No. 639,858. Patented Dec. 26, 1899.

J. H. MARTIN & D. ORMAND.

MACHINE FOR CONSTRUCTING IRRIGATING OR OTHER PIPES.

(Application filed Mar. 29, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

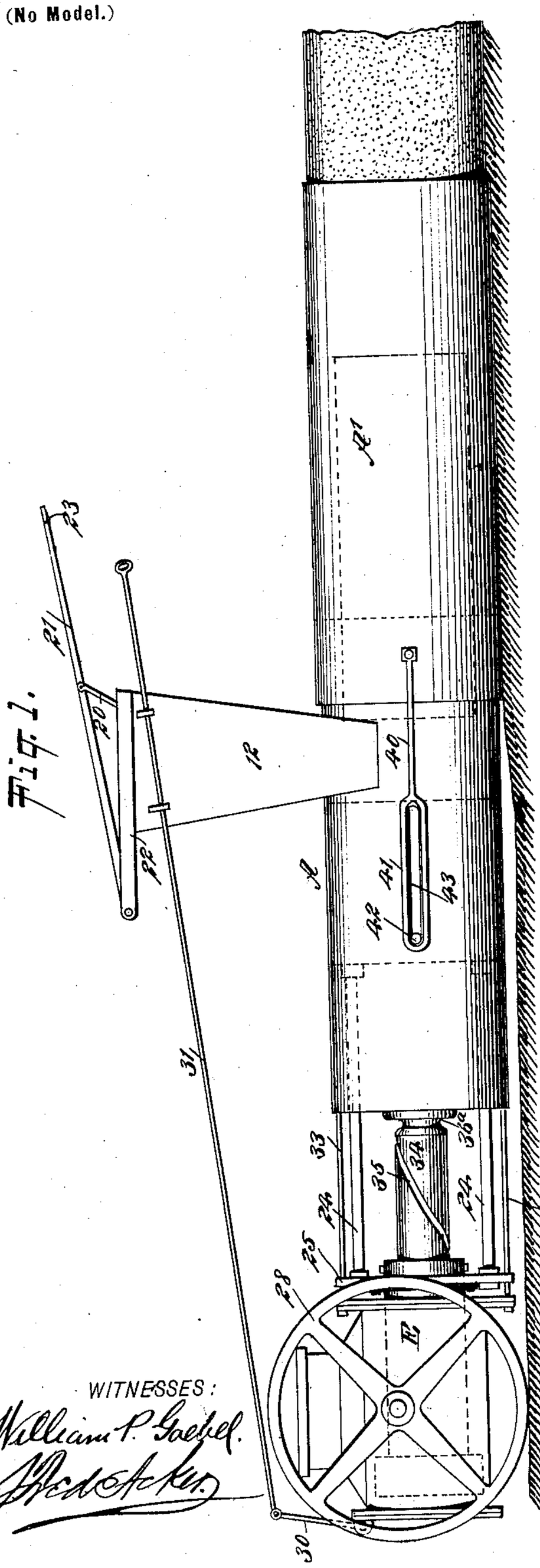

Fig. 3.

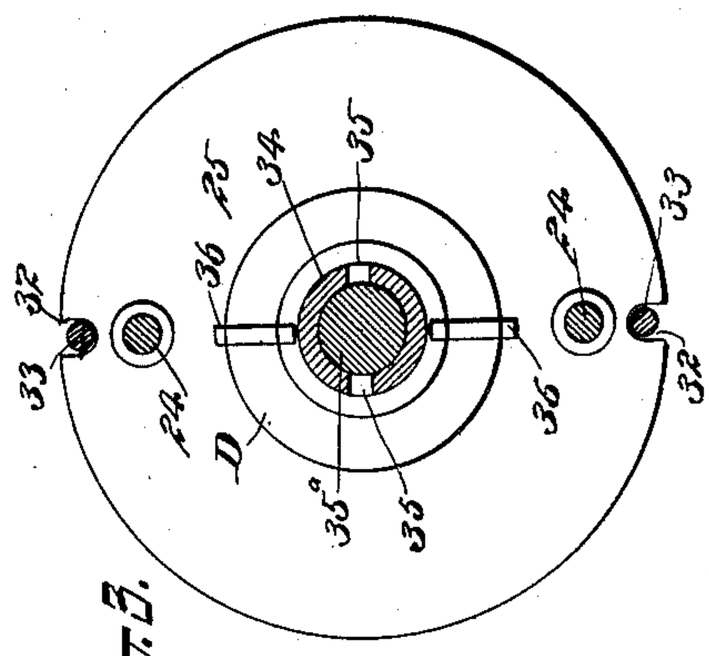

Fig. 2.

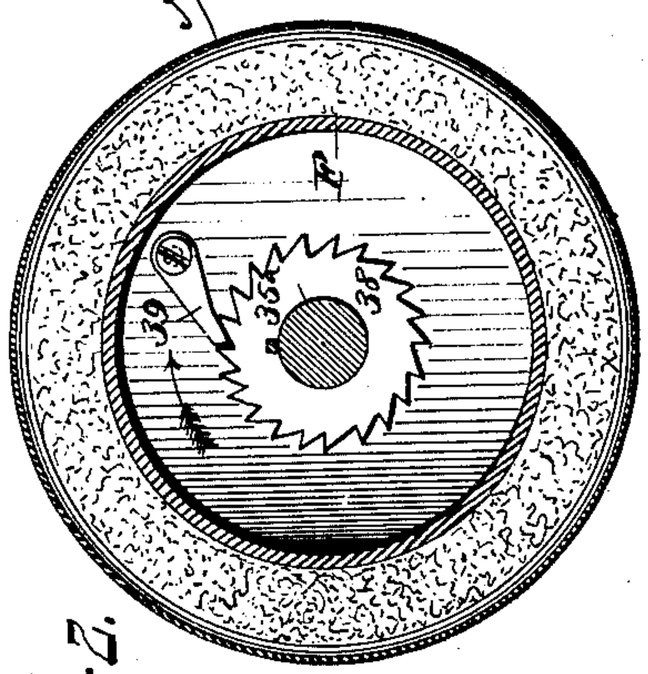

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Fig. 6.

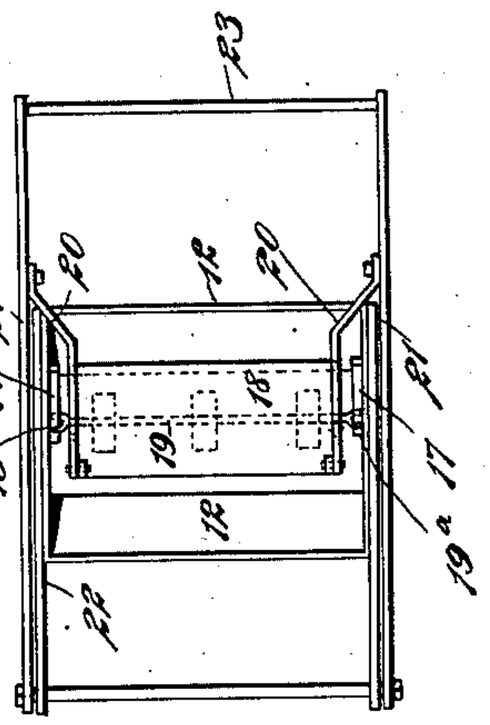
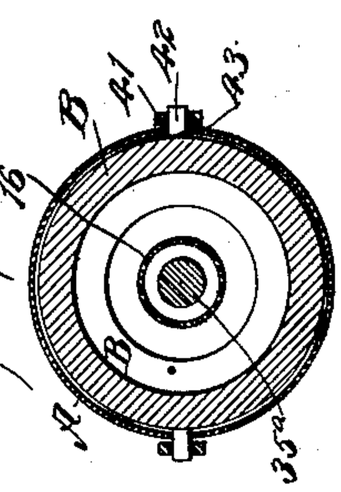


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

JOSEPH H. MARTIN AND DAVID ORMAND, OF RIVERSIDE, CALIFORNIA.

MACHINE FOR CONSTRUCTING IRRIGATING OR OTHER PIPES.

SPECIFICATION forming part of Letters Patent No. 639,858, dated December 26, 1899.

Application filed March 29, 1899. Serial No. 710,955. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH H. MARTIN and DAVID ORMAND, of Riverside, in the county of Riverside and State of California, have invented a new and Improved Machine for Constructing Irrigating or other Pipes, of which the following is a full, clear, and exact description.

The object of this invention is to provide a machine especially adapted to make a continuous concrete pipe of sand and cement or other suitable material either for water, sewer, or electric conduits and to produce said pipe in a simple and economic manner and to so construct the machine that the material utilized will be shaped and set by a single operation of a lever or a like device.

A further object of the invention is to provide a means whereby the material will be distributed in an even and compact manner.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improved machine. Fig. 2 is a transverse section taken practically on the line 2 2 of Fig. 4. Fig. 3 is a transverse section taken on the line 3 3 of Fig. 4. Fig. 4 is a longitudinal vertical section through the entire machine. Fig. 5 is a transverse section taken on the line 5 5 of Fig. 4, and Fig. 6 is a plan view of the hopper and tamping device.

The body or casing A of the machine is circular in cross-section and is provided at its forward end with a spider 10 and also with an intermediate spider 11; but disks may be substituted for the spiders if in practice it be found desirable. An opening is made in the upper portion of the casing A, leading into a chamber 13, into which the cement and sand or other material from which the pipe is to be manufactured is tamped. The opening leading into the tamping-chamber 13 is provided with a suitable hopper 12. The end walls of the chamber 13 are formed through the medium of two disks 14 and 15, placed a suitable distance apart, said disks being of less diameter than the diameter of the casing A, and said disks are centered in the casing, the spaces between the inner peripheries of the disks and the inner surface of the casing being nearly the thickness of the pipe to be made.

The tamping device C employed is best shown in Figs. 2 and 6, and consists of the following parts: Guide-rods 17 are secured longitudinally upon opposing inside surfaces of the hopper 12, and a tamping-plate 18 is located between the guides, mounted to turn upon a spindle 19, provided with a fork 19^a at each end, said forks loosely receiving the guide-rods 17. A link 20 is pivoted to the forward edge portion of the plate, one near each end, and each link is provided with a downwardly-extending rigid arm 18^a, and in the horizontal or working position of the tamping-plate the arms 18^a are immediately over it, as shown in Fig. 4. The upper ends of the links are pivotally attached to levers 21, pivoted to offsets 22 from the forward face of the hopper, and these levers are connected by a handle-bar 23. In the operation of this part of the machine, supposing the hopper to contain cement and the tamping-plate to be at its lowest position in the cement, when the handle-levers are raised and carried forward the links are drawn upward and will turn the tamping-plate upon its pivot until the plate occupies a vertical position between the guide-bars. Meanwhile the plate is also drawn upward, guided by said guide-bars. Thus the plate can be readily drawn through the cement to a point above it. Upon the downstroke of the hand levers and links the tamping-plate is gradually restored to its horizontal position and will be forced downward in such position for a considerable distance, being prevented from turning by the projecting arms of the links.

A hollow plunger B is mounted to slide in the casing A, this plunger B being designed to force the cement or material from the tamping-chamber 13 into the space between the rear disk-wall of said chamber and the casing. The cement-plunger B is mounted to slide over a tubular shaft 16, which is attached to the spiders 10 and 11 of the casing

and to the walls 14 and 15 of the tamping-chamber, holding said walls in place, and the cement-plunger is likewise adapted to slide over the disk forming the forward wall of said tamping-chamber, as is shown in Fig. 4. The cement-plunger is connected by rods 24 with a yoke 25, said yoke being secured to the rear end portion of a piston-plunger D, which comprises a solid head 26 and a tubular body 27. The piston-plunger D is mounted to slide in a hydraulic cylinder E of any approved construction, and said cylinder is supported on wheels 28, journaled at its sides. The cylinder is provided with a valve 29, of ordinary construction, to control the supply of liquid to the piston-plunger, and said valve 29 is preferably worked by hand, a lever 30 being attached to the valve-stem, as shown in Fig. 4. The lever is operated through the medium of a link 31, that is carried rearward through suitable guides at one side of the hopper, as shown in Fig. 1.

Connecting-rods 33 are employed to attach the forward end of the casing A to the rear end of the hydraulic cylinder, and these rods also serve as guides for the yoke 25 of the piston-plunger passing through recesses 32 in the periphery of the yoke, as shown in Fig. 3. These connecting-rods 33 also serve to prevent the piston-plunger from turning during its operation.

The hollow body 27 of the piston-plunger is mounted to slide over a cylinder 34, which is provided with peripherally-located spiral grooves 35, usually two in number, and the grooves extend from end to end of the cylinder. Pins 36, carried by the body of the piston-plunger, enter the grooves 35, thereby imparting a rotary movement to the cylinder at each stroke of the piston-plunger. A shaft 35^a is secured at one of its ends in the cylinder 34, and said shaft is passed through ball-bearings 36^a, located at the forward end of the casing A and through the tubular shaft 16 and out beyond the rear end of said shaft into a revolving core F, located at the rear of the rear wall of the tamping-chamber 13. This revolving core is in the form of a cylinder closed at one end, the forward end being in engagement with the flange of the wall 14 of said tamping-chamber 13, as shown in Fig. 4.

A ratchet-wheel 38 is secured to the end of the shaft 35^a, extending into the revolving core, and a dog 39, pivoted upon the end wall of the revolving core, is in engagement with the ratchet-wheel 38. When the piston-plunger moves rearwardly to cause the cement-plunger to force material from the tamping-chamber, the pins, traveling in the grooves 35 of the cylinder 34, cause the shaft 35^a to revolve sufficiently to impart a half-turn to the revolving core through the medium of the ratchet-wheel 38 and dog 39; but upon the return stroke of the piston-plunger the dog glides over the ratchet-wheel and has no action thereon. The exterior surface of the revolving core corresponds to the interior diameter of the pipe that is to be constructed. The rear end of the shaft 35^a is preferably supported in ball-bearings 37, as is shown in Fig. 4.

A sliding form A′, adapted to shape the outside of the pipe, is employed in connection with the casing A, telescoping the rear end of said casing. The form A′ is free to slide on the casing, but is connected with the casing through the medium of rods 40, pivotally attached to the forward portion of the form A′ at each side, each rod being provided with a link 41, and these links extend forwardly along the outside surfaces of the casing, as shown in Fig. 1, and receive pins 42, projected from the side of the cement-plunger outward through slots 43 made in the casing. At the rearward movement of the piston-plunger the form A′ remains still, while the other part of the machine is pushed forward a distance proportionate to the amount of material that has been tamped into said form by the cement-plunger. At the return stroke of the piston-plunger the studs 42, by engagement with the forward ends of the links 41, will gradually draw the form back to its initial position relative to the casing.

In operation the cement, mortar, or concrete is thrown into the hopper 12 and thus conducted to the chamber 13, in which chamber it is well packed by the tamping device C. Through the medium of the lever 31 the valve in the hydraulic cylinder is shifted in a manner to direct the pressure into the forward end of the cylinder E, which action forces the piston-plunger D rearward, imparting a like movement to the cement-plunger B, causing it to push through the chamber 13 and force the mortar or cement in between the core F and sliding form A′, where it is compressed by the pressure of the plunger B and the friction of the mortar or cement between said core F and the sliding form A′. While the plunger B is being pushed through the chamber 13 the core is made to revolve a half-turn at each stroke by means of the pins 36, the cylinder 34, the shaft 35^a, the ratchet 38, and dog 39. While the cement or mortar is being tamped in the mold, consisting of the core F and form A′, the form A′ remains still, while the other or supply section of the machine is pushed forward by the measure of the material that has been tamped in by the plunger.

By reason of the friction of the mortar or cement against the sides of the form A′ mortar or cement is prevented from being pushed through it, and thereby breaking the pipe already made, and this friction is great enough to force the other or supply section of the machine ahead. When the piston-plunger is at the limit of its rearward stroke, the valve 29 is shifted to bring the pressure at the rear of the hydraulic cylinder and the piston-plunger is carried forward, the two plungers moving

in the same direction; but the core F remains stationary, since the dog 39 will slip over the ratchet-wheel 38. The sliding form A', through the medium of the links 41 and pins 42, is pulled forward at every stroke of the piston-plunger just as far as the machine is moved forward. Loose earth is thrown around the form A' to a point a little above the center and is thoroughly tamped. This supports the sides of the pipe and keeps the crown from falling when the machine is moved forward.

The piston-plunger is made large for two purposes—first, so as to require less water to push it back, and, second, so that the plunger may slide over the grooved cylinder 34.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a machine for constructing irrigating and other pipes, a section arranged to supply material, and a mold for the material capable of movement upon said supply-section and having a revolving core.

2. In a machine for constructing irrigating and other pipes, a section arranged to supply material, a plunger operating in said section, a mold having a sliding movement upon the supply-section, and a core for said mold mounted to revolve, said plunger acting at one stroke to move the supply-section, and at the next stroke to carry the mold in the same direction as the supply-section.

3. In a machine for constructing irrigating and other pipes, a mold consisting of a form mounted to slide, and a core mounted to revolve within said form, and means for revolving said core, substantially as set forth.

4. In a machine for constructing irrigating and other pipes, a supply-section, a plunger operating in said supply-section, and a mold consisting of a form mounted to slide upon the supply-section and a core mounted to turn within said form.

5. In a machine for constructing irrigating and other pipes, a supply-section, a mold capable of movement on the supply-section, a tamping-plunger, a piston-plunger connected with the tamping-plunger, and a hydraulic cylinder in which the piston-plunger is mounted to slide, substantially as described.

6. In a machine for constructing irrigating and other pipes, a supply-section, a mold consisting of a form mounted to slide upon the supply-section and a core mounted to turn within said form, a tamping-plunger operating in said supply-section, and a hydraulic device for operating said plunger, substantially as described.

7. In a machine for constructing irrigating and other pipes, a supply-section, a tamping-plunger mounted in said supply-section, a mold consisting of a form mounted to slide on the supply-section, and a core within the form, means for rotating said core at the tamping movement of the tamping-plunger, and means for moving the form-section of the mold when the tamping-plunger moves in an opposite direction, substantially as described.

8. In a machine for constructing irrigating and other pipes, a supply-section, a hydraulically-operated tamping-plunger held to slide in the supply-section, a receiving-chamber located in front of said plunger, a hopper leading to the said chamber, a tamping device located within said hopper, and a mold consisting of a form mounted to slide upon the supply-section and a core mounted to turn within said form, as described.

9. In a machine for constructing irrigating and other pipes, the combination, with a supply-section provided with a chamber, the front and rear walls whereof are disk-shaped and of less diameter than the diameter of said section, a hopper connected with said chamber, a tamping device located in said hopper, and a hollow tamping-plunger adapted to slide over the forward and rear walls of said chamber, and means for operating said plunger, of a mold consisting of a form mounted to slide on the supply-section, and a core mounted to turn and located within said form at the rear of the rear wall of said chamber, as described.

10. In a machine for constructing irrigating and other supply-pipes a supply-section for the material provided with a chamber the front and rear walls whereof are disk-shaped and of less diameter than that of said section, a hollow tamping-plunger adapted to slide over said front and rear walls, and a mold for the material, substantially as described.

11. In a machine for constructing irrigating and other pipes, a section arranged to supply material, a mold for the material, a tamping-plunger, a piston-plunger connected with the tamping-plunger, and means for operating the piston-plunger, substantially as set forth.

12. In a machine for constructing irrigating and other pipes, a casing forming a supply-section for the material and provided with slots, a mold adapted to receive the material and mounted to slide upon the casing, a tamping-plunger operating in the casing, and provided with projecting pins extending through the slots in the casing, and rods pivotally attached to the molds and each provided with a link, the links extending along the outside surface of the casing and receiving the said pins projected from the tamping-plunger, substantially as set forth.

13. In a machine for constructing irrigating and other pipes, a supply-section, a tamping-plunger, a mold consisting of a form mounted to slide upon the supply-section and a core within said form, a shaft mounted to revolve, a driving connection between the said shaft and the core, and means for operating the tamping-plunger and rotating said shaft, substantially as described.

14. In a machine for constructing irrigating and other pipes, a supply-section, a tamping-plunger, a mold consisting of a form mounted to slide upon the supply-section and a core

within said form, a hydraulic cylinder supported on wheels, a piston-plunger mounted to slide in said hydraulic cylinder and connected with the tamping-plunger to operate the same, a shaft, means for imparting rotary motion to said shaft at each stroke of the piston-plunger, and a driving connection between the said shaft and the said core whereby when the piston-plunger is operated the core is turned, substantially as set forth.

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