G. E. DRUM & R. P. SMITH.

REVERSING MECHANISM FOR DYEING MACHINES.

APPLICATION FILED MAR. 23, 1908.

917,026. Patented Apr. 6, 1909.

3 SHEETS—SHEET 1.

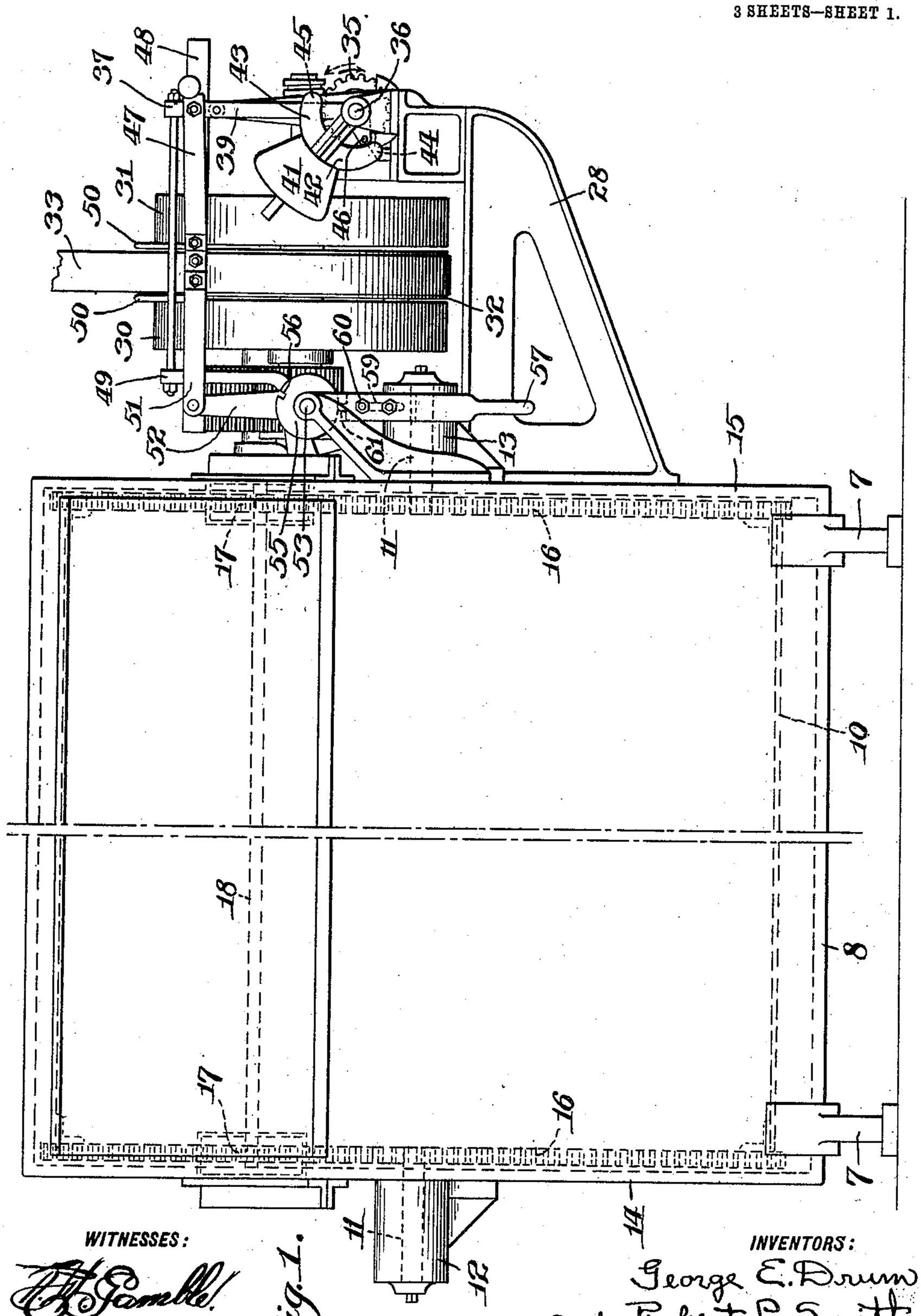

Fig. 1.

WITNESSES:

H. C. Gamble.

E. M. Ware

INVENTORS:

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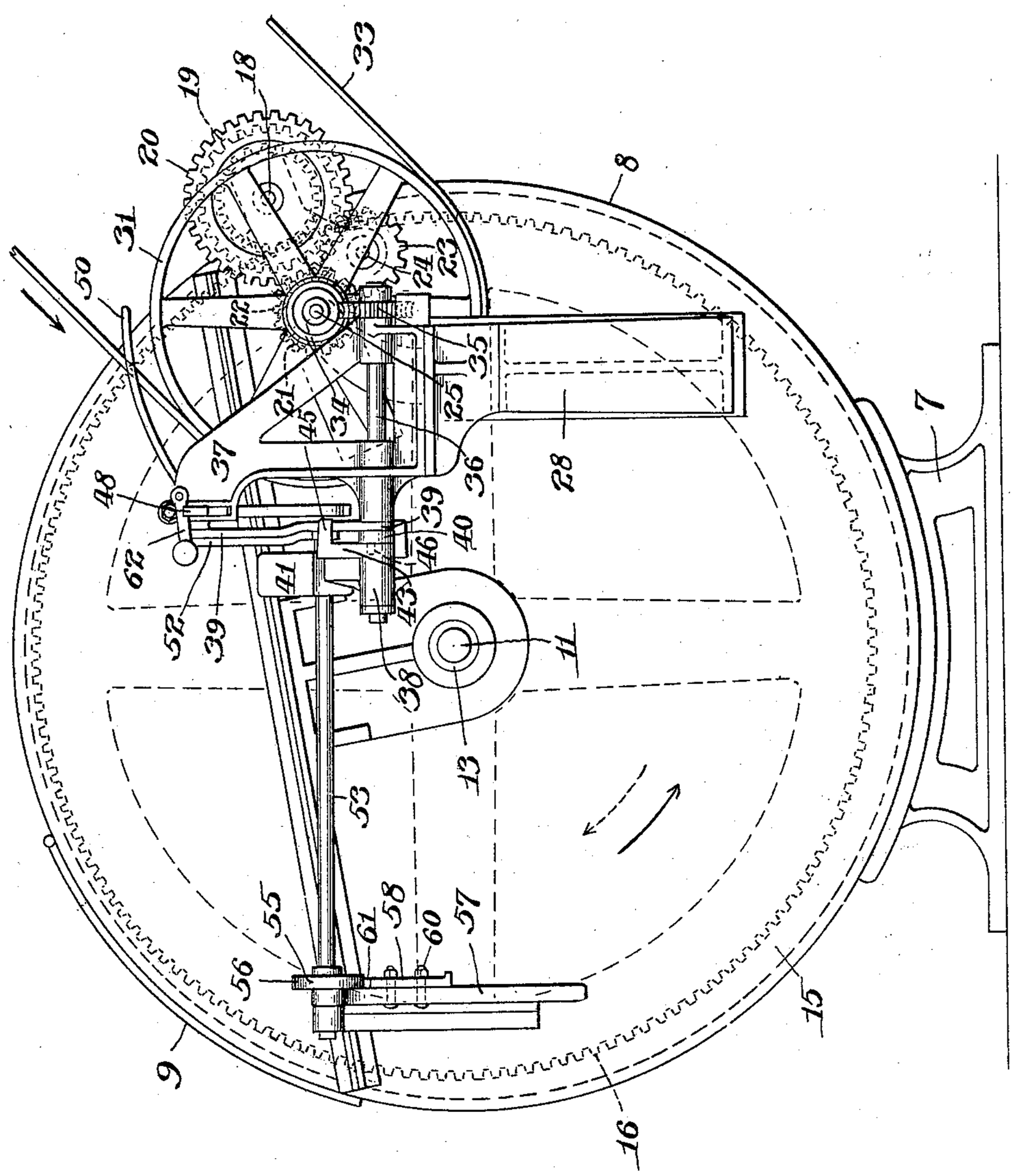

Fig. 2.

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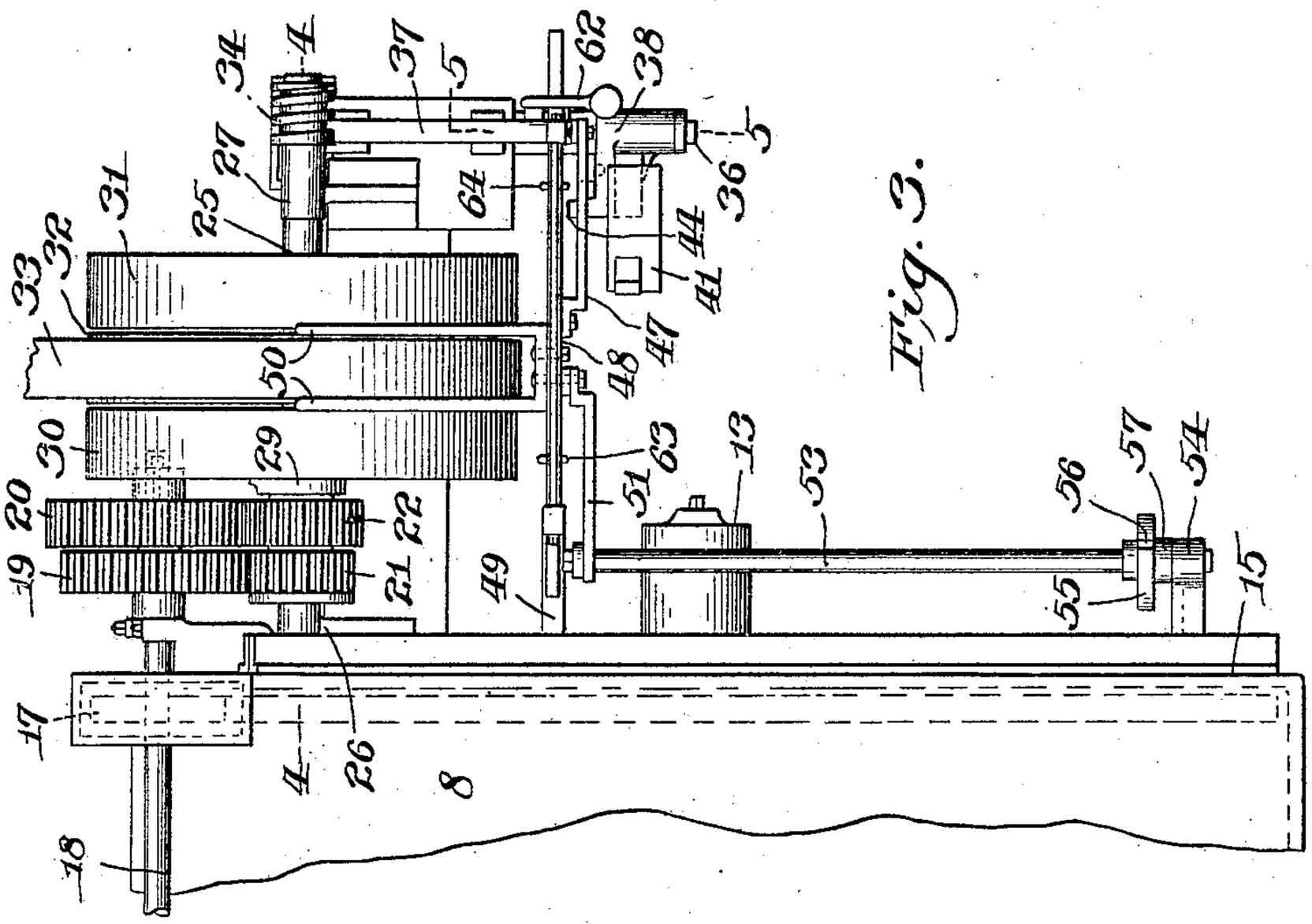

Fig. 3.

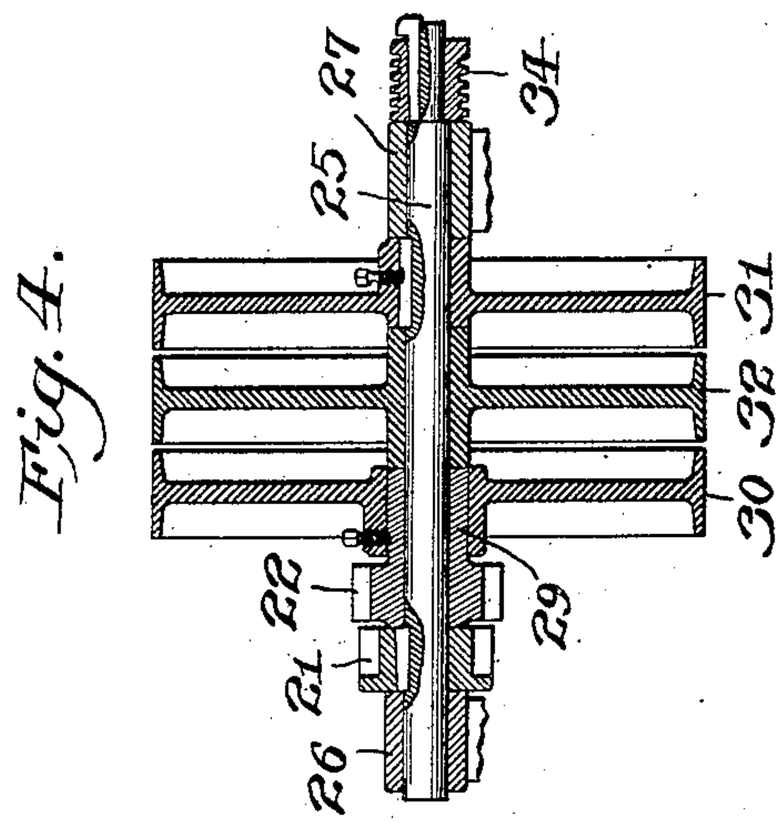

Fig. 4.

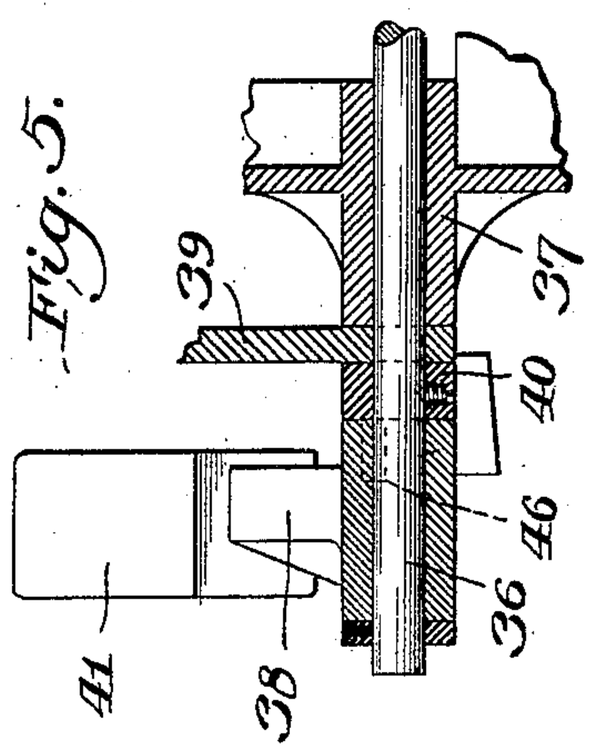

Fig. 5.

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UNITED STATES PATENT OFFICE.

GEORGE E. DRUM AND ROBERT P. SMITH, OF PHILADELPHIA, PENNSYLVANIA.

REVERSING MECHANISM FOR DYEING-MACHINES.

No. 917,026. Specification of Letters Patent. Patented April 6, 1909.

Application filed March 28, 1908. Serial No. 422,625.

To all whom it may concern:

Be it known that we, GEORGE E. DRUM and ROBERT P. SMITH, citizens of the United States, residing in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Reversing Mechanism for Dyeing-Machines, of which the following is a specification.

This invention relates to reversing mechanisms, especially adapted for use in connection with dyeing machines wherein a rotatable part for containing the articles to be dyed is rotated in reverse directions in alternate succession within a tank containing the dyeing liquor.

The object of the invention is to provide a simple and efficient mechanism whereby the rotatable part of the dyeing machine may be automatically rotated in reverse directions in alternate succession.

To this end, the invention consists in the novel construction and combinations of parts which will be hereinafter fully described and claimed.

In the drawings:—Figure 1 is a front elevation of a dyeing machine provided with our improved reversing mechanism. Fig. 2 is an end elevation thereof. Fig. 3 is a plan view, partly broken away. Fig. 4 is a sectional view of the parts carried by the main driving shaft, as on the line 4—4, Fig. 3. Fig. 5 is a sectional view showing a part of the automatic controlling mechanism for the belt shipping mechanism, as on the line 5—5, of Fig. 3.

Mounted on suitable supports 7 is a cylindrical tank 8, adapted to contain the dyeing liquor, and to which access may be had by means of a suitable door 9. Within the tank 8 is a perforated, cylindrical carrier 10, for containing the articles to be dyed. The carrier 10 is supported on a stud shaft 11 projecting from the end heads of the carrier 10, and into suitable bearings 12 and 13 on the end heads 14 and 15 of the tank 8. The end heads of the carrier 10 are provided with gear wheels 16, in mesh with pinions 17 on a shaft 18 extending longitudinally of the tank 8, and journaled in suitable bearings thereon.

The operation of the parts thus far is as follows:—The dyeing liquor is introduced to the tank 8, and the articles to be dyed are introduced to the carrier 10 through the door 9 and a suitable door (not shown) in the carrier 10. This being done, the shaft 18 is turned first in one direction and then in the opposite direction, thus, through the pinions 17 and gear wheels 16, rotating the carrier 10 in reverse directions in alternate succession and thus effecting a thorough agitation of the articles to be dyed in the dyeing liquor contained within the tank 8, as is common and well known in this art.

We shall now proceed to describe our improved reversing mechanism for the carrier 10.

One end of the shaft 18 extends outwardly and has secured thereto two gear wheels 19 and 20, arranged in line with two gear wheels 21 and 22 respectively. The gear wheel 20 is in mesh with the gear wheel 22, and the gear wheel 19 is in mesh with an idler 23 which in turn is in mesh with the gear wheel 21, the idler 23 being journaled on a stud shaft 24 projecting from the end head of the tank 8. The gear wheel 21 is secured to a shaft 25 which is mounted in bearings 26 and 27 on the end head 15 of the tank 8, and a bracket 28 projecting from said end head, respectively; and the gear wheel 22 is formed on or secured to the hub 29 of a pulley 30, which is rotatably mounted on the shaft 25. Secured to the shaft 25 a short distance from the pulley 30, is a pulley 31, and loosely mounted on the shaft 25 between the pulleys 30 and 31 is a pulley 32, around which passes a belt 33, which may be driven from any suitable source of power. The outer end of the shaft 25 is provided with a worm 34 which coacts with a worm wheel 35 on a shaft 36 extending forwardly and at right angles to the shaft 25, and having its bearings in a bracket 37 rising from the outer end of the bracket 28.

Loosely mounted on the forward portion of the shaft 36 are two arms 38 and 39, and secured to the shaft 36 between the arms 38 and 39 is an arm 40. The arm 38 is provided with a weight 41, and also with lateral extensions 42 and 43, the extensions 42 and 43 being provided with projections 44 and 45 which extend in the direction of the shaft 36 and are adapted to take against the arm 39 when the arm 38 is rocked from side to side upon the shaft 36. The arm 40 is provided with a pin 46 extending toward the forward end of the shaft 36 and being adapted to take against the arm 38 to move

the same upon the shaft 36, as hereinafter explained.

The upper end of the arm 39 is connected by a pivoted bar 47 to a horizontal belt-shipping bar 48 which is mounted to slide in bearings in the bracket 37 and in a bracket 49 projecting from the end head 15 of the tank 8. This belt shipping bar 48 is provided with prongs 50 which embrace the belt 33 and which are adapted, as hereinafter explained, to shift the belt over the pulleys 30, 31, and 32.

Connected to the belt shipping bar 48 by means of a pivoted bar 51, is the upper end of an arm 52 projecting from a shaft 53 which is mounted in a bearing 54 projecting from the end head 15 of the tank 8, and also in a bearing in the bracket 49. The forward portion of the shaft 53 has a wheel 55 secured thereto, which is provided with a notch 56, and loosely mounted on the shaft 53 and depending therefrom, adjacent the wheel 55, is an arm 57. Arranged against the face of the arm 57, directly beneath the wheel 55, is a plate 58, having a vertical slot 59 therein. This plate 58 is held in place in a manner to have slight longitudinal movement upon the arm 57, by the heads of screws 60, which extend from the arm 57 and through the slot 59. The end of the plate 58 adjacent the wheel 55 is provided with a tooth 61, which, when the arm 57 is moved upwardly around the shaft 53, will fall by gravity into engagement with the notch 56 of the wheel 55, thus locking the arm 57 and wheel 55 together, and permitting the shaft 53 to be rocked by manipulating the arm 57 by hand. By thus rocking the shaft 53 by hand, the arm 52 and bar 51 may be moved to operate the belt shipping bar in a manner to move the belt 33 to any one of the three pulleys 30, 31, or 32, as desired.

As a means to lock the belt shipping bar 48 in position to cause the prongs 50 to maintain the belt 33 in engagement with the loose pulley 32, we provide an arm 62, which is pivoted to the bracket 37 and is adapted to rest by gravity in a notch in the bar 48 when the prongs 50 are in position to direct the belt to the pulley 32, and thus prevent longitudinal movement of the bar 48.

The operation of the reversing mechanism is as follows:—When the parts occupy the position shown in the drawings, the arm 62 is in engagement with the bar 48 and the belt 33 is rotating the loose pulley 32. When it is desired to set the machine in operation, the arm 62 is raised from engagement with the bar 48 and the projection 45 of the arm 38, by reason of the weight 41, moves the arm 39 to cause the bar 47 to operate the belt shipper bar 48, and move the belt 33 into engagement with the loose pulley 30. A pin 63 takes against the bracket 49 and limits the movement of the bar 48. When the belt 33 is in engagement with the loose pulley 30, power is transmitted to the shaft 18 through the gear wheels 22 and 20, in a manner to cause the pinions 17 to actuate the gear wheels 16 and rotate the carrier 10 in the direction indicated by the full line arrow in Fig. 2. During this operation, the pulley 31 fixed to the shaft 25 is rotated reversely of the pulley 30 by the gear wheel 19 engaging the idler 23 and causing it to rotate the gear wheel 21 which is fixed on the shaft 25. The rotation of the shaft 25 turns the worm 34, which slowly turns the worm wheel 35 and therewith the shaft 36 in the direction indicated by the full line arrow in Fig. 1. As the shaft 36 turns in this direction, the pin 46 on the arm 40 engages and raises the arm 38, and moves the projection 45 away from the arm 39 and the projection 44 toward the arm 39. Immediately upon the weight 41 of the arm 38 passing over the center of gravity, the arm and weight quickly fall by gravity in the direction in which they are being moved by the pin 46. This quick motion of the arm 38 causes it to leave the pin 46 and move the projection 44 into engagement with the arm 39, which in turn is moved by the gravity action of the weighted arm 38 until the bar 47 has moved the belt shipper bar 48 to bring the belt 33 into engagement with the pulley 31, a stop pin 64 on the bar 48 engaging the bracket 37 and limiting the movement of said bar. When the belt is thus shifted, it reverses the direction of movement of all of the rotating parts, as follows:—Power being applied to the pulley 31 through the belt 33, in the direction indicated by the arrow in Fig. 2, the pulley 31 rotates the shaft 25 and gear wheel 21, which, through the idler 23, rotates the gear wheel 19, and therewith the shaft 18 and pinion 17, which act upon the gear wheel 16 to rotate the carrier 10 in the direction indicated by the dotted line arrow in Fig. 2. During the rotation of the carrier 10 in this direction, the pulley 30 is rotated reversely of the pulley 31 by the gear wheel 20 acting upon the gear wheel 22, which is secured to the hub of the pulley 30; and during the rotation of the carrier 10 in this direction, the worm 34 acts upon the worm wheel 35 in a manner to rotate it and therewith the shaft 36 in the dotted line arrow in Fig. 1. The belt 33 continues in engagement with the pulley 31 until the rotation of the shaft 36 in the direction of the dotted line arrow causes the pin 46 to engage the arm 38 and raise it with its weight 41 until they have passed over the center of gravity. Whereupon, the projection 45 will engage the arm 39 and cause the bar 47 to operate the belt shipping bar 48 to move the belt 33 into engagement with the pulley 30, the pin 63 engaging the bracket 49 and limiting the movement of the bar 48.

In this position of the belt 33, the carrier 10 will be again rotated in the direction indicated by the full line arrow in Fig. 2, until the operation of the worm 34 and its connections causes the arm 38 to be moved over its center of gravity. Thus the carrier 10 will be rotated in reverse directions in alternate succession, until the belt shipper bar 48 is locked against movement by the pivoted arm 62.

When it is desired to operate the machine by hand,—that is, to say, move the belt 33 at will into engagement with any one of the pulleys 30, 31, and 32—the arm 57 is raised until the tooth 61 engages with the notch 56 of the wheel 55, whereupon the shaft 53 may be rocked to cause its connections with the belt shipper bar 48 to shift the belt 33 to any desired position.

The construction of the automatic mechanism is such as to not interfere with the operation of the belt shipper bar 48 by hand.

We claim:—

1. The combination of a support, a shaft, a pulley fixed to said shaft, a pulley loose on said shaft, a second shaft, gearing between said first and second named shafts, reverse gearing between said loose pulley and said second named shaft, a third shaft, gearing between the first named shaft and the third named shaft, means operative to ship a belt into engagement with the first pulley and the loose pulley in alternate succession, a pivoted arm mounted to move vertically over the center of gravity of its pivotal connection, said arm being provided with means to engage and operate the belt shipping means by the weight of said arm when it is moved from side to side of its center of gravity, and an arm fixed to the third named shaft and provided with means to engage the first named arm to move it from side to side of its center of gravity during the operation of the third named shaft.

2. The combination of a support, a shaft, a pulley fixed to said shaft, a pulley loose on said shaft, a second shaft, gearing between said first and second named shafts, reverse gearing between said loose pulley and said second named shaft, a third shaft, gearing between the first named shaft and the third named shaft, a bar provided with belt shipping means to engage a belt and ship it into engagement with said fast pulley and said loose pulley in alternate succession, a pivoted arm, connections between said arm and said bar, a weighted, pivoted arm mounted to move vertically over the center of gravity of its pivotal connection, said weighted arm being provided with means adapted to engage said pivoted arm to operate the belt shipping bar when it is moved from side to side of its center of gravity, and an arm fixed to the third named shaft and provided with means to engage said weighted arm to move it from side to side of its center of gravity during the operation of the third named shaft.

3. The combination of a support, a shaft, a pulley fixed to said shaft, a pulley loose on said shaft, a third pulley loose on said shaft between the first and second named pulleys, a second shaft, gearing between said first and second named shafts, reverse gearing between the second named pulley and the second named shaft, a third shaft, gearing between the first named shaft and the third named shaft, a bar provided with belt shipping means to engage a belt and ship it into engagement with the first named pulley and the second named pulley and over the third named pulley in alternate succession, a pivoted arm, connections between said arm and said bar, a weighted pivoted arm mounted to move vertically over the center of gravity of its pivotal connection, said weighted arm being provided with means adapted to engage said pivoted arm to operate the belt shipping bar when it is moved from side to side of its center of gravity, an arm fixed to the third named shaft and provided with means to engage said weighted arm to move it from side to side of its center of gravity during the operation of the third named shaft, and means to lock said bar with its belt shipping means in position to direct a belt to the third named pulley.

4. The combination of a support, a shaft, a pulley fixed to said shaft, a pulley loose on said shaft, a third pulley loose on said shaft between the first and second named pulleys, a second shaft, gearing between said first and second named shafts, reverse gearing between the second named pulley and the second named shaft, a third shaft, gearing between the first named shaft and the third named shaft, a bar provided with belt shipping means to engage a belt and ship it into engagement with the first named pulley and the second named pulley and over the third named pulley in alternate succession, a pivoted arm, connections between said arm and said bar, a weighted pivoted arm mounted to move vertically over the center of gravity of its pivotal connection, said weighted arm being provided with means adapted to engage said pivoted arm to operate the belt shipping bar when it is moved from side to side of its center of gravity, an arm fixed to the third named shaft and provided with means to engage said weighted arm to move it from side to side of its center of gravity during the operation of the third named shaft, a hand operated part, and operative connections between said part and said bar.

5. The combination of a support, a shaft, a pulley fixed to said shaft, a pulley loose on said shaft, a third pulley loose on said shaft between the first and second named pulleys, a second shaft, gearing between said first and

second named shafts, reverse gearing between the second named pulley and the second named shaft, a third shaft, gearing between the first named shaft and the third named shaft, a bar provided with belt shipping means to engage a belt and ship it into engagement with the first named pulley and the second named pulley and over the third named pulley in alternate succession, a pivoted arm, connections between said arm and said bar, a weighted pivoted arm mounted to move vertically over the center of gravity of its pivotal connection, said weighted arm being provided with means adapted to engage said pivoted arm to operate the belt shipping bar when it is moved from side to side of its center of gravity, an arm fixed to the third named shaft and provided with means to engage said weighted arm to move it from side to side of its center of gravity during the operation of the third named shaft, a fourth shaft, operative connections between the fourth named shaft and said bar, a hand lever on the fourth named shaft, and means for connecting and disconnecting the hand lever with the fourth named shaft.

6. The combination of a support, a shaft, a pulley fixed to said shaft, a pulley loose on said shaft, a third pulley loose on said shaft between said first and second named pulleys, a second shaft, gearing between said first and second named shafts, reverse gearing between the second named pulley and the second named shaft, a third shaft, gearing between the first named shaft and the third named shaft, a bar provided with belt shipping means to engage a belt and ship it into engagement with the first named pulley and the second named pulley and over the third named pulley in alternate succession, a pivoted arm, connections between said arm and said bar, a weighted pivoted arm mounted to move vertically over the center of gravity of its pivotal connection, said weighted arm being provided with means adapted to engage said pivoted arm to operate the belt shipping bar when it is moved from side to side of its center of gravity, an arm fixed to the third named shaft and provided with means to engage said weighted arm to move it from side to side of its center of gravity during the operation of the third named shaft, a fourth shaft, an arm projecting from the fourth shaft and connected to said bar, a wheel provided with a notch and fixed to said fourth shaft, and a hand lever loose on said fourth shaft and provided with means adapted to engage said notch.

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

GEORGE E. DRUM.
ROBERT P. SMITH.

Witnesses:
MARGARET CRAIG,
IRMA BAETZEL.