

No. 742,602.

J. H. CROSKY.

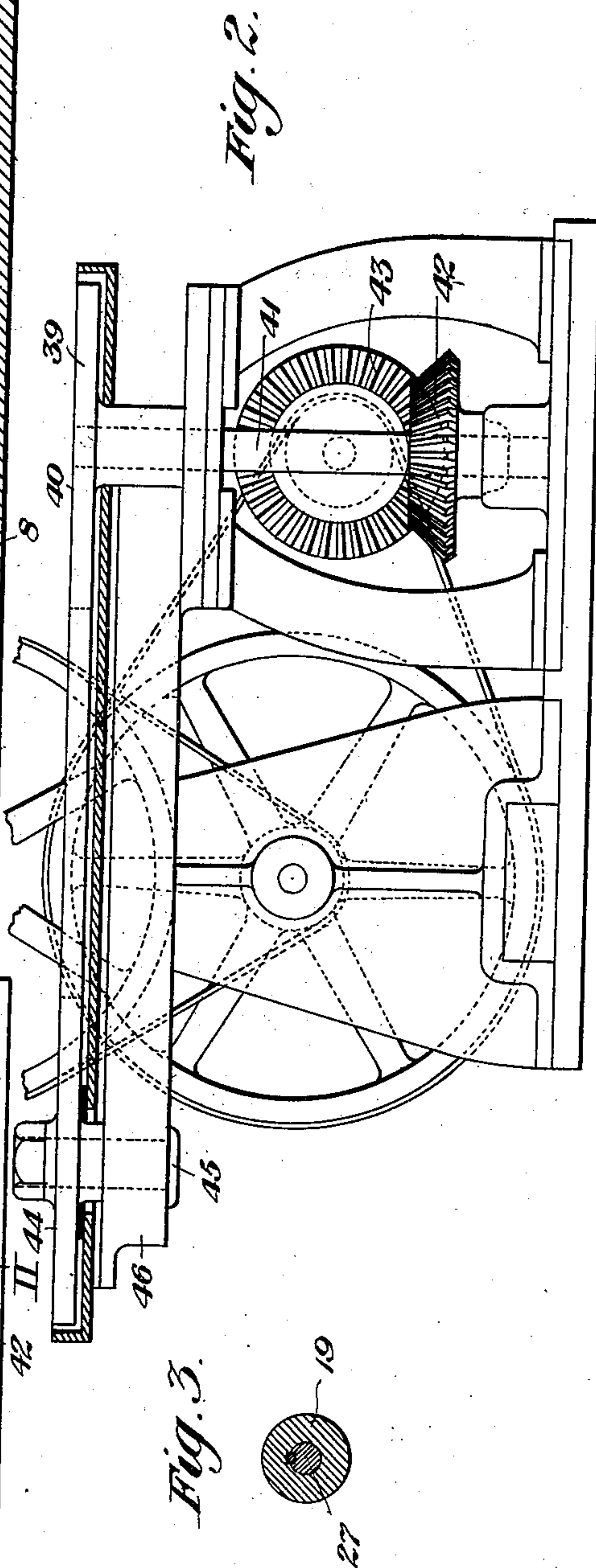
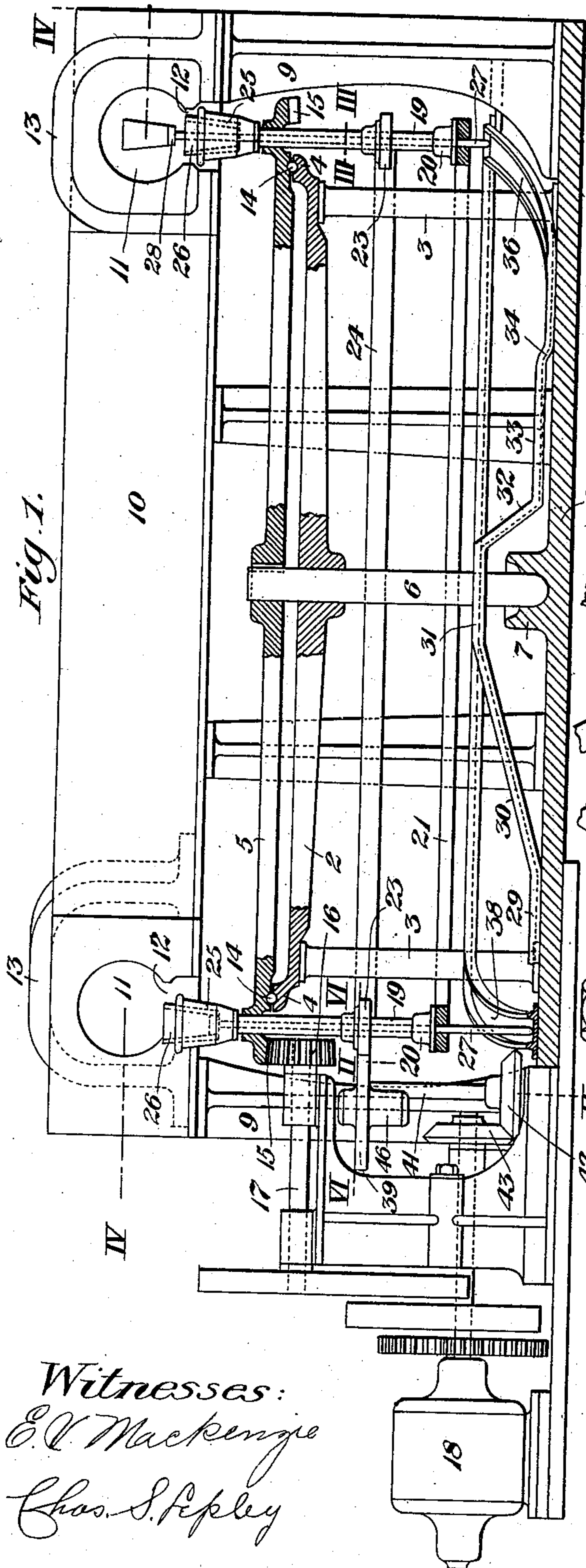
PATENTED OCT. 27, 1903.

METHOD OF FINISHING GLASSWARE.

NO MODEL.

APPLICATION FILED APR. 28, 1903.

3 SHEETS—SHEET 1.



Witnesses:  
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Inventor:  
John H. Crosky  
by O. M. Clarke  
his attorney



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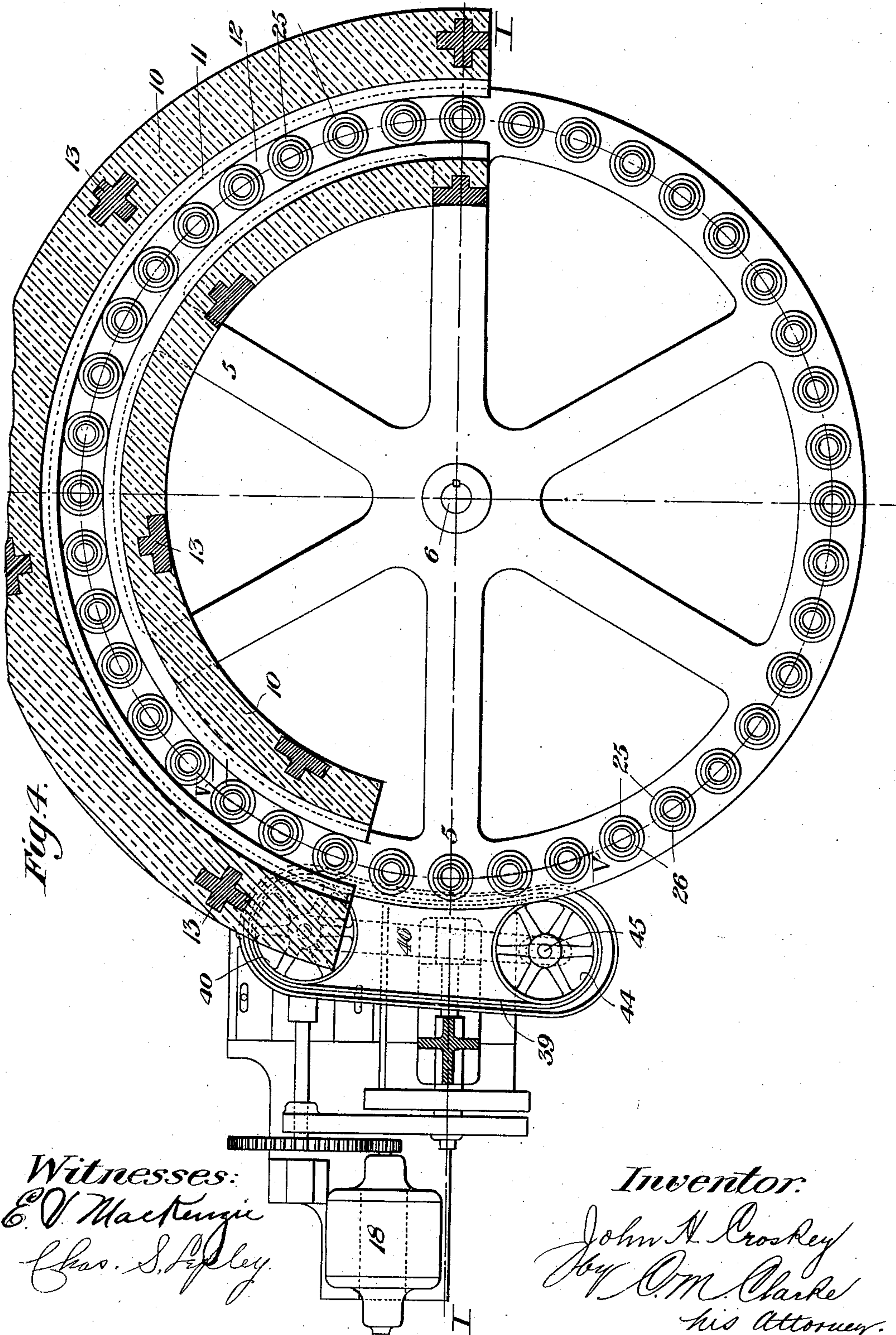
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3 SHEETS—SHEET 3.

Fig. 5.

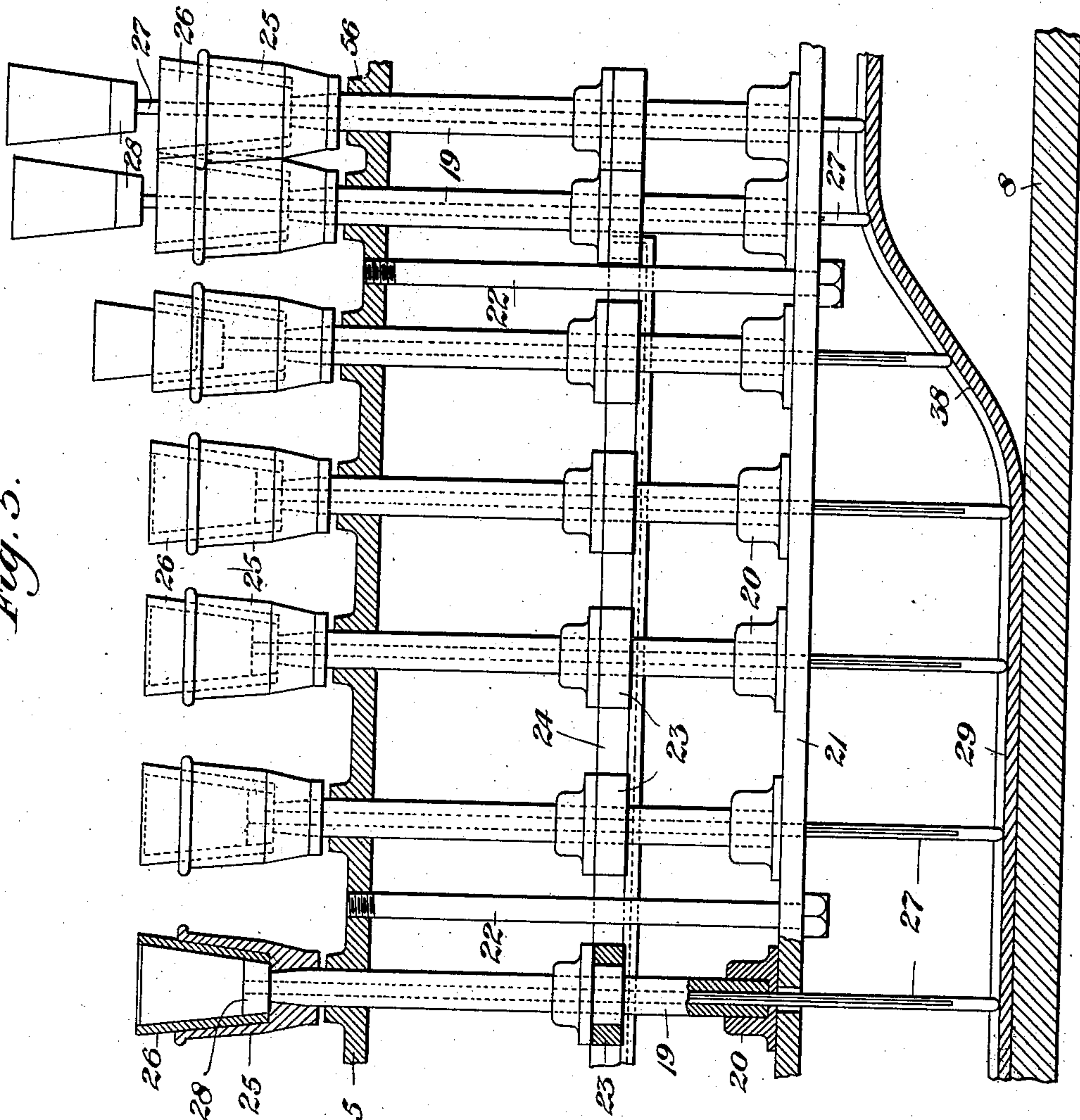
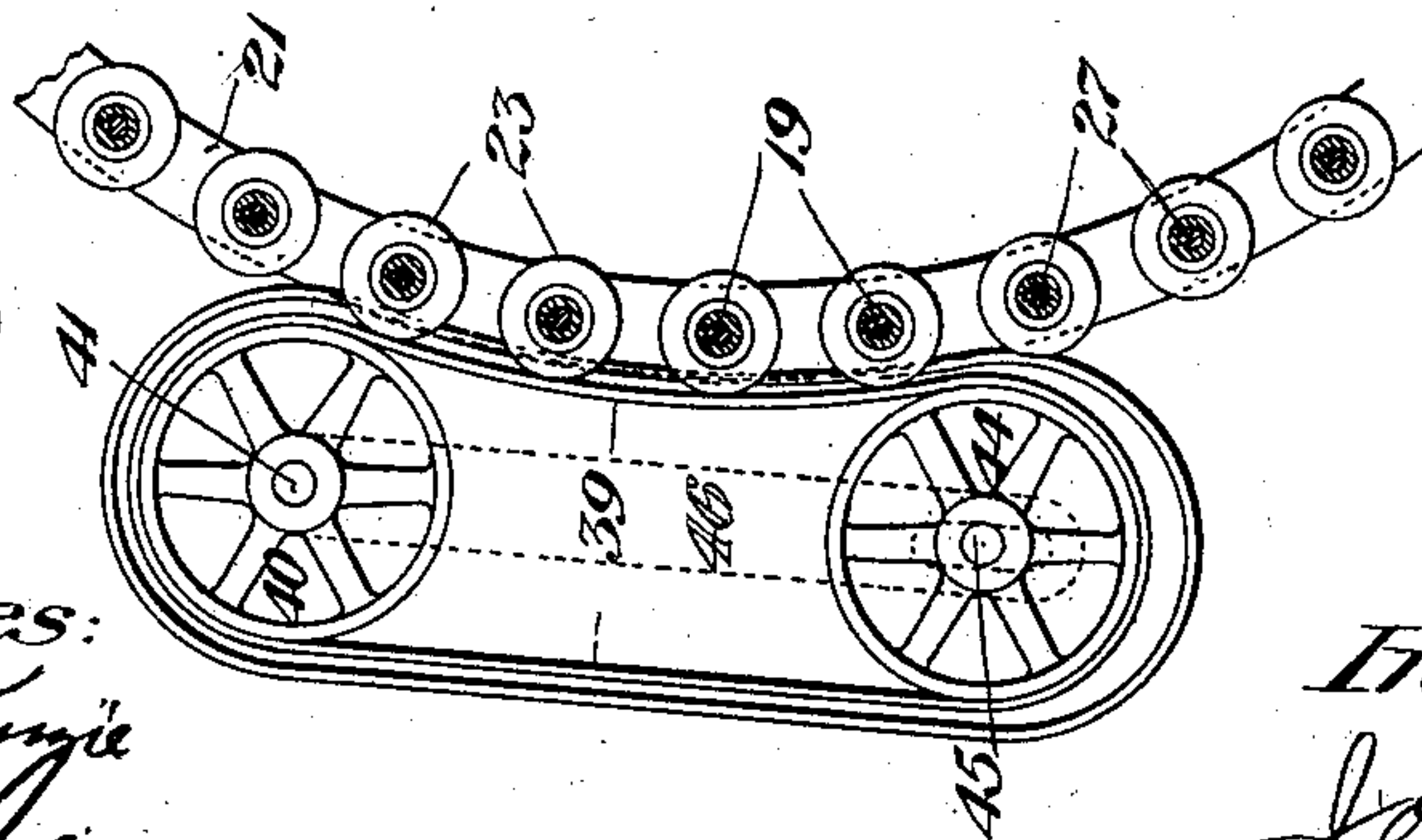


Fig. 6.



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# UNITED STATES PATENT OFFICE.

JOHN H. CROSKEY, OF PITTSBURG, PENNSYLVANIA.

## METHOD OF FINISHING GLASSWARE.

SPECIFICATION forming part of Letters Patent No. 742,602, dated October 27, 1903.

Application filed April 28, 1903. Serial No. 154,732. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. CROSKEY, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Methods of Finishing Glassware, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of this specification, illustrating the apparatus employed in carrying out my invention.

In the drawings, Figure 1 is a central vertical sectional view of my improved glass-finishing apparatus, taken on the line I I of Fig. 4, the cam-track, however, being shown in elevation and projecting in front of the central portion. Fig. 2 is a vertical sectional view indicated by the line II II of Fig. 1. Fig. 3 is a cross-section through one of the spindles on the line III III of Fig. 1. Fig. 4 is a plan view, the furnace being shown in section and indicated by the line IV IV of Fig. 1. Fig. 5 is a vertical sectional view on the line V V of Fig. 4. Fig. 6 is a detail sectional plan view on the line VI VI of Fig. 1, showing the means for rotating the spindles rapidly.

My invention relates to a method or process of finishing pressed or blown glassware, such as tumblers; and it has for its object to perfectly fire-polish the article, to expose the surfaces of the ware to an even degree of heat, to re-form it, and generally to produce a more satisfactory result and a better finished ware at less cost and with less careful hand manipulation than is required at present.

Referring now to the drawings, wherein the apparatus for carrying out the invention is illustrated, 2 is a stationary wheel mounted upon columns 3 and provided with a peripheral track or ball-race 4, adapted to support the rotating carrying-wheel 5. The carrying-wheel is keyed to a central spindle 6, having a bearing at the middle of the wheel 2 and resting at its lower end in a step-box 7, set upon or formed integral with the base-plate 8. Mounted upon columns 9 or other suitable supporting means is the circularly-arranged furnace 10, having an interior heating-chamber 11 and a lower smaller opening

or space 12, through which the ware is introduced to the interior or raised or lowered. The brickwork of the furnace is supported at intervals upon overhanging brackets 13; but such construction is well understood and does not *per se* form any part of the present invention.

The carrier 5 is rotatably mounted upon ball or roller bearings 14, running in the race or track 4, and is provided with a peripheral series of teeth 15, into which gears a driving-pinion 16, mounted upon the inner end of shaft 17 and actuated primarily through suitable gearing from an electric motor 18 or other suitable source of power or prime mover.

Mounted in the outer portion of the carrier 5, beyond the supporting-bearings and inside of the peripheral rack 15, is a series of closely-adjacent rotating spindles 19, set in lower bearings 20, mounted on a depending ring 21, suspended from wheel 5 by supporting-arms 22, located at intervals between the spindle, as clearly shown in Fig. 3. The spindles 19 are each provided with friction-wheels 23, having peripheral bearings of vulcanized fiber or other suitable material and by which the spindles are rotated by frictional engagement against a stationary circular band 24, upon which the wheels 23 bear as the spindles are carried around by carrier 5. The band 24 extends from the front or entering end of the furnace around its inner wall, terminating at its other end.

On the top of each spindle 19 is mounted and secured a cup 25, in the inside of which is nested an inner changeable receiving-cup 26 for the ware. The inner cup is adapted to form the ware and is of varying interior shapes, as desired. It may be removed and other cups substituted and is also very easily cleaned or repaired.

The spindles 19 are provided with a central longitudinal channel or passage-way in which is mounted an independent longitudinally-movable rod 27, having a spline or key engagement with the spindle, so that it will be rotated by it and yet be free to be raised or lowered therein. Secured to the upper end of the stem 27 is a supporting-head 28, adapted to receive and support the ware when it



is raised, as shown to the right of Fig. 3, and lower it into the inner cup 26, as shown at the left of said figure.

Corresponding to the path of the spindles 5 is a circular cam-track 29, having a gradually-inclined portion 30 at the front of the apparatus, a short level portion 31 of the maximum height, an abrupt downwardly-inclined portion 32, a horizontal portion 33 on a plane 10 a little above the lowermost level, an abrupt drop 34, and a gradual incline 36 up to its highest level, which is then continued around through the entire area of the furnace to its outlet, the track there inclining down, as at 38, 15 and leading into the lower horizontal level 29.

The lower ends of the stems 27 travel upon this undulating track, rising and falling, as controlled by the cam portion thereof and by gravity, or traveling horizontally upon the 20 level portions.

At one end of the apparatus is provided an endless driving-belt or carrier 39 of any suitable construction, as linked chains or belting, carried upon a driving-wheel 40, mounted on 25 shaft 41 and driven by bevels 42 43 from the motor, the belt 39 passing around a supporting tightening-wheel 44, mounted upon an adjustable stud 45, carried on a swinging arm 46, by which the tension of the belt may 30 be regulated and the location with relation to the driven wheels adjusted. The band 24 is designed to impart a rotary motion to the spindles and to the ware at slow speed as it travels around through the furnace, while 35 the belt 39, being positively driven, engages the wheels 23 and rotates the spindles and the ware at a comparatively very high speed, which speed may be varied within wide limits as desired. When the stem 27 reaches 40 the bottom of incline 38 and the article of glassware has settled to the bottom, the ware is rapidly rotated, as described, the object of such rapid rotation being to expand the semiplastic glass outwardly against the interior 45 smooth surface of the cup. By such rapid rotation the semiplastic glass is caused to press outwardly against the finished interior of the cup, and as such operation occurs immediately after the ware emerges downwardly 50 from the furnace all inequalities are smoothed and the article is brought to a finished polished shape before cooling and will then cool without changing form. It will be understood that in its passage through the furnace the ware becomes very soft and is subject to such action, thereby causing it to 55 easily assume a perfect form and giving it a perfectly-finished surface as it emerges from the furnace. As it travels around the horizontal track 29 the ware becomes cooled, and as the stems 27 rise upwardly on track 30 the ware is lifted upwardly above the cup to the same position as shown at the right of Fig. 1, when it may be removed by the operator or by any suitable mechanical means. 60 A new tumbler or piece of ware is placed in

the cup resting on the head 28 while the spindle is on track 33, at which position the head 28 is not quite down to its lowermost position, but sufficiently near the bottom to 70 permit the ware to be dropped into the cup. As the spindle progresses it will drop abruptly down the incline 34, when the ware will also drop, thus nesting snugly in the interior of the cup and centrally upon the supporting-head. After having become thus positively centered upon the head 28 the stem 27 gradually rises upon the inclined portion 36 of the track to the highest level, raising 75 the tumbler, as shown in Fig. 1, into the heated furnace-chamber, through which it slowly travels around and in which it is slowly rotated by the frictional action of the band 24. 80

The operation will be readily understood 85 from the foregoing description.

The apparatus is very efficient for the purpose intended and has a large carrying capacity, while each piece of ware is subjected to the same degree of heat and time exposure, resulting in very even and regular treatment. 90

The temperature of the furnace may be accurately regulated, as may also the speed of the different operations, and the entire apparatus is within the easy control of the operator. The fire-polishing and re-forming of the ware will impart to it a highly-finished uniform appearance, obliterating all inequalities and mold-marks, and thus producing the best quality of goods at a minimum of cost. 100

Changes and variations may be made in the construction, design, proportions, or other details of the apparatus by the skilled mechanic without departing from my method, and all such changes are to be considered as within the scope of the following claims. 105

What I claim is—

1. The method of finishing glassware consisting in supporting and heating the ware upon a traveling holder within a furnace, and then expanding the ware to finished shape while plastic without removing it from the holder, substantially as set forth. 110
2. The method of finishing glassware consisting in supporting and heating the ware above a holder to a plastic condition and re-forming the ware while in a plastic state within the same holder, substantially as set forth. 115
3. The method of finishing glassware, consisting in supporting and heating the ware in a holder, lowering it into a forming-mold forming a part of the holder while in a plastic condition, and re-forming the ware therein by imparting rapid movement to the holder, substantially as set forth. 120
4. The method of finishing glassware consisting in exposing and rotating the ware in a furnace so as to heat it to a plastic state, lowering the ware into a forming-carrier and rapidly rotating it therein while still in a 125 130



plastic condition whereby the ware will expand and conform to the interior of the carrier, substantially as set forth.

5 5. The method of treating glassware consisting in first placing the ware within a carrier lowering the ware therein, raising it therefrom into a furnace-chamber, carrying and rotating it through said furnace-chamber, lowering it into the carrier, rotating it

therein at high speed, and raising and re-<sup>to</sup> moving it therefrom, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN H. CROSKEY.

Witnesses:

JAMES MCC. MILLER,  
C. M. CLARKE.