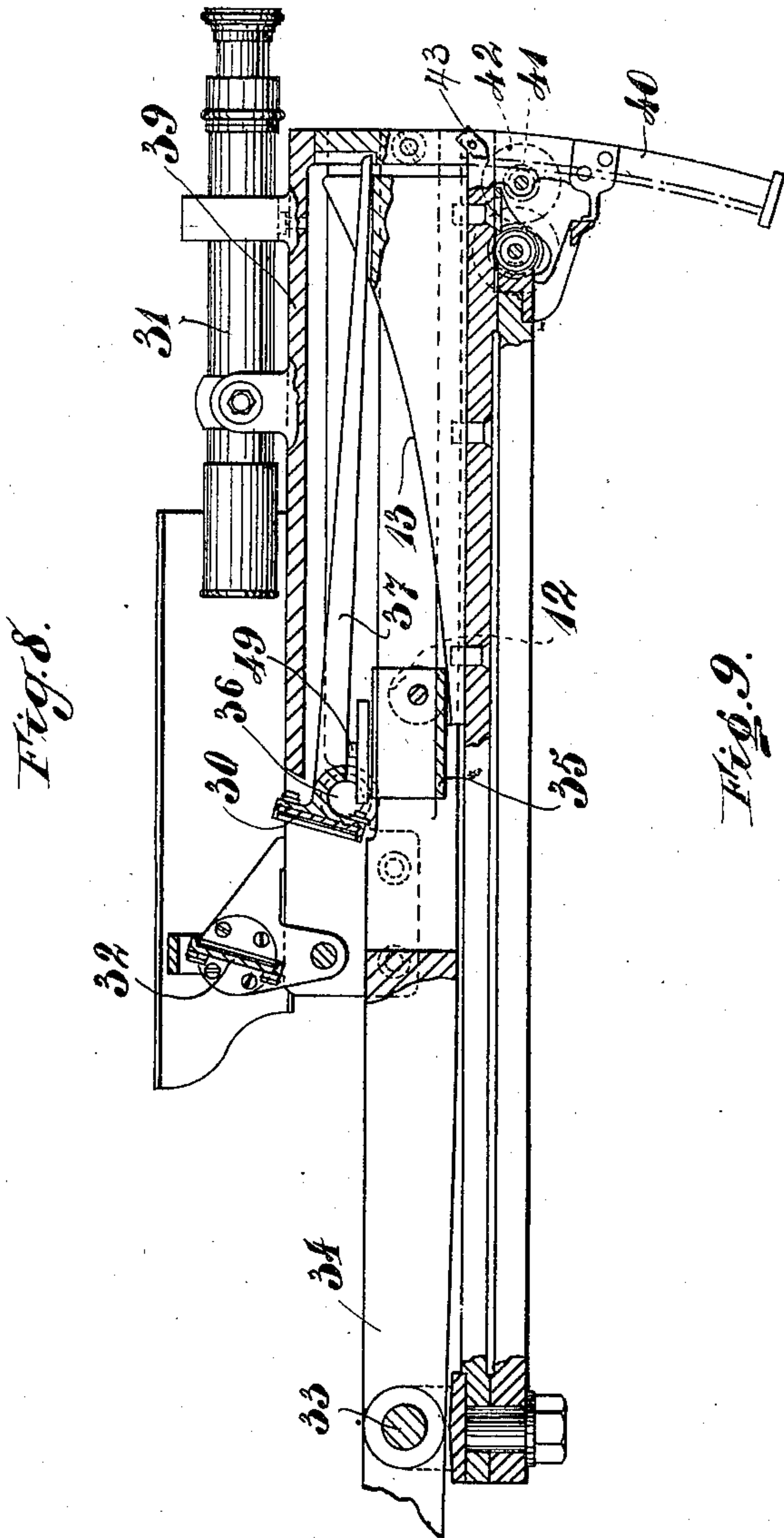
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

NILS ELIAS ANDERSSON, OF CARLSKRONA, SWEDEN.

SIGHTING DEVICE FOR GUNS OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 789,783, dated May 16, 1905.

Application filed April 12, 1902. Serial No. 102,605.

To all whom it may concern:

Be it known that I, NILS ELIAS ANDERSSON, a subject of the King of Sweden and Norway, and a resident of Carlskrona, Sweden, have
 5 invented new and useful Improvements in Sighting Devices for Guns or the Like, of which the following is a specification, reference being had to the drawings accompanying and forming a part hereof.

10 The present invention relates to a sighting device for guns, being more especially intended for use on the guns of war vessels or coast-defenses, where the distance between the gun and the mark or object aimed at continually changes.

15 The object of the present invention is to provide a sighting device which will be simple in its construction and reliable in its function.

20 The invention consists principally in the combination, with the gun, of a sighting device comprising an angle-measuring instrument, the working parts of which consist of mirrors, prisms, lenses, or the like and which is
 25 provided with a telescope-sight.

As well known, two images of the target are commonly obtained in the field of sight of the telescope, which images in the angle-measuring are adjusted to a certain position
 30 in relation to each other, generally in such manner that the one base-line becomes a direct continuation of the other. The measuring of the angle will thus depend only upon the position of the images in relation to each other,
 35 but will be completely independent of their positions in the field of sight. As a sighting-line the optic axis of the telescope of the angle-measuring instrument may be used. In adjusting the sighting-line upon the mark
 40 aimed at the two images will be displaced without changing their positions in relation to each other until the point of the mark upon which the gun has been adjusted coincides with a certain point in the field of sight, marked,
 45 or instance, by a cross of hair or the like, through which the sighting-line runs. In order to make the last-mentioned sight fixed in the field of sight, for instance, so that the sighting-line will coincide with the optic axis
 50 of the telescope, so as to make the sight capa-

ble of being used for any range independent of the magnifying in the telescope and of the elevation of the gun, the whole sight according to the present invention is made turnable, the sight being turned in well-known man-
 55 ner by means of a fixed guide or the like formed in accordance with the path of the projectile. By the said arrangements the images of the mark may be obtained in the middle of the field of sight of the telescope independent
 60 of the range, and the adjusting of the sighting-line upon a certain point of the mark aimed at will be made without losing the control of the range. Variation of range will be observed thereby that the images will change
 65 their positions in relation to each other. By adjusting the angle-measuring instrument it will be possible to follow the said changes as nearly as may be desired, the firing angle being in well-known manner simultaneously va-
 70 ried in corresponding degree.

In the accompanying drawings I have illustrated two constructional forms of my invention in which the angle-measuring instruments are provided with mirrors, the tele-
 75 scope of said angle-measuring instruments being simultaneously adapted to serve as sight.

Figure 1 shows a side view of the one sighting device partially in section on line I I of Fig. 2. Fig. 2 shows the same in section on
 80 line II II of Fig. 1 viewed from above. Fig. 3 is an end elevation; and Fig. 4 a cross-section on line IV IV of Fig. 1, the telescope-sight removed. Fig. 5 is a side view from the other side of the sight partially in section on
 85 line V V of Fig. 2. Figs. 6 and 7 are two side elevations of the sighting device on a slightly-diminished scale. Fig. 8 shows a modified sighting device in side elevation, and Fig. 9 a plan view of the same.

90 The parts by means of which the sighting device is operated in the constructive form shown in Figs. 1 to 7 are two screws 1 and 2, the former being provided for the range, the latter for the height of base. Both of these
 95 operate on the nut 3, located on the screw 5, rotatably mounted on the frame 4. The screw 5 is provided with an elongation supporting a screw-gear 6, continually engaging with the screw 1. The frame 4 is guided by slots 7 100

in the casing 8 and is traversed by the screw 2, which is journaled in such a manner in the box 9, secured on the outside of the casing, and in a projection from the casing, that while rotating it will move the frame 4 forward or backward without being itself shifted. On the screw 1 is mounted a nut 10, a section of which is cut away so that the nut can be moved along the whole length of the screw independently of the position of the screw-gear. On the nut is journaled one end of the shaft 11 of a roller 12, adapted to move on the guide 13, calculated to the ranges at different elevations. This guide is suitably made separately and united by screws or the like with the frame 14, supporting the sighting device, and which frame in its turn is so located on a frame-piece 15, attached to the barrel or tube of the ordnance, as to make its bottom edge to run parallel to the axis of the bore of the gun. The other end of the shaft 11 is journaled in a part 17, adapted to be shifted in a slot 16 in the casing 8 and provided with a pointer indicating on a suitably-graduated scale the range corresponding to its respective positions, Fig. 6. In place of this arrangement the shaft 11 may of course be made in one piece with the nut 10 and the roller 12 be rotatably mounted upon it. The forward end of the screw 1 is rotatably journaled in the cross-piece 18, which is movable about the pins 19 20, arranged at right angles to the screw 1 and passing through the frame 14, and which pins support the casing 8 on their outer ends. The casing is provided with a flange 21, bearing on the nut 10 and projecting downward from the top of the casing. When the screw 1 is rotated so as to move the nut 10 forward or backward, the casing 8 will be rotated in one direction or the other about the pins 19 20. The nut 3, mounted on the screw 5, is provided with a pin 22, Fig. 5, entering in a sliding block 23 in the slot 25, cut in lever 24. The lever is arranged to swing on the pin 26, attached to the casing 8, and is connected, by means of a link 27, with a crank 29, projecting from the shaft 28, journaled horizontally in the casing. The shaft 28 carries at one end the movable mirror 30, belonging to the range-finder. Since the movement of the said mirror 30 should exactly agree with the movement of the lever 24 caused by the sliding piece 23, it will be understood that the slot 25, though the same for the sake of simplicity is shown straight, must be somewhat curved when the special connection illustrated in the drawings is used between the lever 24 and the shaft 28. The telescope-sight 31 and the mirror 32, silvered on half its surface, are rigidly secured to the casing 8. The telescope-sight, together with the two mirrors and the gearing for turning the movable mirror, thus forms an angle-measuring instrument arranged as an ordinary sextant or octant. When the screw 2 is

rotated, the frame 4 is shifted back and forth and the distance between the fulcrum 26 of lever 24 and the pin 22, projecting from the nut 3, is diminished or increased, the gearing to the movable mirror consequently being varied to conform to different heights of base at the object aimed at, for it is evident that, for instance, a certain height of base requires twice the variation in the angle as half the height of base, and for this reason the distance mentioned must in the former case be only one-half that in the latter. The frame 4 is provided with a small pointer indicating on a scale on the outside of the casing 8 the height of base corresponding to the position in question. On completing the adjustment at a given height of base the required revolution of the mirror 30 is obtained by turning the screw 1, which operates on the screw-gear 6 so as to rotate the screw 5, and thus raise or lower the nut 3.

In place of having the screw-gear 6 stationary and attached to the screw 5 a disengaging-gear may be introduced between the screw-gear and screw. Such a gear is conveniently employed in combination with the arrangement shown in the drawings. If this disengaging-gear be so contrived that the screw 5 will move slower than the screw-gear 6, this will correspond to a lengthening of the lever 24, so that smaller heights of base than otherwise may be employed, and vice versa if the screw 5 is made to revolve faster than the screw-gear 6.

In using the sighting device above described the frame 4 is brought into the position corresponding to the supposed or known height of the base, whereupon angle-measuring is done by means of the screw 1, the casing 8 being simultaneously turned by the roller 12, so that the sighting-line is adjusted in the firing angle corresponding to the range. The use of the sighting device when the range is known, but not the height of the base, or when neither the latter nor the range are known or when the height of the base is to be varied will be well understood by those skilled in the art and need not be more particularly described.

In the constructional form illustrated in Figs. 8 and 9 the telescope-sight 31 is supported by a bar 34, pivoted on a pin 33, the rear end of which bar is forked and provided with a sliding piece 35. The movable mirror 30 is fixed directly on a lever 37, pivoted on a pin 36, the said lever being operated by means of a suitably-graduated micrometer-screw 49, supported in the said sliding piece 35, so as to adjust the said lever 37 for different heights of base. The said sliding piece also supports the roller 12, by the aid of which the sighting device is turned when said roller is displaced along the guide 13, calculated to the ranges at different elevations. The said guide 13 is placed in an opposite position to

that described with reference to Figs. 1 to 7, whereby the feature of a more curved guide is gained for use with guns with flat path of the projectile. The forked end of the bar 34 supports a casing 39, to which the telescope-sight 31 is attached. The said casing also supports the fixed mirror 32. The rear end of said casing is provided with a toothed segment 40, the center of which coincides with the center of the pin 33. Said toothed segment engages with a toothed wheel 41, on the shaft of which is fixed a graduated wheel 42. A fixed pointer 43 is provided on said casing 39. In adjusting the sighting device for a certain distance the sliding piece 35 is shifted along the bar 34, so that the latter and the casing 39 are turned, whereby the toothed segment 40 will rotate the toothed wheel 41, so that the indicator 43 will always point out on the graduated wheel 42 the range corresponding to the position of the sliding piece 35. The further adjustment for variations in range, which may gradually take place, is accomplished by means of a hand-wheel 44, the axle of which is provided with a spiral screw 45, engaging with a rack 46, rigidly fixed to the bar 34. The said spiral screw is pressed against said rack 46 by means of a spiral spring 47 and is movable in its guide or bearing 48, so as to be able of being brought out of engagement with the rack in the case the sliding piece has to be displaced a larger distance.

In the constructional form just described the sliding piece 35 corresponds to the frame 4 in the constructional form described with reference to Figs. 1 to 7. The difference between said parts consists, essentially, therein that the sliding piece 35 in the adjustment for various ranges is shifted along its guide, thereby turning the lever 37 with the mirror 30, and that the adjustment for various heights of base is done by lifting or lowering the said lever 37 by means of the micrometer-screw 49, while the frame 4 when being displaced in its guide will be adjusted for various heights of base, the adjustment for various ranges being done by lifting and lowering the lever 24 by means of the pin 22 on the nut 3. For the rest the two constructions are essentially the same.

It is obvious that the invention is not limited to the constructional forms shown in the drawings and that any suitable device for copying the angle of sight to an arbitrary height of base on a variable range and for transferring the movement to the angle-measuring instrument may be used. Instead of such an instrument with mirrors also any other instrument may be used in which two or more images of the height of base are obtained, which images in the measuring are adjusted in a certain position in relation to each other—for instance, angle-measuring instru-

ments having movable prisms or lenses divided into two halves which are movable in relation to each other. In using angle-measuring instruments with prisms essentially the same constructions as those shown in the drawings may be used. In this case it is, however, necessary to arrange both the movable and the fixed prism in front of the object-glass of the telescope. In using angle-measuring instruments with lenses or parts of lenses the one part should be arranged movable up and down by being attached at a suitable point to the lever 24, (respectively 37,) the fixed part forming one half of the object-glass and the movable part the other half, as usual in such instruments. The use of instruments of the kind last mentioned has the advantage that clearer images are obtained, since the light will not be impaired by being reflected, as the case is in instruments illustrated in the drawings. Since, however, different forms of the said instruments are well known and it is easily understood by those skilled in the art in what manner the same are to be arranged as sighting devices according to the present invention, it is not necessary to more particularly illustrate their use.

Having now described my invention and how it may be carried out, what I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with a telescope adapted for use with the sight of a gun, of means for producing at least two images of the object aimed at in the field of sight of said telescope in such manner that the said images are separated from each other, means for adjusting the position of said images in relation to each other in such manner that the said images will come in juxtaposition, the said telescope and means constituting together an angle-measuring instrument, a swingable part supporting said angle-measuring instrument, a guide calculated to the ranges at different elevation, a roller on said swingable part adapted to run on said guide, and means for shifting the said roller along the said guide according to the different ranges, substantially as and for the purpose set forth.

2. The combination with a telescope adapted for use with the sight of a gun, of mirrors adapted to produce at least two images of the object aimed at in the field of sight of said telescope in such manner that the said images are separated from each other, means for adjusting the position of said images in relation to each other in such manner that the said images will come in juxtaposition, the said telescope, mirrors and means constituting together an angle-measuring instrument, a swingable part supporting said angle-measuring instrument, a guide calculated in accordance with the different ranges, a roller on said swingable part adapted to run on said guide,

and means for shifting the said roller along the said guide according to the different ranges, substantially as and for the purpose set forth.

3. The combination with a telescope adapted for use with the sight of a gun, of means for producing at least two images of the object aimed at in the field of sight of said telescope in such manner that the images are separated from each other, means for adjusting the position of said images in relation to each other in such manner that the said images will come in juxtaposition, the said telescope and means constituting together an angle-measuring instrument, a swingable part supporting the said angle-measuring instrument,

means for swinging the said swingable part, a guide calculated to the ranges at different elevation, a roller on said swingable part adapted to run on the said guide, and means for shifting the said roller along the said guide according to the different ranges, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

NILS ELIAS ANDERSSON.

Witnesses:

JOHN DELMAR,
GUSTAF TSFALT.