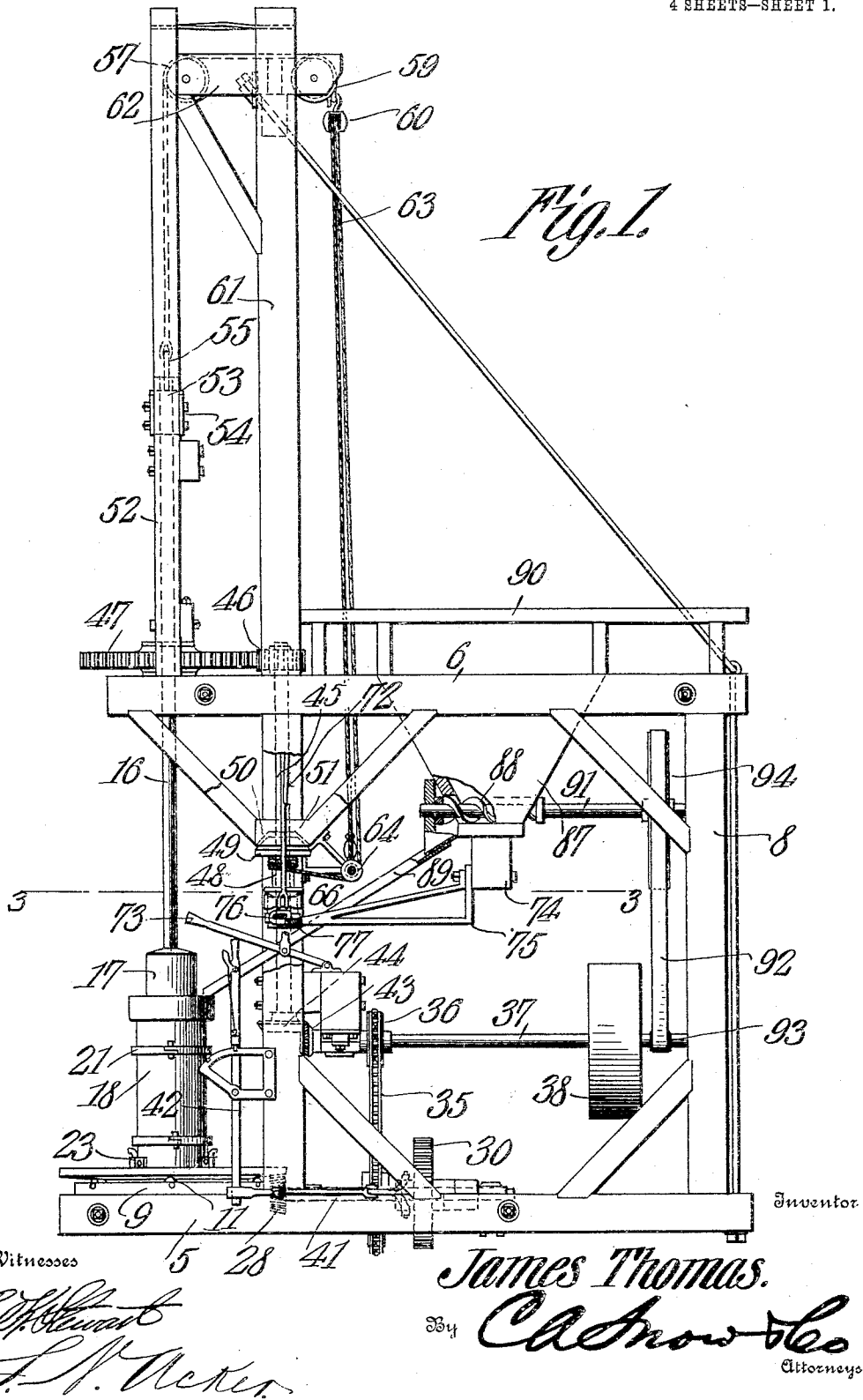


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APPLICATION FILED MAY 15, 1908.

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Patented Aug. 24, 1909.
4 SHEETS—SHEET 1.



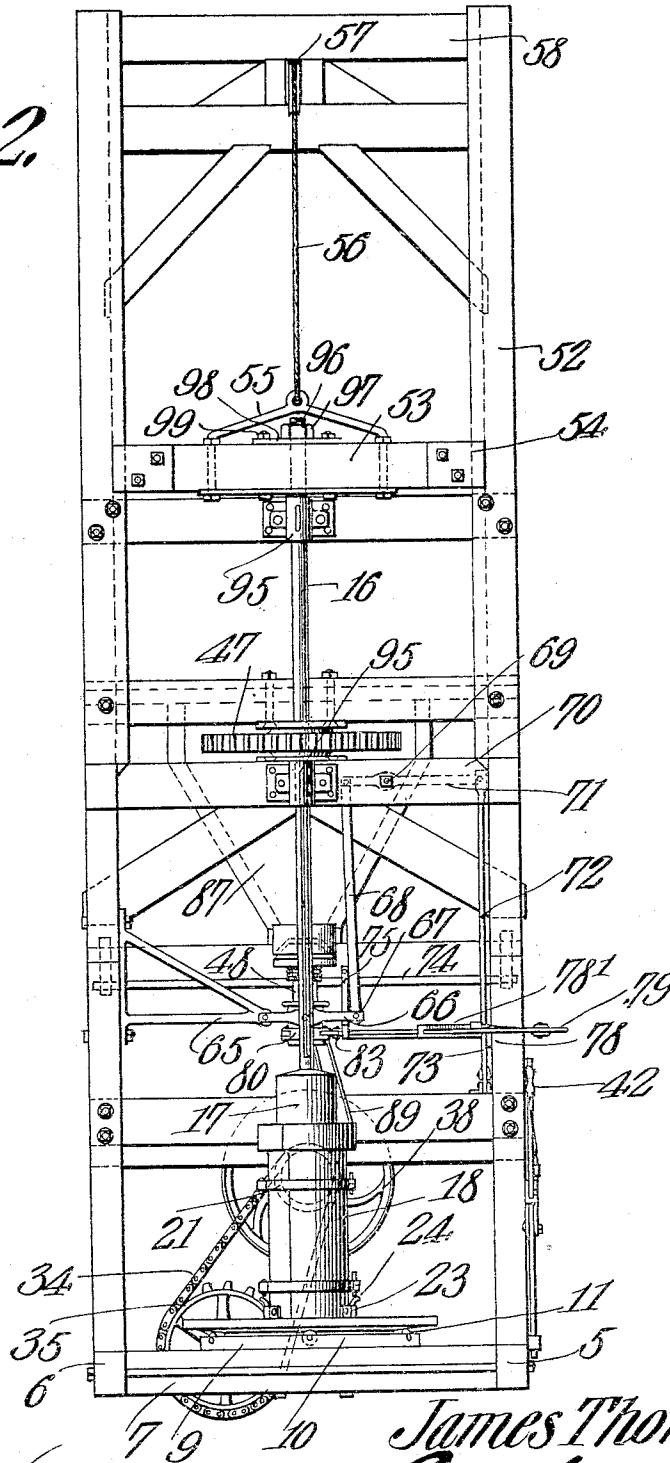
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Fig. 2.



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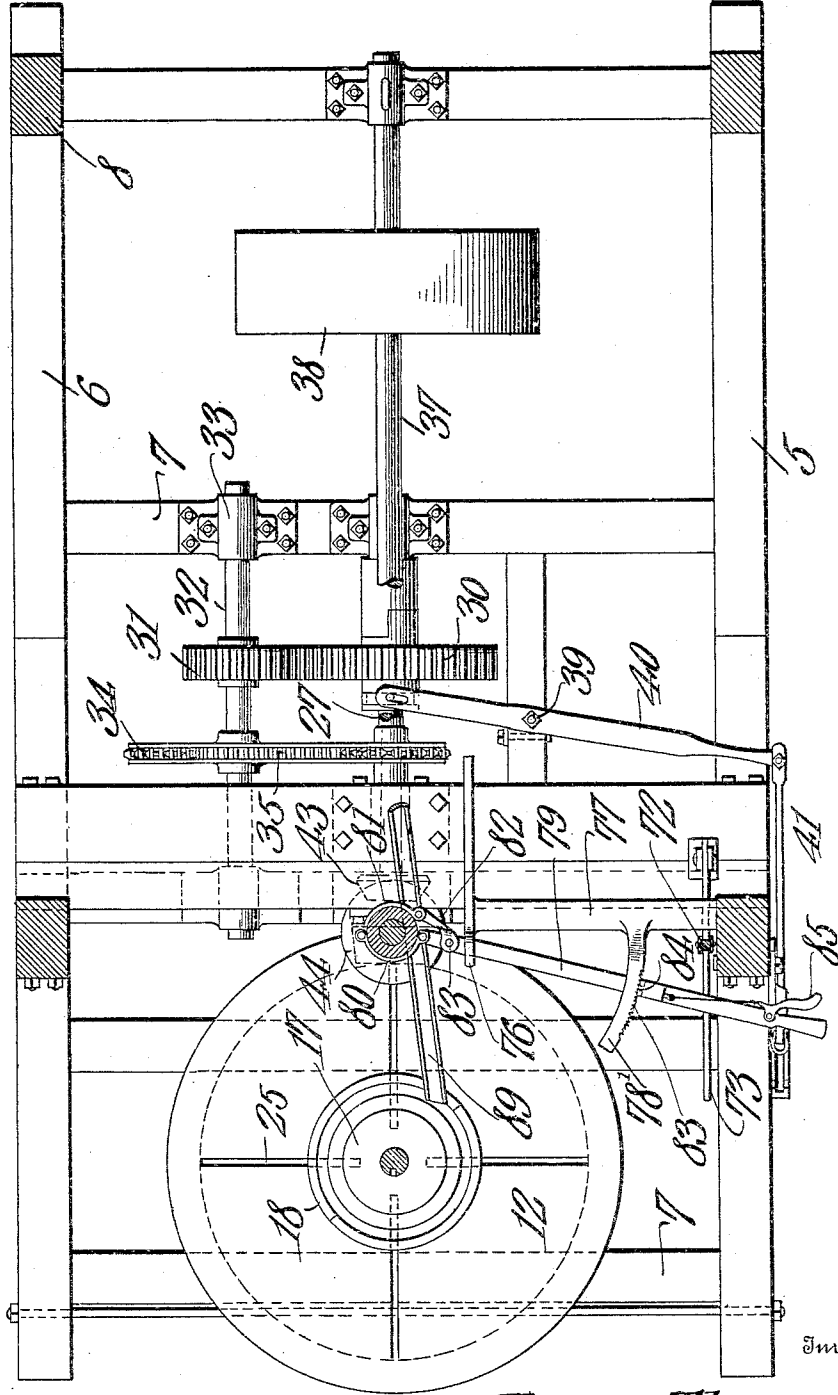
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4 SHEETS—SHEET 3.

Fig. 3.



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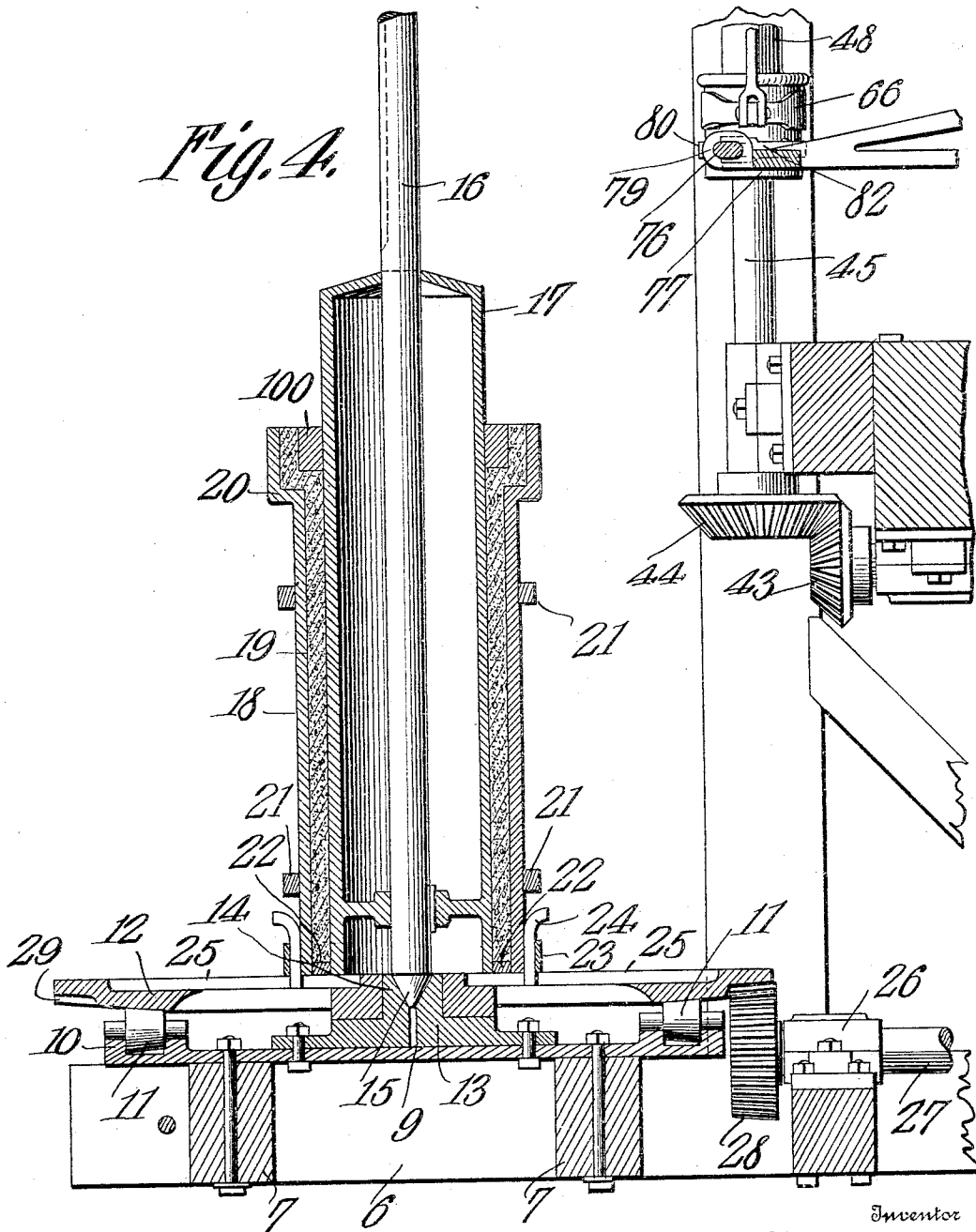
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UNITED STATES PATENT OFFICE.

JAMES THOMAS, OF TACOMA, WASHINGTON.

MACHINE FOR MAKING CONCRETE PIPES.

931,972.

Specification of Letters Patent.

Patented Aug. 24, 1909.

Application filed May 15, 1908. Serial No. 433,054.

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 Machine for Making Concrete Pipes, 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 strong, durable and thoroughly efficient machine of the character described by means of which concrete pipes or drains may be more conveniently and expeditiously manufactured than heretofore.

A further object of the invention is to provide a pipe making machine in which the mold is mounted for rotation in a vertical plane while the concrete is being introduced within the mold thereby to uniformly distribute the concrete around the core and also to facilitate tamping of the same.

A further object is to provide a pipe making machine in which the mold and core are mounted for rotation in the same direction and at different rates of speed so as to thoroughly tamp the concrete around the core and thus produce a pipe or drain having compact exterior walls and a smooth interior core the surface of which is nicely dressed and practically impervious to moisture.

A further object is to provide means for withdrawing the core from the mold while the former is revolving, and means for supporting the core in elevated position 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 partly in section of a pipe making machine constructed in accordance with my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 1 and looking in the direction of the base of the machine.

Fig. 4 is an enlarged vertical sectional view of the mold and its associated parts.

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

The improved pipe making machine forming the subject matter of the present invention comprises spaced supporting frames each consisting of longitudinal sills 5 and 6 connected by one or more transverse bars 7, said frames being disposed one above the other and rigidly united by vertical supports or uprights 8. Bolted or otherwise rigidly secured to the adjacent transverse bar 7 of the lower supporting frame is a substantially circular plate 9 having spaced peripheral flanges 10 in which are journaled suitable antifriction rollers 11, the latter forming a support for a revolving table 12.

Secured to the center of the plate 9 is a marginal bearing block 13 having a reduced extension 14 which fits within a correspondingly shaped opening in the center of the table 12 and serves to support the latter. The block 13 is provided with a conical shaped recess 15 in which is journaled the lower end of a core carrying shaft 16.

Secured to and surrounding the shaft 16 is a hollow core member 17, which latter fits within the mold 18 and is spaced from the interior walls of the latter to form an intermediate compartment 19 adapted to receive the cement, concrete or other plastic material forming the body of the pipe or drain. The mold 18 is preferably formed in two sections each of which is provided with an off set portion 20 so as to form the pipe with an interior shoulder for the reception of the reduced end of an adjacent pipe when several of said pipes are positioned end for end in the ground. The sections comprising the mold 18 are held in assembled position by suitable clamping bands 21 which embrace the exterior walls of the mold sections and serve to support the interior walls of said sections in engagement with an annular spacing block 22. Secured to the exterior walls of the mold sections are loops or keepers 23 in which are slidably mounted for vertical movement suitable bolts or pins 24, the latter being adapted to enter slots 25 formed in the table 12 thereby to lock the mold in position on the table so that the mold will rotate with the latter.

Journaled in suitable bearings 26 is a stub shaft 27 carrying a pinion 28 the teeth of

which mesh with corresponding teeth 29 formed on the peripheral edge of the table 12.

Secured to the shaft 27 is a clutch member on the movable section of which is keyed or otherwise rigidly secured a gear wheel 30, which latter meshes with a pinion 31 keyed to a countershaft 32 journaled in suitable bearings 33 on the lower supporting frame 5.

Secured to and disposed in spaced relation to the pinion 31 is a sprocket wheel 34, which latter is connected through the medium of a sprocket chain 35 with a similar sprocket wheel 36 carried by a main driving shaft 37. The driving shaft 37 is provided with a pulley 38 which may be connected through the medium of a belt with an engine or other source of power so that motion may be transmitted through the gearing thereby to rotate the mold carrying table.

Pivotally mounted at 39 is a lever 40 one end of which is connected with the movable section of the clutch while the opposite end thereof is connected through the medium of a link 41 with a hand operated lever 42 so that by operating the lever 42 the gear wheel 30 may be thrown into and out of mesh with the pinion 31.

The shaft 37 is provided with a beveled gear 43 which meshes with a corresponding beveled gear 44 formed on the lower end of a vertical shaft 45. The upper end of the shaft 45 is provided with a gear wheel 46 which meshes with a master gear 47 keyed to the core carrying shaft 16, it being here noted that the shaft 16 is free to slide vertically through the master gear 47 to permit the core 17 to be positioned within or withdrawn from the molding compartment.

Loosely mounted on the shaft 45 is a winding drum or spool 48 having a conical head 49 adapted to frictionally engage the correspondingly shaped socket 50 of a fixed member 51 carried by and rigidly secured to the shaft 45. The members 48 and 51 constitute a clutch the object of which will more fully hereinafter appear.

Extending vertically from the longitudinal sills of the upper supporting frame 6 are spaced uprights 52 between which is slidably mounted for vertical movement a head block or follower 53, the latter being provided with terminal plates 54 which overlap the edges of the standards 52 and form guides for the head block 53.

Secured to the upper edge of the head block 53 is a yoke 55 to which is secured one end of a rope or cable 56 the opposite end of which passes over a sheave or pulley 57 mounted for rotation on the upper connecting bars 58 of the uprights 52, the opposite end of the cable 56 being passed around a similar sheave or pulley 59 and provided with a terminal eye for engagement with the hook of a block and tackle 60.

Disposed in spaced relation to the up-

rights 52 are similar uprights 61, the uprights 52 and 61 being connected by spaced relatively short transverse bars 62 between which the pulleys or sheaves 57 and 59 are journaled.

The rope or cable 63 of the block and tackle extends over a pulley 64 and is wound around the drum 48 so that when the member 49 is moved into frictional engagement with the member 51 the rope 63 will be wound upon the drum 48 and through the medium of the hoisting mechanism withdraw the core 17 from the mold so as to permit the removal of the molded product.

Extending laterally from the supporting frame is a bracket 65 to the free end of which is pivotally connected a clutch operating member 66, which latter encircles the lower portion of the drum 48 and is pivotally connected at 67 with a rod 68.

Pivotally mounted at 69 on a transverse beam 70 is a lever 71 one end of which is pivotally connected to the rod 68 while the opposite end thereof is pivotally connected with a similar rod 72 extending parallel with one of the uprights 8 and operatively connected with a hand lever 73 so that by depressing the lever 73 the member 66 will be actuated to throw the members 49 and 51 in engagement with each other.

It will thus be seen that the core and mold are mounted for rotation in the same direction, the relative speed of the core with respect to the mold being preferably four to one, which ratio, however, may be increased or diminished by making the master gear 47 larger or smaller. It will also be noted that by operating the hand lever 73 the drum 48 may be rotated to effect the removal of the core from the mold without stopping the rotation of said core thus preventing the cement from adhering to the exterior walls of the core.

Secured to a transverse beam 74 is a substantially triangular shaped bracket 75 having an eye 76 formed in one end thereof and provided with a laterally extending bar 77, which latter is provided with a depending ear 78 for attachment to the adjacent standard 8.

Extending laterally from the bar 77 is a horizontally disposed keeper 78' in which is mounted for oscillating movement a horizontally disposed lever 79. The inner end of the lever 79 extends through the eye 76 and is attached to a brake strap section 80. Pivoted to the brake strap section 80 is a similar brake strap section 81, which latter is pivoted to a link 82, pivotally mounted at 83, on the inner end of the lever 79. It will thus be seen that by operating the lever 79 the strap sections 80 and 81 will frictionally engage the winding drum 48 so as to prevent rotation of the latter and thus support the core 17 in elevated position when removing the molded

pipe from the mold. One edge of the keeper 78' is provided with a plurality of teeth 83 for engagement with a pawl 84 carried by an auxiliary handle 85 thereby to lock the lever in operative position.

Depending from the upper supporting frame 6 is a hopper 87 in which is mounted a worm screw 88, which latter serves to feed the concrete, cement or other material through a trough 89 into the molding compartment 19. A platform 90 is supported on the upper frame 6 so that the workman may conveniently fill the hopper 87 with concrete.

Motion is transmitted from the pulley 38 to the shaft 91 of the worm screw through the medium of a belt 92 passing around suitable pulleys 93 and 94 carried by the shafts 37 and 91, respectively.

The core carrying shaft 16 is slidably mounted in suitable bearings 95 and is provided at its upper end with a threaded extension 96 which passes through the head block or follower 53 for engagement with a suitable retaining nut 97, the latter being adapted to bear against a wear plate 98 secured to the follower or head block, as by screws or similar fastening devices 99.

An annular band or collar 100 is secured to or formed integral with the exterior walls of the core 17 for position within the mold at the off set portion 20 thereof in order to form a corresponding off set on the molded drain or pipe for the purpose before mentioned.

In operation a quantity of concrete, cement or similar plastic material is shoveled or otherwise introduced into the hopper 87 after which the mold sections are positioned on the table 12 and locked in engagement therewith by forcing the pins 24 downwardly within the radiating slots 25 of the table. The core 17 is then positioned within the mold and the lever 42 actuated to move the gear 30 into engagement with the pinion 31 thus transmitting motion from the main driving shaft through the medium of a sprocket chain 35 to the table to rotate the latter, the lever 73 having been previously moved so as to throw the clutch members 49 and 51 out of engagement with each other. As the shaft 37 revolves motion will be imparted through the medium of the beveled gears 43 and 44 to the shaft 45 and through the medium of the pinion 46 to the master gear 47 thus rotating the core 17 within the mold. As the mold 18 and core member 17 revolve the worm screw 88 will feed the concrete and cement through the chute or trough 89 into the molding compartment 19 and uniformly distribute the same around the core, the movement of the mold and core serving to thoroughly tamp the concrete within the molding compartment as the concrete is fed to the mold. The exterior wall of the core will preferably be continuously

coated with linseed oil or other lubricating material so as to prevent adhesion of the cement and also to form the interior core of the molded pipe or tile with a smooth surface, the oil on the core serving to render the walls impervious to moisture. After the pipe or drain has been formed the handle 73 is actuated to throw the clutch member 49 in engagement with the member 51 which causes the cable 63 to be wound upon the drum 48 and thus exert a longitudinal pull on the cable 56 thereby to elevate the core above the mold and in which position it may be firmly supported by manipulating the brake lever 79 in the manner before described. After the core has been withdrawn from the mold the clamping bands 21 and pins 24 are released and the sections comprising the mold swung laterally to open position thus exposing the pipe and permitting the ready removal of the molded product.

It will here be noted that the core is withdrawn from the molding compartment without stopping the rotation of either the core or mold. It will also be noted that the concrete is equally distributed within the molding compartment as the mold revolves, while the rotation of the core with respect to the mold is such as to thoroughly tamp the concrete within the molding compartment.

From the foregoing description it is thought that the construction and operation of the device will be readily understood by those skilled in the art and further description thereof is deemed unnecessary.

Having thus described the invention what is claimed is:

1. In a machine of the class described, a supporting frame, a table mounted for rotation on the frame, a core carrying shaft, a core secured to and movable with the shaft, a master gear secured to the core carrying shaft, a vertical shaft having a pinion meshing with the master gear, a winding drum slidably mounted on the vertical shaft, a flexible connection between the core carrying shaft and the winding drum, a clutch for securing the drum to the vertical shaft thereby to operate the same to elevate the core, a driving shaft operatively connected with the vertical shaft, means for transmitting motion to the driving shaft to the table, a hopper, a feeding device disposed within the hopper for feeding material to the mold, and a connection between the driving shaft and feeding device for operating the latter, said core and mold being mounted for rotation in the same direction and at different rates of speed while the mold and core are held against reciprocation.

2. In a machine of the class described, a supporting frame, a table mounted for rotation on the frame, a mold carried by the table, a rotatable core disposed within the mold, a shaft secured to and mounted for

rotation with the core, a master gear secured to the core carrying shaft, a vertical shaft having a pinion meshing with the master gear, a drum slidably mounted on the vertical shaft, a flexible connection between the core carrying shaft and said drum, a clutch for rotating the drum with the vertical shaft thereby to move the core to elevated position, a friction brake adapted to engage the drum for supporting the core in elevated position, a driving shaft operatively connected with the vertical shaft, a hopper having a feeding device for delivering material to the mold, and means for transmitting motion from the driving shaft to the table and feeding device, respectively, said mold and core being mounted for rotation in the same direction while held against reciprocating movement.

3. In a machine of the class described, a supporting frame, a table mounted for rotation on the supporting frame, a mold secured to and carried by the table, spaced uprights secured to and forming part of the frame, a head block slidably mounted between the uprights, a shaft secured to the head block, a core carried by the shaft, a master gear secured to the shaft, a vertical shaft having a gear adapted to mesh with the master gear on the core carrying shaft, a drum slidably mounted on the vertical shaft, a flexible connection between the head block and the drum, a clutch for securing the drum to and releasing said drum from the shaft, a driving shaft operatively connected with the vertical shaft, a hopper having a trough for feeding material to the mold, a feeding device disposed within the hopper, and means for transmitting motion from the driving shaft to the table and feeding device, respectively.

4. In a machine of the class described, a supporting frame, a table mounted for rotation on the frame and provided with peripheral teeth, a mold carried by the table, a vertically movable core member mounted for rotation within the mold, a stub shaft having a pinion meshing with the teeth on the table, a counter shaft having a pinion secured thereto, a master gear slidably mounted on the stub shaft and adapted to engage the pinion on the counter shaft, a sprocket wheel secured to said counter shaft, a driving shaft having a sprocket wheel secured thereto, a sprocket chain forming a connection between the sprocket on the driving shaft and the sprocket on the stub shaft, a lever for throwing the master gear into and out of engagement with the pinion on the counter shaft, means operable by the driving shaft for feed-

ing material to the mold, and means operable by the driving shaft for rotating the core.

5. In a machine of the class described, a supporting frame, a table mounted for rotation on the frame, a mold carried by the table, a shaft journaled in the frame, a core secured to and mounted for rotation with the shaft, a master gear secured to the core carrying shaft, a vertical shaft having a pinion meshing with the master gear, a drum loosely mounted on the vertical shaft, a cable connecting the core carrying shaft and drum, a clutch for keying the drum to the vertical shaft thereby to wind the cable on the drum and effect the elevation of the core, a bracket secured to the frame and having an eye formed therein, a bar extending laterally from the bracket and provided with a keeper, a lever extending through said keeper and eye, a brake band encircling the drum and operatively connected with the adjacent end of the lever for locking the core member in elevated position, and a driving shaft operatively connected with the table and vertical shaft, respectively, for rotating said table and core.

6. In a machine of the class described, a supporting frame, a table mounted for rotation on the frame, a core carrying shaft mounted for rotation within the mold, a vertically movable core secured to and mounted for rotation with the shaft, a master gear secured to the core carrying shaft and through which said shaft is movable in a vertical plane, a vertical shaft having a pinion meshing with the master gear, a winding drum loosely mounted on the vertical shaft, a flexible connection between the winding drum and the core carrying shaft for elevating the latter, a clutch for keying the winding drum to the vertical shaft, a bracket extending laterally from the frame, a yoke pivotally connected with the bracket and encircling the drum, an operating lever operatively connected with the yoke for actuating the clutch, a driving shaft operatively connected with the vertical shaft, a hopper for feeding material to the mold, a feeding device disposed within the hopper, and means for transmitting motion from the driving shaft to the feeding device and table, 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:

WILLIAM M. EVANS,
FRED RANDOLPH SMITH.