S. GRIFFITH.

MOLDING APPARATUS.

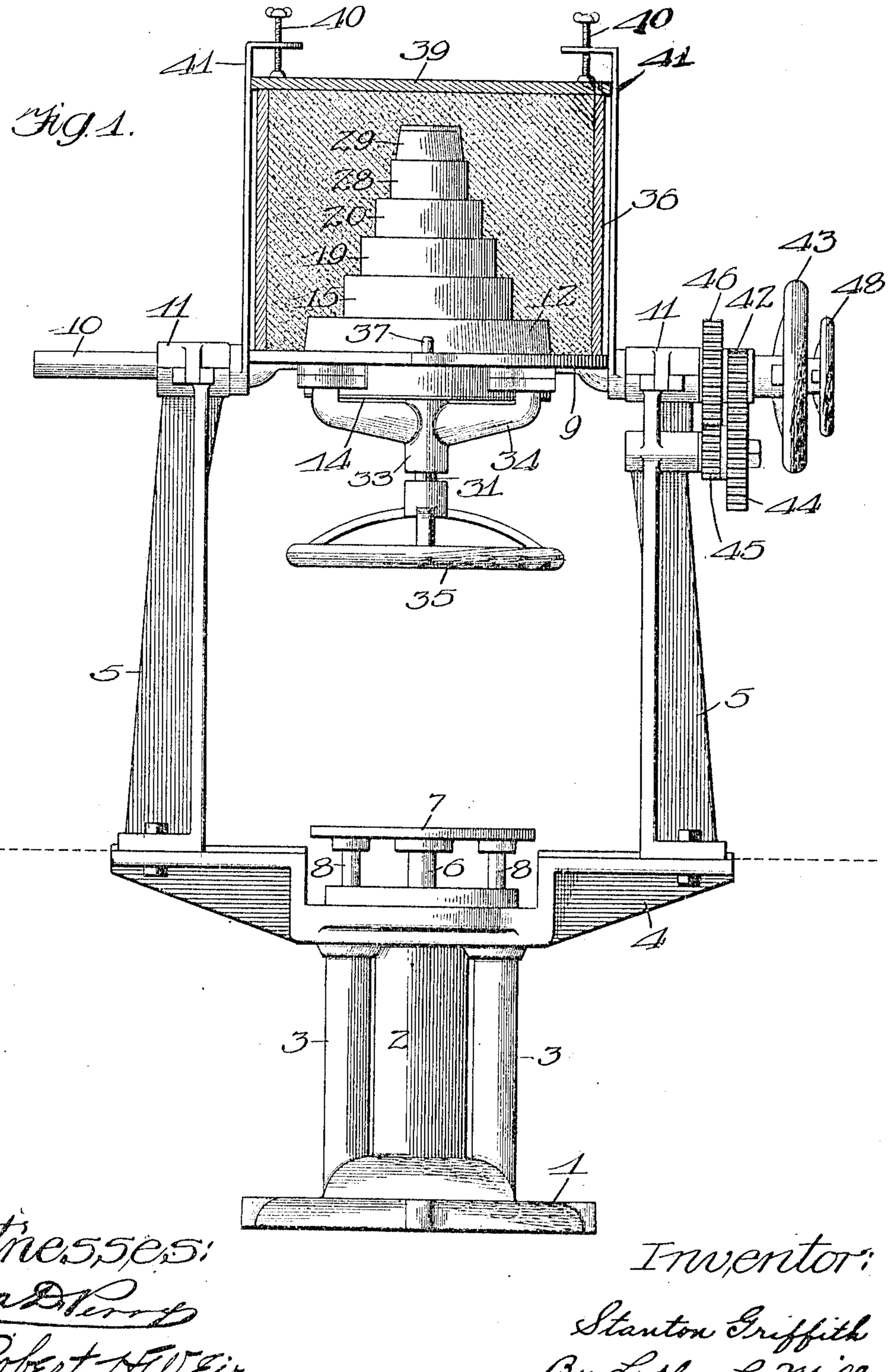
APPLICATION FILED NOV. 13, 1907.

954,430.

Patented Apr. 12, 1910.

5 SHEETS—SHEET 1.

Fig. 1.



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5 SHEETS—SHEET 2.

Fig. 2.

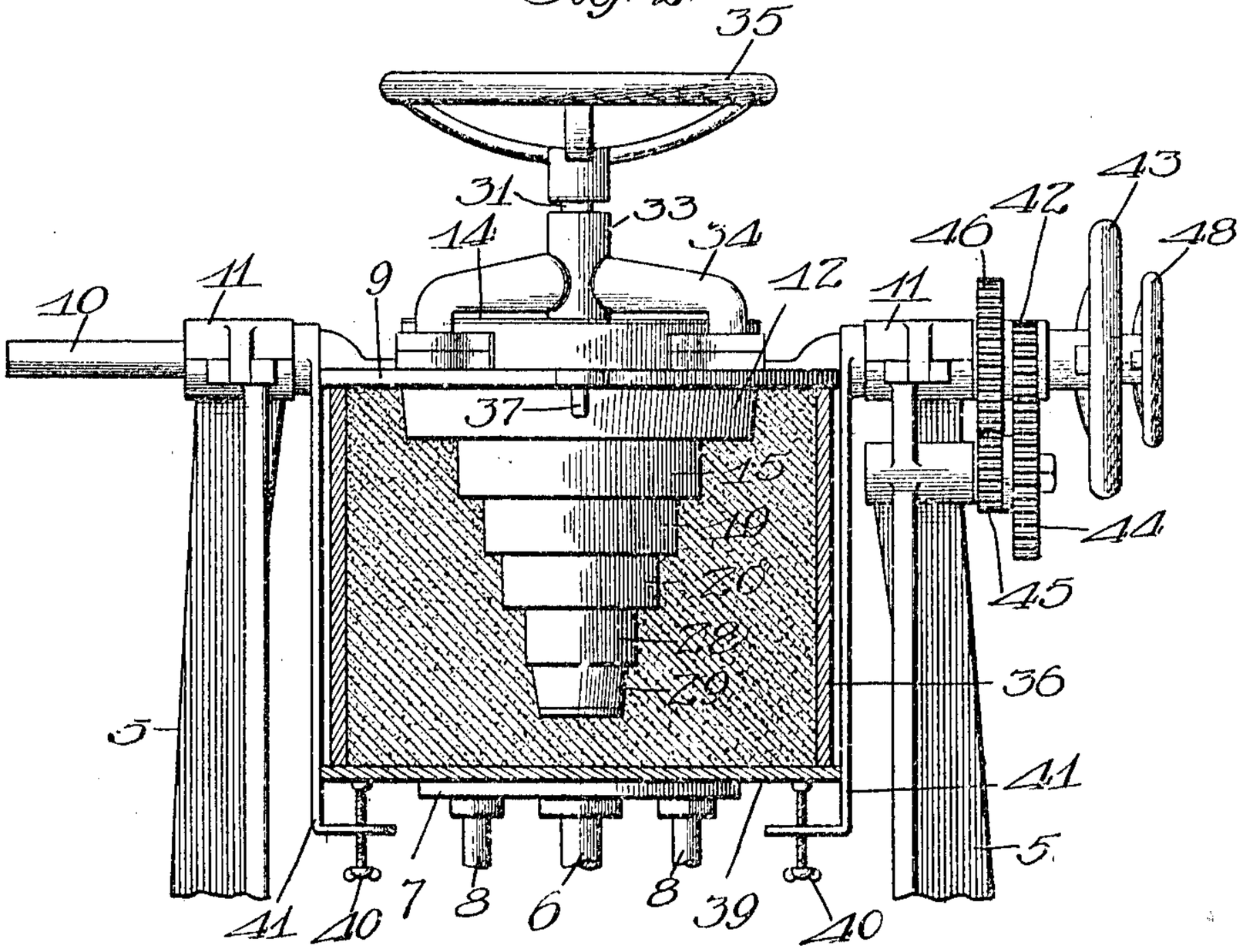
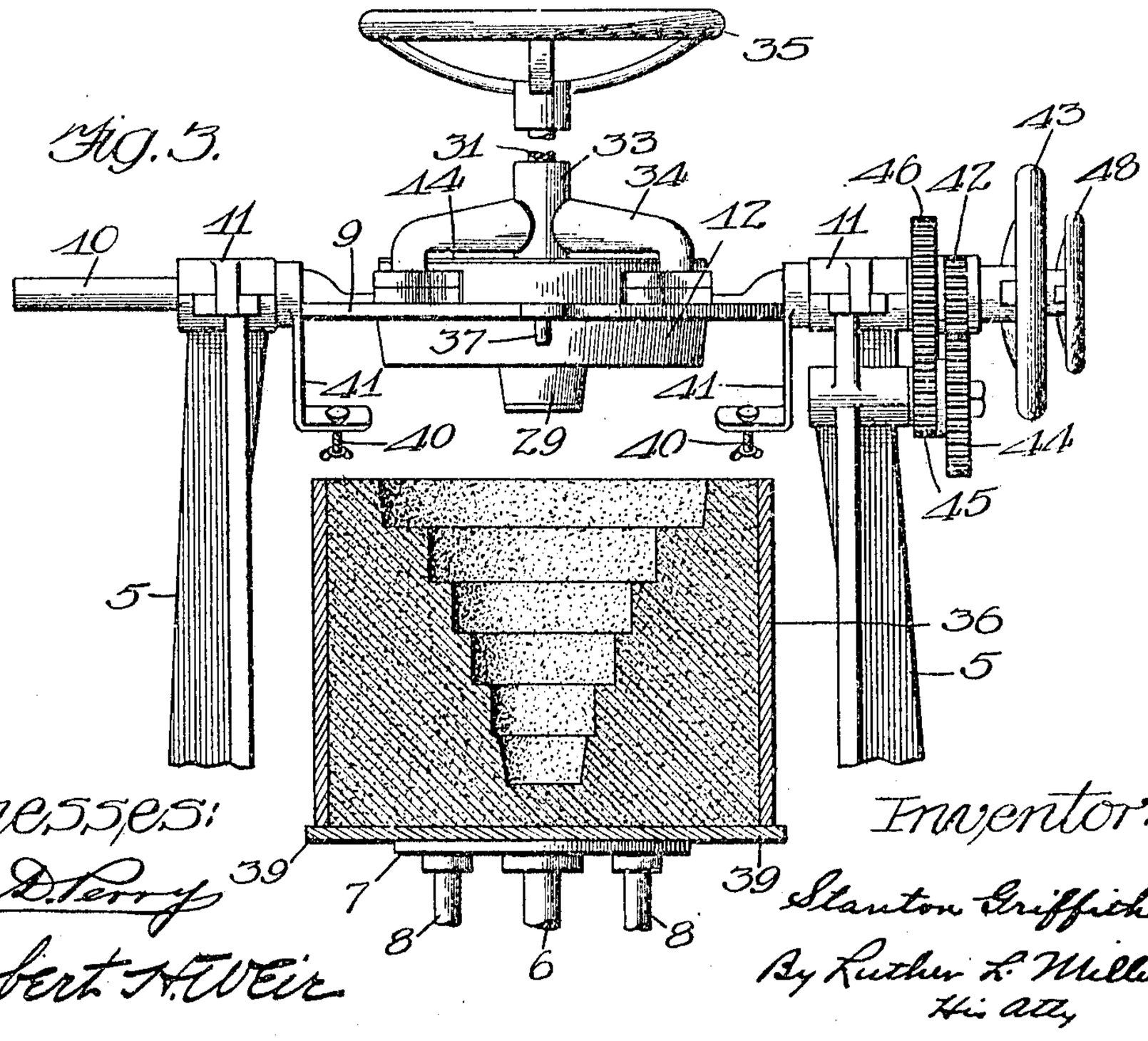


Fig. 3.



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5 SHEETS—SHEET 3.

Fig. 4.

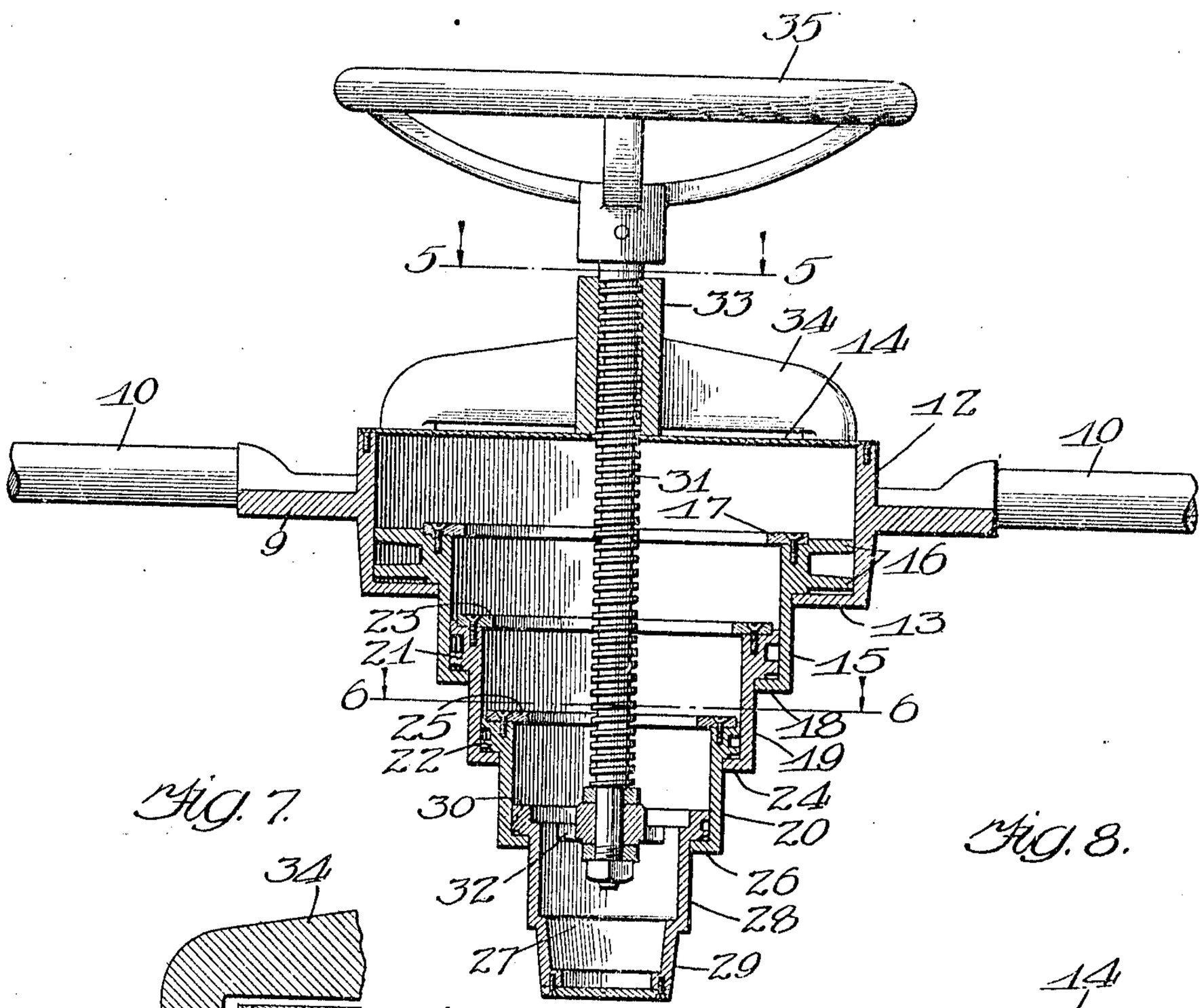


Fig. 7.

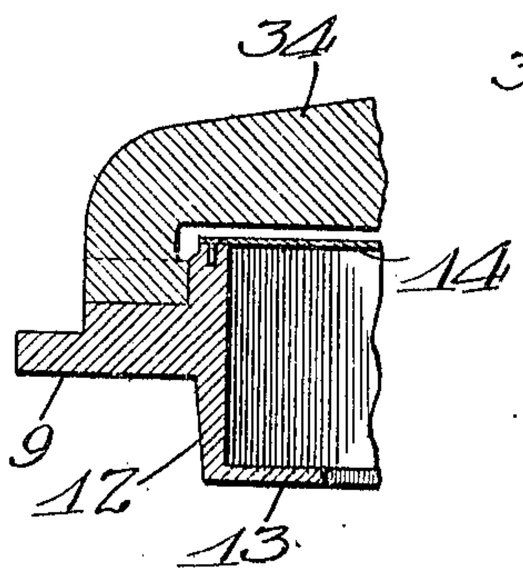
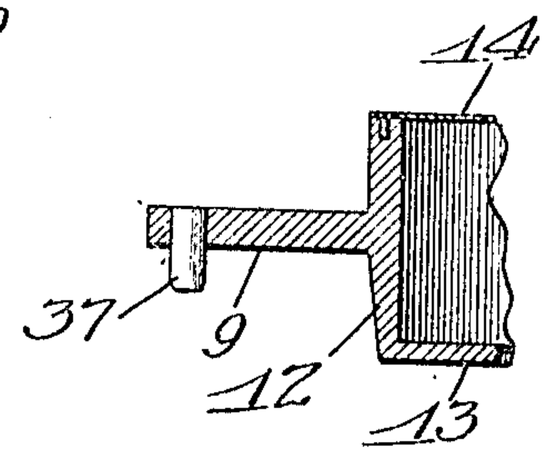


Fig. 8.



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5 SHEETS—SHEET 4.

Fig. 5.

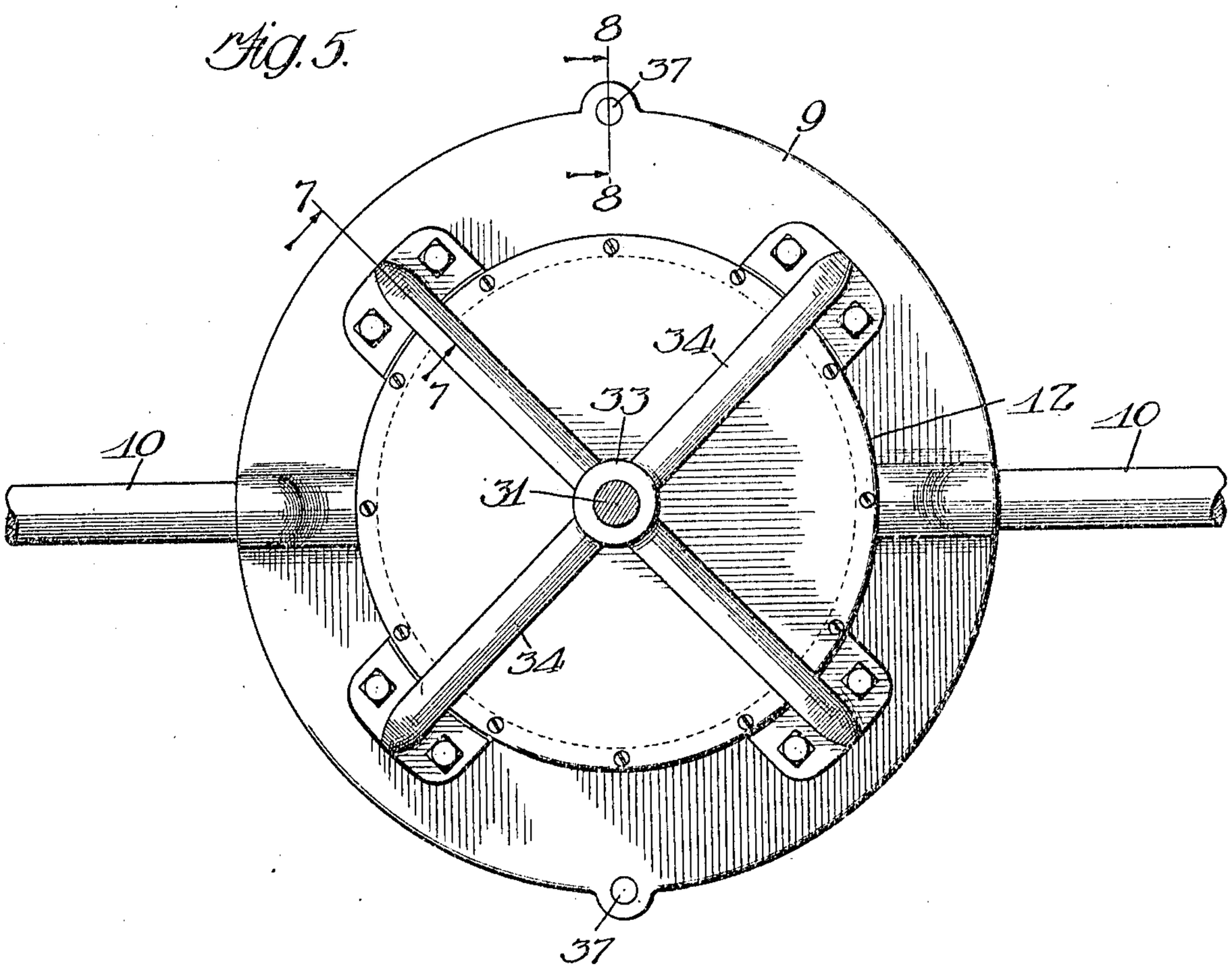
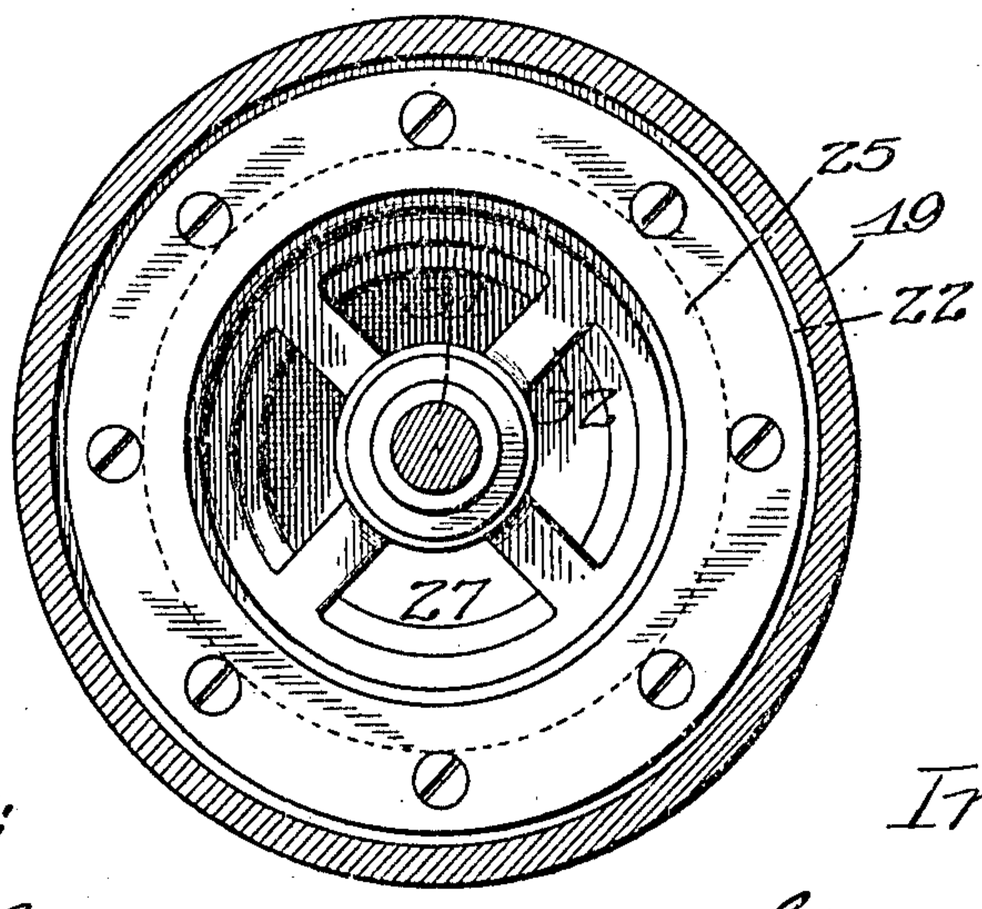


Fig. 6.



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5 SHEETS—SHEET 5.

Fig. 9.

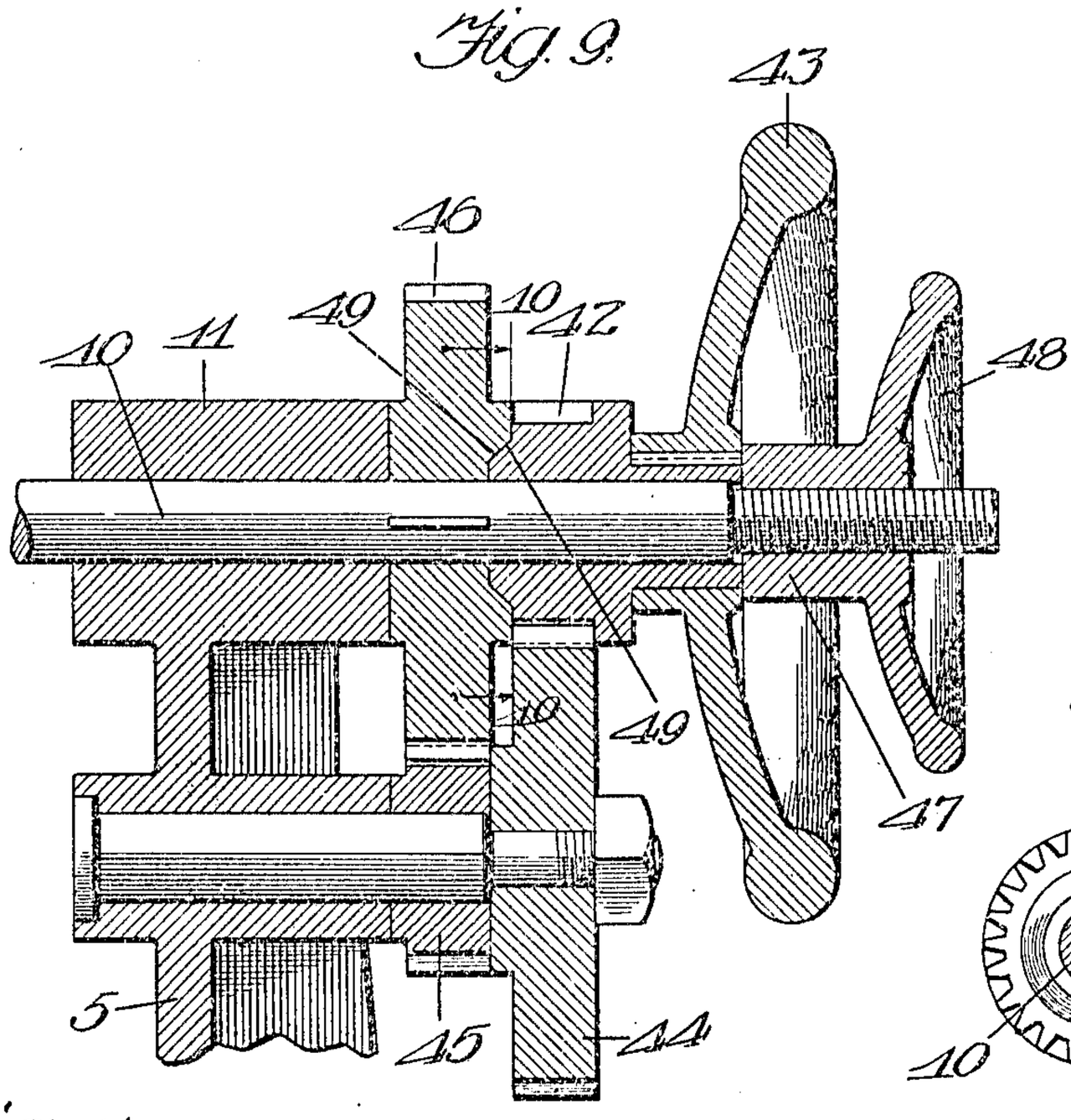


Fig. 10.

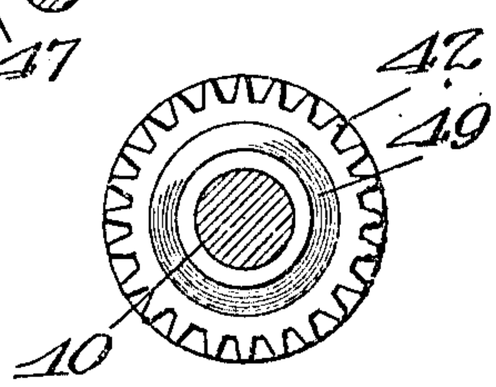


Fig. 11.

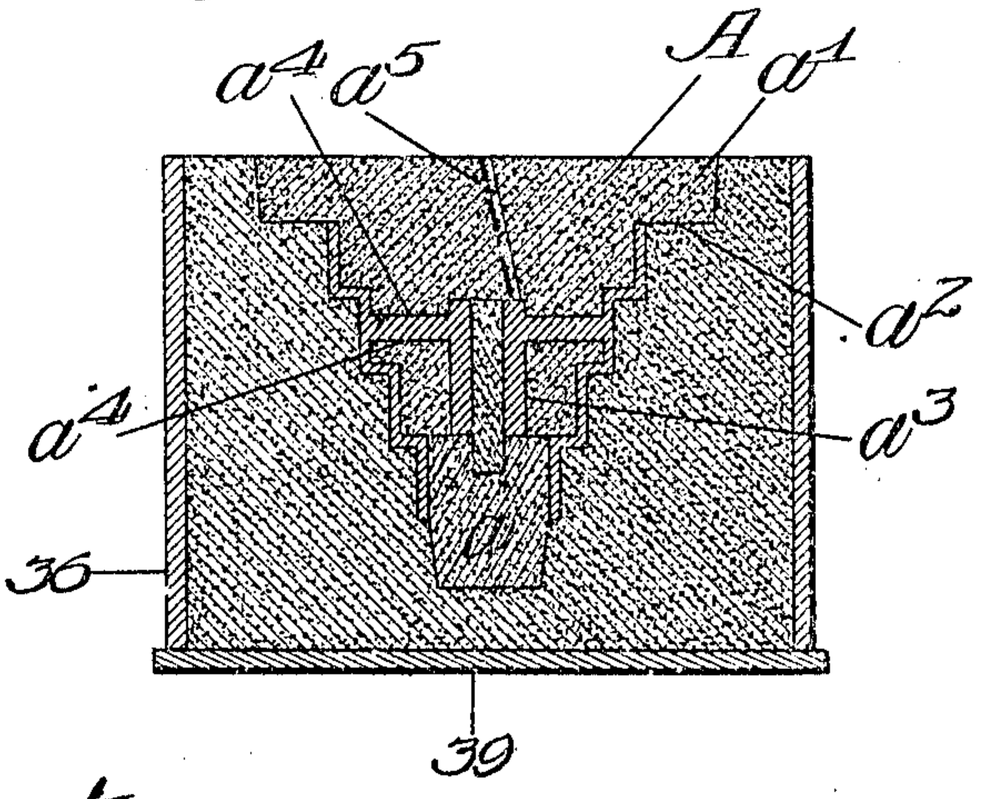
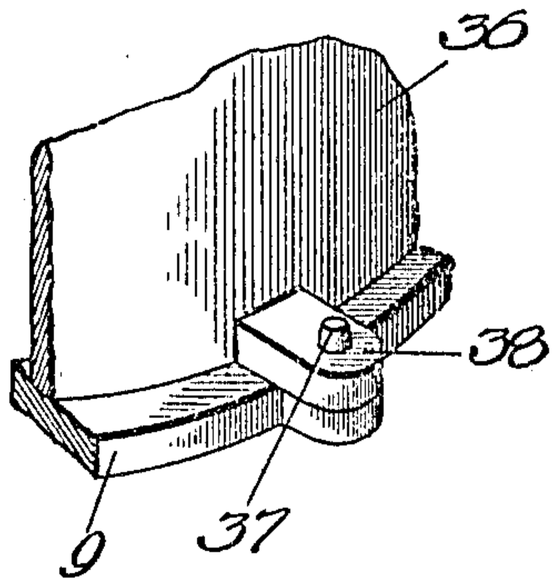


Fig. 12.



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UNITED STATES PATENT OFFICE.

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MOLDING APPARATUS.

954,430. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed November 13, 1907. Serial No. 401,974.

To all whom it may concern:

Be it known that I, STANTON GRIFFITH, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Molding Apparatus, of which the following is a specification.

This invention relates to machines for forming the molds used in metal founding, and refers particularly to the pattern and the means for drawing the pattern.

The invention also relates to improved means for handling the flask and for locking it in position.

In the accompanying drawings, Figure 1 is a side elevation of a molding machine embodying my invention, the flask being shown in inverted position. Fig. 2 is a side elevation of the upper part of the machine, showing the flask rotated into drawing position. Fig. 3 is a view somewhat similar to that of Fig. 2, but showing the pattern drawn and the flask being removed. Fig. 4 is a vertical central section through the pattern. Fig. 5 is a top plan view of the pattern-supporting plate. The view is taken on the plane of dotted line 5 5 of Fig. 4. Fig. 6 is a section on dotted line 6 6 of Fig. 4. Fig. 7 is a section on dotted line 7 7 of Fig. 5. Fig. 8 is a section on line 8 8 of Fig. 5. Fig. 9 is a sectional detail view of the gearing for revolving the flask and the means for securing the flask in inverted position. Fig. 10 is a section on dotted line 10 10 of Fig. 9. Fig. 11 is a vertical section through the flask, showing the core in position and the metal as having been poured. Fig. 12 is a perspective view showing a part of the means for connecting the flask to the pattern plate.

The embodiment selected for illustration comprises a flask adapted to be inverted for the introduction of the sand into the flask and the ramming operation, said flask being arranged to be revolved through an arc of 180° into what may be termed the normal position. A vertically movable table is provided adapted to be placed beneath the flask when the latter is in normal position and to be lowered with said flask thereon for the purpose of withdrawing the flask from the machine. In this instance, the framework of the machine comprises a base 1, a hydraulic or compressed-air cylinder 2 secured to said base in an upright position, vertical guide tubes 3 also fixed to said base, a beam 4 rigidly attached to the upper ends of the cylinder 2 and the guide tubes 3, and two upright standards 5, which standards are secured to the beam 4 and, if desired, may be made laterally adjustable thereon. In the cylinder 2 is a piston (not shown), to the piston rod 6 of which is fixed a table 7. Guide rods 8 are attached to said table and extend into the sleeves 3.

A pattern-carrying plate 9 (Fig. 5), in ring form, is provided at diametrically opposite points with two trunnions 10, which trunnions are rotatably supported in bearings 11 in the upper ends of the standards 5. The pattern shown herein is for a stepped pulley and is illustrated in detail in Fig. 4. A ring 12 is formed integral with the pattern-carrying plate 9 and has at one end an annular inwardly-extending flange 13, the other end of said ring being closed by a disk 14. Slidably mounted in the ring 12 is a second ring 15 having outwardly-extending flanges 16 at one end adapted to contact the inner periphery of the ring 12, and an inwardly-extending flange 17. At the other end of the ring 15 is an annular inwardly-extending flange 18. The rings 19 and 20 are substantially similar to the ring 15, each being provided respectively with outwardly-extending flanges 21 and 22 and inwardly-extending flanges 23, 24, 25 and 26. The rings 15, 19 and 20 constitute patterns for three of the belt-faces or steps of the pulleys. In the ring 20 is slidably mounted a member 27 having a cylindrical portion 28 forming the pattern for the lowest step of the pulley, and a tapering block 29 adapted to form a seat in the mold for the core. The member 27 has an outwardly-extending flange 30 contacting the inner periphery of the ring 20. It will be seen that the rings 15, 19, 20 and 28 may be nested, or, in other words, drawn one inside the other and into the ring 12.

In the nesting operation the flange 30 engages the flange 25, the flange 22 engages the flange 23, and the flange 21 engages the flange 17. In the process of extending the pattern into the operative form, the flange 30 engages the flange 26, the flange 22 engages the flange 24, and the flange 21 engages the flange 18. Said flanges positively and accurately limit the extent of relative

movement between the rings. The flanges also serve to guide the rings to move steadily. The outwardly-extending members at the upper end of each ring are made in the form of two annular separated flanges in order to provide a wide bearing surface and at the same time reduce as much as possible the extent of surface in frictional contact.

The means herein shown for drawing and extending the pattern comprises a screw 31 rotatably connected with a spider 32 cast integral with the member 27. Said screw extends through the internally screw-threaded hub 33 of a spider 34, the arms of which spider are rigidly secured to the pattern-carrying plate 9. Upon the end of the screw 31 projecting from the pattern, is fixed a hand wheel 35.

The flask, in the present instance, comprises a cylindrical section 36 adapted to rest upon the pattern-carrying plate 9 and surround the pattern. Pins 37 upon said plate are arranged to enter perforated lugs 38 on the flask-section 36 (Fig. 12) for properly locating the latter upon the plate 9. The bottom of the flask consists of a disk 39 adapted to fit over the cylinder 36 and to be secured thereto by means of screws 40 carried by arms 41 rotatably mounted upon the trunnions 10. Means (not shown) similar to the pins 37 and lugs 38 is provided for positioning the bottom plate 39.

The means used in the present embodiment for revolving the flask comprises a gear wheel 42 rotatably mounted upon one of the trunnions 10, said gear wheel having rigidly secured thereto a hand wheel 43. The gear wheel 42 meshes with a gear wheel 44 rotatably mounted on one of the standards 5 and having a driving connection with a gear wheel 45. The latter meshes with a gear 46 fixed upon the trunnion 10. As will be readily seen, the gear train just described is so proportioned as to impart a relatively low speed to the gear wheel 46.

In order to lock the flask in inverted position, as shown in Fig. 1, I provide, in this instance, a nut 47 turned upon the outer screw-threaded end of the trunnion 10, said nut having a hand wheel 48 fixed thereto. The nut 47 bears at its inner end against the hub of the hand wheel 43 and is arranged to move the gear wheel 42 into clamping engagement with the gear wheel 46, conical friction-clutch faces 49 being preferably formed upon the adjacent sides of said gear wheels. When a mold is to be formed, the pattern is extended and the pattern-carrying plate 9 revolved into the position indicated in Fig. 1 and locked in such position by means of the hand wheel 48. The flask-section 36 is then placed upon the pattern-carrying plate, and sand placed in the flask and rammed in any suitable way. The bottom board 39 having been laid upon the upper end of the flask-section 36 and secured thereto by means of the clamping screws 40, the flask is revolved into the position it is shown to occupy in Fig. 2, and the table 7 placed under the flask. The pattern is now drawn by collapsing said pattern, the rotation of the screw 31 causing the pattern-sections 15, 19, 20 and 28 to be drawn steadily and firmly into the ring 12 as indicated in Fig. 3. The smoothness and steadiness of the pattern-drawing operation permits of straight drawing and results in the production of castings which are so smooth and true as greatly to reduce the amount of machining necessary in finishing the castings. After the pattern is drawn, the flask is disconnected from the pattern-carrying plate 9 by loosening the clamp screws 40 and swinging the arms 41 to one side. The table 7 is now lowered with the flask resting thereon, said flask being, in practice, deposited upon a car (not shown) by means of which it is moved to the place where the core A (Fig. 11) is to be inserted into the mold. Said core comprises a portion a adapted to enter the seat formed by the tapering portion 29 of the pattern, and an annular portion a' adapted to rest upon the annular shoulder a^2 of the mold. Suitable openings a^3 a^4 are formed in the core to provide for the hub and the arms joining the hub to the pulley shell. The metal is poured through an opening a^5 in the core.

It is apparent that many changes may be made in the embodiment herein shown of my invention without departing from the spirit and scope thereof. I do not, therefore, limit myself to the precise details herein set forth.

I claim as my invention:

1. In a molding machine, in combination, a supporting frame; a pattern-carrying plate; trunnions on said plate at opposite sides thereof, said trunnions being rotatably mounted in said supporting frame; a flask adapted to be set upon said plate; and two arms extending alongside said flask, each of said arms having one end rotatably mounted upon one of said trunnions and carrying means at its other end adapted to engage the flask for clamping it to the pattern-carrying plate.

2. A stepped-pulley pattern comprising a plate; a ring attached to said plate, said ring having an inwardly-extending flange, said flange and the portion of said ring below said plate being adapted to form a seat in the mold for an annular flange portion of the core; a ring having at its upper end an outwardly-extending flange arranged to slide in contact with the inner surface of the first mentioned ring, the second mentioned ring being guided by the flange on the first mentioned ring; an inwardly-ex-

tending flange at the top and bottom of the second mentioned ring; a ring slidably mounted in the second mentioned ring, the third ring being guided by said bottom flange and being adapted to engage the top flange; a ring slidably mounted in and guided by the third ring, the fourth ring being adapted to engage the third ring, the fourth ring having at its lower end a tapering block adapted to form a seat in the mold for the core, the second, third and fourth rings constituting patterns for the belt faces of a stepped pulley; and means engaging the fourth ring for sliding the second, third and fourth rings to collapse and extend the pattern.

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