

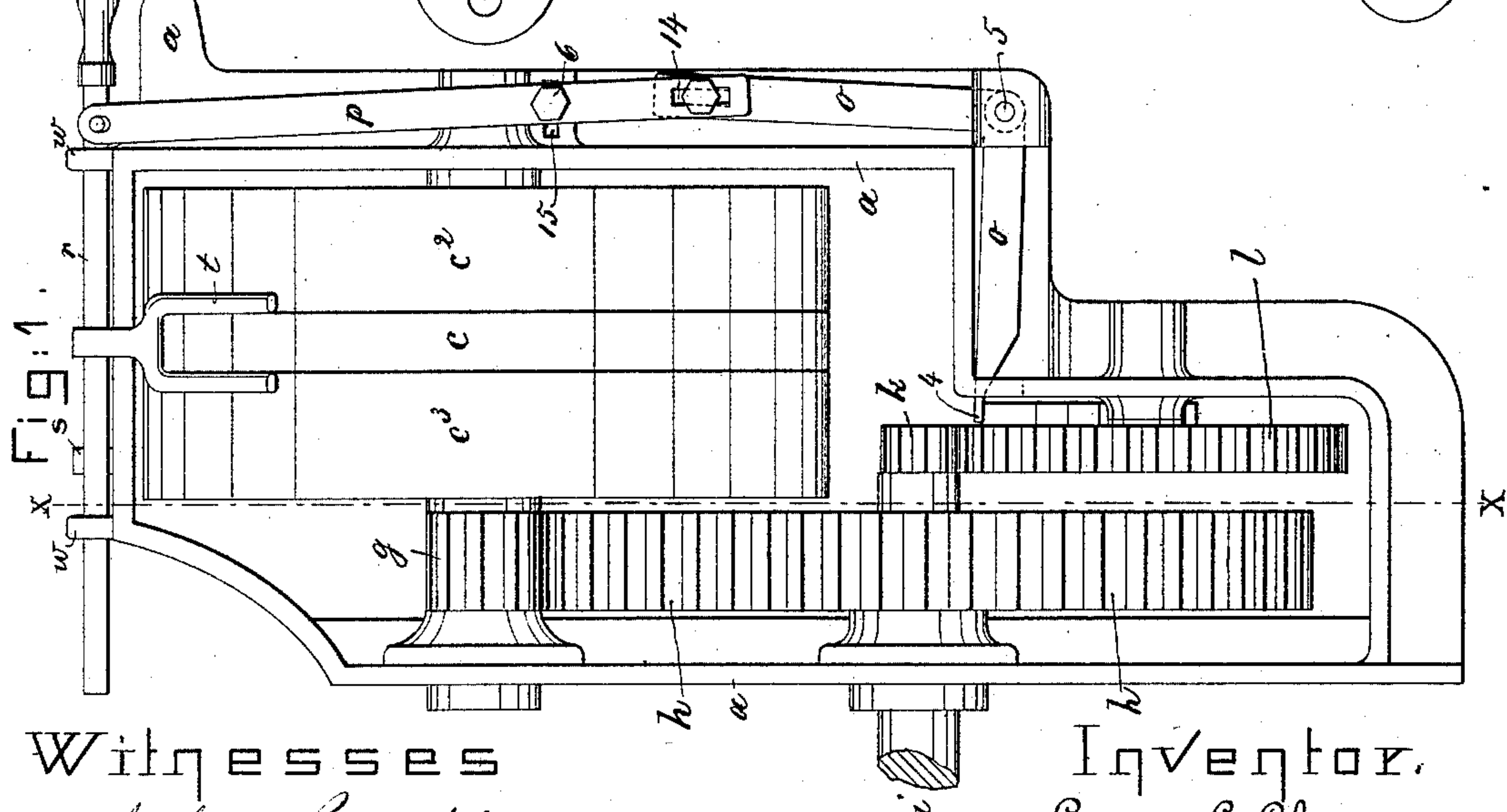
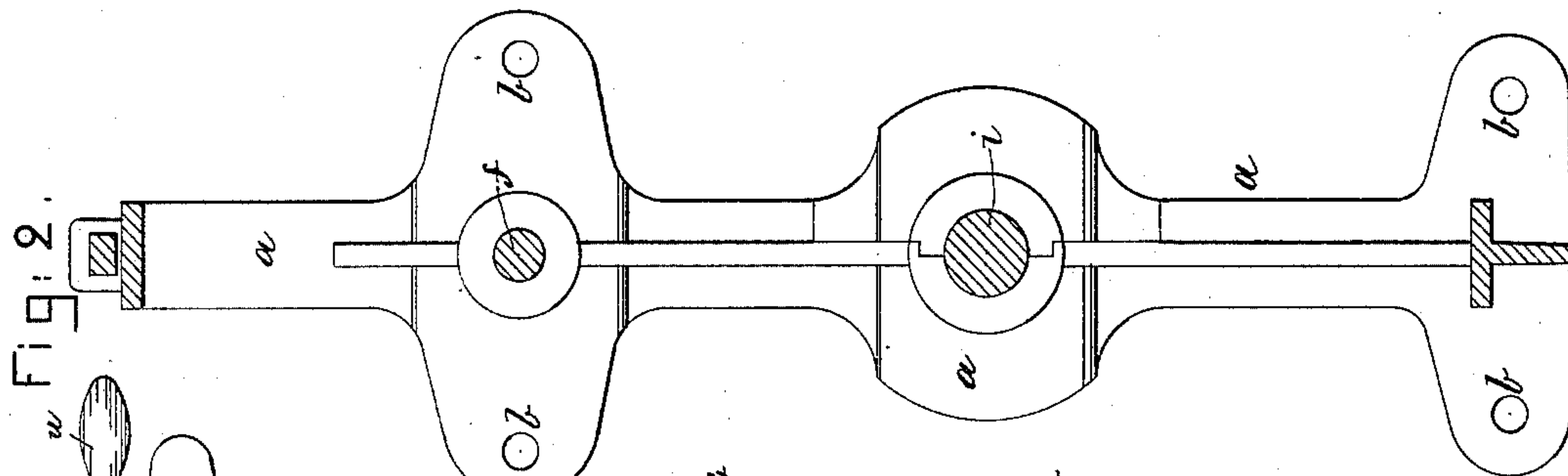
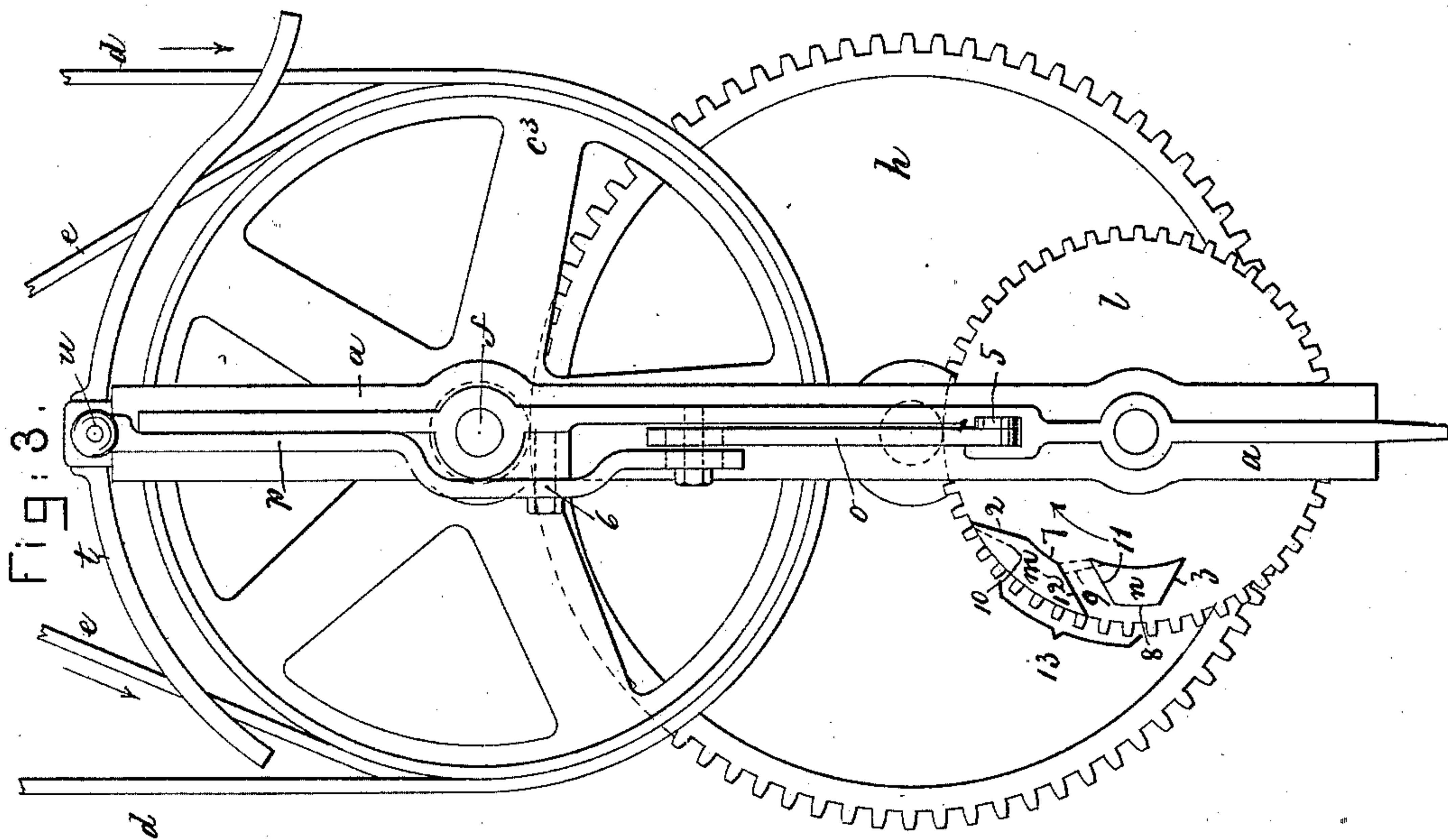
(No Model.)

G. L. SHOREY.

Automatic Reversing Device.

No. 232,308.

Patented Sept. 14, 1880.



Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE L. SHOREY, OF LYNN, MASSACHUSETTS.

AUTOMATIC REVERSING DEVICE.

SPECIFICATION forming part of Letters Patent No. 232,308, dated September 14, 1880.

Application filed May 22, 1880. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. SHOREY, of Lynn, county of Essex, State of Massachusetts, have invented an Improvement in Automatic Reversing Devices, of which the following description, in connection with the accompanying drawings, is a specification.

My invention relates to mechanical movements, and is shown in an automatic reversing device.

In some kinds of machinery, as, for instance, washing-machines, it is desirable to have the machinery run a short time in one direction, and then reverse and run in the other direction, such a reversal insuring the proper detensive action and preventing the knotting up of the clothes. It is obvious that such a reversal of the running mechanism is also desirable in other kinds of machinery, as for mixing and stirring and like operations, it being immaterial whether such machinery runs with the same speed or for the same length of time in the two directions.

As herein shown, my invention is embodied in a reversing-gear for a washing-machine, such machine consisting of a drum to receive the clothes and adapted to be rotated in an external casing filled with water, soap, &c.; and it consists in the combination, with a shipping-lever adapted to ship a belt or clutch, of a reversing-gear engaged and rotated by a pinion rotated upon the main cylinder-shaft, the said gear being provided with cam-surfaces to engage and ship the shipping-lever, and thereby reverse the direction of rotation of the machinery, the said reversing-gear included. After thus having reversed the machine by one of its cam-surfaces the reversing-gear carries the cam-surface away from the lever just engaged thereby until, when it has made nearly a whole revolution, another cam-surface engages the said lever, advances to shift, and then again recedes in the reverse direction, and the said gear thus keeps up a continuous oscillating movement until the machinery is stopped.

As herein shown, the reversal is accomplished by a fast and two loose pulleys, and straight and crossed belts therefor, in the usual manner, and the belt-shipper is operated by a compound shipping-lever, the portion engaged by

the cam being a bent lever adjustably connected, as hereinafter described, with the shipping portion, such adjustment enabling the proper amount of movement to be given to the belts.

Figure 1 is a side elevation of my improved reversing-gear; Fig. 2, a section thereof on line X X, showing the form of the frame-work, and Fig. 3 an end elevation thereof.

The frame *a*, of suitable form to sustain the shafts, levers, &c., is provided with flanges and bolt-holes *b*, to properly secure it to the casing of the washing-machine.

The driving-pulley *c*, rotated in one direction by the open belt *d* and in the other by the crossed belt *e*, (see Fig. 3,) is keyed upon the shaft *f*, upon which run the loose pulleys *c*² *c*³ on either side of the driving-pulley *c*, the said pulleys alternately receiving the belts *d* *e*, respectively, while the other one is on the pulley *c*, driving the machine. The shaft *f* carries a pinion, *g*, meshing with the gear *h* on a shaft, *i*, which extends into the casing and carries the clothes-cylinder of the washing-machine. Upon the same shaft *i* is a pinion, *k*, engaging the reversing-gear *l*, and properly proportioned thereto to cause the latter to revolve once while the machine is running for a sufficient length of time in one direction to make it desirable to reverse it.

The reversing-gear *l* carries on its side the reversing-cams *m* *n*, properly placed to engage by their surfaces 2 3 one end, 4, Fig. 1, of the bent lever *o*, pivoted at 5, the other end whereof is pivoted to the short arm of the straight shipping-lever *P*, pivoted at 6, and connected at its other end with the sliding belt-shipper *r*, having the belt-guides *s* *t* and handle *u*.

When the parts are in the position shown in the drawings the open belt *d* is on the driving-pulley *c*, and the crossed belt *e* on the loose pulley *c*³, the end 4 of the lever *o* being in its highest position, and the shipper *r* in its extreme inward position—that is, toward the left in Fig. 1. The machine running under such circumstances, the reversing-gear *l* will turn in the direction of the arrow thereon, Fig. 3, and the surface 2 of the cam *m* will come into engagement with the end 4 of the lever *o*, and as the gear rotates further will move the said end 4 downward toward the

center of the gear *l*, and thus rock the lever *o* and the connected lever *p*, the latter then moving the shipper *r* outward to the right of Fig. 1, first carrying the belt *d* upon the loose pulley *c*², so that it ceases to impel the machine, the latter having sufficient momentum to complete the movement of the shipper *r* to bring the belt *e* upon the pulley *c*, in order to drive the machine in the opposite direction. The gear *l* now turns in the direction opposite to the arrow, the cam *m* moving away from the end of the lever *o*, leaving it in its lowest position until, after nearly a revolution of the gear *l*, the surface 3 of the cam *n* engages the lever *o*, and again reverses the machine, these operations being kept up as long as power is applied to the belts *d e*.

It will be noticed that the surface 2 should extend outward toward the periphery of gear *l* farther than the surface 3, and the latter (3) inward farther than the former (2) by a distance as great as the vertical thickness of the end 4 of the lever *o*, and that the surfaces 7 and 8 may pass along for a short distance over the end of the said lever without further moving it while the movement of the machine in either direction is being checked and reversed.

When the machine is in proper working order the cam-surfaces 2 3 and a portion of the ones 7 8 are all that are needed, and the working-surfaces of both cams *m n* might be placed on a single cam-projection—as, for instance, the one, *m*, bounded by the surfaces 2 7 and the surfaces indicated by the dotted lines, the ones 9 10 performing the function of the ones 3 8; but in case the machine should for any cause fail to reverse, as if by carelessness, the wrong one of the belts *d e* should be crossed, or the connections of the levers *o p* fail, or the belt to check the momentum of and reverse the machine should break, the surface 7 or 10 would continue moving past the lever *o*, and the rear side of the surface 9 or 2 would strike the said lever and cause some breakage or derangement of the machinery. To obviate this the two acting surfaces are placed on the separate cam-projections *m n*, and a channel or space is left between them, so that if either of the entire surfaces 7 or 8 should pass by the lever the latter will be met by the surface 11 or 12, and the lever returned to its original position without damaging the machinery, which would either come to rest with both belts on the loose pulleys, or would continue moving in one direction until the fault was rectified.

A similar protection to the machine might be accomplished by removing the teeth of the gear *l*, embraced by the bracket 13, so that in case the surfaces 7 or 8 should travel too far the gear *l* would become disengaged by the pinion *k* and cease to turn.

It will be understood that the two cam-projections *m n* may really be considered as a single working-cam, and are herein spoken of as such.

The ends of *o* and *p* are slotted, as shown at 14, so that the connecting-pin can be placed at the different points relative to the fulcrum 5 6, and thus properly adjust the throw or amount of movement of the shipper *r* relative to that of the cams *m n*; and the fulcrum 6 of lever *p* is also adjustable in the slot 15, to make the range of movement of the said shipper in its guides *w* between the proper points.

The machine is stopped at any time when the cams *m n* are not near the lever *o* by moving the shipper *r* by its handle *u*, so as to place both belts *d e* on the loose pulleys *c*² *c*³.

It is evident that the reversing-wheel *l* may be driven by a pulley, as there need not be any positive time relation between the act of reversal and other movements of the machine. It is also obvious that the shipping-lever may act on a clutch or other driving arrangement instead of the belts.

If desired, the two cam-projections *m n* might be placed on opposite sides of the wheel *l*, in which case the surfaces 2 and 3 would be the acting surfaces if one of the belts, as the one marked *e*, were crossed, while the surfaces 11 12 would act if the other one of the belts were crossed, and the cams might be so placed that one pair of surfaces would act at different intervals from the other pair.

I claim—

1. In a reversing mechanism for washing-machines, the following elements, namely: a reversing-wheel rotated in connection with the machine and provided with two cam-surfaces and a shipping-lever to be engaged and moved by one of the said cam-surfaces in the rotation of the reversing-wheel in one direction to reverse the direction of rotation of the machine, the reversing-wheel included, after which the said lever is engaged by the other cam-surface to again reverse the machine, which is thus automatically caused to run continuously in opposite directions alternately after the alternate engagements of the two cam-surfaces, substantially as described.

2. In a reversing mechanism, a shipping-lever to reverse the driving mechanism and a reversing-wheel and primary cam-surfaces thereon to alternately engage and actuate the said lever, combined with secondary cam-surfaces to actuate the shipping-lever if for any cause the operation of the primary surface fails to reverse the machine and the reversing-wheel continues its rotation in the same direction after the said primary cam-surface has moved the shipping-lever, substantially as and for the purpose set forth.

3. In a reversing mechanism, the reversing-gear and a reversing-cam thereon, combined with a shipper and a compound lever, one portion of which is acted upon by the reversing-cam and the other portion whereof is connected with the shipper, the two portions being adjustably connected with one another, whereby the throw of the shipper relative to that of the cam can be properly regulated by changing

the position of the connecting device, substantially as described.

4. The combination of the reversing-gear and cam-surfaces thereon with the shipper and shipping-lever having a movable fulcrum, whereby the path or range of movement of the shipper can be varied in position, substantially as described.

5. The reversing-gear and its reversing-cam, the bent lever adapted to be engaged thereby, combined with the adjustably-pivoted lever, adjustably connected with the said bent lever, and the belt-shipper, all arranged and to operate substantially as described.

6. In a reversing mechanism for machinery, the shipping-lever combined with a reversing-

wheel provided with the cam-projection *m n*, with the working cam-surfaces at the ends of and the diagonal channel between the portions *m n*, to allow the said cam-projection to pass by the shipper without breakage or derangement of the machinery in case the latter for any cause fails to reverse, substantially as described.

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

GEORGE L. SHOREY.

Witnesses:

JOS. P. LIVERMORE,
ARTHUR REYNOLDS.