T. W. HAMMOND, JR.

CONCRETE PIPE MACHINE.

APPLICATION FILED JAN. 31, 1916.

1,371,239.

Patented Mar. 15, 1921.

4 SHEETS—SHEET 1.

Fig. 1.

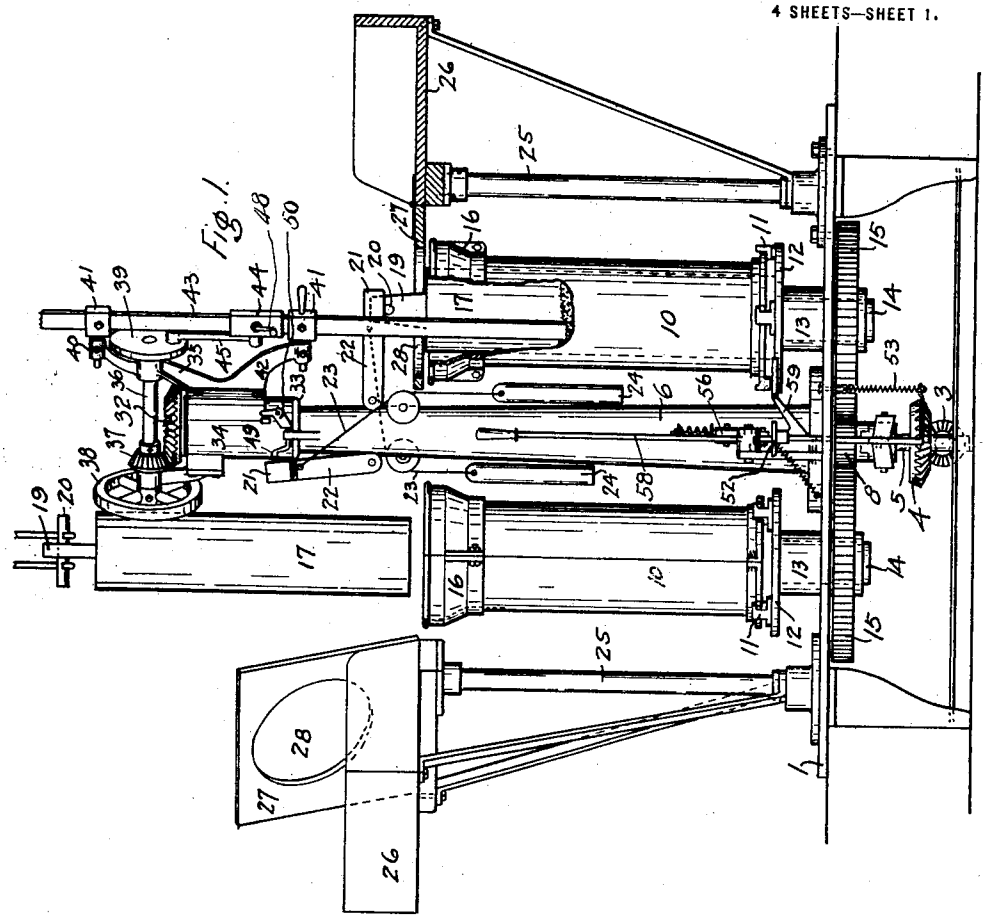
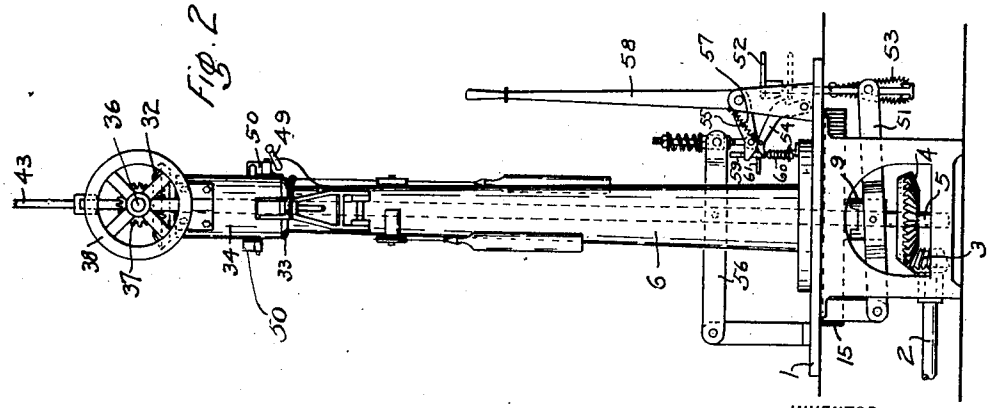


Fig. 2



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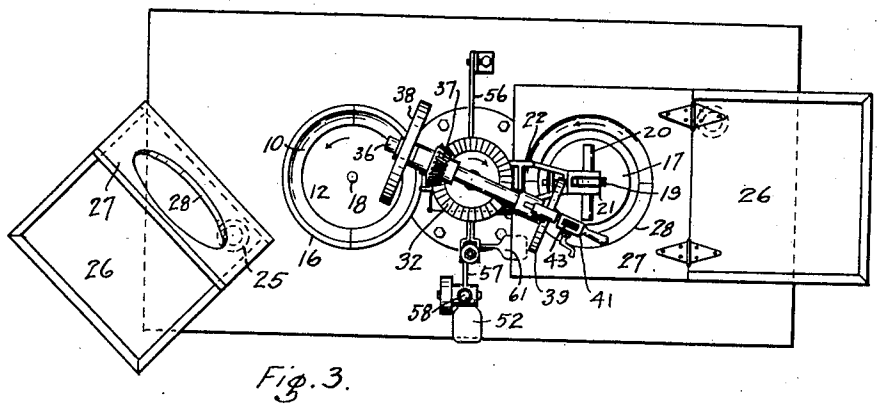


Fig. 3.

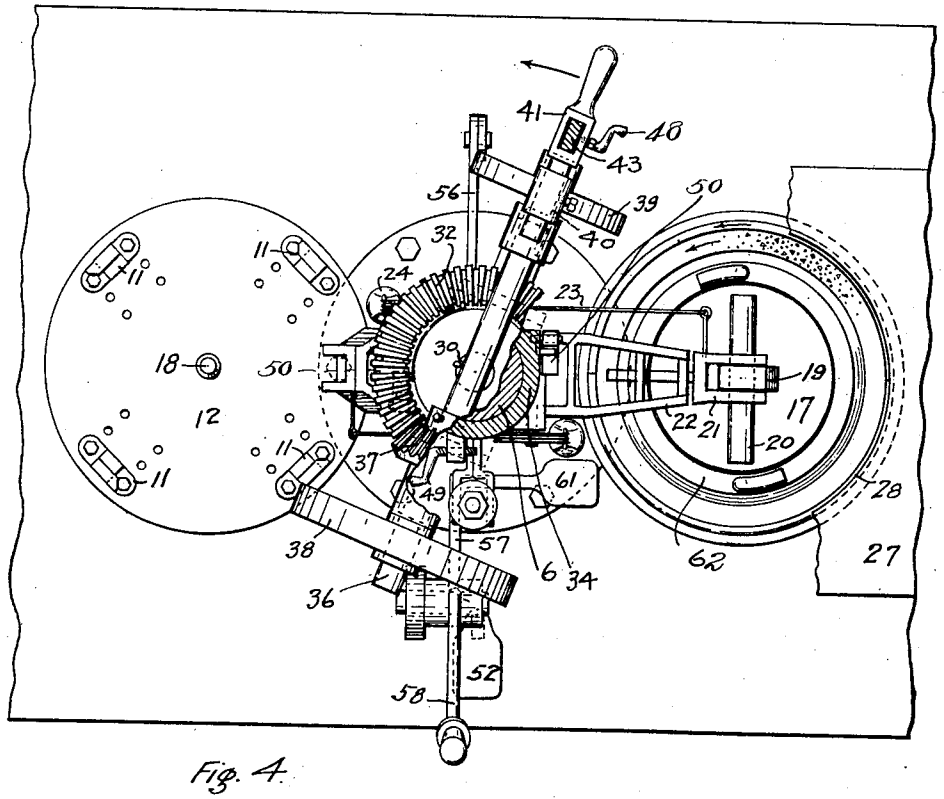


Fig. 4.

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4 SHEETS—SHEET 3.

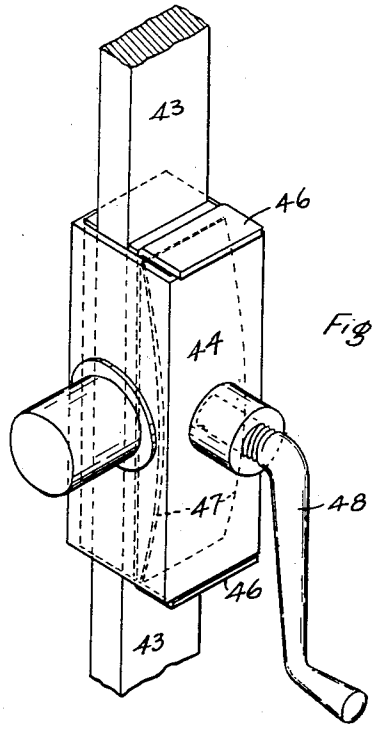


Fig. 6.

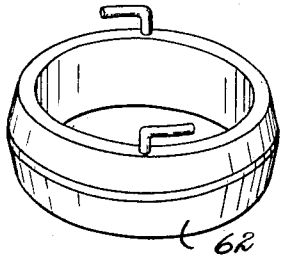


Fig. 7.

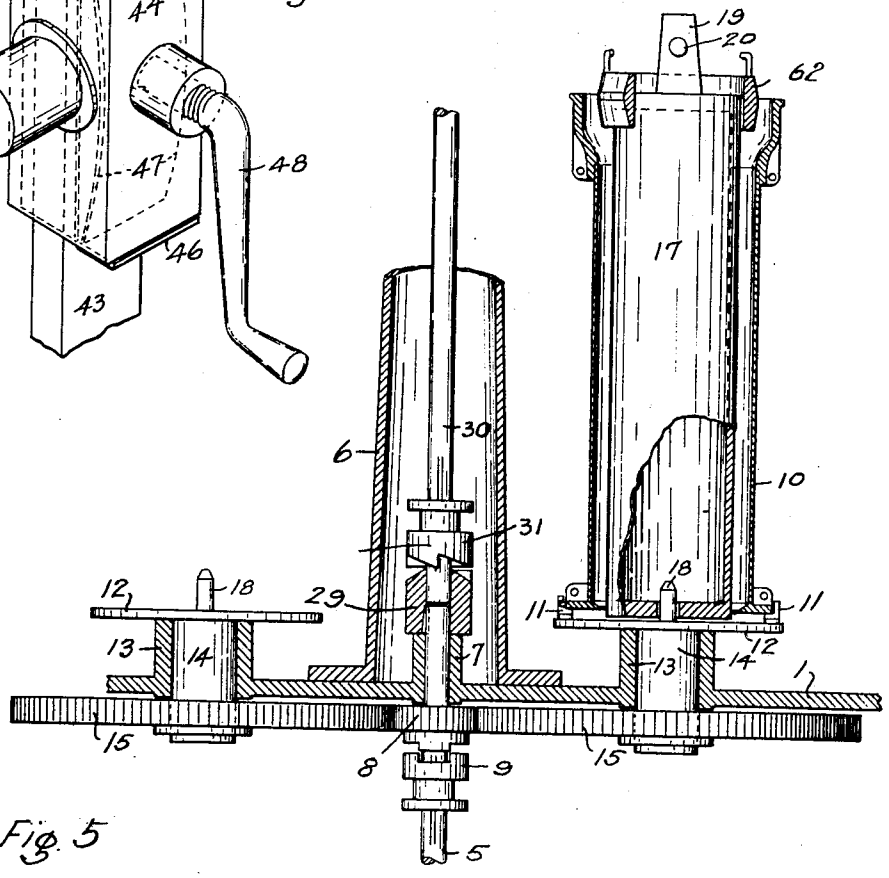


Fig. 5

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4 SHEETS—SHEET 4.

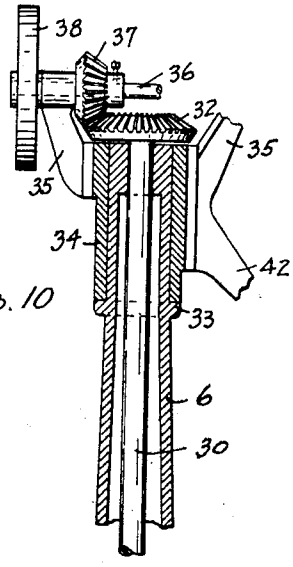


Fig. 10

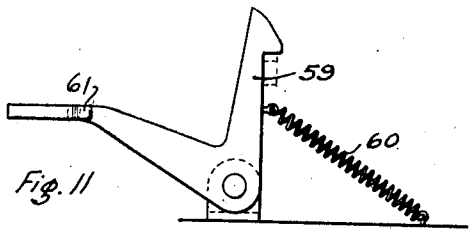


Fig. 11

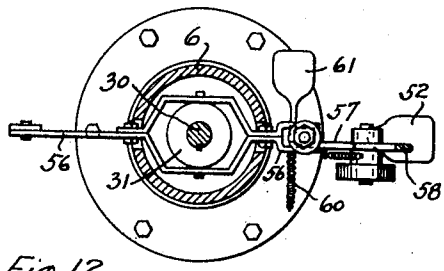


Fig. 12

Fig. 8.

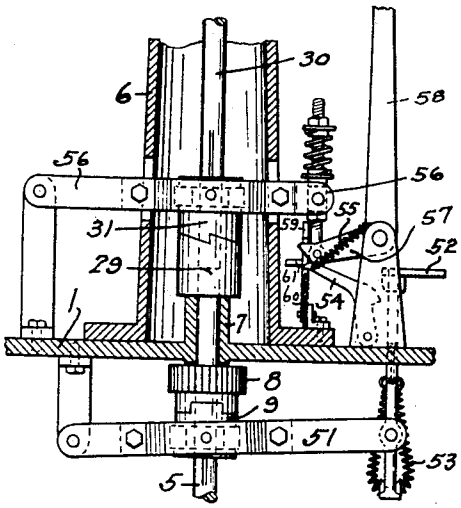
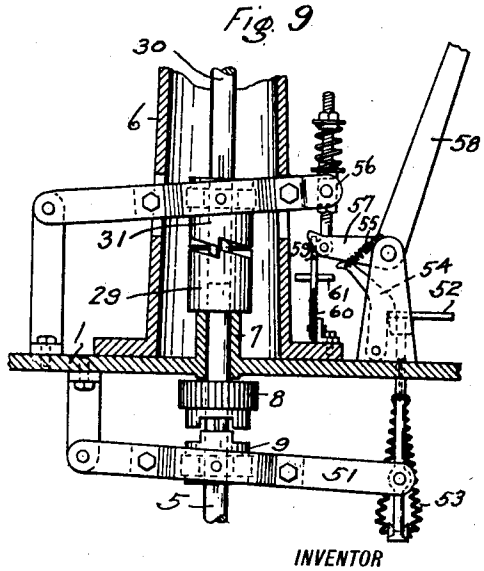


Fig. 9



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CONCRETE-PIPE MACHINE.

1,371,239. Specification of Letters Patent. Patented Mar. 15, 1921.

Application filed January 31, 1916. Serial No. 75,348.

To all whom it may concern:

Be it known that I, THOMAS W. HAMMOND, Jr., a citizen of the United States, residing at Tacoma, in the county of Pierce, State of Washington, have invented certain new and useful Improvements in Concrete-Pipe Machines, of which the following is a specification.

This invention relates to machines for making concrete-pipe, and has for its objects to provide improved means for controlling the rotation of the various parts of the machine; means for holding the pipe core; means for tamping the concrete mixture in the mold; means for adjusting the position and force of said tamping means; and means whereby the same tamping means may be turned to apply to a plurality of molds in succession.

I attain these and other objects by the devices, mechanisms, and arrangements illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the machine, showing it in operation and showing a portion of one of the molds broken away to reveal the interior; Fig. 2 is a side elevation thereof, the mixing table and adjacent mold not being shown therein; Fig. 3 is a plan of the machine as shown in Fig. 1; Fig. 4 is a plan of a portion thereof showing the tamping mechanism swung out of the way, and showing portions in section; Fig. 5 is a section of a portion of the machine showing the clutches disengaged to stop the rotation of all the parts of the machine; Fig. 6 is a perspective view of the friction clamp for the tamping bar; Fig. 7 is a perspective view of the bell-core; Figs. 8 and 9 are vertical sections of the lower portion of the machine showing the clutches in and out of engagement respectively and showing the clutch controlling devices; Fig. 10 is a section of the upper part of the machine; Fig. 11 is a side view of the clutch-bar latch; and Fig. 12 is a plan of the clutch operating mechanism.

Similar numerals of reference refer to similar parts throughout the several views.

The bed-plate 1 of the machine frame forms the floor of the machine and may be usually supported on a level with the floor of the room in which it is mounted. The driving shaft 2 is mounted in suitable bearings supported by the frame, and terminates in a bevel gear 3. The gear 3 meshes with and actuates a complementary gear 4 mounted on a short vertical shaft 5. The axis of the shaft 5 forms also the axis of the hollow main post 6 of the machine. The shaft 5 extends upward a short distance in the center of the main post 6, being suitably supported by a bearing 7 therein. A pinion 8 is loosely mounted on the shaft 5 and has a clutch body formed on one side adapted to be engaged by a complementary clutch body 9 which is slidably secured on the shaft 5 but which turns therewith, so that if said clutch bodies are separated, the pinion 8 will not rotate with the shaft 5 but as soon as the clutch 9 is brought into engaging position, the said pinion 8 will rotate with the said shaft.

The mold 10 is of any approved type, being provided with lugs 11 at its lower edge by means of which it is supported on the pallet plate 12. This plate 12 is supported by means of a bearing or boss 13 formed on the frame of the machine, and is mounted on a short shaft 14 which passes downward through said bearing 13 and which has a large gear 15 mounted on its lower end, said gear 15 meshing with the pinion 8 above described. Thus it will be seen that when the clutch bodies are in engagement the said pallet plate 12 will be rotated by the shaft 5. The mold 10 is provided with a suitable enlargement 16 at its upper end to form the bell-end of the pipe to be molded therein. A central core 17 fits over a central pin 18 on the pallet plate 12 and is provided with a lug 19 at its upper end, said lug being provided with a cross-pin 20 extending through it, by which it is engaged by the lifting crane to raise it out of the pipe formed in the mold. This lug 19 is held, by means of an open-ended socket 21 slidably, but non-rotatively mounted on the end of an arm 22 extending from the post 6, in such way that the core 17 is held firmly from rotating with the mold and pallet plate (Fig. 4). As the core is raised out of the rotating pipe the socket 21 retains hold of the lug 19 but slides outward on the arm 22, thus preventing the core from being drawn toward the post as it is raised out of the pipe. The arm 22 is pivoted to the post 6 so that it may be raised off the core lug 17. In order to hold this arm 22 either down in operative position or up in inoperative position I attach a flexible wire 23 to it and pass said wire over a pulley, mounted on

the post 6, below the level of the pivot of the arm 22, and hang a weight 24 on the end of the wire so that said weight will hold said arm 22 in either of said positions.

A working table is arranged so as to be at a level immediately over that of the top of the mold 10. This table is mounted on a strong post 25 extending up from the plate 1 so as to turn thereon, and consists of a rear portion 26 having suitable sides and back to prevent the wastage of the mixture thereon, and a front portion 27 hinged to the part 26 and provided with a central hole 28 through which the ingredients are supplied to the interior of the mold as needed. Thus it will be seen that when the table is in use the materials thereon may be easily inserted into the mold and that when the pipe is to be removed the part 27 is raised out of the way and then the whole table is swung on the post 25 to make room to remove the mold with the pipe therein (see Fig. 3).

The above described shaft 5 has a clutch body 29 firmly secured to its upper end above the bearing 7 and within the post 6. This clutch body 29 extends a short distance above the end of the shaft 5 and is provided with a suitable bearing surface therein wherein the lower end of the extension shaft 30 is journaled. This shaft 30 forms an extension of the shaft 5 and lies in the axis of the hollow post 6 and its upper end is suitably journaled in said post. A complementary clutch member 31 is slidably mounted on the lower end of the said shaft 30 and is adapted to be engaged by the clutch surfaces of the clutch body 29 when it is slid to its lowest position on the shaft 30 but to be disengaged therefrom when it is raised on the said shaft. Thus it will be seen that when the parts 29 and 31 are in engagement the shaft 30 will turn with the shaft 5 but that when they are out of such engagement the shaft 30 will not be driven and the clutch body 29 will turn about the end of the shaft 30. The upper end of the shaft 30 is provided with a suitable bevel gear 32 by which the hereinafter described tamping mechanism is driven.

The upper end of the post 6 is provided with a suitable collar 33 around its outer face and such part of the post above said collar is formed so as to receive the cylindrical head 34 and to permit said head to turn freely around the post. This head 34 has two arms 35 extending laterally and upwardly therefrom, said arms being positioned diametrically opposite to each other and being provided with suitable bearings for the horizontal tamping shaft 36 which extends across the top of the machine. This shaft carries a bevel gear 37 adjustably secured thereon and which meshes with the above mentioned gear 32 on the end of the shaft 30, so that the shaft 36 is driven by the said shaft 30. A small hand wheel 38 is mounted on the idle end of the shaft 36. A crank disk 39 is mounted on the other end of the shaft 36 and carries a crank pin thereon. The shaft 36 may be moved axially by adjusting the gear 37 and the hand wheel 38 thereon, said gear and hand wheel being preferably arranged on each side of one of the two arms 35 so as to hold said shaft in adjusted position. In this way the position of the disk 39 may be changed in accordance with the size of the pipe being tamped. As shown in Fig. 1 the arm 35 adjacent the crank disk 39 has an upward extending branch 40 having a guide socket 41 adjustably mounted thereon. Another arm 42 extends downward below the said arm 35 and has another similarly adjustable guide socket 41 mounted on it vertically below the first guide socket. The tamping bar 43 slides freely through the said guide sockets 41 and consists of a strip of wood, or other suitable material. The distance of the bar 43 from the axis of the post 6 may be varied by adjusting the sockets 41 in the arms 40 and 42, respectively, in accordance with the size of the pipe being tamped. The bar 43 also passes through a friction clamp 44 (Fig. 6) which is connected to the crank pin on the disk 39 by a connecting rod 45, so that said clamp 44 is given a reciprocating motion by the rotation of the disk 39. The clamp 44 is provided with an adjustable friction surface 46 which is pressed against the sides of the bar 43 by the spring 47 (indicated in dotted lines) whose action is controlled by the hand screw 48 passing through the side of the clamp 44. It is evident then that the bar 43 is raised by means of the connecting rod 45 and that the force of its blow downward on the cement mixture will depend on the friction between it and the clamp 44. The upward travel of the bar 43 will equal at all times the stroke of the crank pin on the disk 39 but its downward stroke will be limited by the resistance to tamping set up by the mixture in the mold. Each time that the bar 43 slips in the clamp 44 it acts at a slightly higher level in the mold and since the mold is constantly rotating, it is evident that the entire length of the pipe is properly, automatically and equally tamped.

The position of the tamping bar may also be adjusted for different sizes of pipe by throwing it sidewise relatively to the center of the pipe or pallet plate 12, by means of a hand screw 49 mounted on the side of the post 6 and engaging a lug 50 mounted on the head 34. The reaction between the wheels 32 and 37 tends to turn the head 34 but said action is prevented by the said screw 49. When the machine is equipped for working with two molds alternately the

head is provided with two such lugs 50 as shown. However, since the pipe is usually rather thin, it is also necessary to adjust the bar 43 relatively to the center of the post 6, as above described, so as to bring the bar to the same relative position to the center of a larger as of a smaller pipe, or else the edges of the bar would engage the mold and core and would not tamp the mixture freely.

The manual control of the machine is illustrated principally in Figs. 8, 9, 11 and 12. The clutch 9, which rotates with and slides on the shaft 5, is controlled by a lever 51 pivoted to the plate 1 and controlled by a pedal 52 against the action of a spring 53, said parts being arranged so that when the pedal 52 is depressed the clutch is disengaged. A latch 54 is pivoted above the plate 1 and is adapted to engage the pedal 52 to hold it down, said latch being pulled into such engaging position by the spring 55.

The clutch member 31, rotating with but slidable on the extension shaft 30, is operated by a lever 56 which is connected by suitable links to the arm 57 of the hand lever 58 and is arranged so that when the lever 58 is pushed to vertical position (Fig. 8) the clutch member 31 engages the complementary part 29. When the said parts are in such engaging position the arm 57 of the hand lever engages the end of the above mentioned latch 54 to withdraw it from the pedal 52 so that the tamping mechanism will not be operated unless the pallet plate is rotating, since all the clutches will be set in engagement when the hand lever 58 is thus pushed to vertical position. A latch 59 (Fig. 11) is also pivoted above the plate 1 in such position as to engage over the end of the arm 57 of the lever 58 to hold it down in such engaging position, said latch being drawn forward into engaging position by a spring 60. The latch 59 has a pedal lever 61 formed on one side of its pivot by means of which the arm 57 may be released and the clutch members 29 and 31 separated. When the arm 57 is thus released it again releases the latch 54 which then assumes an operative position ready to receive and hold the pedal 52 when it is depressed. Thus it will be seen that the tamping mechanism may be stopped at any moment by stepping on the pedal lever 61 and drawing back on the hand lever 58 but that when it is so stopped the pallet plate 12 continues to rotate until the pedal 52 is depressed.

A removable bell core 62 is provided, said part being adapted to form the enlarged core for the bell end of the pipe.

My machine is operated as follows:—

A mold 10 is secured to one of the pallet plates 12 and then the core 17 is inserted in the mold, its lower end plate engaging the central pin 18 of the pallet plate 12. Then the table 26 is swung into working position and the hinged front portion is turned down so that the hole 28 comes immediately over the mold and the core 17 extends upward through it. Then the arm 22 is swung down so that the socket 21 engages the lug 19 on the core to hold it firmly in place and to keep it from rotating with the mold. Then the head 34 is adjusted on the post 6 and the guide sockets 41 are adjusted in the arms 40 and 42 so that the line of action and position of the tamping bar 43 are in proper position in relation to the center of the mold 10. Then the hand screw 48 of the friction clamp 44 is turned to loosen the bar 43 and the said bar is lowered until its end engages the end of the mold. Then the hand lever 58 is pushed into vertical position thus releasing the pedal 52 from the latch 54 and allowing it to rise under the influence of the spring 53 and raising the lever 51 to place the clutch body 9 in connection with the corresponding parts of the pinion 8 and thus causing the pinion 8, gear 15, pallet 12, and mold 10 to rotate; simultaneously, the arm 57 draws down on the lever 56 thus causing the clutch body 31 to engage the clutch body 29 on the rotating shaft 5 and causing the shaft 30, gears 32 and 37, shaft 36 and crank disk 39 to rotate and, through the connecting rod 45 and friction clamp 44, causing the tamping bar 43 to reciprocate vertically in the guide sockets 41. Then the hand screw 48 is adjusted to give the desired friction between the clamp 44 and the bar 43. Then a small quantity of the cement mixture is dropped through the hole 28 in the table, into the space between the core and the mold, and this is tamped by the bar 43 as the mold carries it under the said bar. It will be noted also that the core 17 does not rotate at any time and therefore it has a polishing or smoothing effect on the concrete as it is forming in the mold, thus tending to increase its density and to render it more thoroughly water-tight. This process goes on until the bell part of the pipe is reached when the machine is stopped by depressing the pedal 61 and releasing the hand lever 58 which may then be drawn back to release the clutch bodies 29 and 31 from engagement, and thus stopping the motion of the tamping bar; and by depressing the pedal 52 to release the pinion 8 from connection with the clutch 9, thus stopping the rotation of the mold. Then the tamping bar is raised out of the mold and the head 34 is turned out of the way, on the post 6, and then the arm 22 is raised away from the lug 19 on the core and a bell core 62 is slipped over the main core and the bell part of the pipe is finished by hand after the mold is again started rotating by releasing the pedal 52. When the pipe is thus finished

its rotation is again stopped and the bell core 62 is removed. Then the arm 22 is again brought into position and the rotation again started. Then the hoisting device is attached to the cross pin 20 of the lug 19 of the core and the core is carefully raised while the mold and pipe are rotating. During this raising of the core it is still steadied by the open-ended socket 21 which engages the lug 19 and which slides outward on the arm 22 as the core rises, until finally it slides off the lug 19, thus preventing the core from breaking the pipe while it is being raised. Then, when the core has been removed, the machine is stopped and the helper may remove the mold and pipe while the operator moves the head 34 to position to similarly work in another mold which has been set up in place on the other pallet plate while he has been making the pipe as above described.

Having therefore described my invention, what I claim is—

1. In a device of the class described, the combination with a rotating mold and a core within said mold adapted to contain between them the mixture to be tamped, of a stationary post positioned outside of said mold, a rotatably adjustable head mounted on said post and adjustable thereon about an axis substantially parallel to the axis of rotation of said mold, guide sockets carried by said head, a tamping bar guided by said sockets, said sockets and said tamping bar being arranged so that the bar is in position to act on the mixture between the core and the mold at a point where the rotation of the mold is substantially normal to the direction of adjustment of said bar by the rotation of said head, so that by the rotation of said head the tamping bar and guide sockets are adjusted relatively to the center of the mold, and means for vertically reciprocating said tamping bar.

2. In a device of the class described, the combination with a rotating mold and a core within said mold adapted to contain between them the mixture to be tamped, of a stationary post positioned outside of said mold, a rotatably adjustable head mounted on said post and adjustable thereon about an axis substantially parallel to the axis of rotation of said mold, guide sockets carried by said head and adjustable toward and from the axis of rotation of said head, a tamping bar guided by said sockets, said sockets and said tamping bar being arranged so that the bar is in position to act on the mixture between the core and the mold at a point where the rotation of the mold is substantially normal to the direction of adjustment of said bar by the rotation of said head, so that the tamping bar is adjusted relatively to the center of the mold by the combined adjustment of said head rotatably on the post and of said sockets on the head, and means for vertically reciprocating said tamping bar.

3. In a device of the class described, the combination with a rotating mold adapted to contain the mixture to be tamped, of a stationary post positioned outside of said mold, a head rotatably mounted on said post, a lug on said post adjacent said head, an adjusting screw passing through said lug, a lug on said head and adapted to be engaged by said screw whereby its position is adjusted on the post, guide sockets carried by said head and adjusted relatively to the center of the mold by the adjustment of said head, a tamping bar guided by said sockets, and means for vertically reciprocating said tamping bar.

4. In a device of the class described, the combination with a rotatably mounted mold and a reciprocally mounted tamping bar adapted to enter said mold and to tamp the materials therein, of a rotating shaft, a clutch connection between said mold and said shaft whereby said mold may be rotated or its rotation may be stopped, a separate clutch connection between said tamping bar and said shaft whereby said bar may be reciprocated or may be stopped, a lever engaging and controlling said last clutch connection, a pedal member engaging and controlling said first clutch connection, and a latch adapted to hold said pedal member in such position that the first clutch is disconnected and adapted to be removed from said holding position by said lever when the lever is thrown into engaging position whereby said mold will be rotated by said shaft when said tamping bar is being reciprocated.

5. In a device of the class described, the combination of a frame, of a rotating mold mounted thereon, a core removably mounted within the mold, said core being co-axial with the mold but separated therefrom, and means mounted on the frame and removably engaging the core both when the core is in position in the mold and when it is being removed therefrom whereby under both conditions said core is held from rotation with said mold.

6. In a concrete pipe-making machine, the combination of a rotatably mounted mold, a reciprocable tamping bar for tamping material within the mold, a driving connection including a clutch for rotating the mold, a driving connection including a clutch for reciprocating the tamping bar, and means for interconnecting said two clutches so that the setting of the second produces setting of the first, each of said clutches being releasable without affecting the other.

7. In a concrete pipe-making machine, the combination of a rotatably mounted mold, a reciprocable tamping bar for tamping mate-

rial within the mold, a driving connection including a clutch for rotating the mold, a driving connection including a clutch for reciprocating the tamping bar, and means for interconnecting said two clutches so that the setting of the second produces setting of the first.

8. In a concrete pipe-making machine, the combination of a rotatably mounted mold, a stationary post outside of said mold, said post having a swinging arm which may be swung over said mold, a reciprocable tamping bar carried by said arm to operate on material within the mold, an operating shaft within said post, and two sets of operating connections leading from said shaft to said mold and said tamping bar respectively, each of said connections including a clutch, the clutches in said two connections being interconnected so that the setting of one produces the setting of the other.

9. In a concrete pipe-making machine, the combination of a stationary post, a plurality of rotatable molds disposed at different positions around said post, a rotatable head mounted on said post, a cross shaft mounted in said head, a driving shaft mounted within said post, gearing connecting said two shafts while permitting the rotation of said head, ratchet mechanism permitting rotation of said head in the direction opposite to the reaction caused by said gearing while preventing it in the direction in which said reaction tends to move it, means for adjusting the positions in which said ratchet mechanism stops said head, and tamping mechanism carried by said head and operated by said cross shaft to act within any desired one of said molds according to the position of said head.

10. In a concrete pipe-making machine, the combination of a stationary post, a rotatable mold beside said post, a rotatable head mounted on said post, a cross shaft mounted in said head, a driving shaft mounted within said post, gearing connecting said two shafts while permitting the rotation of said head, a dog and an adjustable stop for limiting the movement of said head in the direction in which the reaction of the gearing tends to move it, and tamping mechanism carried by said head and operated by said head and operated by said cross shaft to act within said mold.

11. In a concrete pipe-making machine, the combination of a stationary post, a plurality of rotatable molds disposed at different positions around said post, a rotatable head mounted on said post, a cross shaft mounted in said head, a driving shaft mounted within said post, gearing connecting said two shafts while permitting the rotation of said head, ratchet mechanism permitting rotation of said head in the direction opposite to the reaction caused by said gearing while preventing it in the direction in which said reaction tends to move it, and tamping mechanism carried by said head and operated by said cross shaft to act within any desired one of said molds according to the position of said head.

12. In a concrete pipe-making machine, the combination of a rotatable mold, a core within said mold, said core being withdrawable axially from said mold, a stationary member, an arm pivotally mounted on said stationary member and having a releasable engagement with said core to prevent rotation of the core, said engagement being such that as the core is drawn out of the mold the engagement continues during part of such withdrawal and then is automatically released.

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