

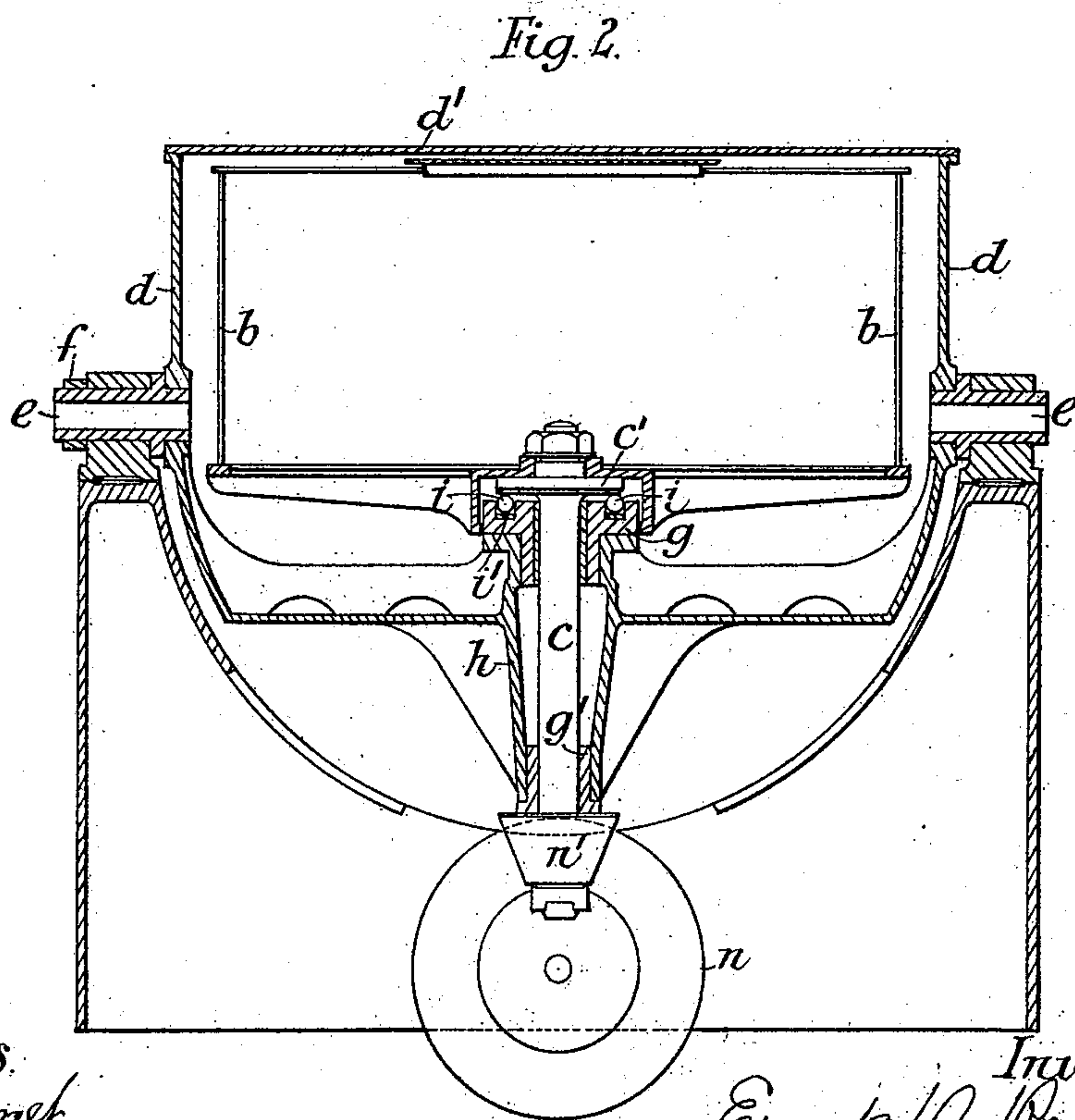
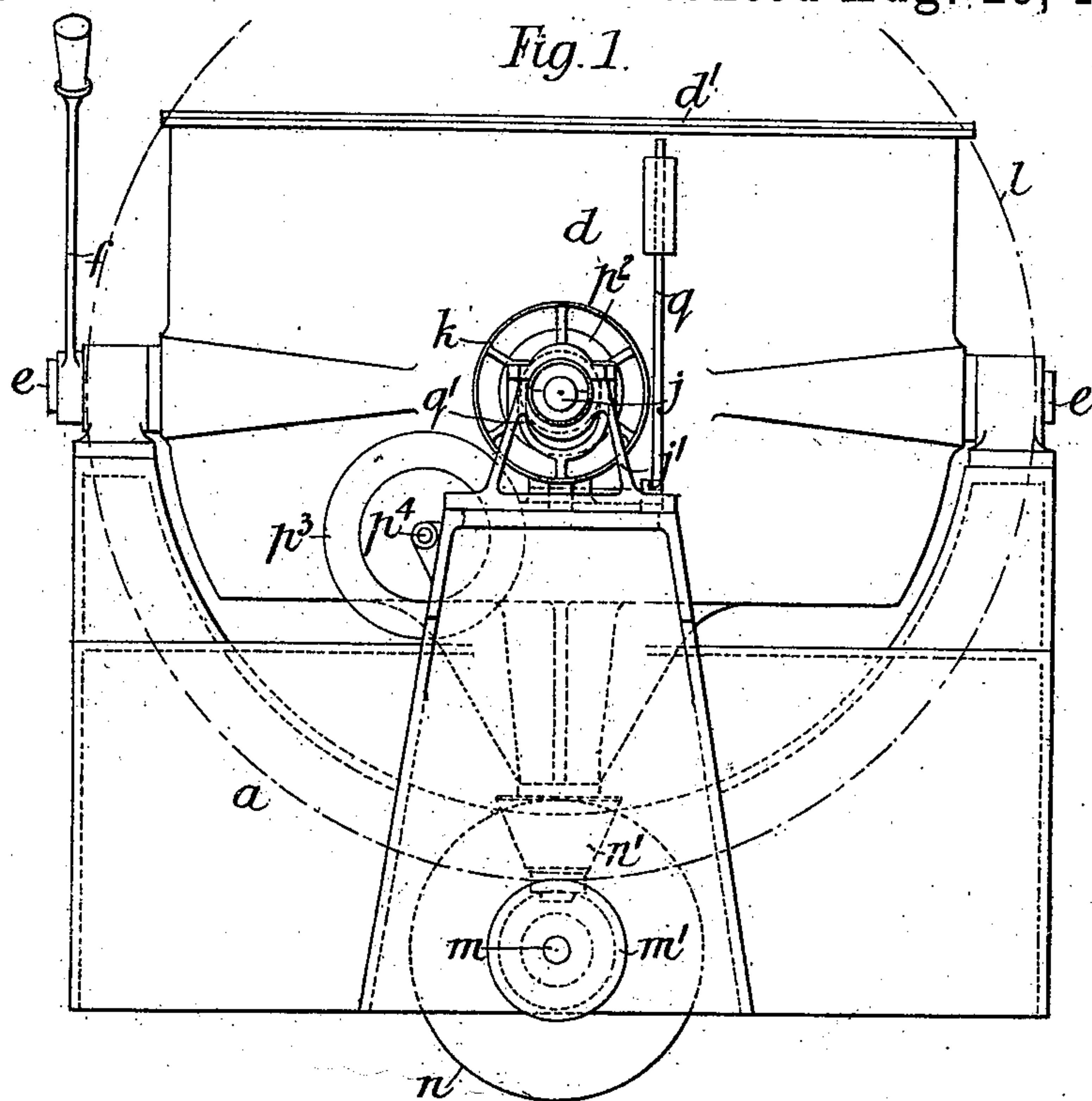
(No Model.)

5 Sheets—Sheet 1.

E. D. REEVE.  
WASHING MACHINE.

No. 504,246.

Patented Aug. 29, 1893.



Witnesses.

Wm. Burnett.

Alex. Scott.

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By John H. Halsted for  
his Atty's

(No Model.)

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Fig. 3.

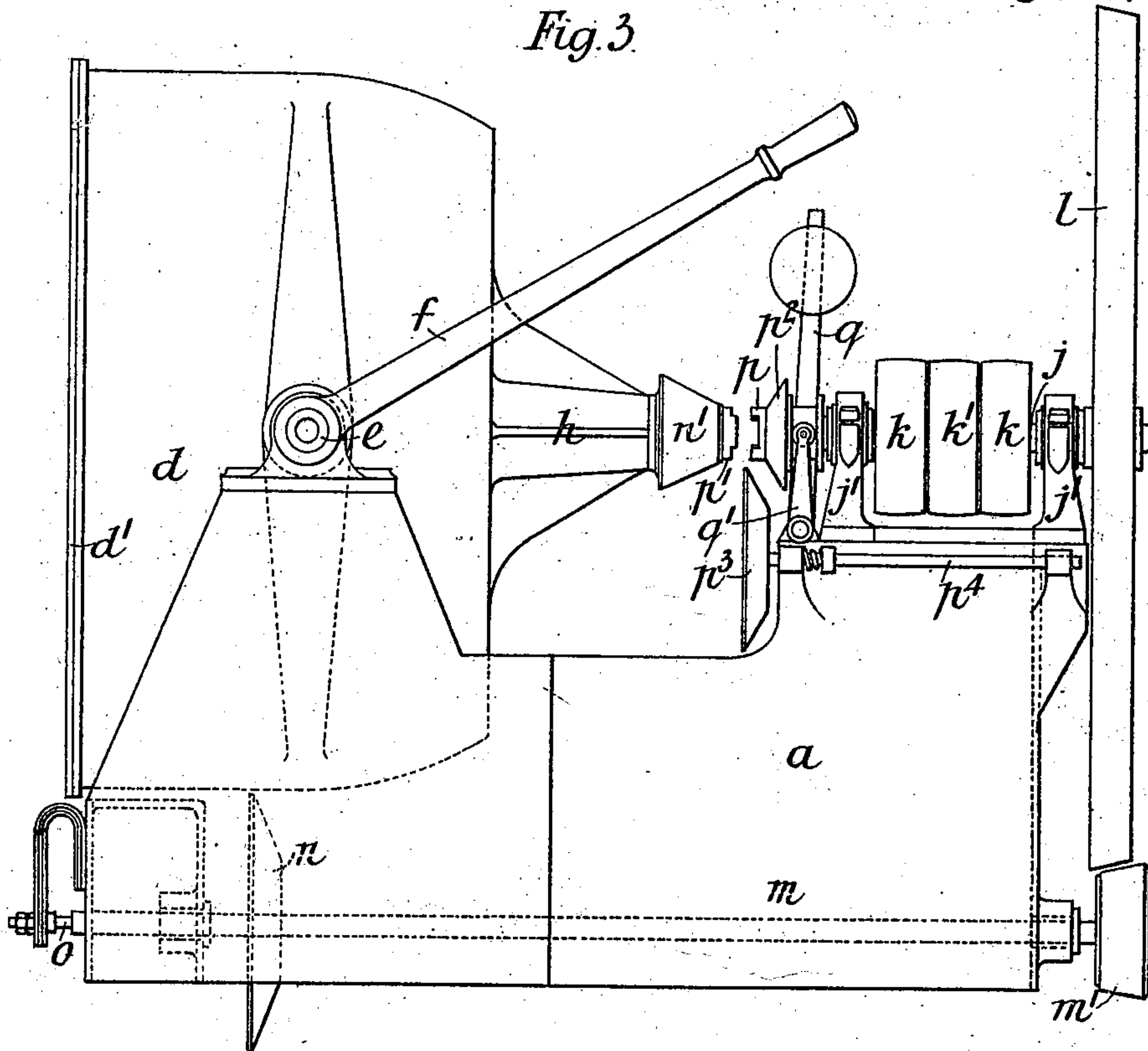
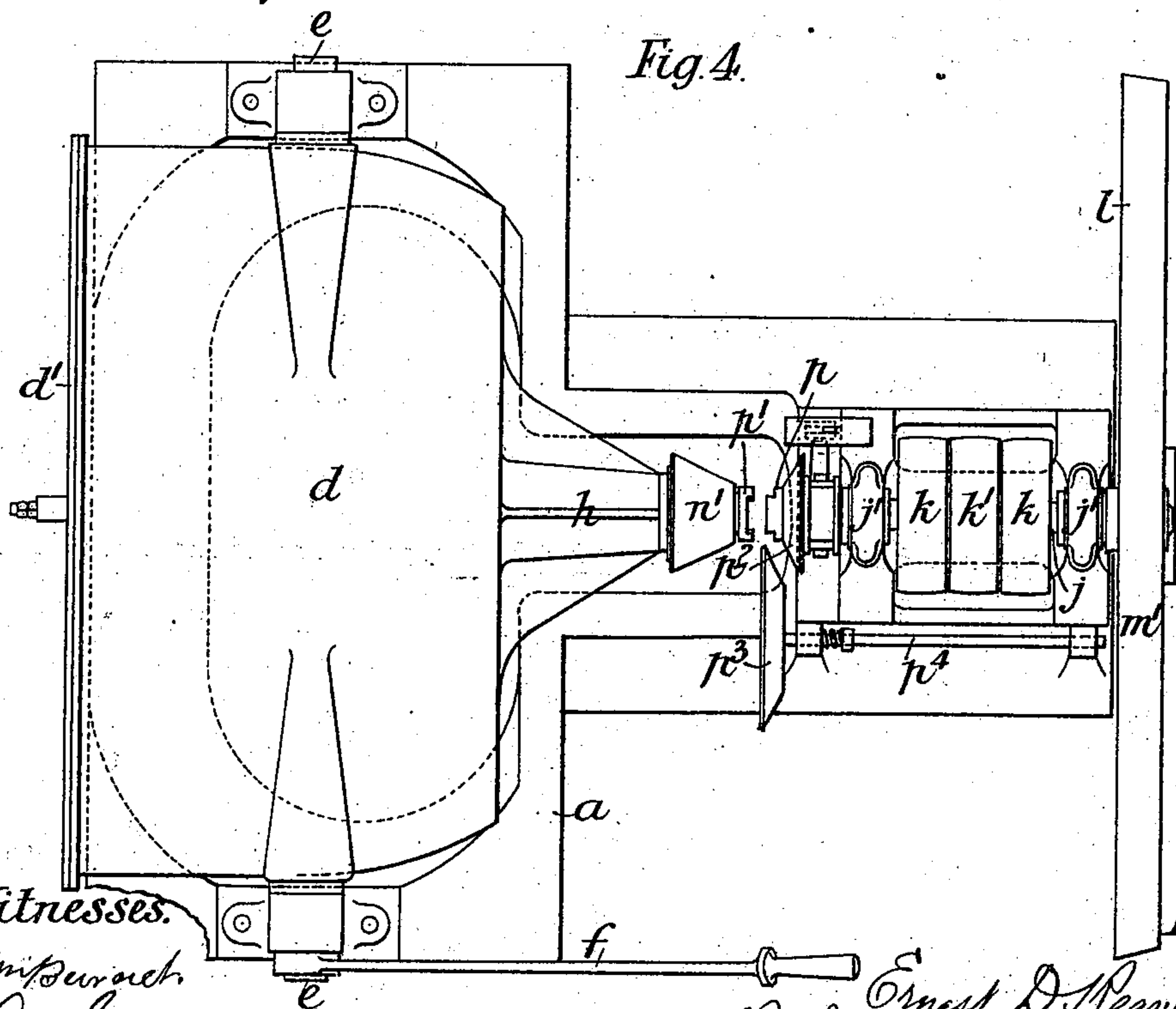


Fig. 4.



Witnesses.

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Fig. 5

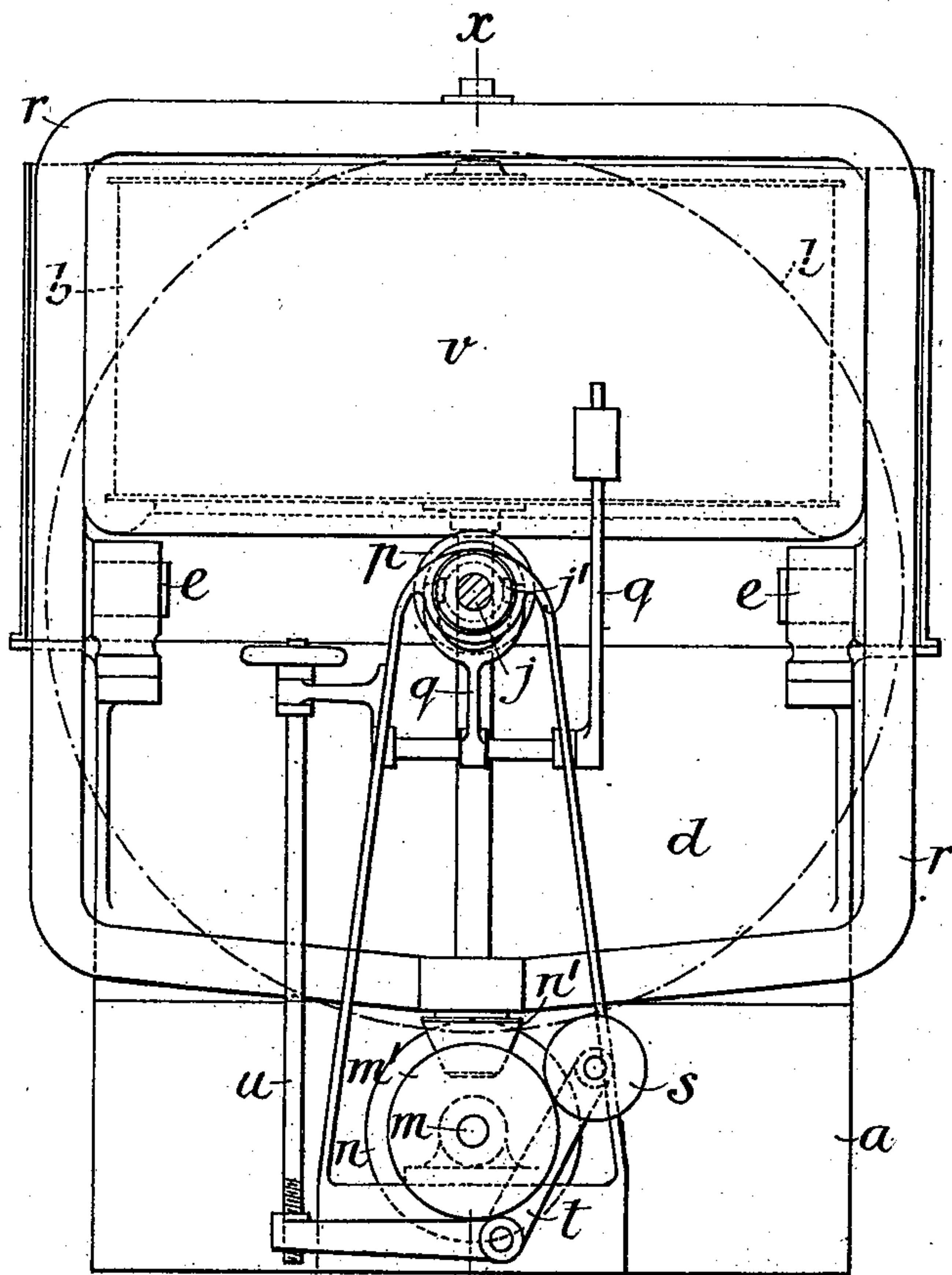
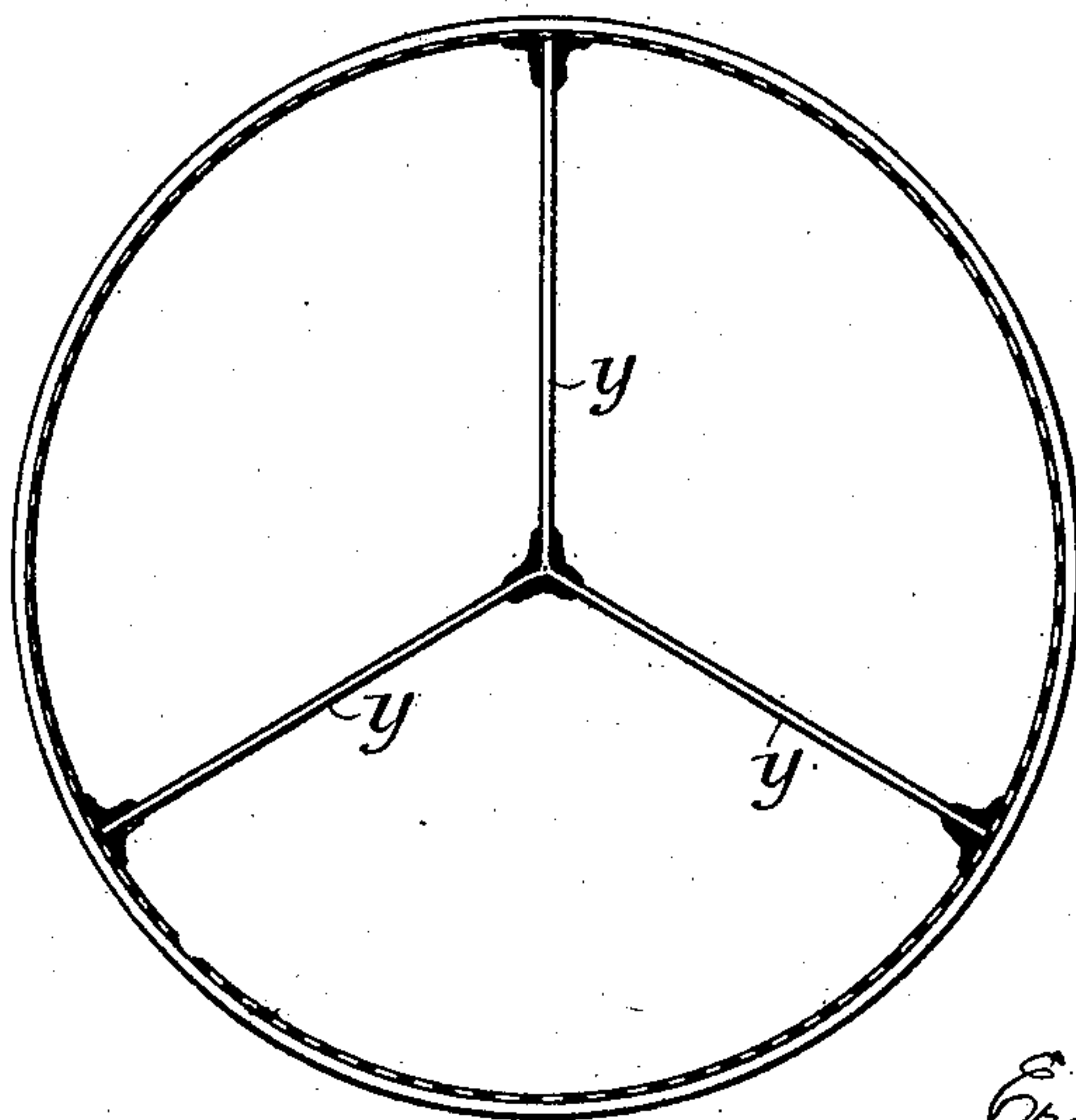


Fig. 8



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(No Model.)

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Fig. 6

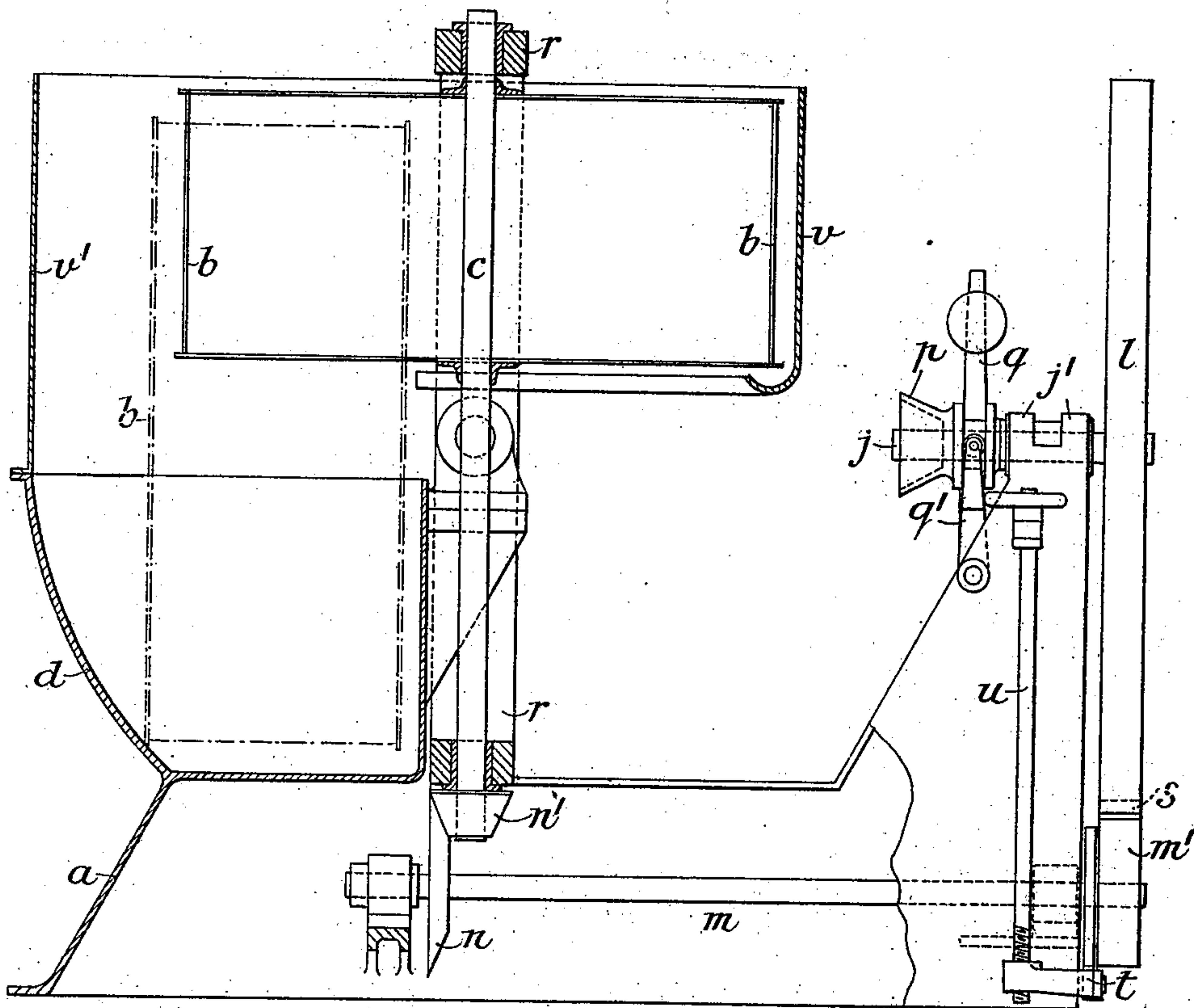
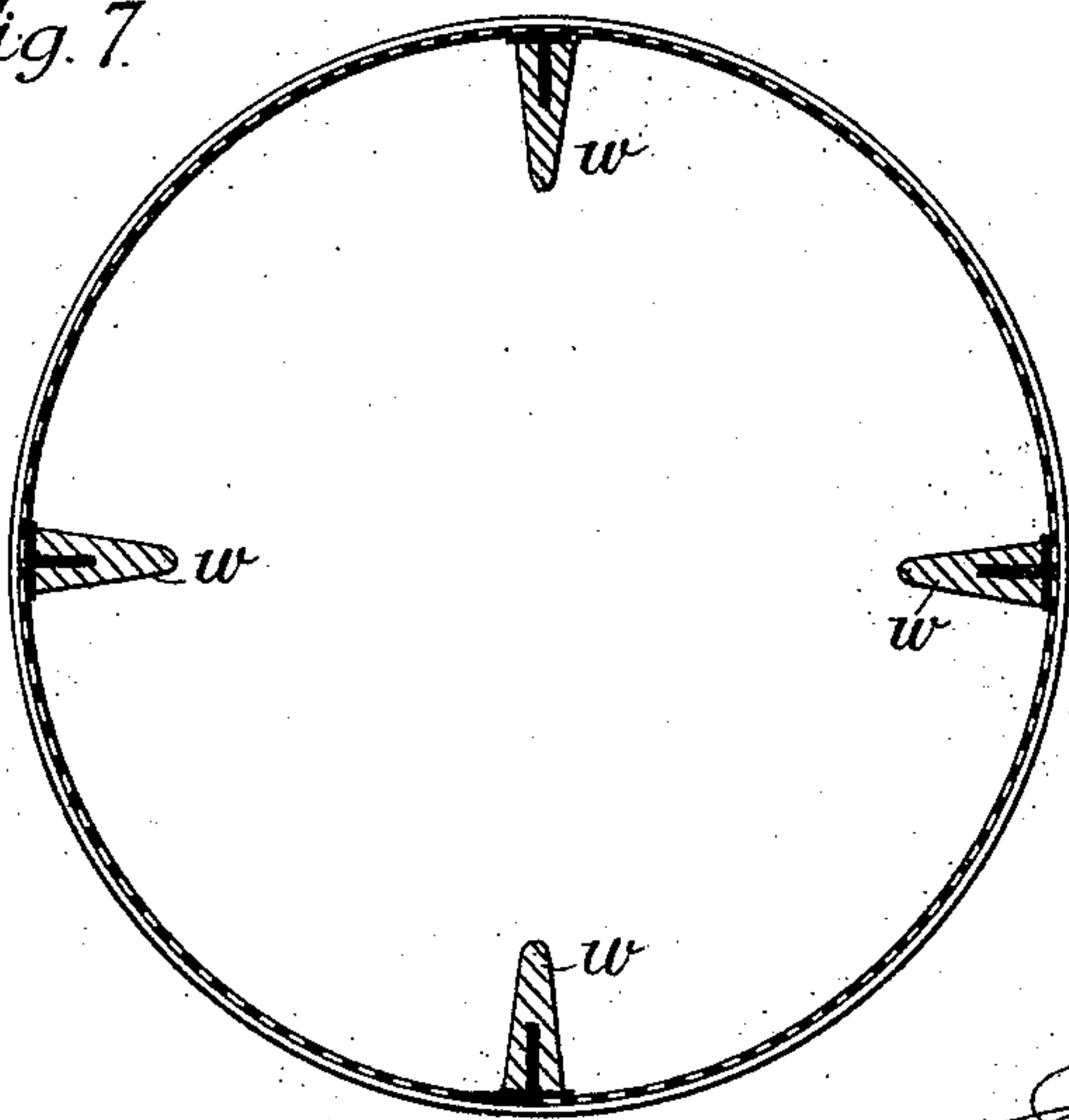


Fig. 7



Witnesses.

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(No Model.)

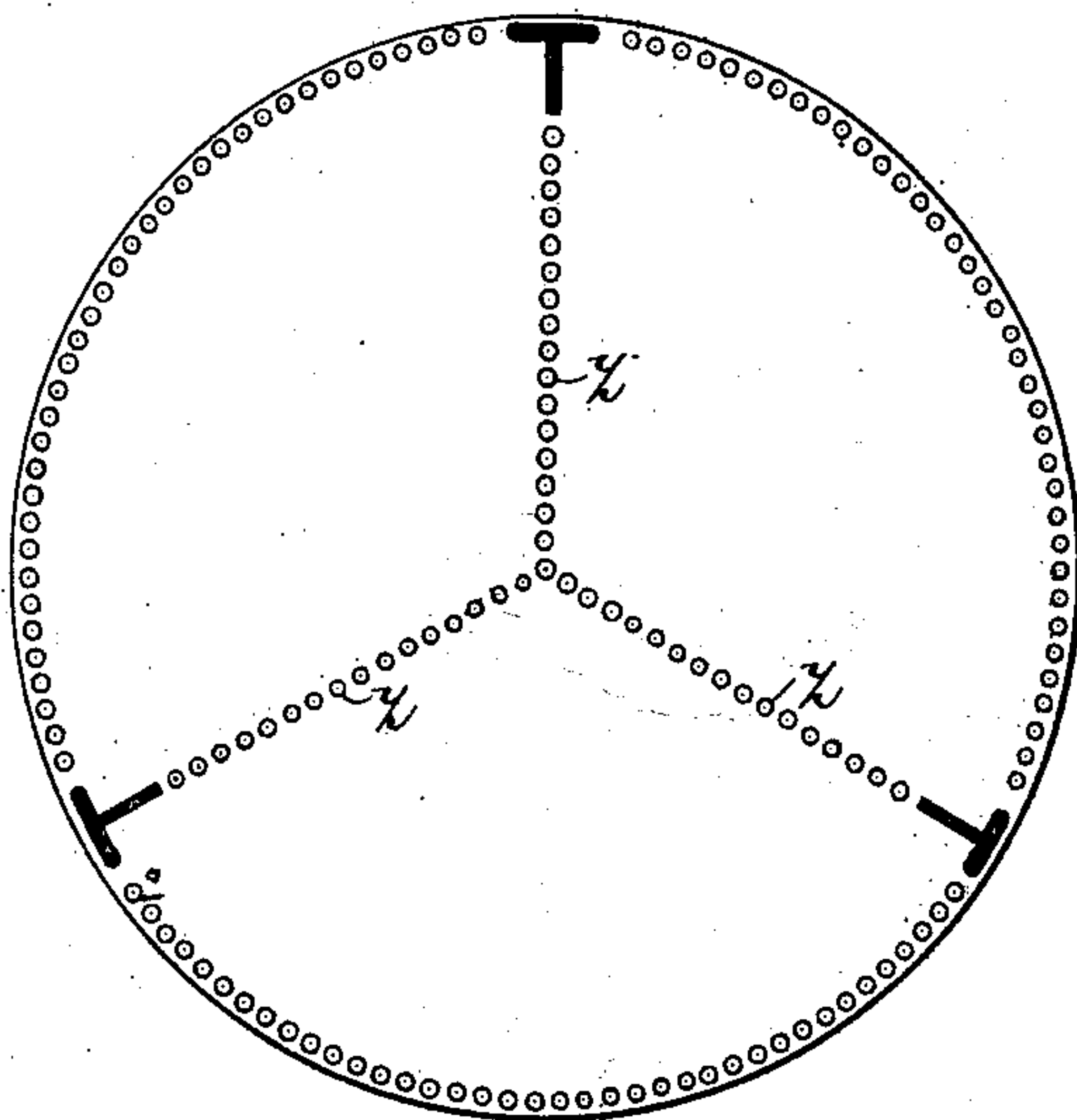
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E. D. REEVE.  
WASHING MACHINE.

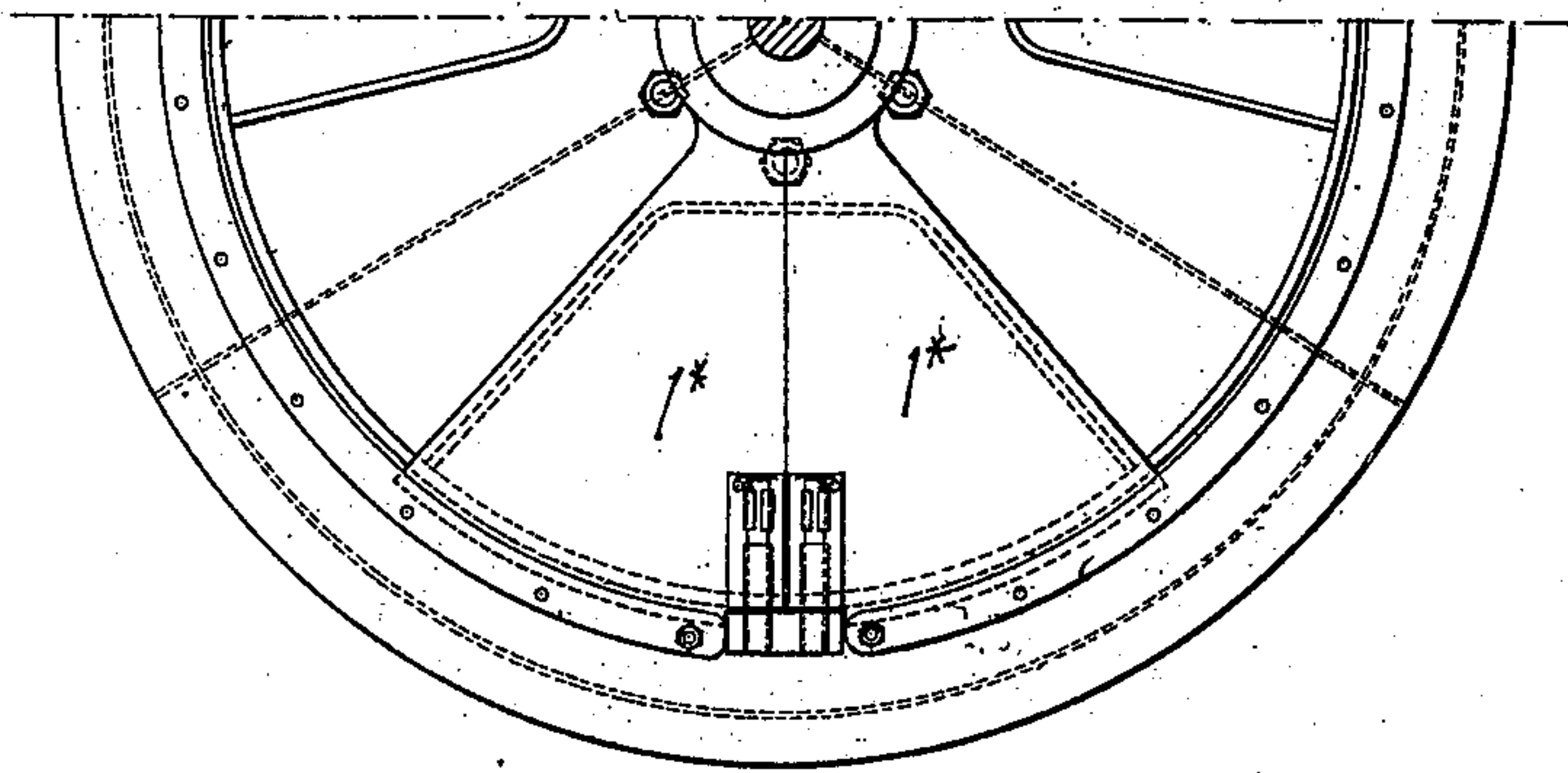
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*Fig. 9.*



*Fig. 10.*



Witnesses.

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# UNITED STATES PATENT OFFICE.

ERNEST DALBY REEVE, OF LONDON, ENGLAND.

## WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 504,246, dated August 29, 1893.

Application filed December 29, 1890. Serial No. 376,187. (No model.)

*To all whom it may concern:*

Be it known that I, ERNEST DALBY REEVE, a subject of the Queen of Great Britain, residing at Putney, London, England, have invented new and useful Improvements in Washing and Drying Machinery, of which the following is a specification.

This invention relates to machinery for washing or cleansing and for drying clothes and other goods or articles made of textile fabric, and especially to that class of such machinery in which a rotating cage, adapted to effect the double purpose of washing and drying is employed.

According to my invention I provide apparatus in which the cage is mounted so that its axis of rotation may be placed in either a horizontal or vertical position in such a manner that, when in one position the cage will be partly immersed in a tank of washing liquid, and when in the other position, the cage will be clear of the liquid and capable of being used as a hydro-extractor, or so that it may be raised above the liquid.

To enable my invention to be fully understood I will describe the same with reference to the accompanying drawings, in which—

Figure 1 is an end elevation of a combined washing-machine and hydro-extractor constructed according to my invention, the parts being in the positions which they occupy when the apparatus is being used as a hydro-extractor; and Fig. 2 is a vertical section of the same. Figs. 3 and 4 are a side elevation and plan respectively of the apparatus showing the parts in the positions which they occupy when the apparatus is being used as a washer. Fig. 5 is an end elevation partly in section of a modified form of apparatus; and Fig. 6 is a side elevation of the same partly in section on the line *x x* Fig. 5. Figs. 7, 8 and 9 are views illustrating suitable constructions of cages for use with my apparatus, and Fig. 10, a half-plan showing the two doors of one of the compartments, the doors being marked 1\*.

Similar reference letters indicate corresponding parts in the several figures.

*a* indicates the frame or bed of the apparatus, *b* the cage, *c* the spindle upon which the same is mounted and which is hereinafter termed the cage spindle, *d* the tank in

which the said cage rotates and which is provided with a cover *d'*, and *e, e* trunnions by means of which the tank is supported upon the frame *a*.

As shown in Figs. 1 to 4, this tank is made of greater depth than the cage so that, when the said tank is in the position shown in Figs. 1 and 2, the washing liquid will lie below the cage and so permit the latter to be used for drying purposes. When, however, the tank is turned upon its trunnions to the position shown in Figs. 3 and 4, the cage will be partly immersed in the said washing liquid.

*f* is a lever attached to one of the trunnions *e* to facilitate the movement of the tank from one position to the other.

*g, g'* are bearings for the cage-spindle *c*, the said bearings being fixed at the two ends of a sleeve or bracket *h* at the center of the bottom of the tank *d*; and in order to reduce the friction as much as possible between the flange *c'* on the cage-spindle and the bearing *g*, I advantageously form in the said bearing *g* a groove (or grooves) into which I insert friction-balls *i, i*, the bottom of the said groove being preferably lined with a case hardened steel plate *i'*, which can be readily removed and renewed when worn.

*j* is the driving-shaft mounted in bearings *j', j'* on the frame *a* and carrying two fast pulleys *k, k* and a loose pulley *k'*, and which are arranged to be driven by open and crossed belts in a well known manner in order that the direction of rotation of the driving-shaft may be reversed.

*l* is a fly-wheel mounted upon the shaft *j*, and serving to transmit motion to a countershaft *m*, through the medium of the wheel *m'* in engagement with the wheel *l*.

*n* is a bevel friction wheel keyed upon the countershaft *m*, and adapted, when the tank is in the position shown in Figs. 1 and 2, to engage with a friction pinion *n'* on the cage-spindle *c* to impart motion to the cage which motion owing to the arrangement and relative diameters of the various wheels will be very rapid.

In practice I prefer to cone the surfaces of the wheels *l, m'*, as shown, so that motion is communicated from the former to the latter by friction, and in order that the wheel *m'*



shall be out of contact with wheel  $l$ , except when required for use, I provide a spring center  $o$ , which presses against one end of the countershaft  $m$ . When, however, the friction-pinion  $n'$  is in contact with the bevel-wheel  $n$  the pressure of the said pinion overcomes the pressure of the spring center so that the wheel  $m'$  is drawn into contact with the wheel  $l$ ; this spring center also serves to reduce friction by regulating the pressure between the friction-wheels.

$p$  is a clutch-box connected to the shaft  $j$  by a spline-joint so that it can slide upon the said shaft to cause it to engage with another clutch-box  $p'$  upon the end of the cage-spindle  $c$ , when the latter is in the position shown in Figs. 3 and 4, so that the motion of the driving-shaft will be communicated to the cage.

$q$  is a weighted lever having a fork  $q'$  which engages in a groove in the clutch-box  $p$ , and serves to move the said clutch-box longitudinally upon the shaft  $j$ , and to retain it in or out of gear with the clutch-box  $p'$ , as required.

In order that when the apparatus is being used for washing the belts shall be periodically shifted to reverse the direction of rotation of the cage, I provide the clutch-box  $p$ , with a cone-surface  $p^2$ , which, when the said clutch-box  $p$  is in engagement with the clutch-box  $p'$ , comes into frictional contact with a cone-wheel  $p^3$  on a shaft  $p^4$ , provided with a screw-thread or otherwise arranged for traversing the belt-shipping forks, (not shown) which forks may be connected to the shaft  $p^4$ .

In the modification of my invention shown in Figs. 5 and 6, the tank  $d^2$  is fixed upon the frame  $a$  and the cage is adapted to rotate with a frame  $r$ , provided with trunnions  $e, e$ , mounted in bearings on the said tank, so that the said frame  $r$  and its cage may be turned over about ninety degrees and thus be moved from the position shown in full lines in Fig. 6 to that shown in dotted lines in the said figure to immerse it more or less in the liquid in the said tank. In this modification the portion  $p$  of the clutch coupling consists of a hollow cone, adapted to be frictionally engaged with the friction pinion or cone  $n'$  on the cage-spindle  $c$ . Also the motion of the fly-wheel  $l$  is communicated to the wheel  $m'$  through the medium of an intermediate friction-wheel  $s$ , which wheel  $s$  is mounted upon a lever  $t$ , operated by a screw-shaft  $u$  in such a manner that by rotating the said shaft  $u$  the said wheel  $s$  can be moved into contact with the wheels  $l$  and  $m'$ , or moved therefrom.

$v$  is a screen or shield surrounding part of the cage  $b$ , and  $v'$  is a screen surrounding the

other part of the cage and fixed to the top of the tank  $d$ .

It is obvious that the machine shown in Figs. 5 and 6 may be provided with pulleys  $k, k, k'$  for driving it with power, as hereinbefore described with reference to Figs. 1 to 4.

The cages which I use in my apparatus may be composed of wire-work (Fig. 7) perforated sheet-metal (Fig. 8), or of tubes or bars (Fig. 9); and they may be provided with rubbers  $w, w$ , as shown in Fig. 7, or divided into sections, and preferably three by means of plates  $y$ , as shown in Fig. 8, or by tubes or bars  $z$ , as shown in Fig. 9. They may also be provided with any well known or suitable door or doors such as shown at  $1^x$  in Fig. 10, in order to afford access to the interior thereof, such doors being held to place by any ordinary latch or latches, button or buttons, or other convenient fastening device or devices.

I advantageously make the trunnions  $e, e$  hollow and supply water, steam, soap, soda and other washing requisites therethrough, and in place of the friction gearing hereinbefore described I may use toothed gearing.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. The combined washing machine and hydro-extractor having a tank and cage relatively disposed substantially as described whereby the axis of revolution of the cage can be turned from a horizontal to a vertical position, in combination with mechanism for rotating the said cage at a higher speed when the axis is vertical, and at a lower speed for washing when the axis is horizontal and partially immersed in the water in the tank, substantially as described.

2. A combined washing machine and hydro-extractor having a cage adapted to rotate in a frame supported upon trunnions, and having such cage and a tank relatively disposed as set forth so that the axis of revolution of the cage can be turned from a horizontal to a vertical position, combined with means substantially as described serving to rotate the cage at a higher speed for hydro-extracting, and at a lower speed for washing when on its horizontal axis and partially immersed in the water in the tank.

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