

No. 702,726.

Patented June 17, 1902.

E. G. HEDMAN.
AUTOMATIC BALANCE OR SCALE.

(Application filed Jan. 11, 1902.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 2.

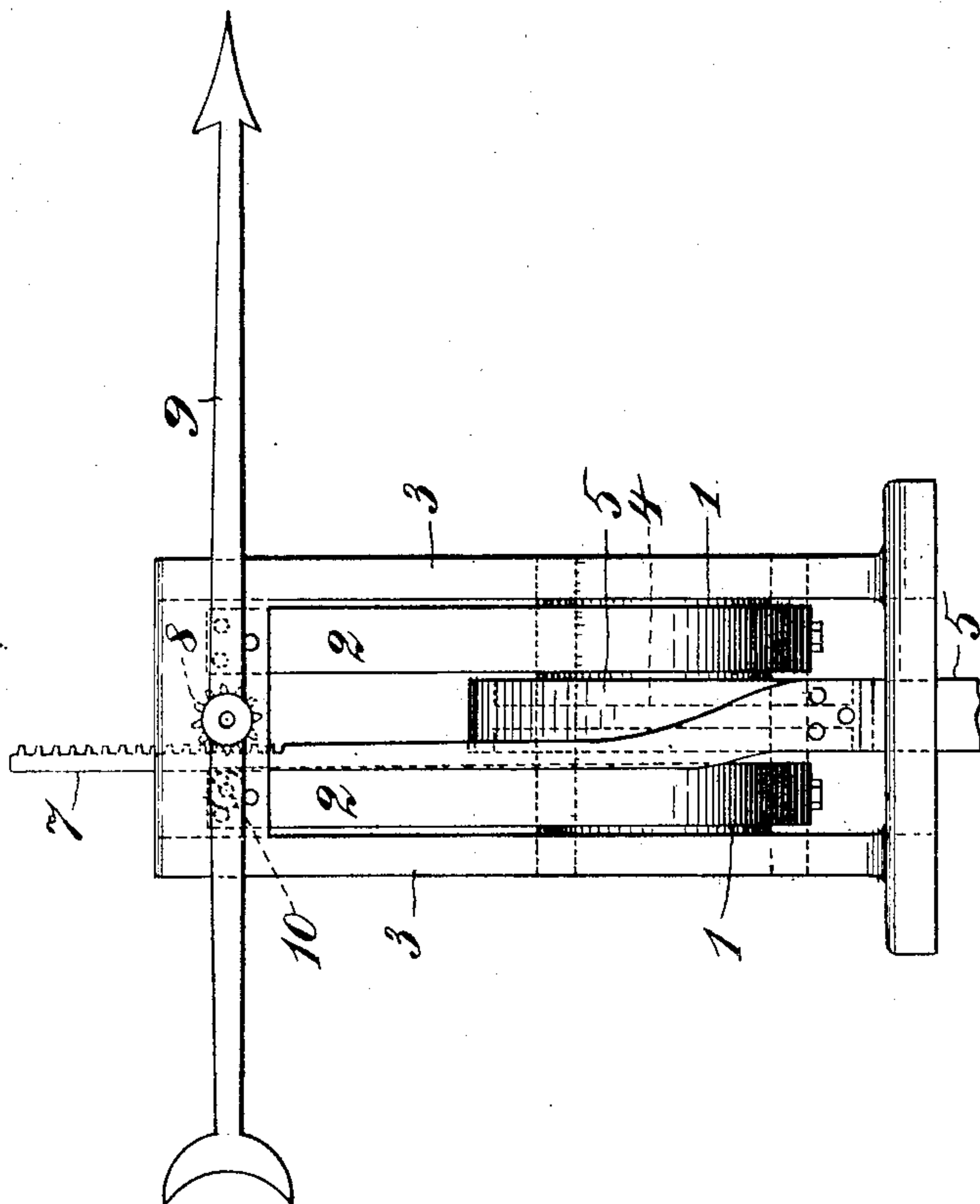
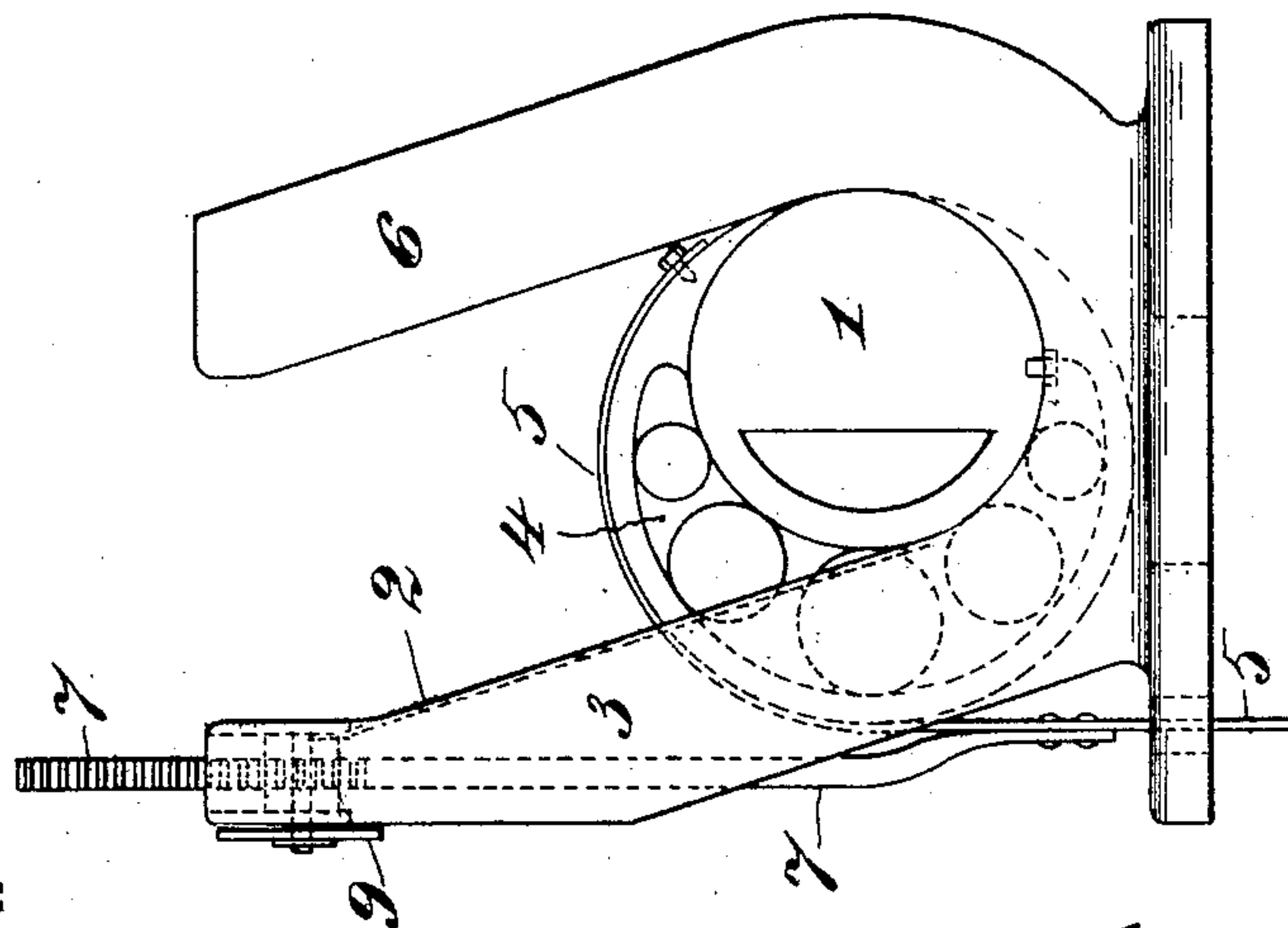


Fig. 1.



WITNESSES:

J. W. Wiman
Peter D. Ross

INVENTOR

Erik G. Hedman

BY

Henry Connors
ATTORNEY

No. 702,726.

Patented June 17, 1902.

E. G. HEDMAN.

AUTOMATIC BALANCE OR SCALE.

(Application filed Jan. 11, 1902.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 4.

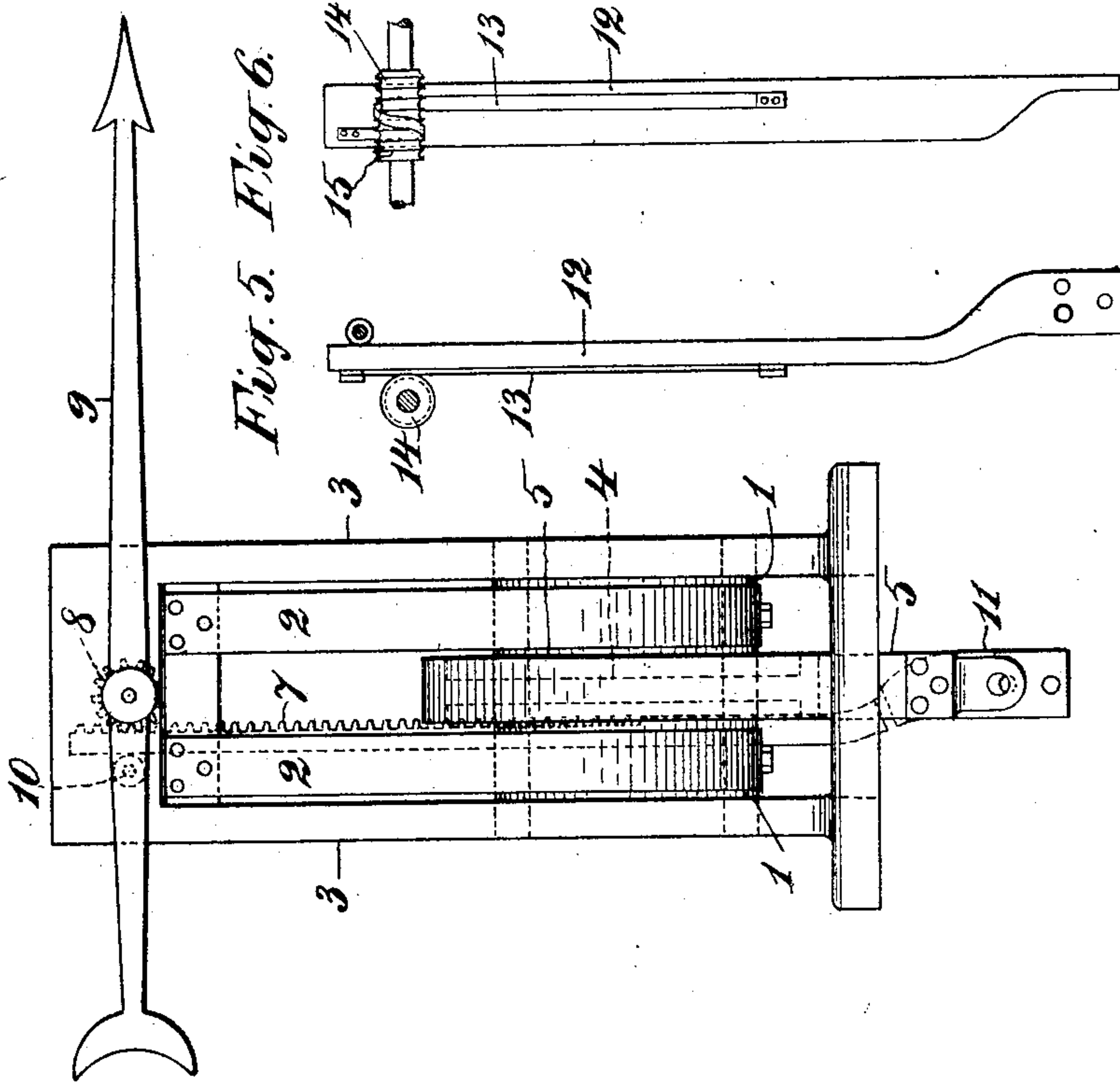


Fig. 5. Fig. 6.

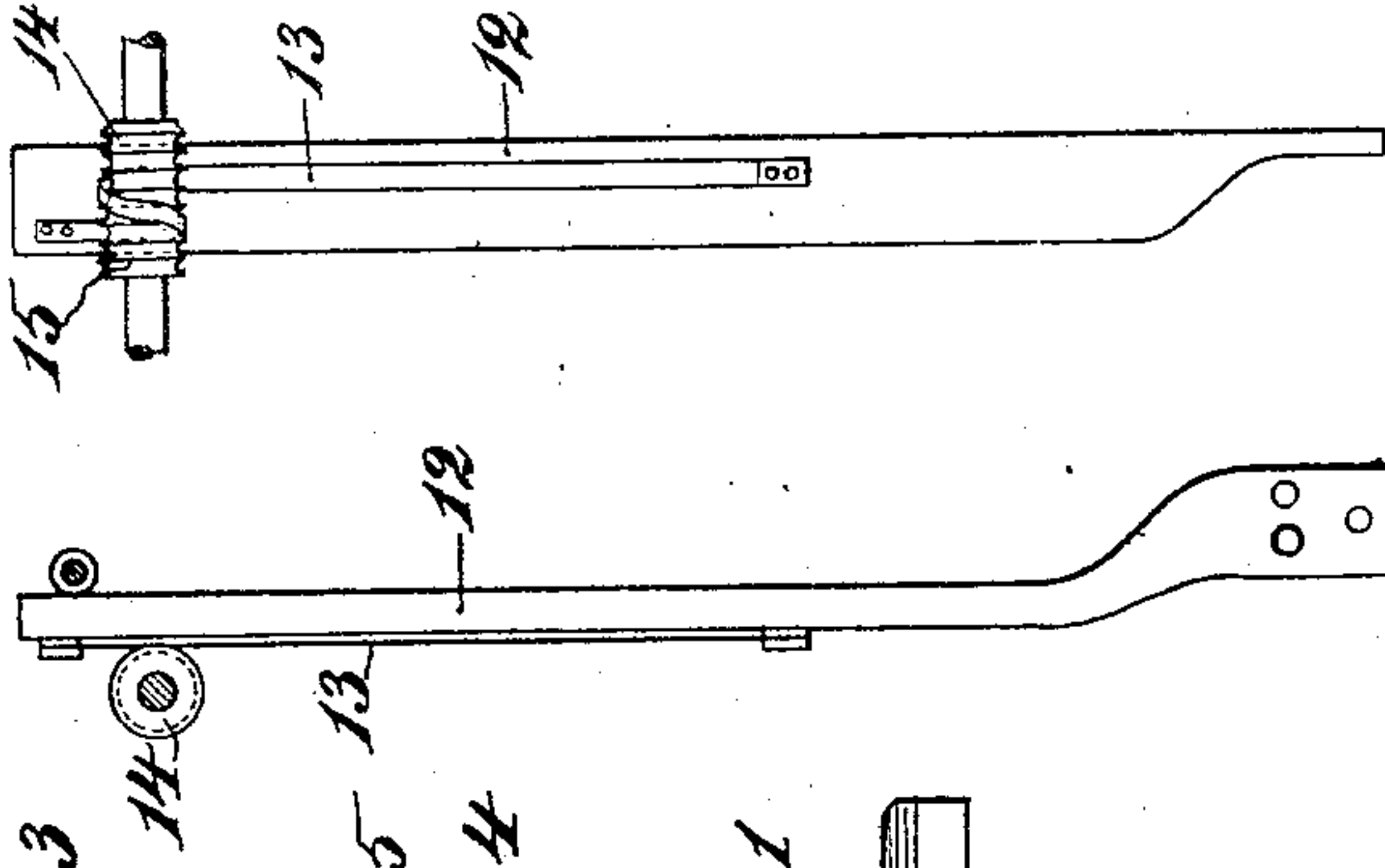
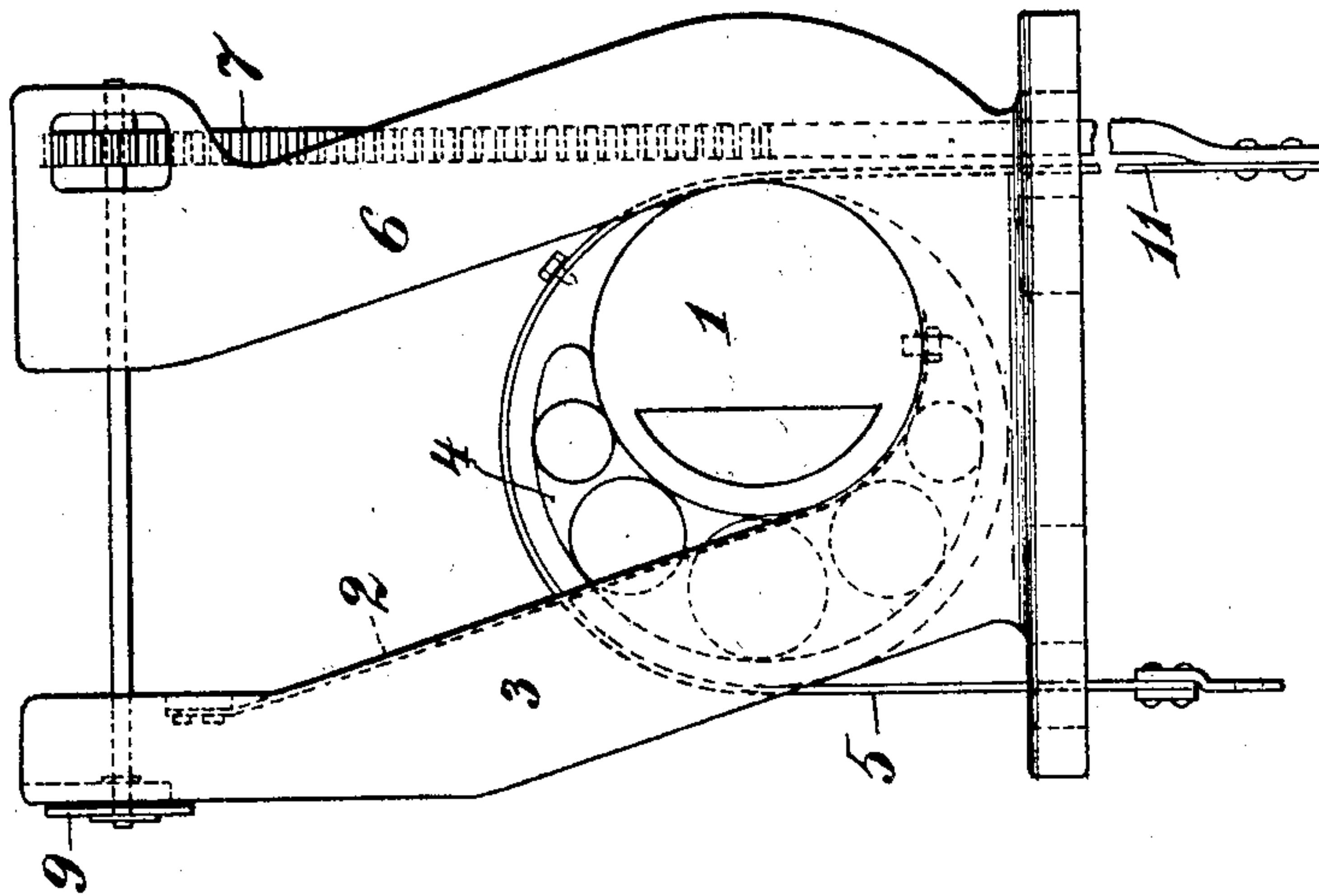


Fig. 3.



WITNESSES:

J. W. Winan
H. Alan Cornett

INVENTOR

Erik G. Hedman

BY

Henry Cornett
ATTORNEY

UNITED STATES PATENT OFFICE.

ERIK GUSTAF HEDMAN, OF STOCKHOLM, SWEDEN.

AUTOMATIC BALANCE OR SCALE.

SPECIFICATION forming part of Letters Patent No. 702,726, dated June 17, 1902.

Application filed January 11, 1902. Serial No. 89,266. (No model.)

To all whom it may concern:

Be it known that I, ERIK GUSTAF HEDMAN, a subject of the King of Sweden and Norway, residing in Stockholm, Sweden, have invented certain Improvements in Scales or Balances, of which the following is a specification.

This invention relates to the class of weighing devices, and it comprises as its essentials a roller adapted to roll up a track, being compelled to do so when rotated preferably by a flexible band or bands secured at one end to a fixed part and at the other end to the roller, an eccentric fixed to and rotating with the said roller, a flexible strap over said eccentric and fixed at one end thereto, the other end depending from the periphery of the eccentric and supporting the object to be weighed, and means operated by the descent of the object being weighed to indicate the weight of the latter. The construction is such that the center of gravity of the combined roller and eccentric is at the axis of the roller and such that as the roller lifts or rolls up its track the leverage with which the weight acts to lift the roller decreases, so that at some point the weight will just suffice to balance the roller. At this point when one balances the other the indicator will indicate the weight of the article being weighed.

In the drawings which serve to illustrate the invention, Figure 1 is a side elevation, and Fig. 2 a front elevation thereof. These views show the rack which operates the weight-indicating pointer as connected with the same end of the strap that supports the article to be weighed. Figs. 3 and 4 are similar views to Figs. 1 and 2, but showing said rack coupled to an extension of the opposite end of said strap. Figs. 5 and 6 are respectively a front and side elevation of device which can be substituted for the rack and pinion of the principal views.

Referring primarily to Figs. 1 and 2, 1 designates a cylindrical roller mounted in a suitable frame having an inclined track 3 for the roller to roll along and guards 6 parallel with the track to keep the roller in place when the weighing device is to be transported. The roller should play freely between the track and the guards. To the roller are attached at one end two flexible straps 2, said straps being attached to the frame at the

other ends near the upper ends of the track 3. Obviously if the roller 1 be rotated so as to roll up the straps 2 thereon—that is, to the left as seen in Fig. 1—it will roll up along the inclined track 3.

Fixed to or constructed integrally with the roller 1 and at the middle of the same, between the track-rails, as herein shown, is a circular eccentric 4. This eccentric will be by preference so set with reference to the roller 1 that when the latter is at rest, as in Fig. 1, a plane passing through the centers of the eccentric and roller will be substantially horizontal. Over the eccentric 4 and secured to it at one end is a flexible strap 5, from which the article to be weighed is suspended. This strap will be so disposed that a weight drawing down on the strap 5 tends to turn the roller 1 so as to wind the straps 2 thereon—that is, the unwinding of the strap 5 winds up the straps 2 and incidentally bodily raises the roller 1 and the eccentric with it by causing the roller to roll up over the track 3. To maintain the center of gravity of the combined roller and eccentric at the axis of the roller 1, the two parts are conveniently lightened at one side by hollowing them out, and thus removing a part of their substance.

As a means for indicating the weight of an article suspended from the strap 5 a rack-bar 7 is secured at its lower end to the strap 5 and its teeth made to gear above with a pinion 8 on an arbor which carries a needle or pointer 9. This pointer will in practice traverse suitable graduations on an ordinary plate or dial, such as may be found in spring-scales. I have not deemed it necessary to illustrate such a graduated dial, nor have I shown means on the strap 5 for supporting the object or thing to be weighed, as such devices are common and of various kinds. Any kind may be employed with my scale. The rack 7 may be backed by a roller 10 to keep it up to the pinion 8.

The construction illustrated in Figs. 3 and 4 is only slightly different from that already described. The rack-bar 7 is in this case secured at its lower end to an opposite extension 11 of the strap 5, or it may be a different strap secured to the eccentric 4 and depending at the opposite side of the latter from that

where the strap 5 depends. Obviously in the construction the rack-bar will move upward when the strap 5 descends; but it will rotate the pinion 8 and cause the pointer 9 to move over suitable graduations, as before described. It will only be necessary to number the graduations in the opposite direction.

A substitute for the rack 7 and pinion 8 is illustrated in Figs. 5 and 6. This is in substance a known device for converting reciprocating into rotary motion and comprises a bar 12, which takes the place of the bar or rack 7, and a strap 13, which is secured at both ends to the bar 12 and turns one or more times spirally about a sleeve 14, which takes the place of the pinion 8. Preferably the sleeve or drum 14 will have a spiral thread formed about its periphery, and this thread will be formed by preference of thin metal 15, wound spirally about the drum, so as to hold the strap 13 up off from the body of the drum. This is a precaution to prevent the accumulation of dirt or dust on the drum from increasing its diameter, so as to affect the accuracy of the indicator, as would be likely to occur if the strap were wound directly on and about the body of the drum.

The track 3 and guide 6 might be vertical without altering the operation of the scale or balance; but in this case the strap 5 would have a lateral movement as the object weighed moved down, due to the gradual lessening of the leverage; but when the track 3 is properly inclined, as shown, the lateral movement imparted to the roller and eccentric will just compensate this lateral movement of the strap 5 and cause the latter to move down without shifting laterally. This compensation is desirable, as it keeps the rack-bar 7 in proper alinement and also allows the strap to play through a narrow slot in the casing with which mechanism described will usually be inclosed.

I do not limit myself to the particular specific construction herein shown, as it will be obvious that it may be varied somewhat without departing materially from the present invention, nor do I limit myself to the number of straps, eccentrics, or pointers that may be employed. This is only a matter of the duplication of parts. By "straps" as the word is herein employed is meant any equivalent flexible connector, as a cord or chain, for example. Also by the word "roller" as herein used with reference to the part designated by the reference-numeral 1 is meant any part of a cylinder capable of performing the functions described.

Having thus described my invention, I claim—

1. In a balance or scale, the roller, the track for it to roll on, means which compel the roller

to move along the track when it rotates, the eccentric secured to or forming part of said roller, the combined roller and eccentric having their common center of gravity at the axis of the roller, and the flexible, depending connector over and attached at one end to said eccentric, substantially as set forth.

2. In a balance or scale, the roller, the inclined track for the roller to move over, means which compel the roller to move along said track when it rotates, the eccentric secured to and forming a part of said roller, said roller and eccentric being so mounted that a plane passing through their centers will be substantially horizontal when the roller is at rest at its lowest point, and the strap over and attached at one end to said eccentric and dependent at the other end to receive the article to be weighed, substantially as set forth.

3. In a balance or scale, a cylindrical roller, an inclined track for the roller to move over, means consisting of straps which compel the roller to move along the track when it turns about its axis, a circular or cylindrical part fixed to the roller in a manner to form an eccentric thereon, and a strap over said eccentric, secured to the latter at one end and depending from the periphery of the eccentric at the other end to support the article to be weighed, substantially as set forth.

4. In a balance or scale, a cylindrical roller, an inclined track for said roller, means which compel the roller to move over the track when it rotates, an eccentric on said roller, and a strap over said eccentric, one end of which depends from the periphery of the eccentric to support the object to be weighed, the other end being secured to the eccentric, the common center of gravity of the combined roller and eccentric being at the axis of the former, and the inclination of the track being just sufficient to compensate for the lateral movement of the supporting-strap as the eccentric rotates, substantially as set forth.

5. In a balance or scale, the combination with a circular eccentric, a flexible connector over the periphery of same, said connector being secured at one end to the eccentric and depending from the periphery of same to support the object to be weighed, and means compelling said eccentric to rise bodily when it is rotated by the descent of the object being weighed, the eccentric having its center of gravity at its center of rotation, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ERIK GUSTAF HEDMAN.

Witnesses:

ERNST SVANQVIST,
ROBERT APELGREN.