

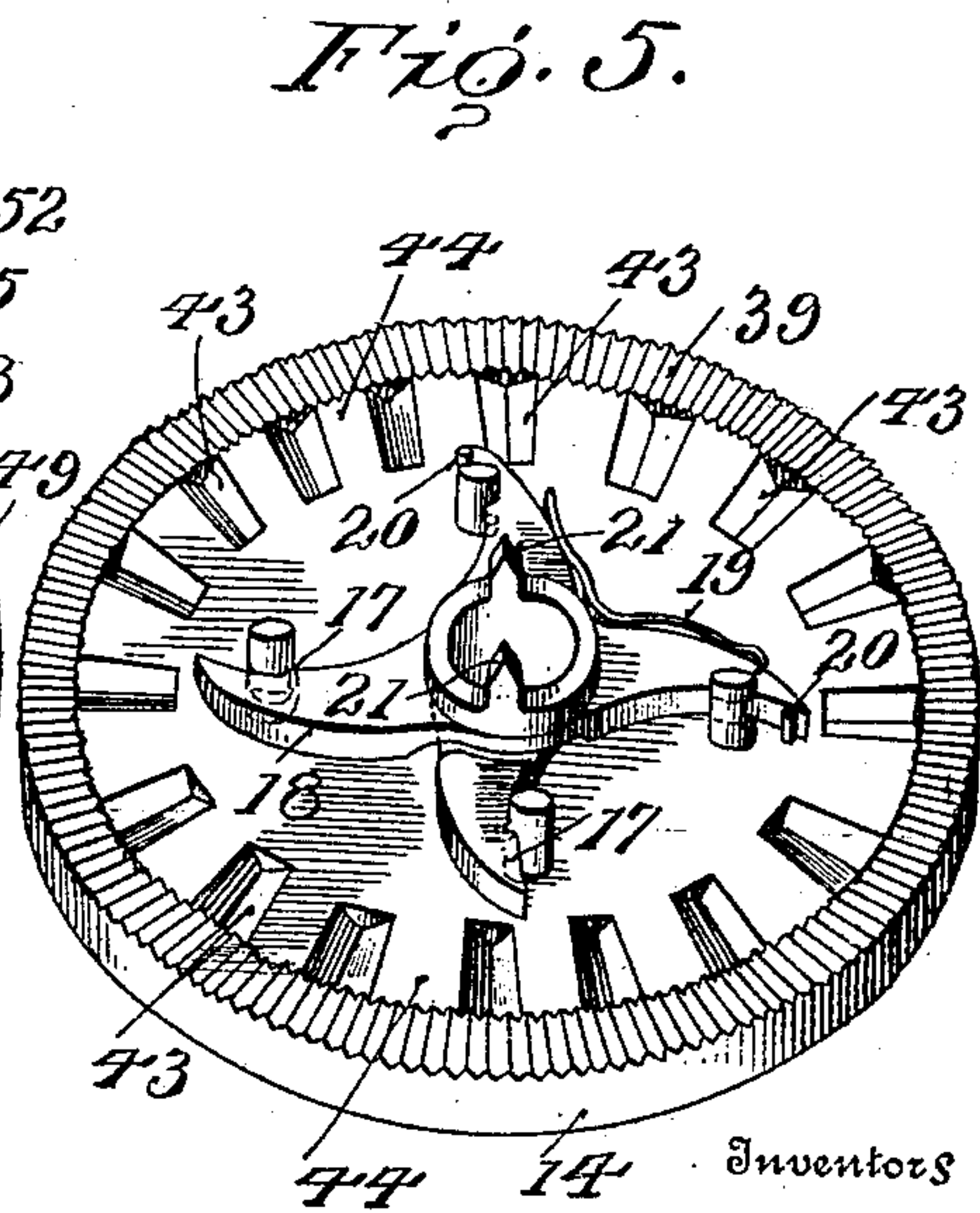
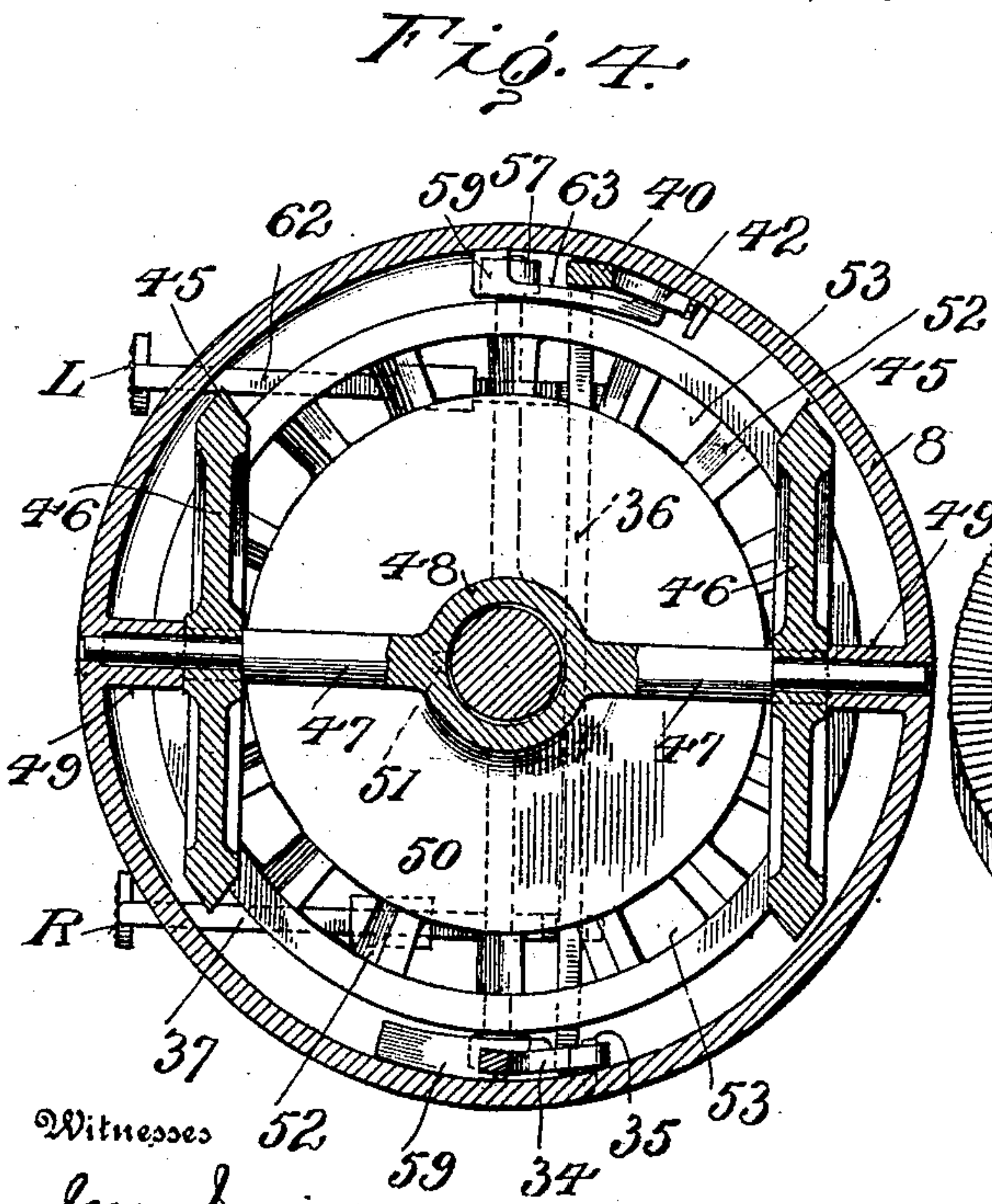
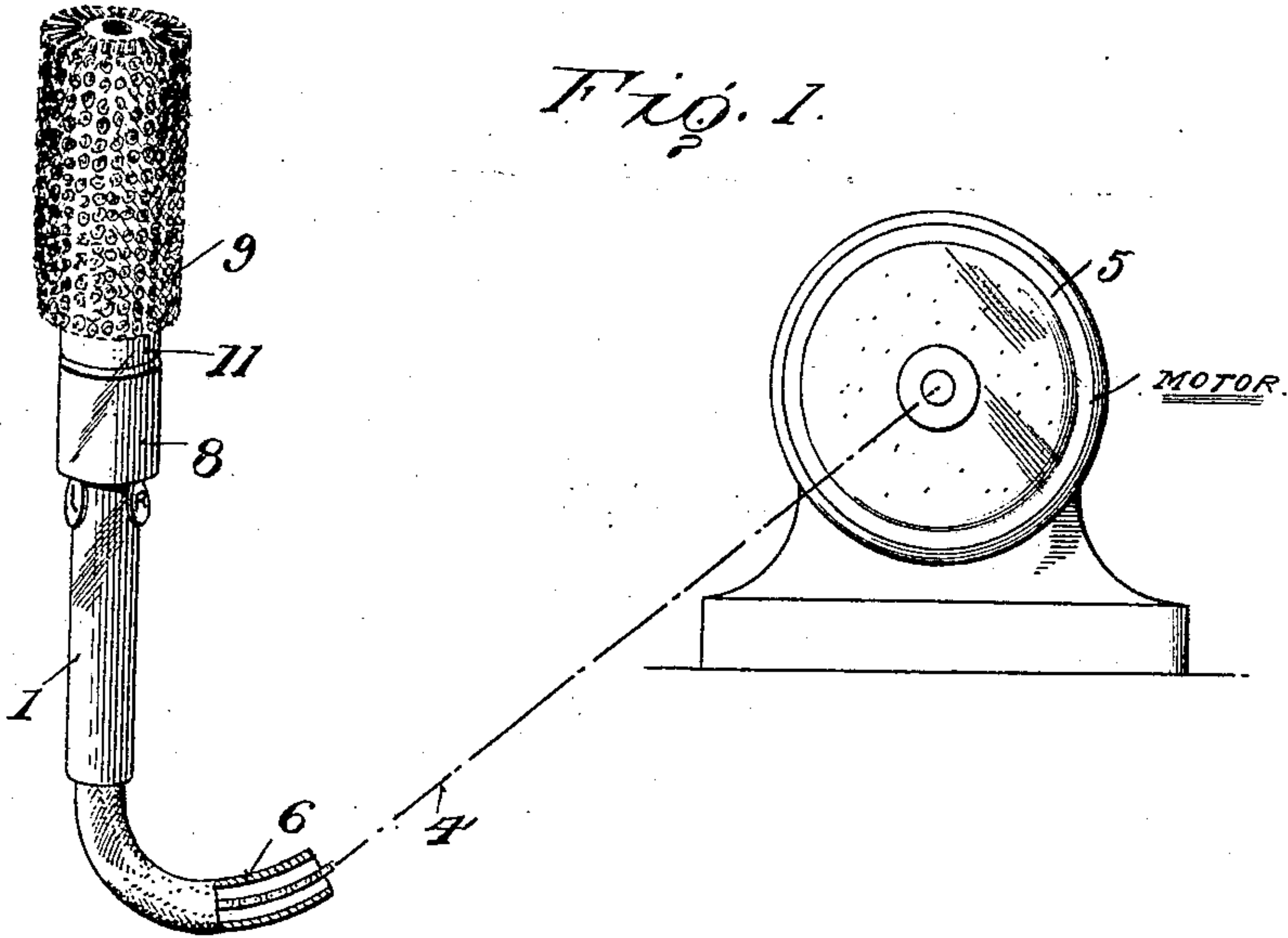
G. F. PRESS & J. W. LEWIS.  
GEARING.

APPLICATION FILED MAY 14, 1908.

910,574.

Patented Jan. 26, 1909.

3 SHEETS—SHEET 1.



Witnesses  
*Jno. H. Miller*  
*W. H. Anderson*

Inventors  
G. F. Press and  
J. W. Lewis.  
By *Wm. H. Macy*, Attorneys



G. F. PRESS & J. W. LEWIS.

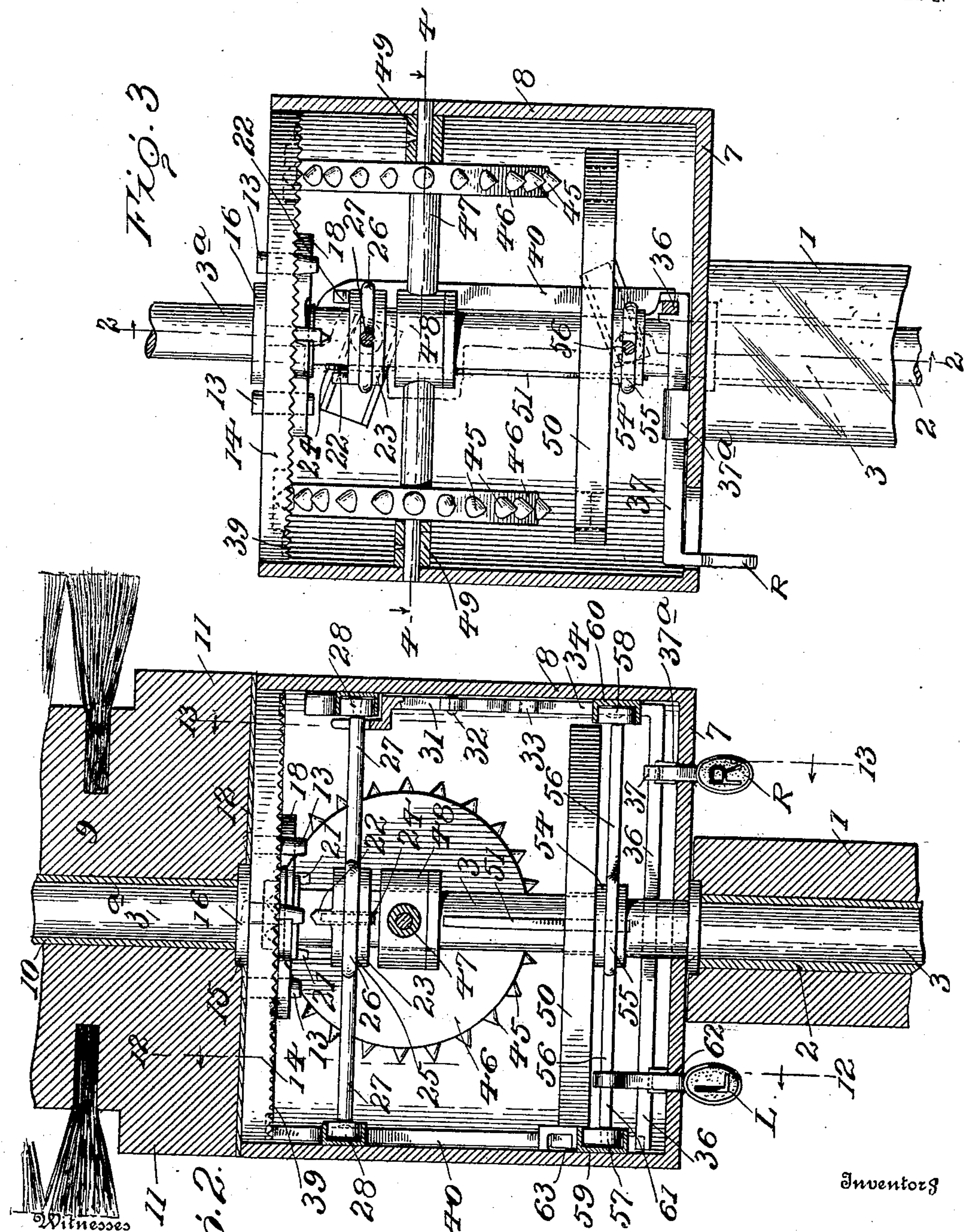
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3 SHEETS—SHEET 2.



Inventors

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J. W. Lewis.

By

*Wm. A. Macy*, Attorneys



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3 SHEETS—SHEET 3.

Fig. 6.

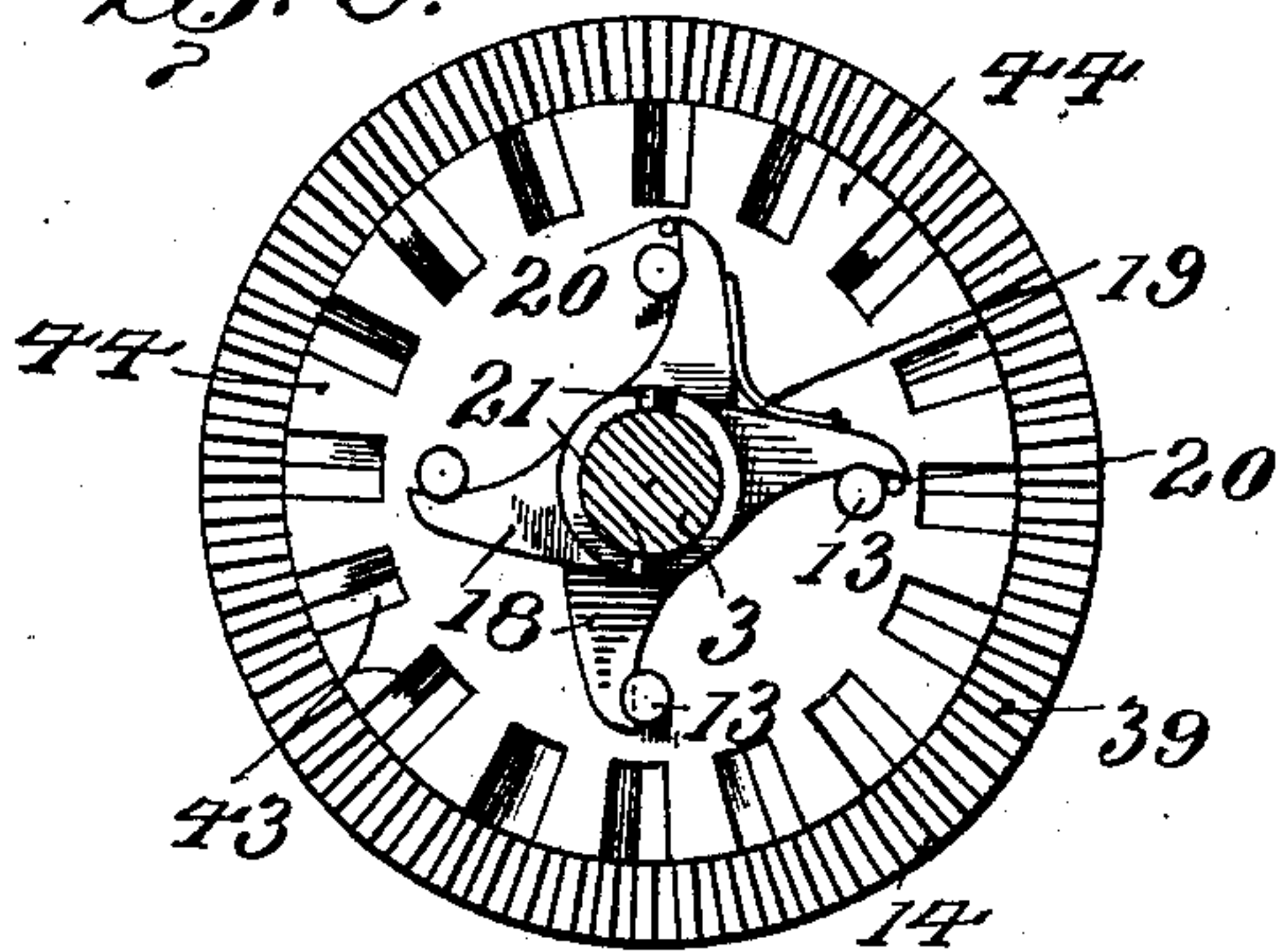


Fig. 7.

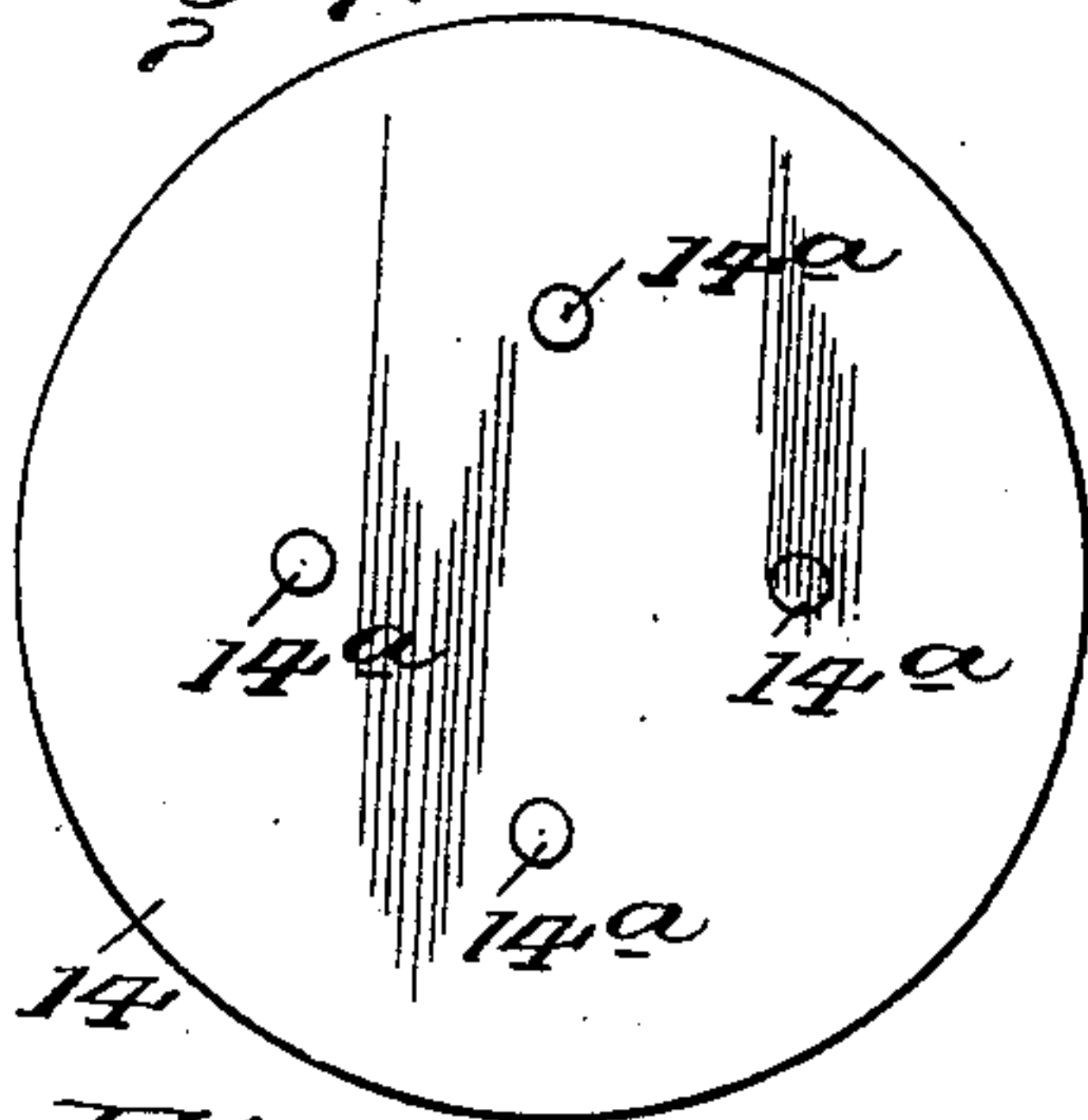


Fig. 8.

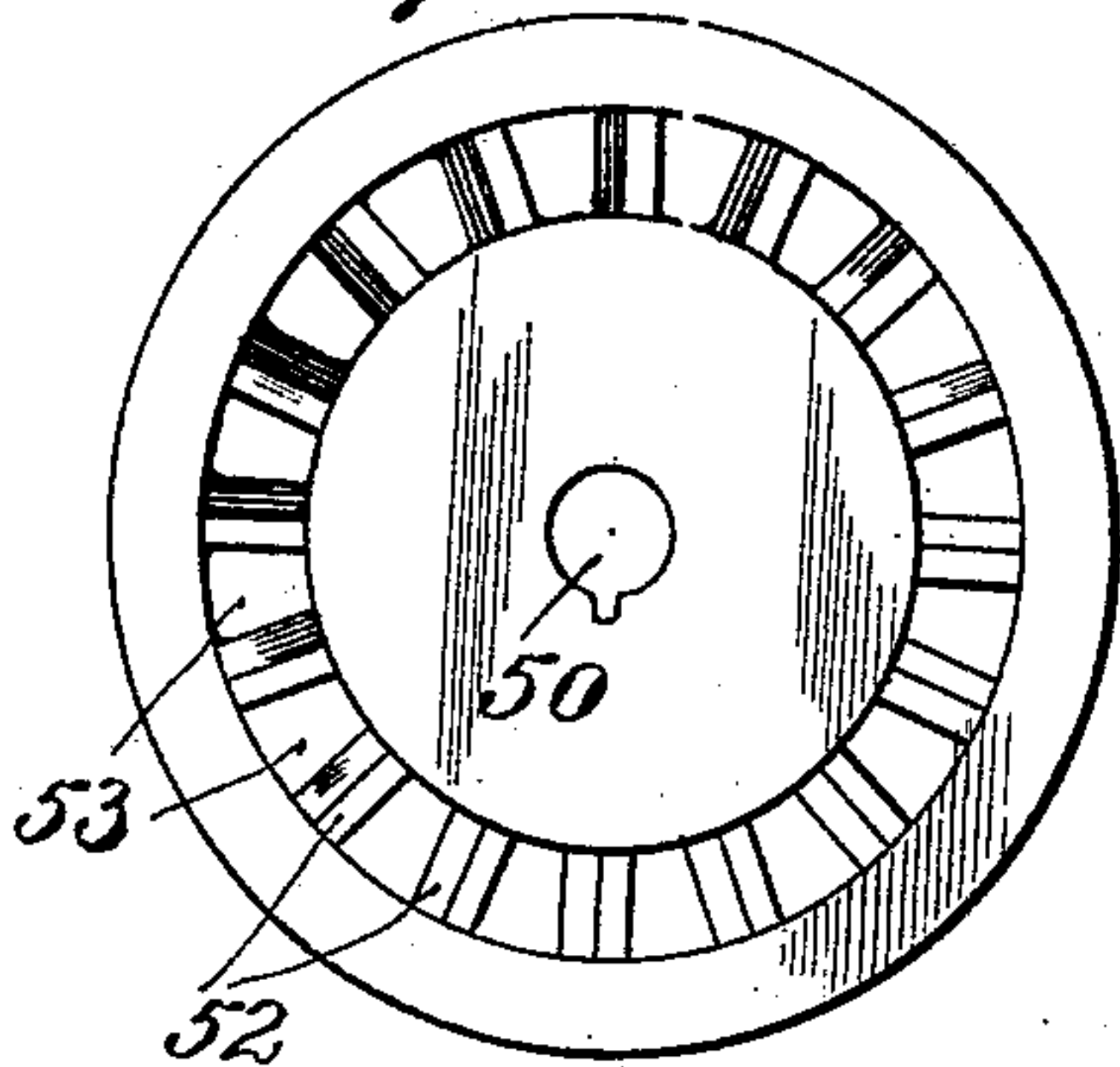


Fig. 9.

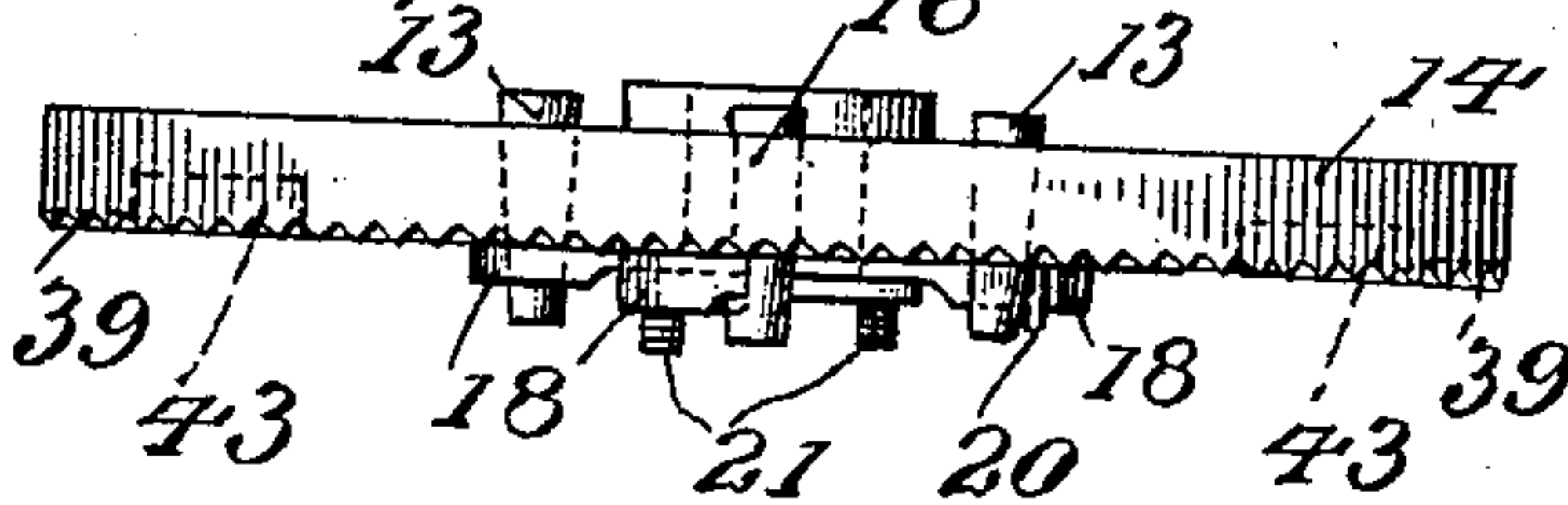


Fig. 10.

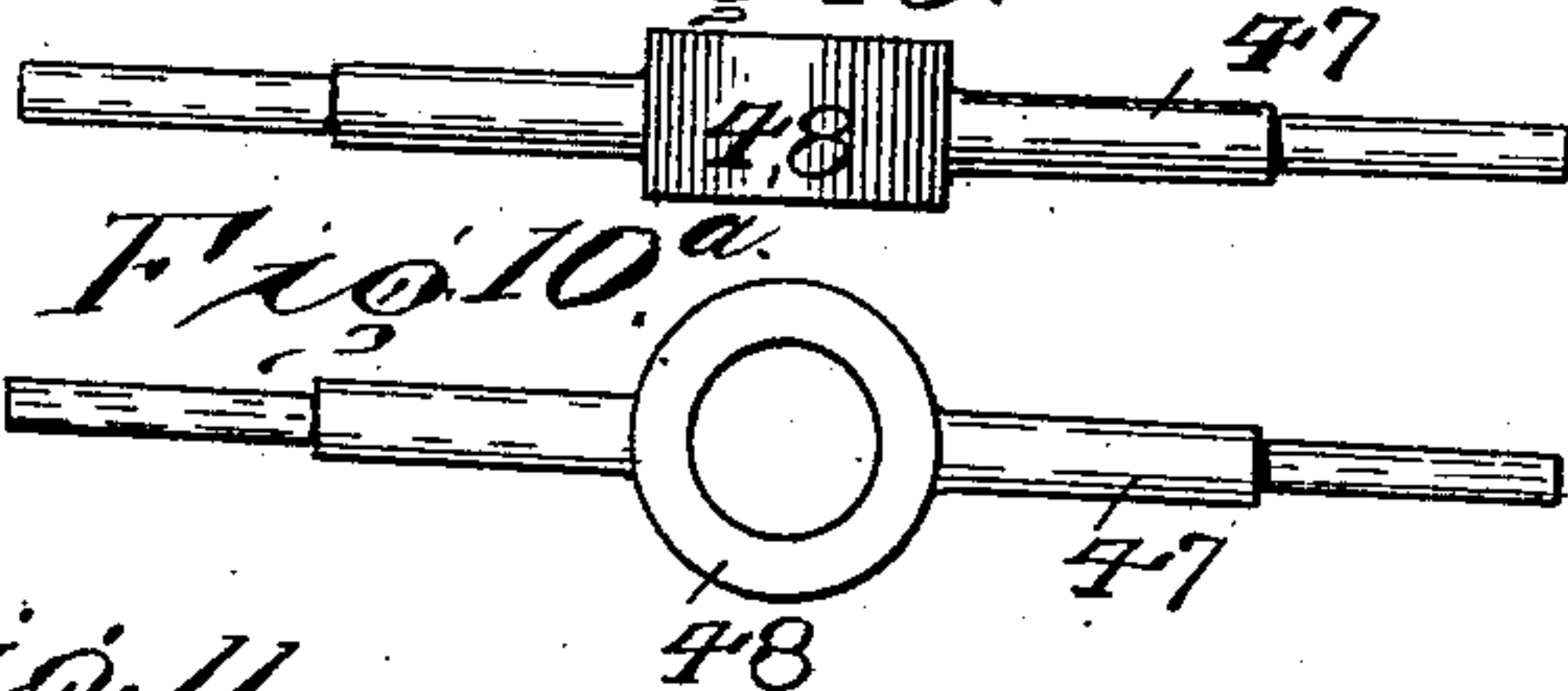


Fig. 10a.

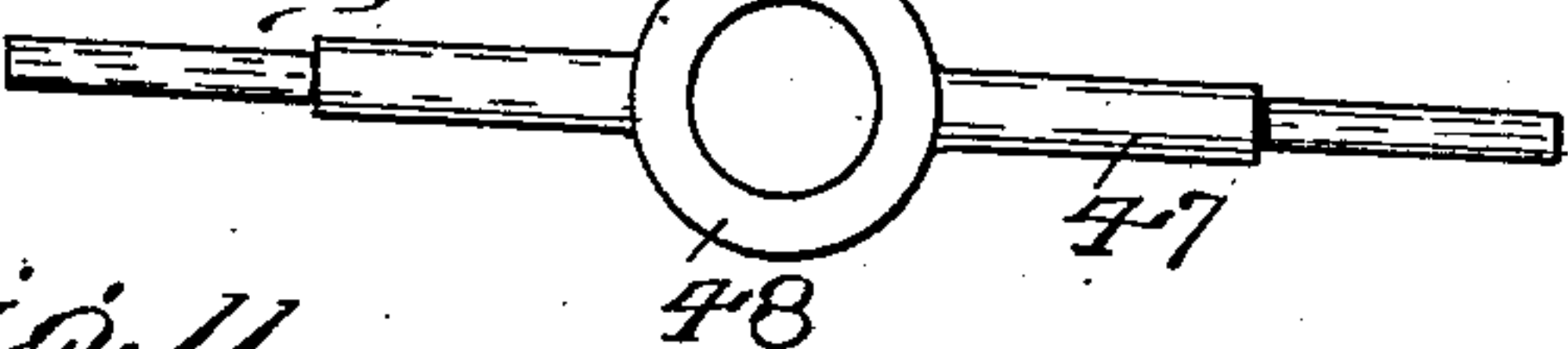


Fig. 12.

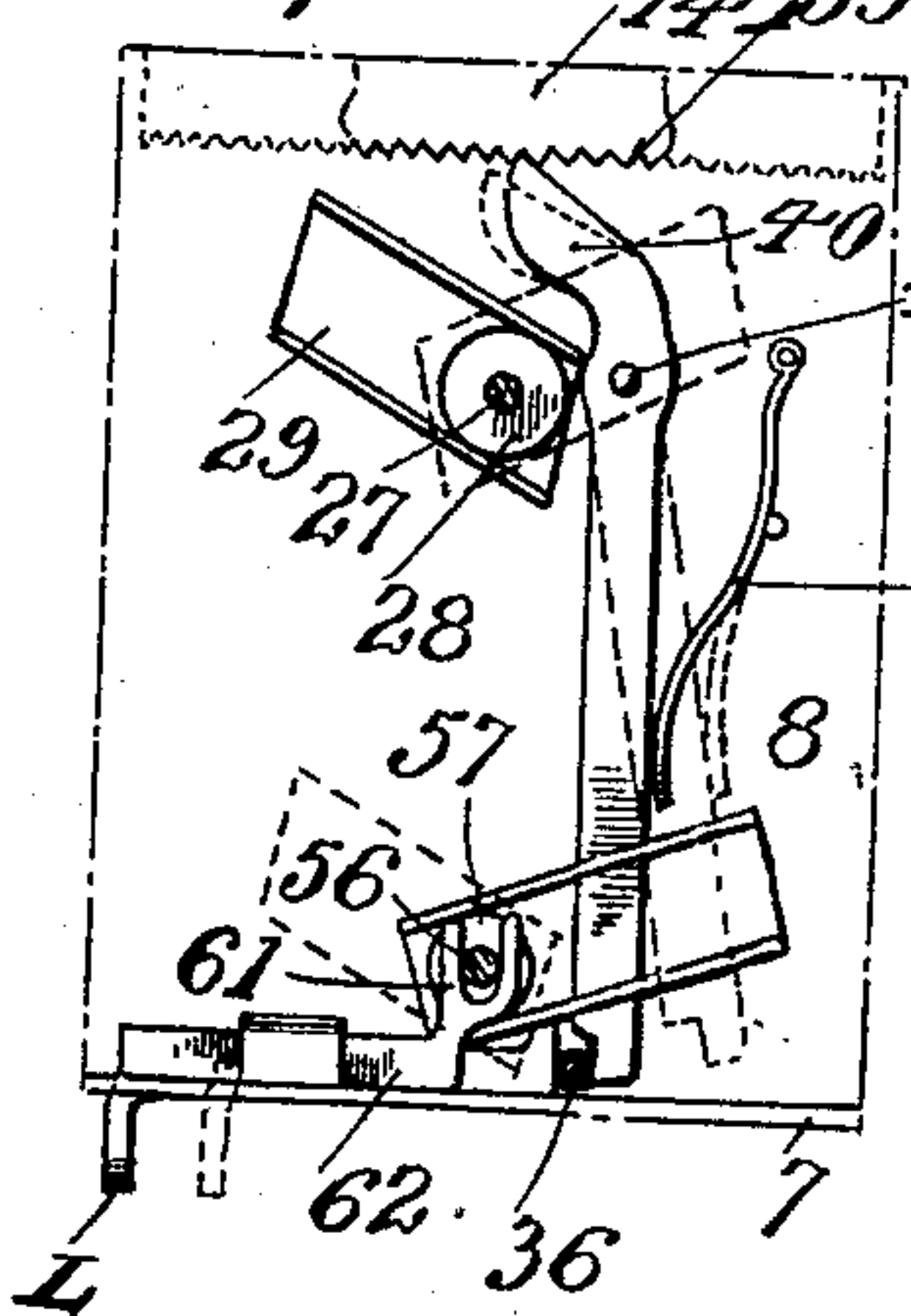


Fig. 11.

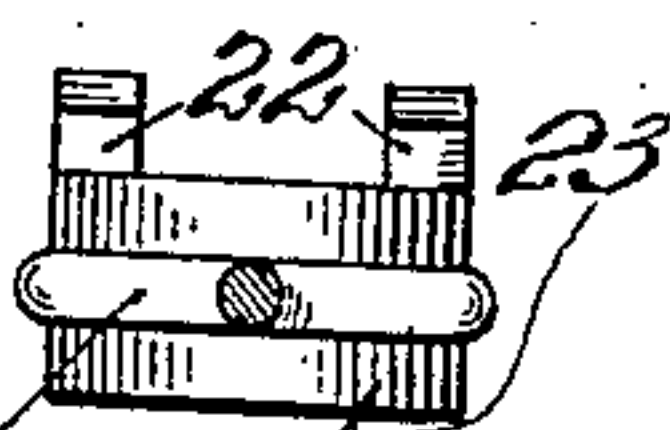


Fig. 11a.

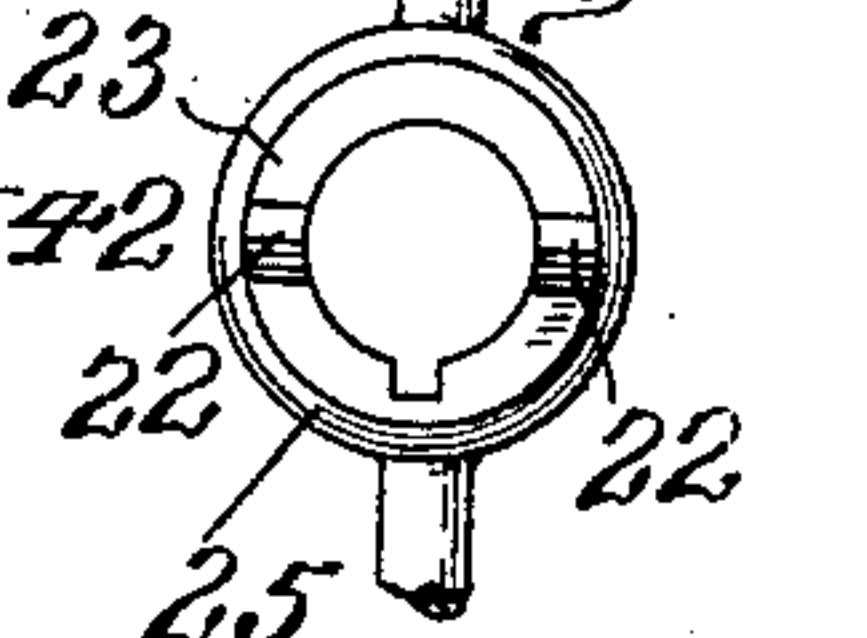


Fig. 14.

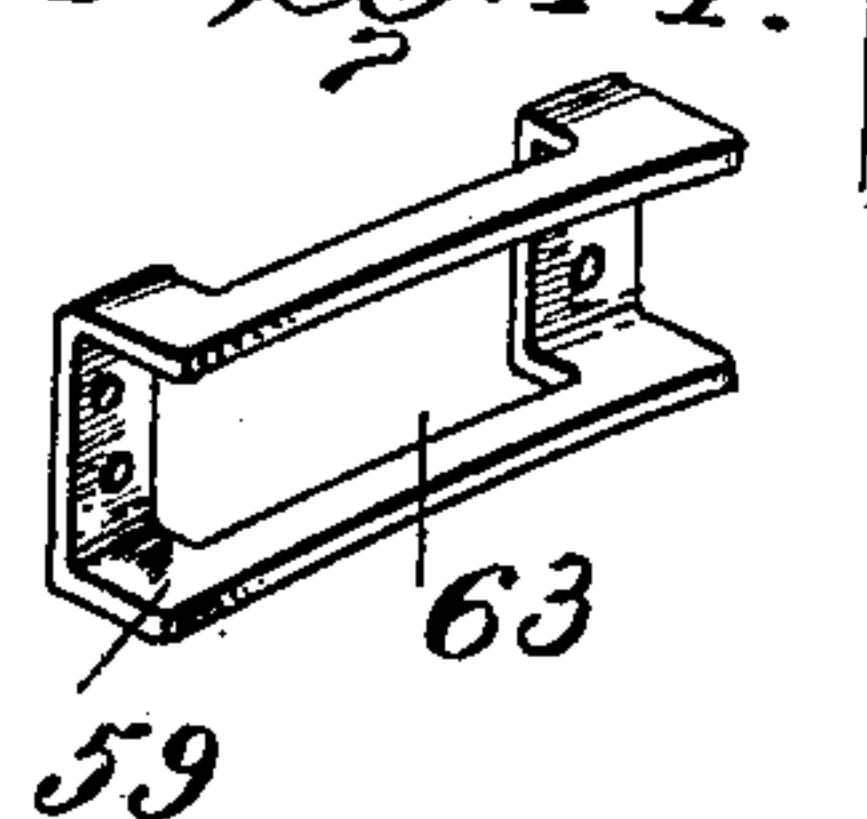
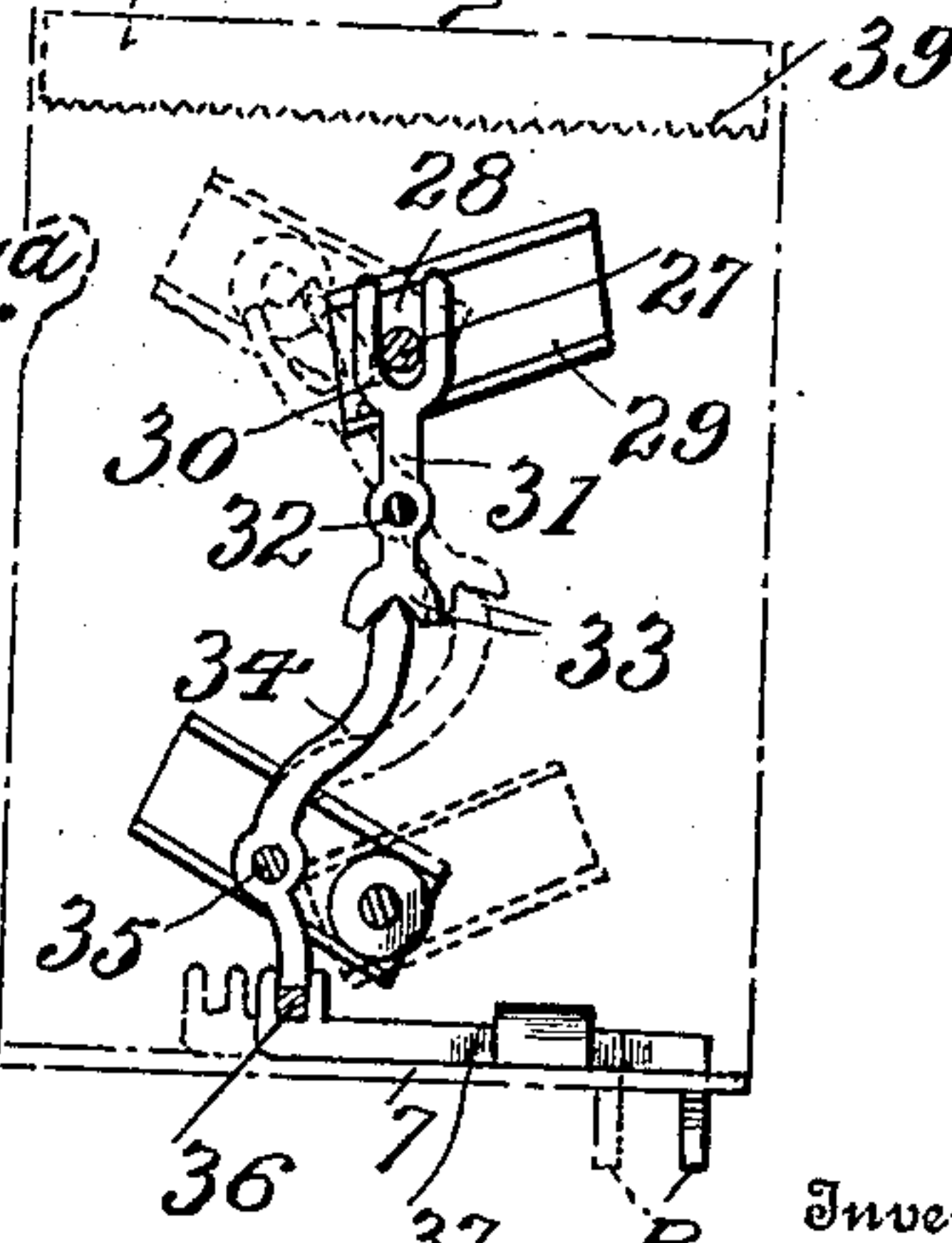


Fig. 13.



Witnesses

*Jno. Miller*

*W. P. Woodson*

By

*Harvey*, Attorneys



# UNITED STATES PATENT OFFICE.

GEORGE F. PRESS AND JOHN W. LEWIS, OF SPOKANE, WASHINGTON.

## GEARING.

No. 910,574.

Specification of Letters Patent.

Patented Jan. 26, 1909.

Application filed May 14, 1908. Serial No. 432,926.

*To all whom it may concern:*

Be it known that we, GEORGE F. PRESS and JOHN W. LEWIS, citizens of the United States and subjects of the King of Great Britain, respectively, and both residing at Spokane, in the county of Spokane and State of Washington, have invented certain new and useful Improvements in Gearing, of which the following is a specification.

10 This invention comprehends certain new and useful improvements in gearing designed particularly for use in connection with rotary brushes, although it is to be understood that the invention is applicable for other use generally in connection with any rotary tool  
15 such as dentists' drills or other drills or wherever it is desired to quickly reverse the rotary movement of a shaft. And the invention has for its primary object, an improved construction of gearing of this character embodying a hollow handle through which the drive shaft extends, or other suitable bearing in which it is journaled, said shaft being operated from any suitable source of power, and  
20 a casing secured to the handle or journal bearing and containing a novel construction and arrangement of actuating gear parts capable of effectually driving the shaft in one direction or the reverse, the reversing movement being very quickly and easily accomplished.

With these and other objects in view as will more fully appear as the description proceeds, the invention consists in certain constructions, arrangements and combination of  
35 the parts that we will hereinafter fully describe and then point out the novel features in the appended claims.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings in which:

Figure 1 is a perspective view of a rotary brush embodying the improved gearing of  
45 our invention. Fig. 2 is a longitudinal sectional view of the parts on the lines 2—2 of Fig. 3; Fig. 3 is a similar view at right angles to Fig. 2. Fig. 4 is a longitudinal sectional view taken on the line 4—4 of Fig. 3; Fig. 5 is a  
50 bottom perspective view of the drive wheel; Fig. 6 is a bottom plan view thereof; Fig. 7 is a top plan view thereof; Fig. 8 is a top plan view of the reversing disk; Fig. 9 is a detail edge view of the drive wheel; Fig. 10 is a side ele-

vation of the support for the releasing gear wheel; Fig. 10<sup>a</sup> is a detail top plan view thereof; Fig. 11 is a detail side elevation of the clutch member for directly connecting the drive wheel with the actuating shaft; Fig. 11<sup>a</sup> is a top plan view thereof, the actuating arm of the clutch member being shown broken away in Figs. 11 and 11<sup>a</sup>. Figs. 12 and 13 are vertical sections somewhat in the nature of diagrams illustrating the interior of the casing at opposite sides; and Fig. 14 is a  
65 detail perspective view of one of the flanged guide members hereinafter specifically described.

Corresponding and like parts are referred to in the following description and indicated  
70 in all the views of the drawings by the same reference characters.

Referring to the drawings, the numeral 1 designates the hollow handle by which our improved device is manipulated, said handle  
75 being formed of hard rubber, wood or any other desired material or substance and being lined with a metallic bushing 2 in which the drive shaft 3 is mounted. This shaft may be connected at one end to flexible  
80 chain or other shafting 4 operatively driven from the motor 5 or any other suitable source of power and contained within a flexible sheathing 6. The handle 1 is secured in any desired way to the inner or  
85 bottom plate 7 of a casing or body portion which is preferably cylindrical as indicated at 8, said casing containing practically all of the actuating parts of the apparatus.

9 designates the brush which is preferably  
90 composed of a wooden body portion that is hollow and that contains a metallic bushing 10. The brush 9 is formed with an annular or preferably enlarged base 11 to which a plate or disk 12 is preferably permanently  
95 secured by screws or the like. The plate 12 is formed with a plurality of pins 13 projecting from one face thereof, said pins being adapted to be inserted through holes 14<sup>a</sup> formed in the drive wheel 14 that is mounted  
100 on the projecting end 3<sup>a</sup> of the shaft 3, for loose rotary movement thereon. The wheel 14 preferably fits snugly within the open outer end of the casing 8, as clearly illustrated in the drawings. The plate 12 may be  
105 provided with a recess 15 to accommodate the retaining ring 16 fast on the projecting end of the shaft. Each of the pins 13 is



formed with a notch 17, the said notches in the present instance being angular, as shown. The pin clutches 18 are mounted on the inwardly facing hub of the drive wheel 14 and encircle said hub, there being four pins and four pin clutches in the present instance. These pin clutches have their edges shaped to fit the notches 17 and they are preferably made in two parts, with two arms to each part, their inner portions being offset with relation to each other so that when they encircle the hub of the wheel 14 all of the arms will be in the same horizontal plane. A spring 19 serves to hold the pin clutches around the hub of the wheel 14 and yet permit a yielding movement thereof so that the arms of the clutches may snap into the notches 17 when the pins are forced into the openings 14<sup>a</sup>. The arms of the pin clutches 18 project partially across the holes 14<sup>a</sup> and the pins 13 are tapered at their ends so that it is only necessary, in order to secure the brush to the wheel, to slip the pins through the holes whereupon they will be engaged by the arms of the pin clutches.

20 designates nibs or protuberances on the lower face of the wheel 14 designed to limit the outward movement of the arms of the pin clutches 18 when they partially cover the holes 14<sup>a</sup>.

Clutch fingers 21 project downwardly from the lower face of the wheel 14 and are designed for engagement with complementary fingers 22 projecting upwardly from a clutch 23 which is mounted on the shaft 3 within the casing 8 and which is held for a longitudinal movement only on said shaft by means of its engagement with a spline or feather 24 formed on the shaft.

In order to effect the engagement of the clutch 23 with the drive wheel 14, the clutch 23 is formed with an annular groove 25 within which a collar 26 fits. The collar 26 is connected to two diametrically disposed arms 27, the outer ends of which carry rollers 28. The said rollers are mounted to travel in oppositely inclined flanged guide ways 29 secured to the interior of the casing 8 and conforming to the curvature thereof. One of the arms 27 is received in the upwardly facing fork 30 of a lever 31 fulcrumed as indicated at 32 in the interior wall of the casing and extending downwardly from its fulcrum, the lower arm of said lever being forked as indicated at 32 and accommodating the pointed upper end of a lever 34. This lever 34 is also fulcrumed in the interior of the casing 8, as indicated at 35, and it is provided with a laterally extending lower arm 36 which reaches preferably entirely across the casing near the lower end thereof. In order to rock the two levers 31 and 34, a slide 37 is provided, said slide being adapted to engage the laterally projecting lower end 36 of lever 34 as shown and be-

ing accommodated in a slot in the plate 7 of the casing and held within a guiding movement thereon by means of a staple or band 37<sup>a</sup>. The lower end of the slide 37 which projects out of the casing, is shaped to form a finger piece designated R, indicating that, in the present instance, the actuation of the slide will result in turning the brush or other tool to the right as the shaft 3 rotates, it being understood that for such movement the shaft 3 will also turn to the right, or in other words that the actuation of the finger piece R will turn the brush in the same direction as the shaft is rotating.

In its lower face at the margin thereof, the drive wheel 14 is formed with a series of teeth 39 designed for engagement with the upper pointed end of a brake lever 40 said lever being fulcrumed intermediate of its ends on the inner wall of the casing 8 as indicated at 41 and being pressed to carry its extremity into engagement with the teeth 39 through the instrumentality of a spring 42.

In addition to the teeth 39, the lower face of the drive wheel 14 is formed with an inner circle of teeth 43 that are preferably spaced from each other circumferentially, with intervening grooves 44. This inner circle of teeth is adapted to be engaged by the pointed teeth 45 of two reversing gear wheels 46 that are mounted on oppositely extending arms 47 journaled at diametrically opposite points in the body portion of the casing and connected together by a collar 48 which encircles the shaft 3. The extremities of the arms 47 are reduced as illustrated and after the gear wheels 46 have been slipped over these reduced extremities, they are held in place by washers 49 interposed between them and the interior wall of the casing.

50 designates a reversing disk which is mounted for a longitudinal movement only on the shaft 3 within the casing, by means of a spline connection 51 with the shaft, said disk being formed in its upper face, considered from the view point of the drawings, with a series of teeth 52 with intervening slots 53 said slots if desired, extending entirely through the disk. The hub 54 of the disk 50 is grooved as shown and a collar 55 fits within said groove. Two oppositely extending arms 56 project out from and are secured to the collar 55, said arms carrying at their extremities rollers designated 57 and 58 mounted for movement in flanged guide ways designated 59 and 60 respectively, secured to the interior wall of the casing and conforming to the curvature thereof. The extremity of one arm 56 is engaged by the upwardly facing forked end 61 of a slide 62 which is mounted in the plate 7 in a manner similar to the slide 37 and which is formed with a depending finger piece designated L. The guide way 59 is slotted in its outer side as indicated at 63 and the brake lever 40



above mentioned projects outwardly through the slot 63 and is designed to be engaged by the roller 57 when the finger piece L is pressed upon to move the slide 62 inwardly.

5 In the practical operation of our improved rotary brush, the brush or other part which it is intended to operate, is secured to the drive wheel 14 in the manner above set forth. If it be desired to rotate the brush to the  
10 right or in the same direction the shaft 3 is rotating, the finger piece R is pressed upon, this will result in rocking the lever 34 in a direction opposite to the inward movement of the slide, and the lever 31 in the same direc-  
15 tion as the slide. As the levers 31 and 34 are thus rocked, it is evident that the arms 27 will be given a partial turn, while at the same time they will be caused to move longitudinally, owing to the mounting of the rollers 28  
20 within the guide ways 29, and consequently the clutch 23 will be slid longitudinally on the shaft 3 into positive engagement with the drive wheel 14 so as to rotate the drive wheel in the same direction as the shaft. It is to be  
25 particularly noted that simultaneous with, or practically just before, the engagement of the clutch 23 with the drive wheel 14, the forward movement of the slide 37 will have rocked the brake lever 40 out of engagement  
30 with the teeth 39, through the extremity of the laterally extending lower end 36 of the lever 34 and hence there will be no interference between the parts and the brake will be released just before the clutch and drive  
35 wheel are coupled. In order to bring the brush to a stand still, it is only necessary to remove the pressure upon the finger piece R whereupon the spring 42 of the brake lever 40 will rock the brake lever into engagement  
40 with the teeth 39 of the drive wheel, while at the same time the spring 42 will cause the lever 40 to positively rock the levers 34 and 31 in a direction to move the arms 27 backwardly and thereby carry the clutch 23 out of  
45 engagement with the drive wheel 14. In order to move the brush to the left or in a direction opposite to the rotation of the shaft 3, the finger piece L is pressed upon. This will result in a partial rotary movement of the  
50 arms 56 which will slide the disk 50 along the shaft 3 and cause said disk to mesh with the reversing gear wheels 46, and as these wheels also mesh with the drive wheel 14, it is evident that said wheel 14 will then be rotated  
55 in a direction opposite to the rotation of the shaft. It will also be understood that in this movement just described the roller 57 will engage the brake lever 40 and disengage the pointed end thereof from the teeth 39 just  
60 before the engagement of the disk 50 and the reversing gear wheels 46. As soon as the finger piece L is released, the spring 42 will again act to effect engagement of the brake lever 40 and the teeth 39 of the drive wheel  
65 14 so as to quickly bring the brush to a stand

still while at the same time the arms 56 will be moved into an opposite direction and the slide 62 moved back to its initial position.

Having thus described the invention, what is claimed as new is:

70 1. An apparatus of the character described, comprising a casing, a drive shaft mounted in said casing, means for driving said shaft, a drive wheel mounted to turn loosely on the shaft, and arranged to carry  
75 a tool, means for directly clutching the drive wheel to the shaft, a reversing disk mounted to move longitudinally on the shaft and arranged for gearing connection with said drive wheel, and means for establishing  
80 such connection.

2. An apparatus of the character described, comprising a casing, a drive shaft mounted therein, means for actuating said shaft, a drive wheel mounted to run loose  
85 on said shaft and arranged to support a tool, means for directly clutching said wheel to the shaft, reversing gear wheels held to turn in the casing and mesh with said drive wheel, a reversing disk held for longitudinal  
90 movement on the shaft, and means for moving said disk into meshing engagement with said reversing gear wheels.

3. An apparatus of the character described, comprising a drive shaft, a drive  
95 wheel loose on said shaft, a casing in which said shaft is journaled, the drive wheel being arranged to carry a tool, a clutch member arranged to directly clutch the drive wheel to the shaft, a disk mounted for longitudinal  
100 movement on the shaft, a gearing connection between the disk and the drive wheel arranged to effect the rotary movement of the drive wheel in a direction opposite to the rotation of the shaft, a brake arranged to  
105 engage the drive wheel, brake releasing mechanism, and means for actuating said brake releasing mechanism by and upon the movement of the clutch member and the reversing disk in a direction to effect the  
110 rotation of the drive wheel in one direction or the reverse.

4. An apparatus of the character described, comprising a casing, a drive shaft journaled therein, a drive wheel mounted  
115 to turn loosely on said shaft and arranged to carry a tool, a clutch member arranged to directly clutch the drive wheel to the shaft, reversing gear wheels held to turn on said casing and disposed perpendicularly to  
120 the drive wheel and meshing therewith, a reversing gear disk held to move longitudinally on the shaft and formed with teeth adapted to mesh with the teeth of the reversing gear wheels, means for actuating  
125 said reversing disk, a brake engaging the drive wheel, releasing mechanism for said brake, and means for actuating said releasing mechanism by and upon the actuation of the means for actuating the reversing disk.  
130



5. An apparatus of the character described, comprising a casing, a drive shaft journaled therein, a drive wheel mounted to turn loosely on said shaft and arranged to carry a tool, a clutch adapted to directly couple the wheel to the shaft and means for actuating said clutch, said means consisting of a collar encircling the shaft, outwardly extending arms secured to said collar, rollers carried on the outer ends of said arms, oppositely inclined guide ways in which said rollers are mounted, and means for imparting a partial turning movement to the arms.

6. An apparatus of the character described, comprising a casing, a drive shaft journaled therein, a drive wheel mounted to turn loosely on said shaft and arranged to carry a tool, a clutch adapted to directly couple the wheel to the shaft and means for actuating said clutch, said means consisting of a collar encircling the shaft, outwardly extending arms secured to said collar, rollers carried on the outer ends of said arms, oppositely inclined guide ways in which said rollers are mounted, a lever fulcrumed in the casing and having one arm operatively connected to one of the first named arms, and means for rocking said lever.

7. An apparatus of the character described, comprising a casing, a drive shaft journaled therein, a drive wheel mounted to turn loosely on said shaft and arranged to carry a tool, a clutch arranged to directly couple the drive wheel to the shaft and mounted for a longitudinal movement on the latter, and means for actuating said clutch, said means consisting of oppositely extending arms having a connection with the shaft rollers carried by said arms, oppositely inclined guideways secured to the casing and in which said rollers are mounted for movement, levers fulcrumed in the casing and having an operative connection with one of said arms, and a finger slide adapted to rock said levers.

8. An apparatus of the character described, comprising a casing, a drive shaft journaled in said casing, a drive wheel mounted to turn loosely on said shaft and arranged to carry a tool, a clutch adapted to connect said drive wheel with the shaft, means for actuating said clutch, said means consisting of oppositely extending arms operatively connected to the clutch, rollers carried by said arms, oppositely inclined guide ways in the casing in which said rollers are mounted, and means for imparting a turning movement to the arms, said means including a lever having a laterally extending end and means for rocking said lever, a brake engaging the drive wheel, the laterally projecting end of the lever being adapted to engage said brake whereby to release the brake from the drive wheel upon the rocking of the lever.

9. An apparatus of the character described,

comprising a drive shaft, a casing in which said drive shaft is mounted, and a drive wheel mounted to turn loose on said shaft and arranged to carry a tool, means for operatively connecting the wheel to the shaft for the movement of the former in one direction, means for operatively connecting the drive wheel to the shaft for movement of the former in the opposite direction, said last named means including a reversing disk held for longitudinal movement on the drive shaft, oppositely extending arms connected to the disk, rollers carried by said arms, and a brake normally held in engagement with the drive wheel, said brake extending into engagement with one of said rollers and adapted to be moved thereby to a released position upon the turning movement of said arms.

10. An apparatus of the character described, comprising a drive shaft, a casing in which said drive shaft is mounted, and a drive wheel mounted to turn loose on said shaft and arranged to carry a tool, means for operatively connecting the wheel to the shaft for the movement of the former in one direction, means for operatively connecting the drive wheel to the shaft for movement of the former in the opposite direction, said last named means including a reversing disk held for longitudinal movement on the drive shaft, oppositely extending arms connected to the disk, rollers carried by said arms, oppositely inclined guideways secured in the casing in which said rollers are mounted, means for imparting a turning movement to said arms, one of said guide ways being provided with a slot, and a brake engaging the drive wheel and extending into said slot and arranged to be actuated by the roller mounted in said guide way.

11. In an apparatus of the character described, the combination of a casing, a drive shaft mounted therein, a drive wheel mounted to turn loose on said shaft, means for operatively connecting the drive wheel to the shaft for the actuation of the former in one direction, and means for operatively connecting the drive wheel to the shaft for the operation of the wheel in an opposite direction, such means consisting of a longitudinally movable clutch member, oppositely extending arms operatively connected to said member, rollers carried by said arms, oppositely inclined guide ways in which said rollers are mounted, and means for imparting a turning movement to said arms.

12. An apparatus of the character described, comprising a casing, a drive shaft journaled therein, a drive wheel arranged to be driven by said shaft, said drive wheel being formed with holes extending there-through, pin clutches secured to said drive wheel, and spring pressed in a direction to partially close the holes a plate formed with notched pins adapted to be forced into said



holes into locking engagement with said pin clutches.

13. An apparatus of the character described, comprising a handle, a casing secured thereto, a drive shaft journaled in said handle and casing, and means for actuating said shaft, a drive wheel mounted to turn loosely on said shaft and arranged to carry a tool, said drive wheel having teeth formed on one face thereof, oppositely extending arms secured in the casing, toothed reversing wheels mounted in said arms and disposed perpendicularly to the drive wheel and meshing with the teeth thereof, means for directly

coupling the drive wheel to the shaft, a reversing disk held for longitudinal movement on the shaft and designed to engage the reversing gear wheels at points diametrically opposite their engagement with the drive wheel and means for moving said disk into meshing engagement with said gear wheels.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE F. PRESS.

JOHN W. LEWIS.

Witnesses:

WM. N. ALDRICH,

J. F. GRIFFITH.