J. THOMAS.

GLAZED CEMENT SEWER PIPE MACHINE.

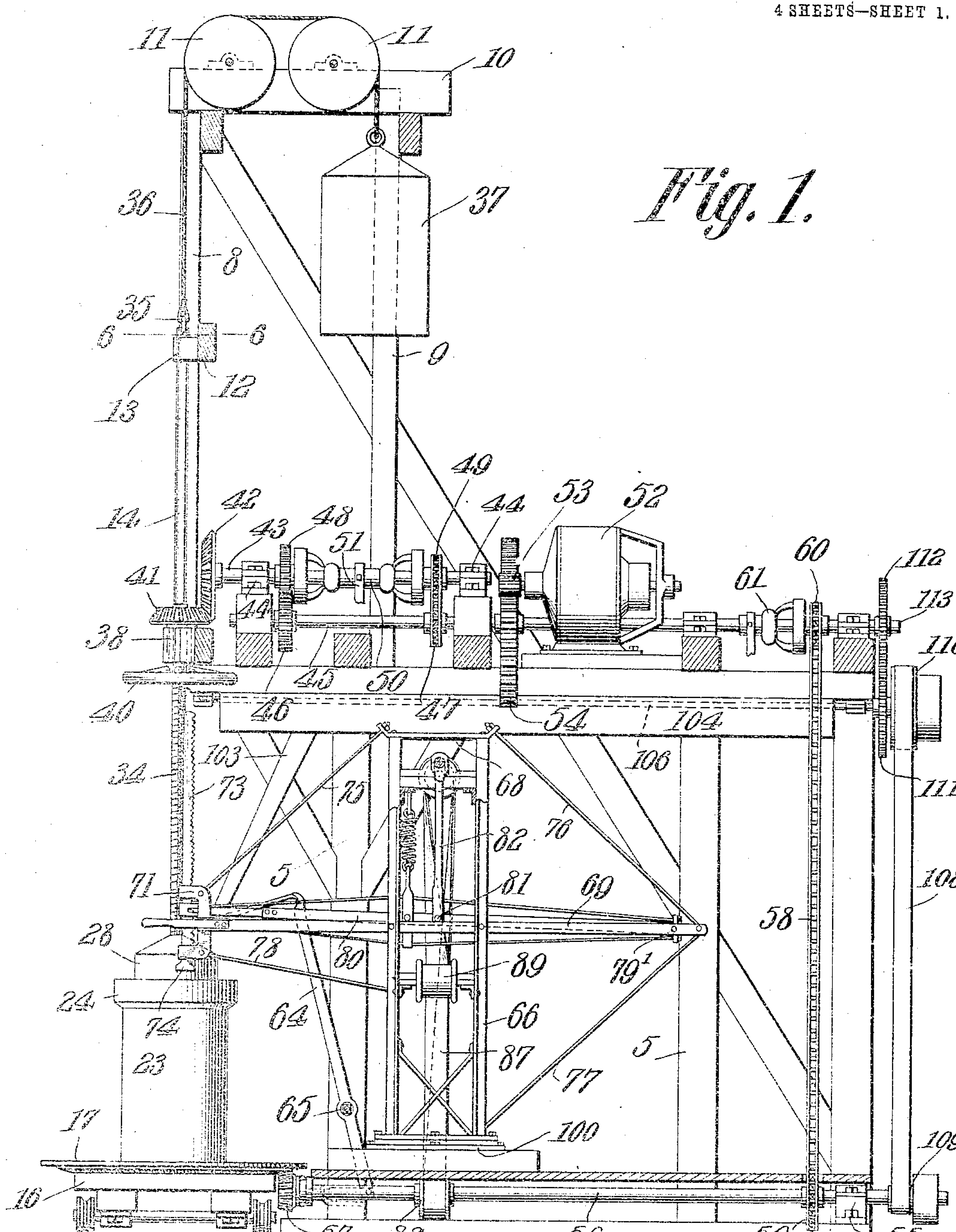
APPLICATION FILED NOV. 17, 1908.

929,898.

Patented Aug. 3, 1909.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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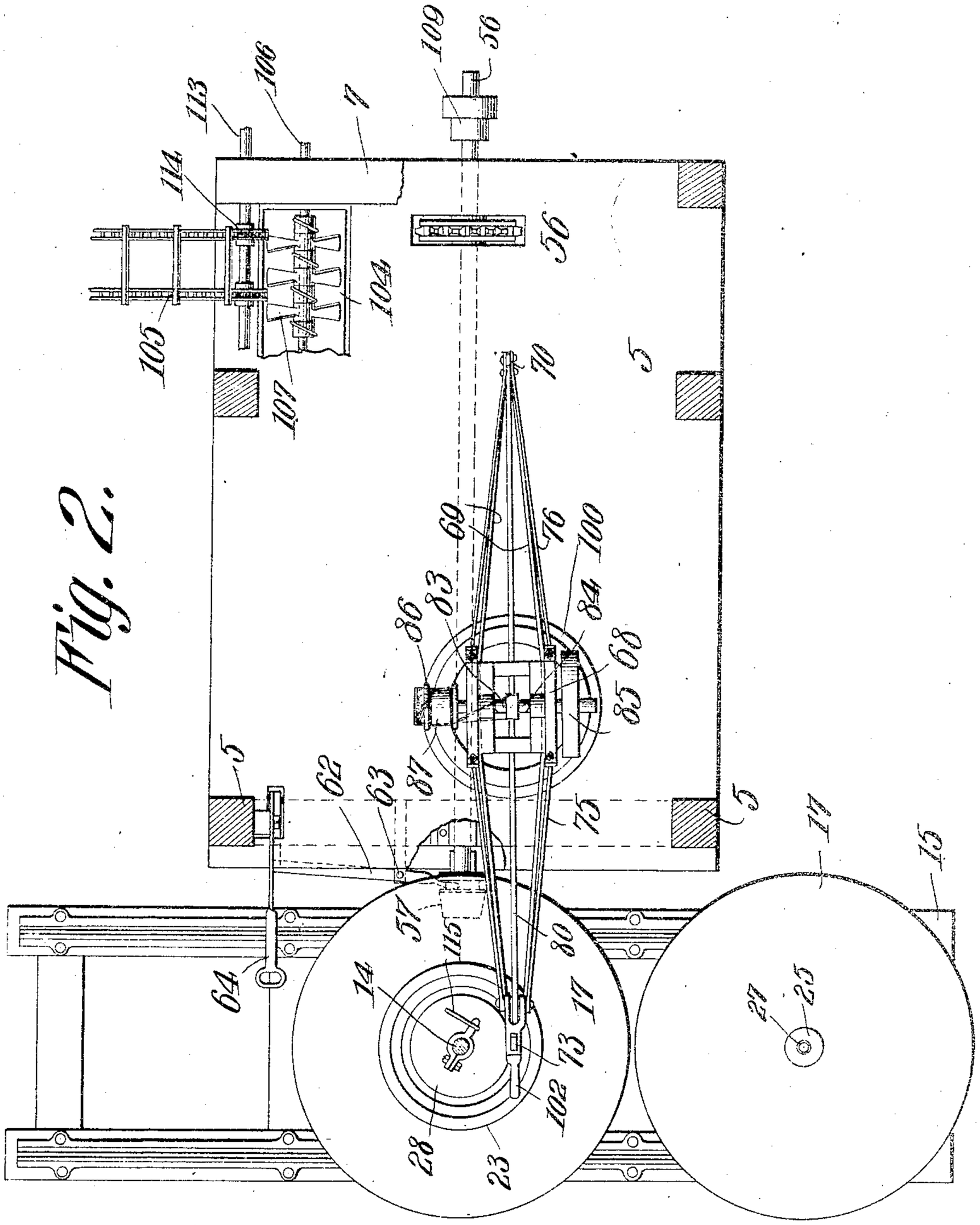
4 SHEETS—SHEET 2.

Fig. 2.



Witnesses

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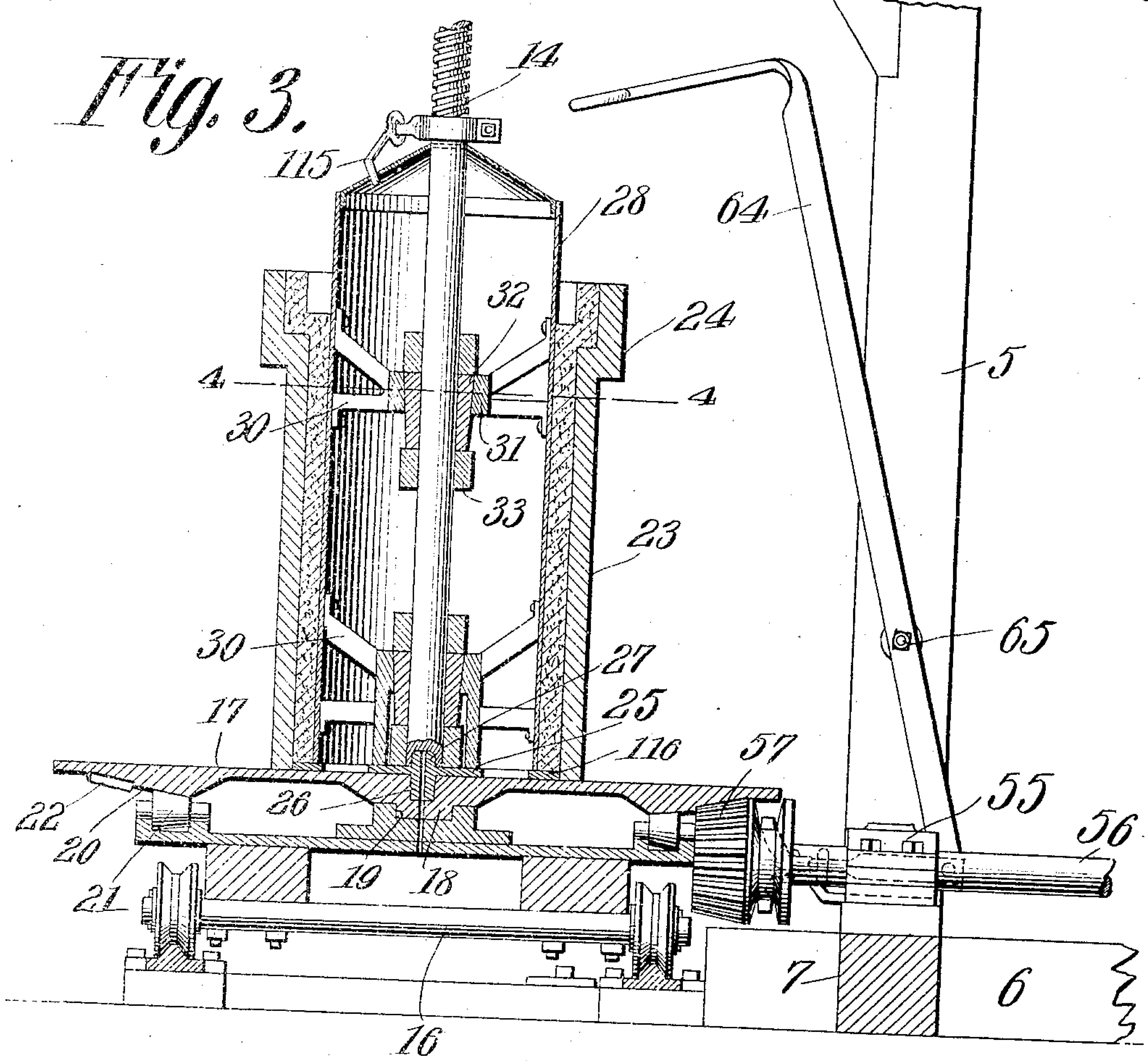
4 SHEETS—SHEET 3.

Fig. 3.



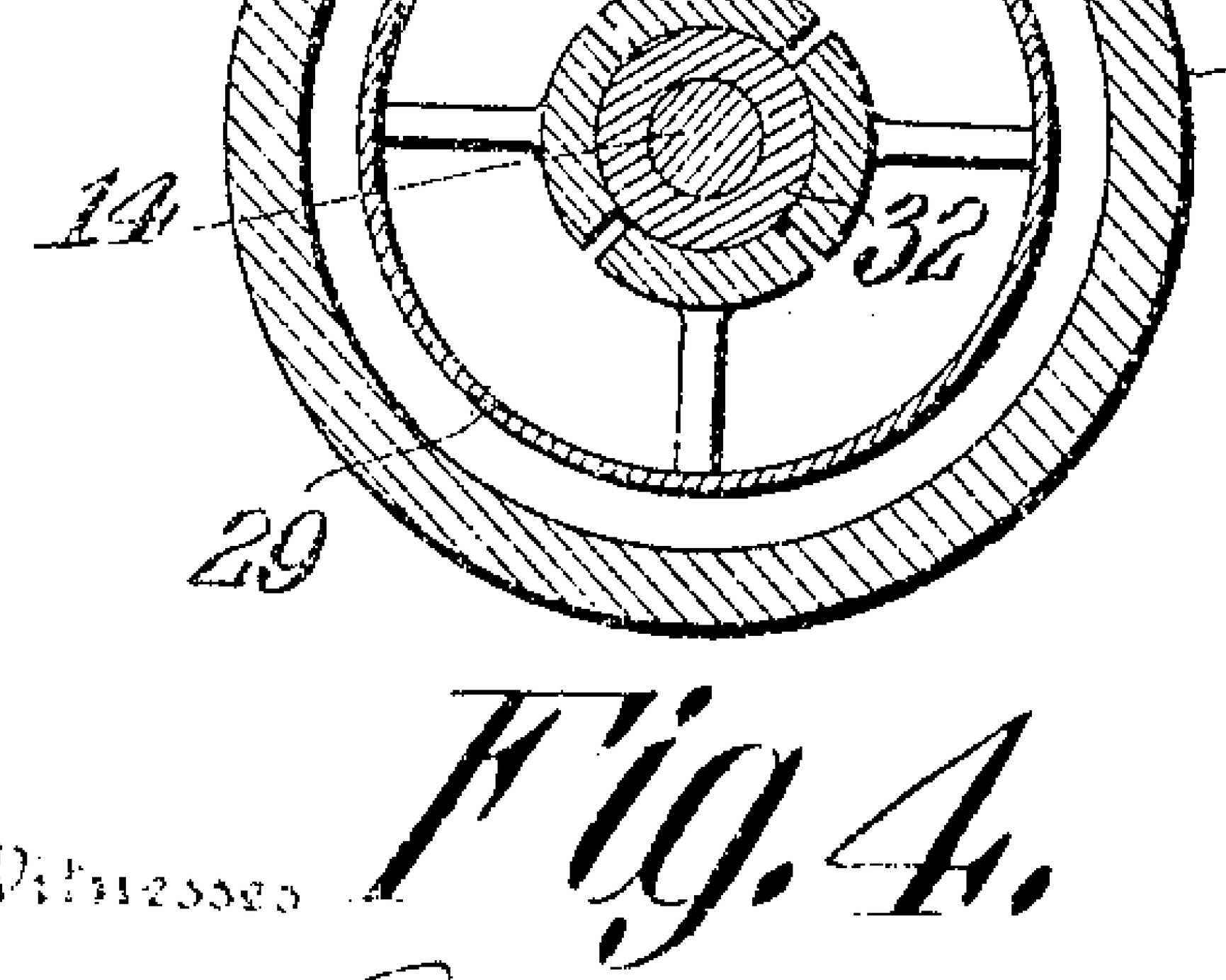


Fig. 4.

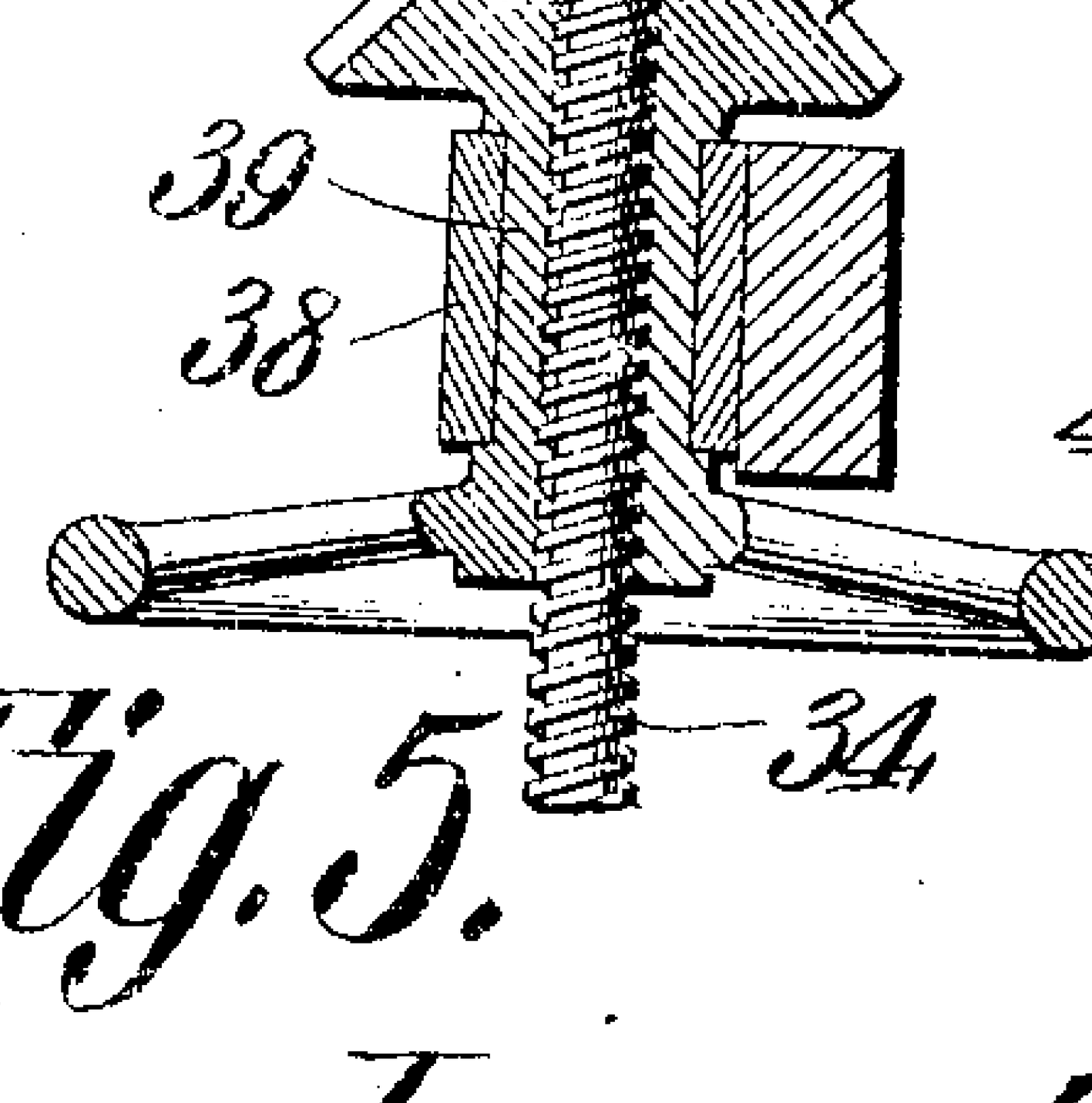


Fig. 5.

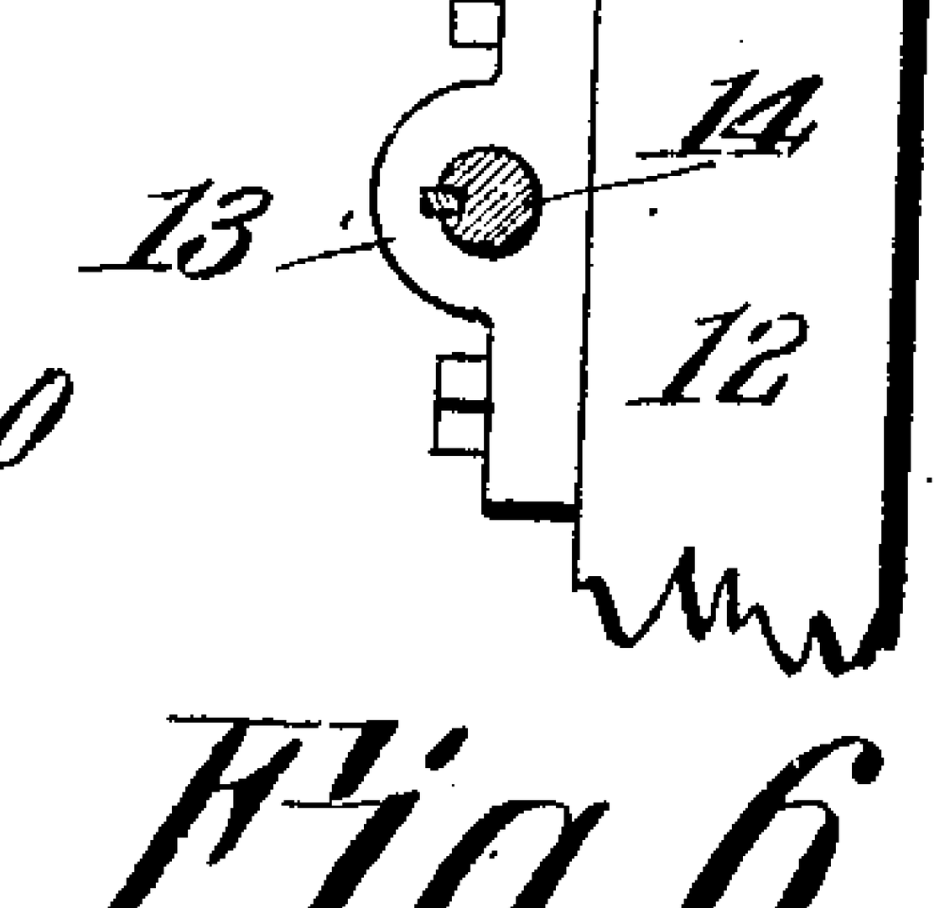


Fig. 6.

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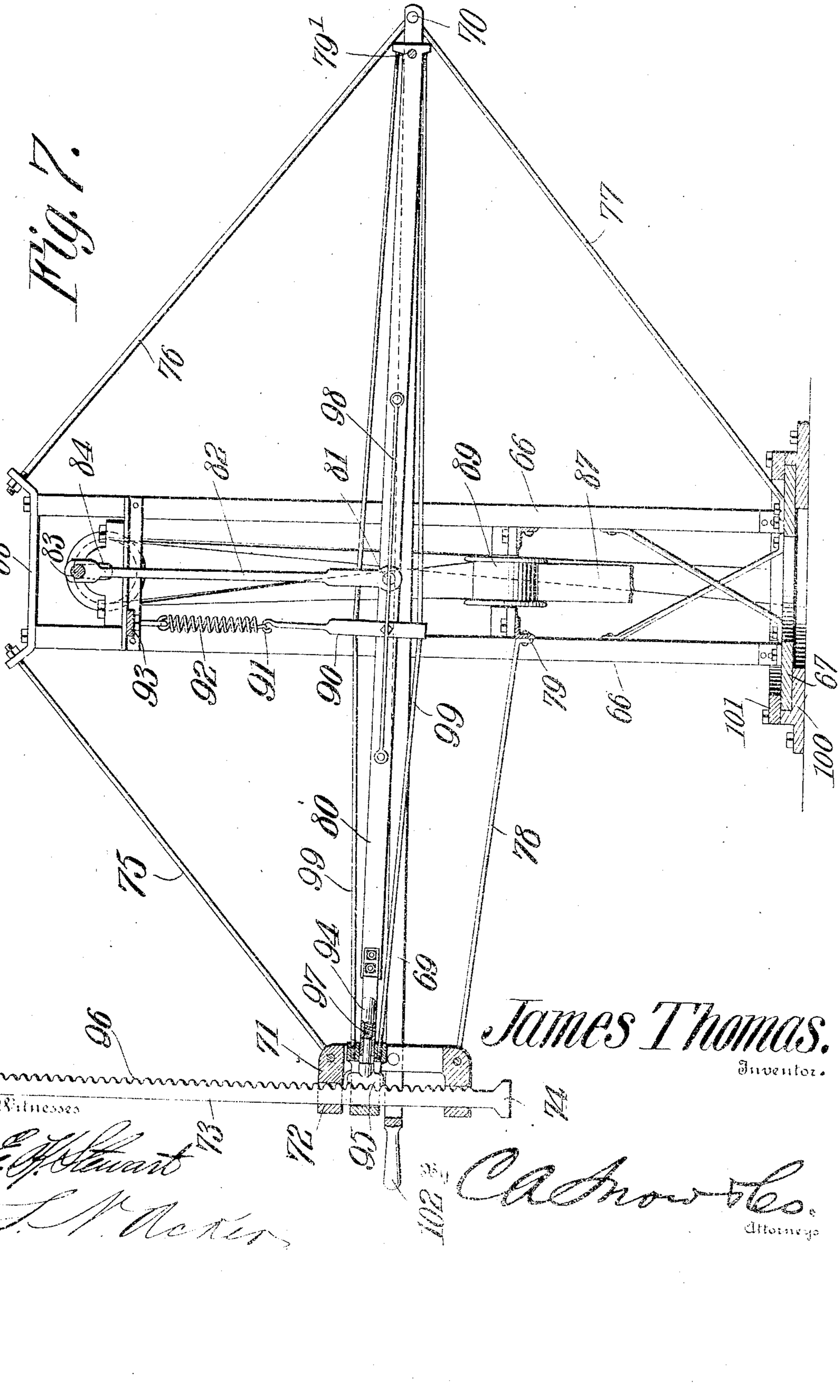
4 SHEETS—SHEET 4.

Fig. 7.



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UNITED STATES PATENT OFFICE.

JAMES THOMAS, OF TACOMA, WASHINGTON.

GLAZED-CEMENT-SEWER-PIPE MACHINE.

No. 928,898. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed November 17, 1908. Serial No. 463,088.

To all whom it may concern:

Be it known that I, JAMES THOMAS, a citizen of the United States, residing at Tacoma, in the county of Pierce and State of Washington, have invented a new and useful Glazed-Cement-Sewer-Pipe Machine, of which the following is a specification.

This invention relates to machines for making concrete pipes or drains such as are employed in the construction of sewers, culverts and the like.

The object of the invention is to provide a machine for forming the interior walls of the pipe or drain with a glazed surface, thereby to render the pipe impervious to moisture.

A further object is to provide a cement pipe machine including a carriage adapted to support a plurality of molds, the latter being movable successively to a position beneath the core member.

A further object is to provide a machine in which the mold and core member are mounted for rotation in the same direction and at the same rate of speed.

A further object is to provide means for tamping the cement or other material in the mold, while the latter rotates.

A further object is to provide means for expanding and contracting the core member, and means for moving said core member to elevated position, thereby to permit the removal of the molded product.

A still further object of the invention is generally to improve this class of devices so as to increase their utility, durability and efficiency.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

In the accompanying drawings forming a part of this specification:—Figure 1 is a side elevation of a machine for making glazed concrete pipes constructed in accordance with my invention. Fig. 2 is a sectional top plan view. Fig. 3 is a detail sectional view of the mold carrier and its associated parts. Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 3. Fig. 5 is a vertical detail sectional view of the hand wheel for operating the core carrying shaft. Fig. 6 is a transverse sectional view taken on the line 6—6 of Fig. 1. Fig. 7 is a side elevation of the tamping mechanism.

Similar numerals of reference indicate corresponding parts in all of the figures of the drawing.

The improved pipe making machine forming the subject matter of the present invention comprises a main supporting frame including spaced uprights 5 connected by longitudinal and transverse sills 6 and 7.

Disposed above the main supporting frame and secured in any suitable manner to the upper longitudinal sills of said frame is an auxiliary frame including front and rear standards 8 and 9 connected at their upper ends by relatively short longitudinally disposed bars 10 on which are journaled spaced wheels or pulleys 11. The forward bars 10 are connected by spaced transverse bars 12 to one of which is secured a casting 13 in which is mounted for vertical movement a core carrying shaft 14.

Arranged in front of the main supporting frame is a track 15 on which is mounted for travel a carriage 16. Mounted for rotation on the carriage 16 are spaced tables 17 each provided with a centrally disposed trunnion 18 fitting in a correspondingly shaped socket 19, and which, in conjunction with said socket, forms the pivotal axis of the table. The peripheral edge of each table 17 is provided with an inclined bearing surface 20 for engagement with conical shaped friction rollers 21 mounted for rotation on the carriage, that portion of each table adjacent the inclined bearing surface 20 being provided with an annular row of teeth constituting a rack 22. Mounted on each table 17 is a cylindrical mold 23 having its upper end offset at 24 and its lower end disposed concentric with the core-carrying shaft 14. Arranged within the mold 23 and resting on the upper surface of the table 17 is a disk or plate 25 having oppositely disposed cylindrical portions 26 and 27, one of which is seated in a socket formed in the trunnion 18, while the other enters a socket in the adjacent end

of the core-carrying shaft 14 and serves to center said core-carrying shaft on the adjacent revolving table.

Loosely mounted on the shaft 14 is a core member 28, the latter being preferably formed of sheet metal and having its adjacent longitudinal edges over-lapped at 29, thereby to permit expansion and contraction of the core. Secured to the interior walls of the core are a series of arms or spiders 30, each terminating in a segmental plate 31 adapted to bear against a conical shaped bearing sleeve 32, loosely mounted on the shaft 14. The conical shaped bearing sleeves 32 are retained in position on the shaft 14 by means of spaced collars 33, the lower one of each of which, by engagement with the adjacent segmental plates 31 serve to withdraw the core 28 from within the mold when an upward pull is exerted on the shaft 14, as will be more fully explained hereinafter. The core 28 rotates with the mold 23 on the table 17, while the shaft 14 remains relatively stationary, the sleeves 32 forming a bearing for the arms of the mold during the rotation of the table. It will thus be seen that when a slight upward movement is imparted to the shaft 14, the inclined faces of the bearing sleeves 32 will engage the correspondingly inclined faces of the segmental plates 31 and thus permit the core to contract so that the same may be disengaged from the interior wall of the pipe. It will also be noted that when a downward movement is imparted to the shaft 14, the inclined faces of the sleeves will exert a lateral pressure on the segmental plates 31 and thus expand the core so as to hold the same in frictional contact with the interior wall of the pipe. The intermediate portion of the shaft 14 is threaded at 34, while the upper end thereof extends through the bearings 13 and is provided with a ring or eye 35 to which is attached one end of a cord or cable 36, the latter being extended over the wheels or pulleys 11 and provided with a weight 37 which forms a counterbalance for the core and its associated parts.

Journaled in a bearing 38 secured to one of the transverse bars 12 of the auxiliary supporting frame is a sleeve 39, the interior walls of which are threaded for engagement with the threads on the shaft 14, one end of said sleeve being provided with a hand-wheel 40, while the opposite end thereof is formed with a beveled gear 41 meshing with a corresponding bevel gear 42 carried by a stub shaft 43, the latter being mounted in suitable bearings 44 on the main supporting frame, as shown. Arranged beneath the stub shaft 43 is a main driving shaft 45 carrying a gear wheel 46 and a sprocket wheel 47, the gear wheel 46 being arranged to engage a corresponding gear wheel 48 carried by the stub shaft 43, and the sprocket wheel 47 being connected through the medium of a sprocket chain with a similar sprocket wheel 49 also mounted on the stub shaft 43.

The gear wheel 48 and the sprocket wheel 49 are loosely mounted on the stub shaft 43 and are keyed to the latter by means of a clutch 50 so that by actuating the operating handle 51 motion may be transmitted from either the member 46 or the member 47 to the shaft 43 and thus rotate the latter to raise or lower the core member.

Mounted on the main supporting frame is a motor 52 on the driving shaft of which is secured a pinion 53, the latter being adapted to mesh with a master gear 54 keyed to the main shaft 45. Journaled in suitable bearings 55 on the main supporting frame is a longitudinally disposed shaft 56, to one end of which is secured a pinion 57, which latter is arranged to successively engage the racks 22 on the tables 17, thereby to rotate the same. Motion is transmitted from the main shaft 45 to the shaft 56 through the medium of a sprocket chain 58, said chain passing over a sprocket wheel 59 keyed to the shaft 56 and also over a similar sprocket wheel 60 loosely mounted on the shaft 45. A clutch 61 is mounted on the shaft 45 for keying the sprocket wheel 60 to said shaft when it is desired to impart movement from the shaft 45 to the shaft 56. The pinion 57 is slidably mounted on the adjacent end of the shaft 56 and is moved to operative position in engagement with the rack on the adjacent table 17 through the medium of a lever 62 pivotally mounted at 63 on one of the sills of the main frame. A hand-lever 64 is also pivotally mounted at 65 on the adjacent upright of the main supporting frame with its lower end pivotally connected to the lever 62 so that by moving the handle 64 in one direction, the pinion 57 will be moved into engagement with the teeth on the adjacent table to rotate the latter, and by moving the lever 64 in the opposite direction, the pinion 57 will be thrown out of gear with the rack 22 so as to permit the removal of the mold and the molded product.

Mounted on the main supporting frame at the rear of the track 15 is the mechanism employed for tamping the material in the mold, as the latter rotates with the table 17.

The tamping mechanism comprises a supporting frame including a plurality of vertically disposed angle bars 66, connected at their lower ends by an annulus or ring 67 and at their upper ends by a cap piece or plate 68. Extending between the vertical uprights 66 of the tamping frame is a horizontally disposed frame comprising spaced bars 69 having their intermediate portions bolted or otherwise rigidly secured to the upright 66 and their opposite ends brought

together and rigidly united, as indicated at 70. Disposed between and rigidly secured to the horizontal bars 69 at the forward end of the tamping frame is a yoke member 71 having vertically alined openings 72 formed therein for the reception of a vertically movable rack or tamping member 73, the latter being provided with a terminal head 74 adapted to enter the molding compartment and tamp the material in said molding compartment as the mold revolves.

The horizontal frame of the tamping mechanism is reinforced and strengthened by the provision of upper inclined tie bars 75 and 76, one of which extends from an inclined perforated ear on the cap piece 68 to the yoke 71, while the other tie rod extends from a similar inclined perforated ear on said cap piece to the rear ends of the bars 69 at their point of attachment to each other. A tie rod 77 also preferably extands from the rear ends of the bars 69 to the annular member or ring 67, while another tie bar 78 extends from the lower portion of the yoke 71 to a transverse bar or bracket 79 connecting the uprights 66 of the tamping frame. Pivotally mounted at 79′ between the horizontal bars 69 of the tamping frame is a striking bar 80 having its intermediate portion pivotally connected at 81 with a pitman 82 carried by a crank shaft 83. The crank shaft 83 is journaled in a bearing 84 and has its opposite ends extended laterally beyond the vertical plane of the members 66 to permit the attachment of a balance wheel 85 and a pulley 86.

Motion is transmitted from the longitudinal shaft 56 to the crank shaft 83 through the medium of a belt 87, which latter passes around a pulley 88 on the shaft 56 for engagement with the pulley 86, there being a similar pulley 89 journaled on the bracket 79 for engagement with the intermediate portion of the belt. The pulley 89 not only forms a guide for the belt 87 but also acts as a belt tightener, said pulley being adjustable longitudinally of the bracket 79 for this purpose.

Secured to the striking bar 80 at a point in advance of the pivot 81 is a hanger 90 having its upper end reduced and provided with a hook 91 for engagement with the adjacent end of a coiled spring 92, the opposite end of which is fastened to one of the transverse bars 93 connecting the uprights of the tamping frame, as shown. The spring 92 serves to assist in sustaining the weight of the striking bar and also insures a quick return of said striking member after each downward movement of the tamping member 73. Secured to the forward or free end of the striking bar 80 is a sleeve 94 in which is mounted a head 95, the face of which is formed with a series of teeth or serrations arranged to engage the teeth 96 of the tamping bar 73, there being a spring 97 arranged within the sleeves 94 for normally and yieldably supporting the teeth of the head 95 in engagement with the rack bar.

The tension of the spring 97 is such that under ordinary circumstances the tamping bar 73 will be locked against vertical movement, but as the cement fills the compartment of the mold, the head 74 coming in contact with the cement or concrete will disengage the teeth on said rack from the teeth on the head 95 and thus permit vertical movement of the tamping member 73.

It will thus be seen that the adjustment of the tamping member 73 is automatic, said member accommodating itself to the height of the concrete or cement within the molding chamber, as the latter is filled.

The striking bar is preferably reinforced and strengthened by the provision of lateral truss rods 98, there being longitudinal truss rods 99 arranged above and below the striking bar and secured in any suitable manner to the opposite ends of the striking bar 80.

The plate 67 together with the vertical frame of the tamping mechanism is mounted for rotation on a base plate 100, the latter being secured to the adjacent sills of the main supporting frame and provided with an over-hanging flange 101 arranged to bear against the upper surface of the plate 67 for preventing accidental displacement of the same.

A handle 102 is extended longitudinally from the bars 69 at their points of attachment to the yoke 71 so that said tamping frame may be rotated on the bed plate 100 to a position out of the path of movement of the carriage 16 when it is desired to remove the mold from the table. Thus it will be seen that by manipulating the handle 102, the tamping member 73 may be moved to a position above the mold so as to tamp the contents of the molding chamber when the table carrying the mold is rotated on the carriage.

The material is fed to the molding compartment through a trough or spout 103 leading from a hopper 104, the concrete or other material being supplied to the hopper by a conveyer or similar device 105. Arranged within the hopper 104 is a horizontally disposed shaft 106 to which is secured a plurality of spaced mixing blades or paddles 107 which serve to agitate the material in the hopper and thoroughly mix the same before feeding the latter to the molding compartment. Motion is transmitted from the shaft 56 to the shaft 106 through the medium of a belt 108 extending vertically of the main supporting frame and passing over pulleys 109 and 110, one of which is secured to the horizontal shaft 106, as shown. A

gear wheel 111 is secured to the shaft 106 adjacent the pulley 110 for engagement with a corresponding gear wheel 112 carried by a stub shaft 113, the latter being provided with spaced sprocket wheels 114 which serve to actuate the conveyer to deliver the concrete or other material to the hopper 104. An annular member or pallet 116 is also preferably positioned on each revolving table to form the bottom of the molding compartment.

In operation the molds are placed in position on the table 17 and the carriage 16 actuated to move the first mold to a position below the core member, after which the clutch 50 is actuated to rotate the shaft 14 and thus lower the core member 28 within the mold. The clutch 61 is then operated to transmit motion from the shaft 56 to the adjacent table 17 so as to cause the mold together with the core to revolve with the table as the concrete or other material is fed through the spout 103 into the molding compartment. As the shaft 56 revolves motion will be transmitted through the medium of the belt 87 to the tamping member 73, thereby to reciprocate the same and thoroughly tamp the material within the molding compartment as the table and its associated parts revolve. After the molding of the pipe is effected the handle 102 is grasped by the operator and the tamping mechanism swung laterally to a position out of the path of movement of the mold. The hand wheel 40 is then rotated manually to slightly elevate the shaft 14 which permits the core member 28 to collapse or contract and thus become disengaged from the interior wall of the molded pipe. After the core 28 has thus been disengaged from the interior wall of the molded product, said core is locked on the shaft 14 by means of a hook 115 engaging the upper end of the core member, as shown. The hand wheel 40 is then rotated in the opposite direction which lowers the shaft 14 and causes the conical bearing sleeves 32 to engage the segmental plates 31 and expand the mold into frictional engagement with the inner face of the molded product. The core together with the shaft, now remain relatively stationary, while the table carrying the mold is rapidly rotated, thus causing the smooth exterior walls of the core to polish the inner wall of the pipe or tile and produce a glazed surface which is impervious to moisture. After the polishing or glazing operation is completed the clutch member 50 is actuated to elevate the shaft 14 and thus lift the core from the mold so as to permit the carriage 16 to travel longitudinally of the track, until the mold on the adjacent table is positioned beneath the core member. The completed pipe may now be removed from one table, while the clutch 50 is being actuated to lower the shaft 14 and core 28 within the mold on the mating table thus permitting the continuous operation of the machine.

Having thus described the invention what is claimed is:—

1. In a machine of the class described, a mold-carrier, a mold mounted for rotation on the carrier, a core member movable to operative position within the mold, means for tamping the material in the mold as the latter is rotated means for rotating the mold and core in the same direction during one operation of the machine, and means for locking the core against rotation while the mold revolves at another stage of operation of the machine.

2. In a machine of the class described, a mold-carrier, a mold mounted on said carrier, a core movable to operative position within the mold, means for simultaneously rotating the mold and core in the same direction during one operation of the machine, and means for locking the core against rotation while the mold revolves at another stage of operation of the machine.

3. In a machine of the class described, a mold-carrier, a mold mounted for rotation on said carrier, a core movable to operative position within the mold, means for simultaneously rotating the mold and core in the same direction, during one operation of the machine, means for locking the core against rotation while the mold revolves at another stage of operation of the machine and tamping mechanism movable to a position above the molding compartment and adapted to tamp the material in said compartment while the mold and core are rotating together.

4. In a machine of the class described, a mold-carrier, a vertically movable core, a plurality of molds mounted for rotation on said carrier and movable successively to a position beneath the core, means for lowering the core within said molds, means for simultaneously rotating the core and the adjacent mold in the same direction during one operation of the machine, and means for locking the core against rotation while the mold revolves at another stage of operation of the machine.

5. In a machine f the class described, a carriage, a plurality of tables mounted for rotation on the carriage, a mold mounted for rotation with each table, a core movable successively to operative position within each mold, means for successively rotating each mold, and the core simultaneously in the same direction, during one operation of the machine, means for locking the core against rotation while the adjacent mold revolves during another operation of the machine, and tamping mechanism movable to a posi-

tion above the mold for tamping the material in the latter as said mold is revolved.

6. In a machine of the class described, a carriage, a table mounted for rotation on the carriage, a mold carried by and movable with the table, a core movable to operative position within the mold, means for expanding the core, means for rotating the mold and core simultaneously in the same direction during one operation of the machine, and means for locking the core against rotation when the mold revolves during another stage of operation of the machine.

7. In a machine of the class described, a carriage, a table mounted for rotation on the carriage, a mold carried by and mounted for rotation with the table, a hollow core movable to operative position within the mold, a threaded shaft secured to the core, means operatively connected with the shaft for automatically raising and lowering the core, and means independent of the automatic means for manually raising and lowering the core, means for rotating the mold and core in the same direction during one operation of the machine, and means for locking the core against rotation while the mold revolves at another stage of operation of the machine.

8. In a machine of the class described, a carriage, a table mounted for rotation on the carriage, a mold carried by and mounted for rotation with the table, an expansible core movable to operative position within the mold, a threaded shaft carried by the core, a sleeve having interior threads for engagement with the threads on the shaft and having a pinion on one end thereof, and a handle on the other, a stub shaft having a pinion for engagement with the pinion on the sleeve, means operatively connected with the stub shaft for rotating the latter to effect the vertical movement of the core, means for rotating the table, and means for tamping the material within the mold as the latter revolves.

9. In a machine of the class described, a track, a carriage mounted for travel on the track, a table mounted for rotation on the carriage and provided with a rack, a mold carried by and mounted for rotation with the table, an expansible core movable to operative position within the mold, means for expanding and contracting the core, a shaft carried by the core, a stub shaft operatively connected with the core-carrying shaft, a means for rotating the stub shaft to raise and lower the core, a longitudinally disposed shaft, a pinion carried by the longitudinal shaft and movable into and out of engagement with the teeth on the rack of the table, and a connection between the longitudinal shaft and the stub shaft for rotating the former.

10. In a machine of the class described, a track, a carriage mounted for travel on the track, a table mounted for rotation on the carriage and provided with a rack, a mold carried by and mounted for rotation with the table, a core movable to operative position within the mold, a shaft carried by the core, a main driving shaft, a master gear secured to the main driving shaft, a motor having a pinion arranged to mesh with the master gear, a stub shaft operatively connected with the core carrying shaft, a connection between the main shaft and stub shaft for rotating the stub shaft to raise and lower the core-carrying shaft, means independent of the motor for raising and lowering the core-carrying shaft, a longitudinal shaft having a pinion for engagement with the teeth on the table, and a connection between the main shaft and the longitudinal shaft for actuating the latter, thereby to rotate the table.

11. In a machine of the class described, a mold carrier, a mold mounted on said carrier, a core carrying shaft having spaced collars secured thereto, tapered bearing sleeves journaled between said collars, an expansible core loosely mounted on said shaft and provided with radiating arms having correspondingly tapered inner ends for engagement with the adjacent bearing sleeves, means for raising and lowering the core carrying shaft, thereby to expand and contract the core, means for rotating the mold and core in the same direction during one operation of the machine, and means for locking the core against rotation while the mold revolves at another stage of operation of the machine.

12. In a machine of the class described, a mold, a rotary frame, a horizontally disposed frame forming a part of the rotary frame and comprising longitudinal bars having their opposite ends converged, a yoke interposed between the converged ends of the bars at one end of the frame and provided with vertically alined openings, a striking bar pivotally mounted between said bars at the opposite ends thereof, a tamping element slidably mounted in the alined openings of the yoke and actuated by the striking bar, a crank shaft, and a connection between the crank shaft and striking bar.

13. In a machine of the class described, a mold, a rotary frame, a horizontal frame forming a part of the rotary frame, a yoke secured to one end of the horizontal frame and provided with registering openings, a tamping element mounted for vertical movement within said openings and provided with a rack, a striking bar pivotally mounted on the horizontal frame, a sleeve secured to one end of the striking bar, a spring actuated head carried by the sleeve and provided with

a serrated face adapted to engage the teeth on the tamping member, a crank shaft, a pitman forming a connection between the crank shaft and striking bar, and a spring disposed above said striking bar and connected with the latter and with the rotary frame, respectively.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JAMES THOMAS.

Witnesses:
T. W. HAMMOND,
J. SONNEMA.