

No. 663,773.

Patented Dec. 11, 1900.

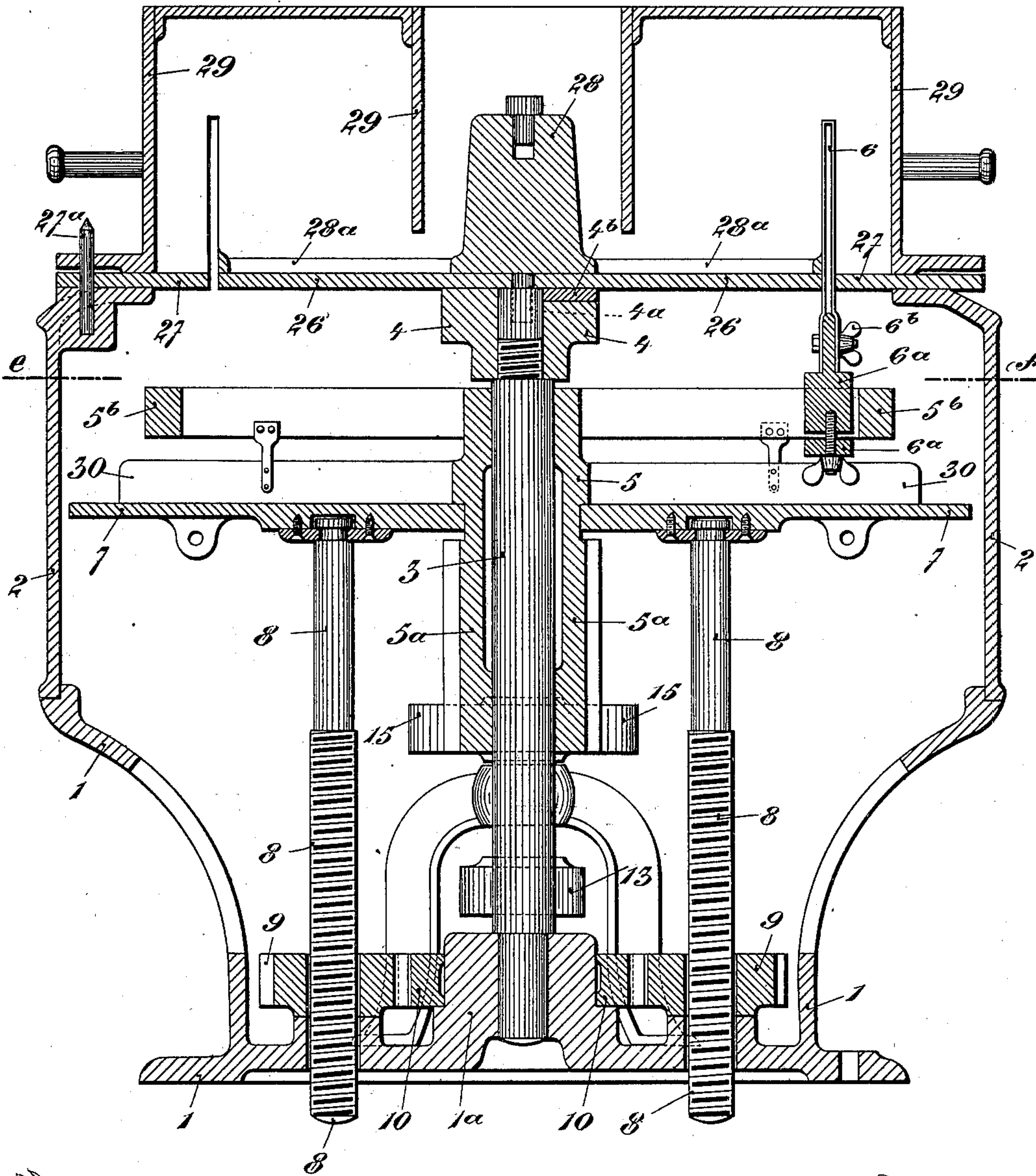
W. MÖBUS.
MOLD MAKING MACHINE.

(Application filed June 14, 1900.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



Witnesses

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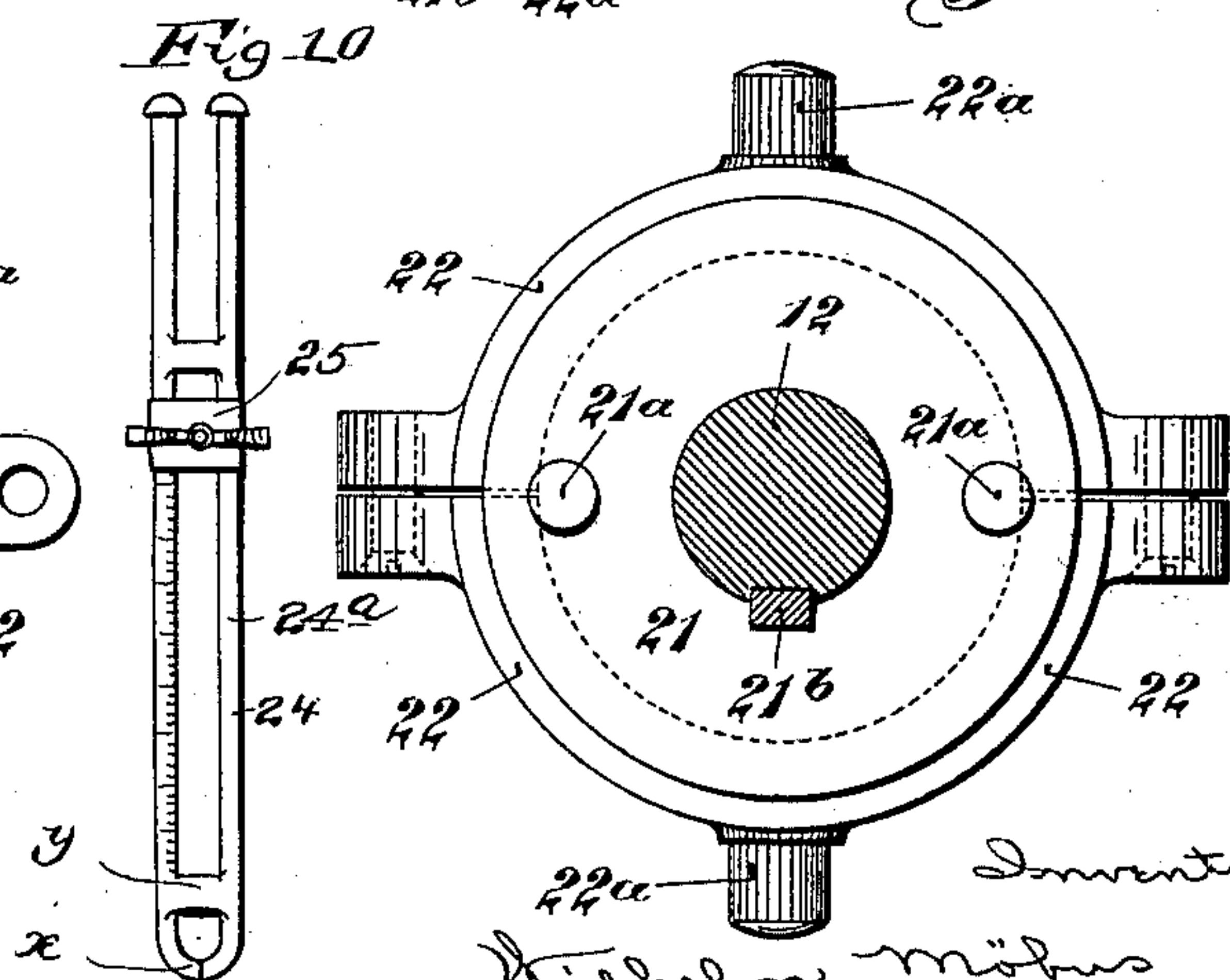
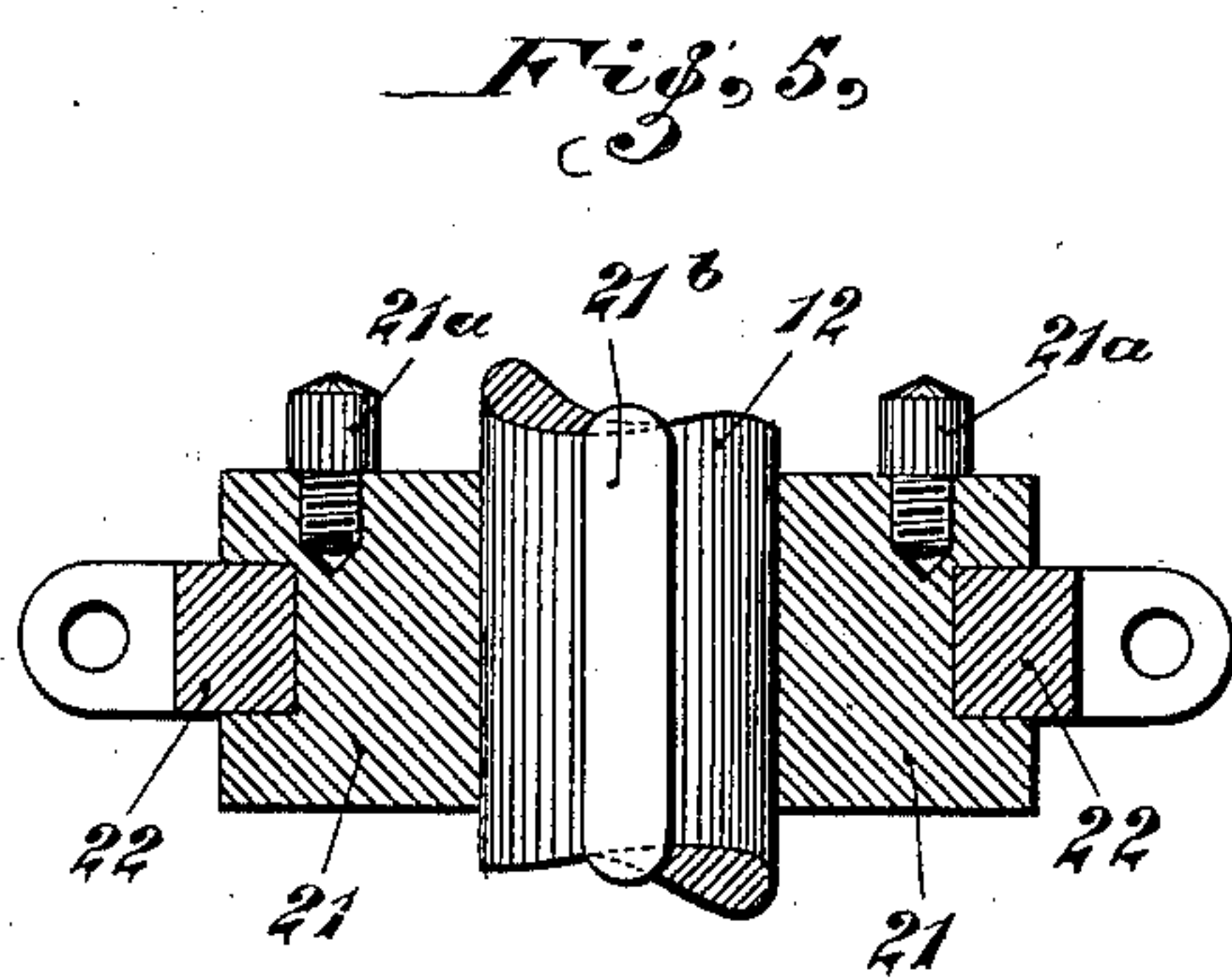
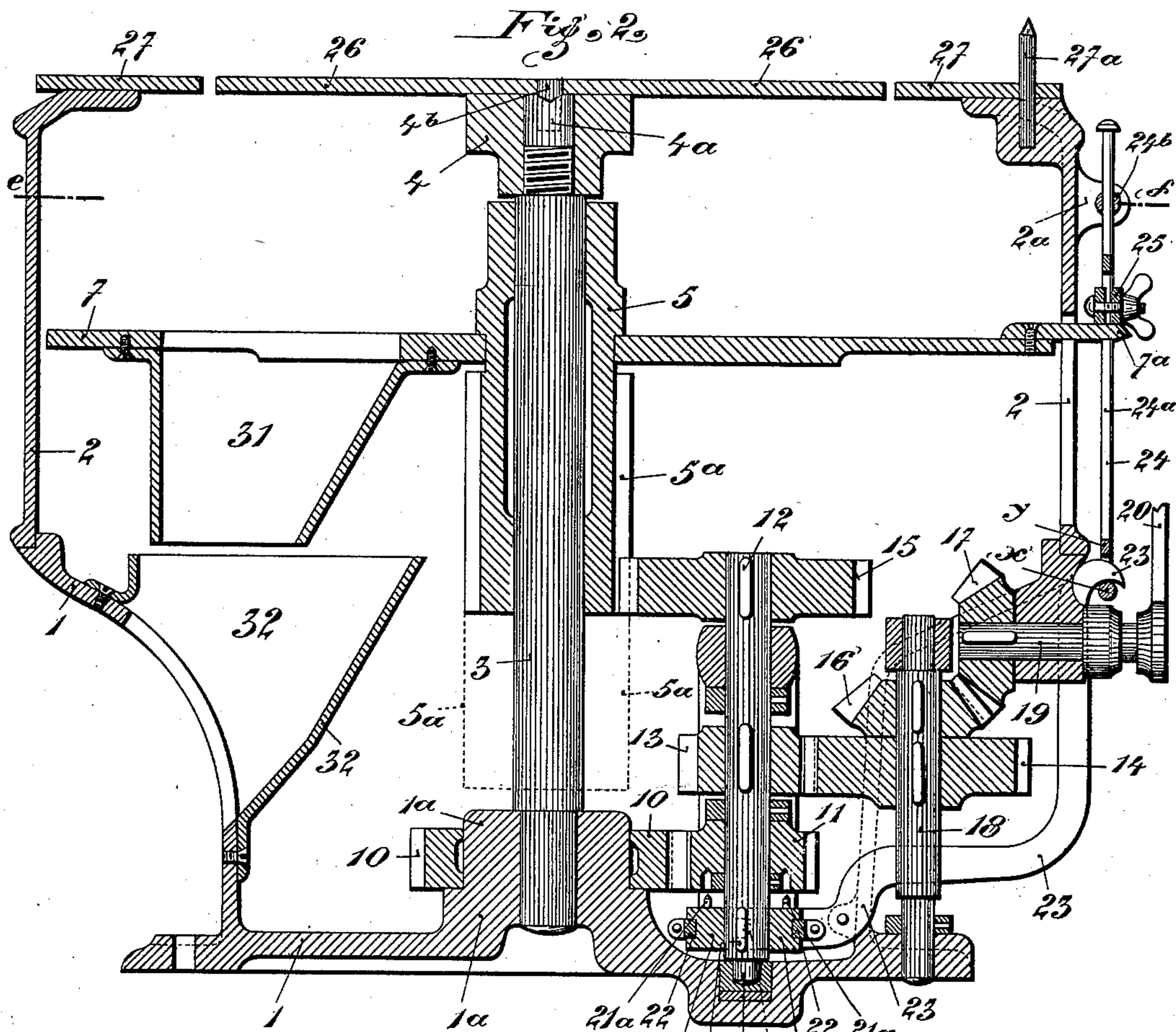
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3 Sheets—Sheet 2.



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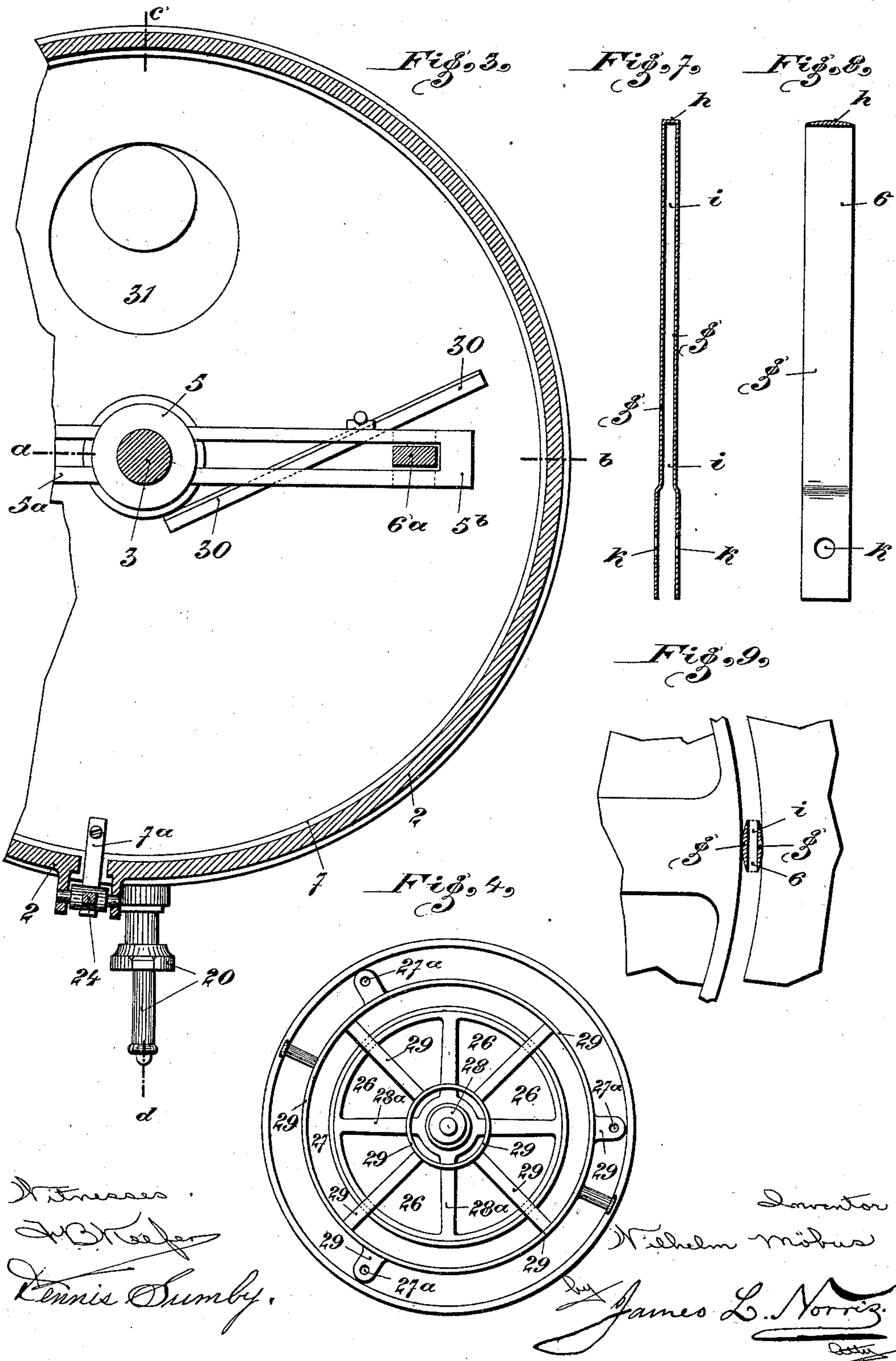
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3 Sheets—Sheet 3.



UNITED STATES PATENT OFFICE.

WILHELM MÖBUS, OF REUTLINGEN, GERMANY.

MOLD-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 663,773, dated December 11, 1900.

Application filed June 14, 1900. Serial No. 20,365. (No model.)

To all whom it may concern:

Be it known that I, WILHELM MÖBUS, engineer, a subject of the King of Würtemberg, residing at Reutlingen, in the Kingdom of Würtemberg and Empire of Germany, have invented certain new and useful Improvements in Mold-Making Machines, of which the following is a specification.

My invention relates to a mold-making machine, especially for making molds for circular parts of machinery.

The present molding-machine differs essentially from other machines intended for the same purpose in that the molding-knife is automatically and with perfect evenness raised or lowered by means of screw-spindles or rack-bars combined with a face-plate and self-setting wheel-gearing, the breadth of the rim to be molded being rapidly and easily adjusted by means of a scale device, the latter stopping the geared wheelwork by means of a disengagement device coupled with it as soon as the cutting-knife or face-plate has reached the intended height.

A mold-forming machine according to this invention is represented in the accompanying drawings.

Figure 1 is a vertical section on the line *a b* of Fig. 3; Fig. 2, a vertical section on the line *c d* of Fig. 3; Fig. 3, a horizontal section showing the face-plate 7 and the rotatory arm 5^b of the sleeve 5 on the line *e f* of Figs. 1 and 2. Fig. 4 is a plan view of the mold device according to Fig. 1 provided with a molding-box for a belt-pulley. Fig. 5 is a vertical section, on a larger scale, of the coupling device 21 according to Fig. 2; Fig. 6, a plan view of the coupling device 21. Figs. 7 and 8 are detail views of the cutter. Fig. 9 is a sectional view of the cutter and a portion of the plates 26 and 27. Fig. 10 is a side elevation of the scale device.

The formation of a mold (for instance, a mold from which belt-pulleys may be cast) is carried out in the following manner: For the sake of clearness it will be assumed that a mold for a belt-pulley with four straight arms is to be made. First a bed-plate 26, on which the mold will eventually be made, of a diameter equal to the inner diameter of the belt-pulley, is fixed in place on a central support 3, the said plate being centrally secured

by means of a stud 4^a and tenon 4^b, closing corresponding recesses in the part 4 on the spindle 3. The molding-knife 6 is then pushed upward toward the plate 26 on its support 6^a, to which it is secured by means of a bolt, with a wing-nut 6^b, and adjusted so that its top is level with the top of the plate 26. An annular plate 27, guided on three rods 27^a, is placed concentrically with the plate 26, its inner diameter being equal to the outer diameter of the belt-pulley to be formed. The nave 28, together with the cross-arms or spokes 28^a, is now put in place, a cover 29 placed over the parts, and the whole packed with sand. At this moment the sleeve 5, together with the long teeth or pinion 5^a, occupies the position shown in Fig. 2. The forming of the mold now proceeds as follows: By turning a crank 20, Fig. 2, its horizontal shaft 19 turns a bevel-wheel 17, keyed on it, gearing with a bevel-wheel 16 on a vertical shaft 18, provided with a spur-wheel 14. The spur-wheel 14 gears with another spur-wheel 13, keyed on a vertical shaft 12. A spur-wheel 15, also keyed on the shaft 12, gears with a broad pinion 5, movable on the shaft 3, and effects the rotatory movement of said pinion. Another spur-wheel 11, arranged loosely on the shaft 12, gears with an intermediate wheel 10, loosely arranged on the bearing of the central shaft, said wheel 10 gearing with two spur-wheels 9, Fig. 1, acting as rotatable nuts for effecting the raising and lowering of the two screw-threaded spindles 8. The screw-threaded spindles 8 may be replaced by toothed bars or the equivalent. The object of the gearing actuated by the crank 20, as described, is to raise the screw-threaded spindles 8, carrying the plate 7, the head 5, with the tooth 5^a and the guide-arms 5^b, carried on said head, as well as the molding-knife holder 6^a and the molding-knife 6, when forming the mold, so that the whole is raised or lowered evenly and at the same time rotated. Before beginning work the scale rod or device 24, on which are marked graduations indicating the heights for the different diameters of wheels, Fig. 2, is set to correspond to the intended breadth of the rim, and this is done in the following manner: Let us assume that it is intended to cast a belt-pulley the rim breadth of which is three hundred milli-

meters, in which case it will be necessary to make two molds, each time making a ring one hundred and fifty millimeters high. A slide 25, adjustably arranged on the scale rod or device 24, on which it can be fixed at any point required, is fixed at one hundred and fifty millimeters high, or rather at one hundred and forty millimeters, for the following reason: The studs 21^a on the top of the coupling-disk 21 are ten millimeters high and have to be allowed for in calculating the height of the rim in question. These studs 21^a are adapted to engage in recesses on the inner side of the pinion 11 to couple them together.

The object and construction of the scale device 24 and the coupling-disk 21 are as follows: In order to be able to form molds for belt-pulleys of any required width, the scale device 24 is constructed of two vertical uprights connected together in such a manner as to form a slot or passage 24^a between the same, in the slot 24^a of which a projection 7^a of the annular plate 7, loosely arranged around and supported on the plate 7, is movable upward and downward. The scale device 24 is guided by the rotatory shaft 24^b, mounted in projections 2^a on the machine-frame 2. The scale device is squared at its upper end and can be moved upward or downward, as desired. The scale device is provided at the lower end with a round cross-bar *x* and a square cross-bar *y*, the latter resting against a projection of the uncoupling-lever 23 during the time the formation of the mold is taking place and until the projection 7^a has risen sufficiently to effect the disengagement of the coupling 21, in consequence of which the connection between the pinion 21 and the toothed wheel 11 is broken. The uncoupling-lever 23 is fork-shaped at its end and acts upon the studs or trunnions 22^a, Figs. 2 and 6, of a ring 22, surrounding the coupling-disk 21. This disk 21 is arranged on the lower end of the vertical shaft 12 and rotates with it, being connected by a feather and groove device 21^b. The disk 21, with its studs 21^a, effects the communication with the toothed wheel 11 (but only through the falling of lever 23) in such a manner that the studs 21^a enter into corresponding recesses in the toothed wheel 11, as represented in Fig. 2. As soon as the cutter or the projection 7^a on the ring 7 has reached the predetermined height the said projection raises the bar 24, and with it the lever 23, and with it the coupling-disk 21, to such a height that the vertically-movable spur-wheel 11 stops rotating and the screw-threaded spindles 8 can no longer effect a further raising of the molding-knife. The crank-lever 20 is still rotated several times, so as to smooth the surfaces formed by the molding-knife 6. Then the scale device 24 is disengaged from the projection of the lever 23, whereupon the latter falls downward and the coupling-disk 21 is again engaged with the toothed wheel 11. The crank 20 is now turned to the left

instead of to the right, in consequence of which the whole mechanism returns to its initial position. It is now possible to remove the sand-mold, together with the mold-box 29. To continue the work, it is necessary to again connect the lever 23 with the bar *x* of the scale device 24. The sand falling through the slot of the plates 26 and 27 onto the plate 7 is swept by plates or scrapers 30 into funnels 31 32, and thence onto the floor in such a manner that no sand can fall into the mechanism.

When belt-pulleys of more than one series of arms are required, it will be necessary, as is usually the case, to provide several mold-cases arranged on each other, such a construction not being indicated here for the sake of clearness.

The molding cutter or knife 6 used in combination with this mold-forming machine is represented in Fig. 7 in a longitudinal section, in elevation in Fig. 8, and in cross-section in Fig. 9 and differs from those generally used in that it is formed of a pair of parallel blades each having its outer face rounded, as at *g*, connected together at their top in a rounded manner, as at *h*, and spaced apart to form the elongated slot *i*. This construction offers the advantage that by means of such a cutter a perfectly clean and smooth mold can be formed. This fork-shaped construction has also the additional advantage that no sand can become packed in front of the cutter, the sand passing through the slot *i* of the cutter 6. Besides this the molding-cutter used in the present mold-forming machine combines two knives in itself. Although the edges of the slot of the cutter cut a passage in the sand narrower than that which is intended to be cut, this is rectified by means of the bulging sides of the cutter, as represented in Fig. 9. The cutter is removably fastened at *k* to the knife-holder of the machine.

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. In a mold-forming machine, a molding knife or cutter consisting of a pair of parallel blades suitably spaced apart, connected together at their upper end and having their outer face and upper cutting-surface rounded.

2. In a mold-forming machine, a bed-plate, an annular plate surrounding the same and positioned in such a manner as to form a slot or passage between the two plates, an adjustable molding knife or cutter operating in the said slot or passage, and consisting of a pair of parallel blades suitably spaced apart, connected together at their upper ends and having on their outer face an upper cutting-surface surrounded by a rotating arm for supporting said knife or cutter, means for automatically elevating and rotating simultaneously said arm and knife or cutter, and means for

automatically discontinuing the vertical movement of the said arm and knife, substantially as described.

3. In a mold-forming machine, a bed-plate, 5 an annular plate surrounding the same and positioned in such a manner as to form a slot or passage between the two plates, an adjustable molding knife or cutter operating in the said passage and consisting of a pair of parallel blades connected together at their upper 10 end and having their outer face and upper cutting-surface rounded, a rotating vertically-moving arm arranged below the said plates and adapted to support said knife or cutter, 15 a plate 7 arranged below said arm, a projection connected to the said plate, a scale device provided with a suitable slot in which operates said projection, means for simultaneously rotating and elevating said arm, and 20 means adapted to be operated by said projection for discontinuing the operation of said elevating means.

4. In a mold-forming machine, a scale device provided with a suitable slot, a molding 25 knife or cutter, means for simultaneously rotating and elevating said knife or cutter, a connection between said means and said scale, and means operating in said slot and adapted to operate said connection for discontinuing the movement of said operating 30 means.

5. In a mold-forming machine, a scale de-

vice provided with a suitable slot, a molding knife or cutter, a suitable gearing for simultaneously elevating and rotating the same, a 35 coupling-disk adapted to engage said gearing for discontinuing the operation thereof, an uncoupling-lever connected to said disk and said scale, and means operating in said slot 40 and adapted to elevate said scale for operating said lever and cause said disk to contact with said gearing.

6. In a mold-forming machine, a scale device provided with a suitable slot, a knife or cutter, a suitable gearing for simultaneously 45 rotating and elevating the same, a coupling-disk adapted to engage said gearing for discontinuing the operation thereof at a set point, an uncoupling-lever connected at one end to said disk and at its opposite end to 50 said scale, means operating in said slot and adapted to elevate said scale for operating said lever and cause said disk to engage with said gearing, and means rotating simultaneously with said knife or cutter for removing 55 the surplus sand during the molding operation.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILHELM MÖBUS.

Witnesses:

ERNEST ANDRÉ,
WILLIAM ESSENWEIN.