(No Model.) 3 Sheets—Sheet 1.

# W. W. WALLACE.

## MACHINE FOR MANUFACTURING SEWER PIPE.

No. 555,838. Patented Mar. 3, 1896.

Fig. 1.

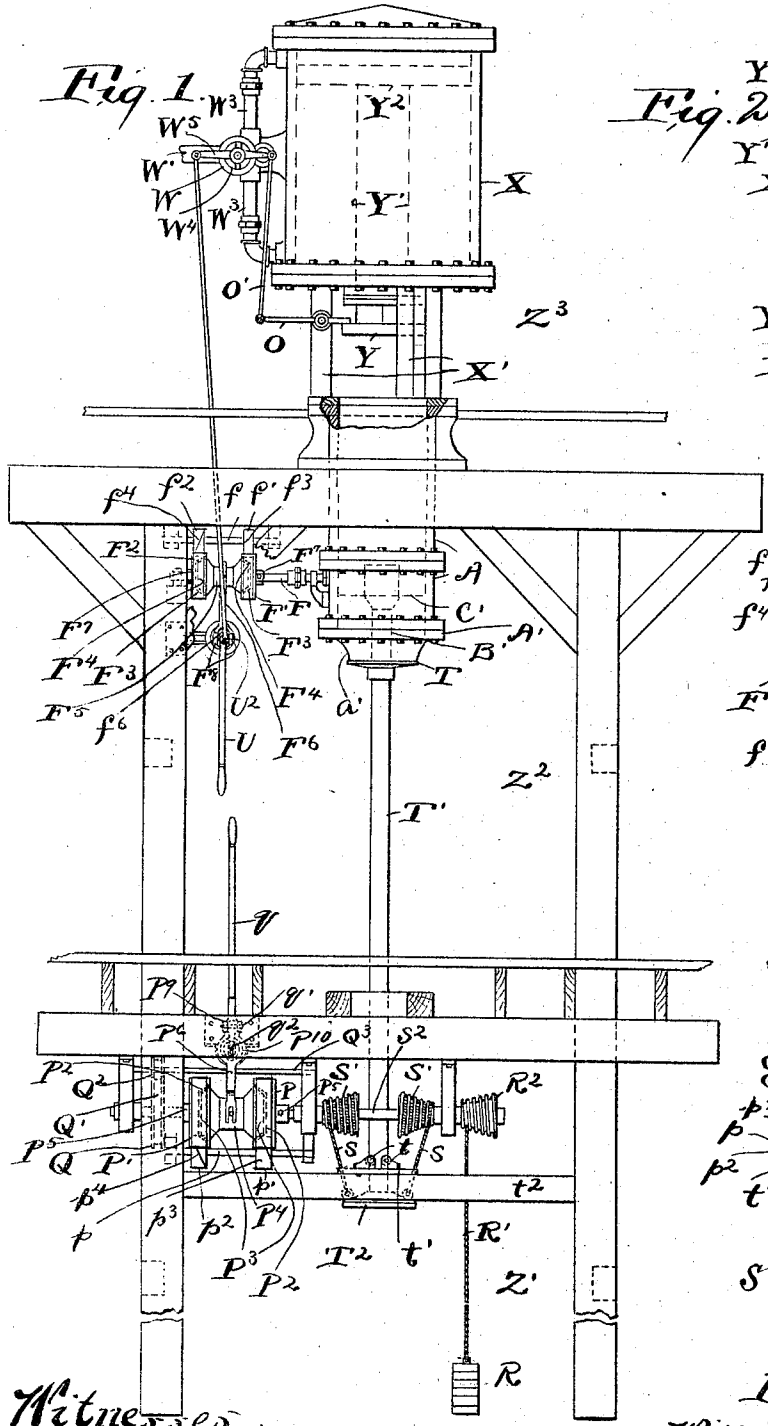
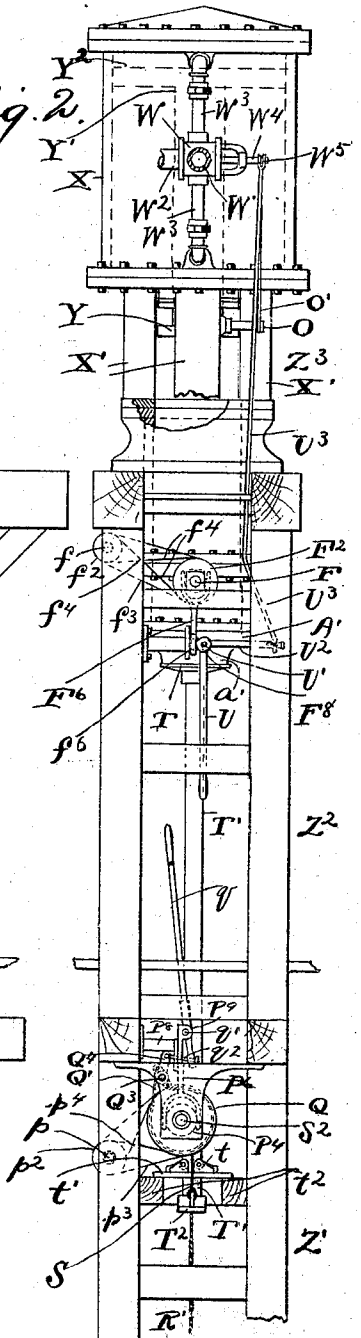


Fig. 2.



Witnesses
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Ella E. Tilden

Inventor
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By Lyon, Lynch, Dorer & Donnelly
his attorneys

(No Model.) 3 Sheets—Sheet 2.

# W. W. WALLACE.

## MACHINE FOR MANUFACTURING SEWER PIPE.

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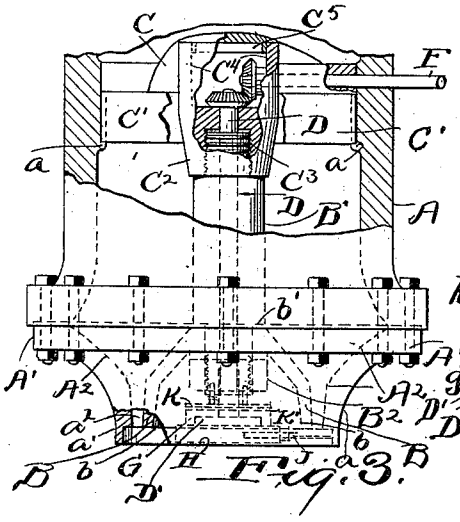


Fig. 3.

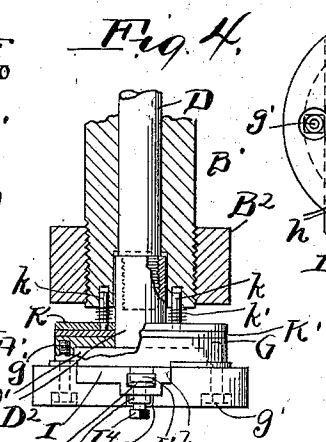


Fig. 4.

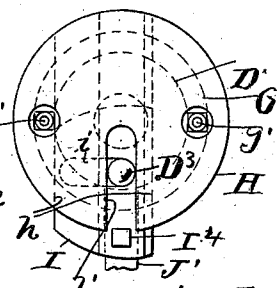


Fig. 5.

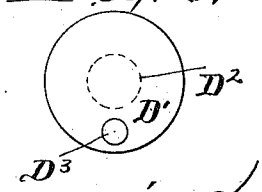


Fig. 6.

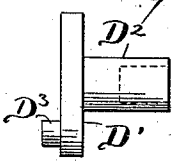


Fig. 7.

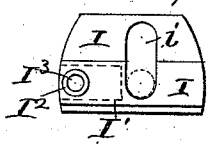
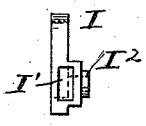


Fig. 10.



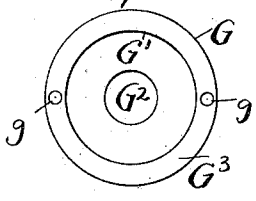


Fig. 8.

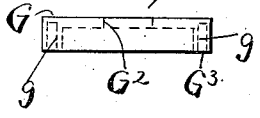


Fig. 9.

Fig. 11.

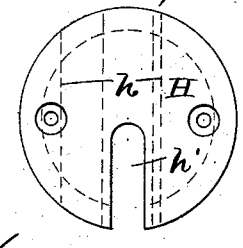


Fig. 12.

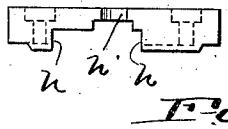


Fig. 13.

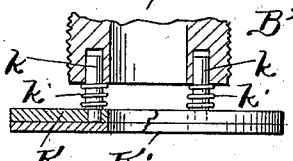


Fig. 14.

Witnesses.
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Ella E. Tilden

Inventor.
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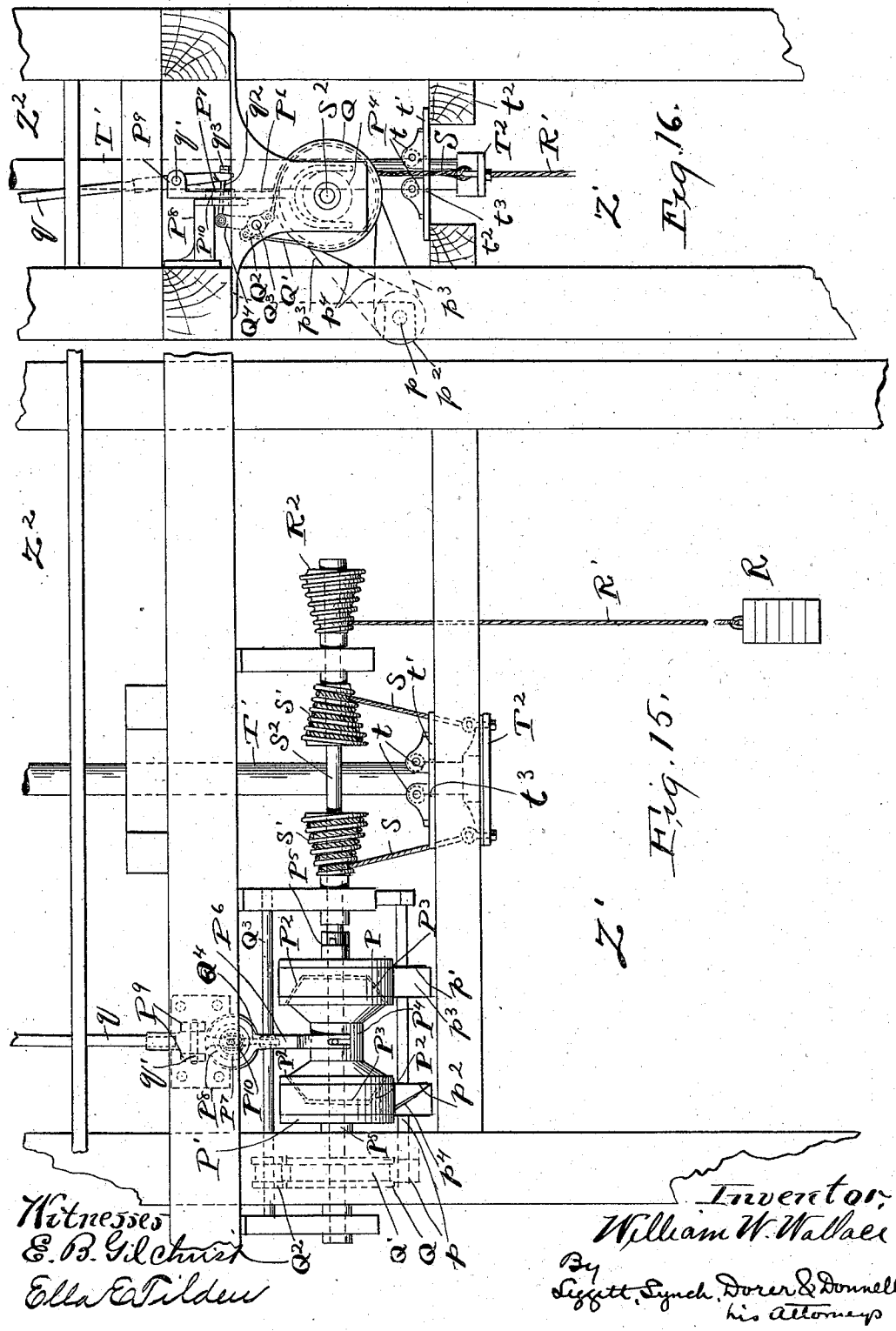
his Attorneys

(No Model.) 3 Sheets—Sheet 3.

# W. W. WALLACE.

## MACHINE FOR MANUFACTURING SEWER PIPE.

No. 555,838. Patented Mar. 3, 1896.



Witnesses
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Ella E. Tilden

Inventor:
William W. Wallace.
By Liggett, Lynch, Dorer & Donnelly
his attorneys

# UNITED STATES PATENT OFFICE.

WILLIAM W. WALLACE, OF WILLOUGHBY, OHIO, ASSIGNOR TO J. W. PENFIELD & SON, OF SAME PLACE.

## MACHINE FOR MANUFACTURING SEWER-PIPE.

SPECIFICATION forming part of Letters Patent No. 555,838, dated March 3, 1896.

Application filed January 2, 1896. Serial No. 574,021. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM W. WALLACE, of Willoughby, Lake county, Ohio, have invented certain new and useful Improvements in Sewer-Pipe, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in apparatus for making sewer-pipe and other tubular clay products, and more especially to an apparatus employing the press and cut-off mechanism disclosed in United States Letters Patent No. 526,274, granted to me September 18, 1894.

The object of my present invention is to render the construction of the apparatus simple and durable and especially convenient for the operator and to enable the latter, by means of one hand-lever, to operate the valve of the steam-chest and to effect the reversal of the cutter and to enable the operator, by means of another hand-lever within his convenient reach, to effect the reversal of the shaft employed in reciprocating the pipe-bearing table and for effecting the application of the brake instrumental in arresting the rotation of said shaft.

With this object in view, and to the end of realizing certain other advantages hereinafter specified, my invention consists in certain features of construction and combinations of parts, hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 shows three stories of a building provided with my improved apparatus for manufacturing sewer-pipe and other tubular clay products, and Fig. 2 is a left-hand side elevation relative to Fig. 1 of said apparatus. Portions are broken away and in section in said figures to more clearly show the construction. Figs. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14, appearing on Sheet 2 of the drawings, illustrate the cut-off mechanism disclosed in the Letters Patent hereinbefore referred to. Fig. 3 is a side elevation, partly in section, of a portion of the clay-receiving or press cylinder die at the lower end of said cylinder and cut-off mechanism. Figs. 4 and 5 are enlarged side elevations, partly in section, and a bottom plan, respectively, of the knife-head and attachments and adjacent members. Figs. 6 and 7 are end and side elevations, respectively, of the crank. Figs. 8 and 9 are plan and side elevations, respectively, of disk G. Figs. 10 and 11 are plan and end elevations, respectively, of slide I. Figs. 12 and 13 exhibit a bottom plan and corresponding elevation of cap H. Fig. 14 is a side elevation, partly in section, showing a friction-brake employed. Figs. 15 and 16 are side elevations, taken at right angles to each other, of the mechanism employed in effecting the reversal of the shaft instrumental in reciprocating the pipe-bearing table, and also shows a brake instrumental in arresting the rotation of said shaft.

Referring to Figs. 1 and 2 of the drawings, Z′, $Z^2$, and $Z^3$ represent three stories of a building. Z′ designates the first or lower story, $Z^3$ the upper or third story, and $Z^2$ the second or middle story. An upright and suitably-supported clay-receiving or press cylinder A extends through the ceiling of the middle story and floor of the upper or third story of the building, and, as shown in Fig. 3 on Sheet 2 of the drawings, the lower end of cylinder A has an internal shoulder *a* and is provided at its lower end with a removable head A′. Said head has a large downwardly and annularly flanged central opening, $A^2$, the flange *a′* whereof flares upwardly, as shown, and serves as the die that gives shape and size to the exterior of the sewer-pipe or other product of the machine.

B represents the core that gives the internal shape and size to the product, said core at its outer end having an external diameter sufficiently smaller than the internal diameter of the flange *a′* to form an annular opening or passage-way $a^2$ through which the clay is forced. For supporting the core is provided, first, a spider C that is provided with a rim C′ that rests on shoulder *a* aforesaid. The hub $C^2$ of the spider has a vertical bore $C^3$, whose lower portion is screw-threaded for engaging the reduced screw-threaded upper end of the core-bar B′. The core is chambered, as at *b*, and the chamber is open at its lower end, and the reduced screw-threaded lower

end of bar B′ extends through a vertical centrally-located hole in the core, and a nut $B^2$ is mounted upon said screw-threaded portion of the core-bar against the top wall of chamber *b* of the core and secures the core when the latter is in position engaging the shoulder *b′* formed upon the core-bar by the reduction of the lower end of said bar. By removing nut $B^2$ the core can be removed and another core substituted, as would be the case if a die of different size were to be used. Bar B′ has a central bore extending from end to end thereof to accommodate shaft D, and one of the spider-arms has a horizontal radial bore that accommodates the shaft F. The two shafts D and F are intergeared, as shown, and the upper portion of hub $C^2$ is counterbored or chambered, as at $C^4$, to accommodate the gears. A cap $C^5$ is also provided to keep the mud or clay out of chamber $C^4$. Shaft D is provided with a crank-wheel or crank D′, the hub $D^2$ whereof has preferably a screw-threaded bore engaged by the correspondingly-threaded lower end of the shaft proper. The crank or crank-disk is shown detached in Figs. 6 and 7, and $D^3$ designates the wrist-pin of the same.

G represents a horizontal disk. (Shown detached in Figs. 8 and 9.) The back or upper face of the disk is flat, and the lower face of the disk is recessed, as at G′, to receive with an easy fit the crank or crank-wheel D′, (see Figs. 3, 4, and 5,) disk G having a central bore $G^2$ to receive the hub of the crank-wheel. When the parts are assembled only wrist $D^3$ extends below rim $G^3$ of disk G, and disk G rests upon, and has no other support than, the crank-wheel, and, according to circumstances hereinafter mentioned, disk G may or may not revolve with the crank. Rim $G^3$ of disk G is provided with bolt-holes *g* for receiving bolts or screws *g′* that secure cap H to the under side of disk G. Disk G and cap H constitute the knife-head. Cap H, that is shown detached in Figs. 12 and 13, has a recess *h* extending across the inner face thereof, in which recess operates the slide I. (Shown detached in Figs. 10 and 11.) Slide I is adapted to reciprocate endwise of recess *h*. Slide I has a socket I′ arranged lengthwise of the slide, and said socket receives the shank J′ of knife J, that is shown more clearly in Figs. 3, 4, and 5. The outer wall of socket I′ is reinforced by a boss $I^2$. A screw-threaded hole $I^3$ extends through the boss and socket-wall for receiving the set-screw $I^4$ that secures the knife, and cap H has a slot *h* for accommodating said boss and set-screw. The slide has a transverse slot *i* in which operates the crank-wrist $D^3$. Slot *i* is only long enough to permit the crank to make a half-revolution in the one direction or the other without revolving the knife-head.

The arrangement of parts is such that a half-revolution of the crank in one direction thrusts the knife out to the point shown in dotted lines, Fig. 3, thereby causing the knife to pierce the opposing wall of the sewer-pipe, and the knife being retained in such distended position a revolution of the knife will cause the knife to sever the pipe. Next, if the movement of the crank be reversed, the first half-revolution of the crank will move the slide and knife back to the place of beginning; but the knife-head being, as aforesaid, supported from the crank-disk, would revolve without the crank easier than the slide would move endwise. Hence there must be provided some means for holding the knife-head from revolving until the knife-bearing slide has been actuated. For this purpose I provide a brake constructed and arranged as follows:

K designates a disk, (see Figs. 3, 4, and 14,) supposed to have the same diameter as disk G. Disk K is mounted loosely on pins or members *k* that depend from the lower end of the stationary core-bar B′.

K′ represents a disk of leather or other suitable material interposed between disks G and K. Around pins *k* are coiled springs *k′*, the tension whereof acts downwardly against disk K and causes sufficient friction on disk K′ to hold the knife-head from revolving during the first half-revolution of the crank. The crank having made a half-revolution in either direction, the wrist $D^3$ of the crank will have engaged an end wall of slot *i*, after which the crank must either stop or cause the knife-head to revolve, and as there is nothing to prevent the knife-head from revolving except the slight friction aforesaid and the resistance of the knife-blade in the clay the result is the knife-head revolves with and is driven by the crank so long as the power that drives the knife-head is applied.

From the foregoing it will be understood that the driving device for the knife-head should be of such construction that the operator can start, stop, and reverse the knife-head instantly at will, and for this purpose I employ the following: Two pulleys F′ and $F^2$ are loosely mounted upon shaft F a suitable distance apart. Said pulleys are driven in opposite directions, and motion is communicated to the pulleys in any approved manner from a suitably-supported counter-shaft *f* by two pulleys *f′* $f^2$ operatively mounted upon said counter-shaft and operatively connected by an uncrossed belt $f^3$ and a crossed belt $f^4$, respectively, with pulleys F′ $F^2$, respectively. Friction-clutches are employed for establishing operative connection between pulleys F′, $F^2$, and shaft F, and said shaft F, and consequently the cutter, is actuated in the one direction or the other according as pulley F′ or pulley $F^2$ is operatively connected with the shaft, and when one of said pulleys is operatively connected with the shaft and the motion of the cutter is to be reversed operative connection between said pulley and the shaft is interrupted and the other pulley is operatively connected with the shaft.

One member, $F^3$, of each clutch is formed in the respective pulley, and the companion

member $F^4$ of each clutch is operatively and slidably mounted upon the shaft in any approved manner. A collar $F^5$ is interposed between members $F^4$ of the clutches, and the arrangement of parts is such that when said collar is in its intermediate position members $F^4$ of the clutches are frictionally released from the companion members $F^3$ of the clutches, and frictional engagement between the members of the one clutch or the other is established according as collar $F^5$ is slid endwise upon the shaft in the one direction or the other, and of course it is obvious that pulley $F'$, rotating in the one direction, or pulley $F^2$ rotating in the opposite direction, will be operatively connected with the supporting-shaft according as one or the other clutch is rendered operative. An upright clutch-lever $F^6$ has its upper or forked end operatively connected with collar $F^5$, and is fulcrumed preferably horizontally and at right angles to the axis of the aforesaid collar at $f^6$ to any stationary object, and the one or the other clutch is rendered operative or inoperative by actuating lever $F^6$ upon its fulcrum $f^6$ in the direction required. Collars $F^7$, fixed upon shaft F, prevent displacement of the pulleys in establishing operative connection between the pulleys and shaft.

Cylinder A is open at its upper end, at which the clay is introduced, (see Figs. 1 and 2,) and the clay received by the cylinder is compressed and forced downwardly by means of a plunger or piston Y that is adapted to enter and operate endwise of the upper portion of said cylinder, and is rigid or operatively connected with the rod or stem $Y'$ of a piston $Y^2$ arranged and operating within a steam-cylinder X suitably supported a suitable distance above the clay-receiving or press cylinder. Any suitable number fo standards $X'$ are interposed between the lower head of the steam-cylinder and the upper end of the press-cylinder, and the clay is introduced into the press-cylinder at the spaces had between said standards. A steam-chest W is located at one side of and suitably supported from the steam-cylinder, preferably midway between the heads of said cylinder. Steam-chest W is provided in the usual manner with a steam-supply pipe $W'$ and an exhaust-pipe $W^2$.

$W^3$ represents the two steam-pipes leading from the steam-chest and communicating with opposite ends, respectively, of the chamber of the steam-cylinder. A suitably-constructed oscillating valve $W^4$ of any well-known construction is provided within the steam-chest for controlling the supply of steam to the cylinder and for admitting steam to opposite ends of the chamber of the cylinder alternately. Steam-chests having oscillating valves are too well known to require illustration or more extended description. Suffice it to state that piston $Y^2$ is actuated in the one direction or the other according as steam is admitted into the one or the other end of the cylinder-chamber, and that the clay-compressing piston or plunger is actuated downwardly or elevated according as the piston in the steam-cylinder is actuated downwardly or upwardly. One of the trunnions of the steam-chest valve extends outside of the steam-chest, and externally of the chest is provided with a vertically-tilting lever $W^5$ operatively connected at or near its central portion with said trunnion.

U designates an upright hand-lever within convenient reach of the operator. Lever U is not only operatively connected with clutch-lever $F^6$, but is also operatively connected with valve-lever $W^5$, and hence the clutch-lever and valve-lever are operated by the same hand-lever. Clutch-lever $F^6$ at its lower or fulcrumed end is provided with two laterally-projecting lugs or ears $F^8$ (see Fig. 1) arranged at opposite sides, respectively, of the fulcrum. Hand-lever U is shown horizontally fulcrumed at its upper end at $U'$ (see Fig. 2) to and between ears $F^8$. The fulcrum of the hand-lever is coincident with and arranged at right angles to the fulcrum of the clutch-lever. The interposition of the upper end of the hand-lever between the aforesaid ears on the clutch-lever establishes operative connection between said levers, so far as the actuation of the clutch-lever by means of the hand-lever is concerned. Hand-lever U at its upper end has a laterally-projecting arm $U^2$ arranged at right angles, or approximately at right angles, with the hand-lever, and in conjunction with the hand-lever forming a bell-crank lever, and lever-arm $U^2$ at its outer end is operatively connected by means of a rod $U^3$ with one end of valve-lever $W^5$, and it is obvious that the valve-lever is actuated in the one direction or the other according as hand-lever U is actuated upon its fulcrum in the one or the other direction. Hence it will be observed that the valve of the steam-chest and clutch-lever $F^6$ are operatively connected in an exceedingly simple manner with one hand-lever. A swivel-joint is employed between rod $U^3$ and lever-arm $U^2$, so that the actuation of hand-lever U in operating the clutch-lever will not actuate said rod.

The pipe discharged from the die at the lower end of the clay-receiving or press cylinder engages the upper surface of a vertically-reciprocated horizontally-arranged table T, that is rigid with or operatively connected in any approved manner with the upper end of an upright vertically-reciprocating rod or bar $T'$, that extends downwardly through the floor of the second or middle story and through the ceiling of the first or lower story of the building and is engaged a suitable distance above its lower extremity by a series of suitably-supported guide-rollers $t$, suitably arranged in the same horizontal plane about the external surface of the table-bearing bar or rod. In the case illustrated guide-rollers $t$ are supported from a horizontally-arranged plate $t'$, supported from horizontally-

arranged stationary beams or timbers $t^2$. (See Figs. 15 and 16.)

Rod or bar T′ extends downwardly through a hole $t^3$ (shown in dotted lines) in plate $t'$, and at its lower extremity, below said plate, terminates in a cross bar or head $T^2$. Two cables S S are suitably attached to opposite ends, respectively, of bar or head $T^2$. Cables S S lead upwardly from head or bar $T^2$ and at their opposite ends engage conical drums S′ S′, respectively, operatively mounted a suitable distance apart upon a suitably-supported shaft $S^2$, arranged horizontally at any suitable point, preferably between the series of guide-rollers $t$ and the ceiling above. Drums $S^2$ are grooved or corrugated spirally and circumferentially upon their external peripheries, and the engaging cables are arranged to wind upon the drums in said grooves or corrugations. The two drums S′ S′ are arranged with their diametrically-larger ends *vis-à-vis*, and the arrangement of parts is such that both cables S S shall simultaneously wind upon or be paid out by the drums, and shall commence to wind upon the larger ends of the drums and shall be paid out by the drums from the smaller ends of the drums, and the arrangement of parts is furthermore such that in the manufacture of pipe shaft $S^2$ is rotated in the direction required to cause drums S′ to pay out the engaging cables and thereby effect the reciprocation of the table-bearing rod or bar in the direction required to accommodate the discharge of the pipe from the press, and when the desired length of pipe has been discharged and severed from the remaining clay within the press-cylinder shaft $S^2$ is rotated in the opposite direction to cause drums S′ S′ to wind up the engaging cables, and thereby elevate or guide the table-bearing rod or bar in the direction required to elevate or move the table borne thereby in the direction of the discharging end of the cylinder. Table T is preferably moved slower as it approaches the discharging end of the press-cylinder, and I effect the desired retardation in the movement of the table in the direction indicated by means of the conical winding-drums, and by means of the corrugations and correspondence of the two drums uniformity in the actuation of and equal distribution of the load between the two cables is obtained.

The table-bearing rod or bar is counterbalanced by a weight R attached to one end of the cable R′, that at its opposite end operatively engages a winding-drum $R^2$ operatively mounted upon shaft $S^2$. The weight-bearing drum corresponds in shape and dimensions with the aforesaid cable-actuating drums—that is, is conical and provided with external spiral and circumferential grooves or corrugations for receiving the engaging cable. The weight-bearing drum is arranged in suitable proximity to the diametrically-smaller end of one of the cable-actuating drums and is arranged with its smaller end adjacent to the respective cable-actuating drum, and the arrangement of parts is such that the table-bearing rod or bar shall be properly counterbalanced in any position thereof, and consequently the weight-engaging cable is arranged to wind upon the engaging drum from the smaller end of the drum and is paid out from said drum from the larger toward the smaller end of the drum.

The means employed for effecting the rotation of the drum-bearing shaft comprises two pulleys P P′ (see Fig. 15) driven in opposite directions, respectively, and loosely mounted upon the drum-bearing shaft a suitable distance apart. Motion is communicated to said pulleys from a counter-shaft $p$ by means of two pulleys $p'$ $p^2$ operatively mounted upon the counter-shaft. An uncrossed belt $p^3$ operatively connects pulley $p'$ with pulley P, and a crossed belt $p^4$ operatively connects pulley P′ with pulley $p^2$.

Clutches are employed for establishing and interrupting operative connection between pulleys P P′ and the drum-bearing shaft. Friction-clutches are shown provided in the case illustrated. One member, $P^2$, of each clutch is formed in the respective pulley, and the other clutch member, $P^3$, of each clutch is operatively and slidably mounted, in any approved manner, upon the shaft. A collar $P^4$ is loosely mounted upon the shaft between the movable or slidable members of the clutches. In the intermediate position of this collar the movable clutch members are released from frictional engagement with the stationary clutch members, and frictional engagement is established and interrupted between the members of the one clutch or the other, according as collar $P^4$ is shifted endwise in the one or the other direction. Collars $P^5$, rigid upon the shaft, prevent endwise displacement of the pulleys in rendering the clutches operative. It is obvious that the drum-bearing shaft will be rotated in the one direction or the other according as operative connection between said shaft and the one or the other pulley is established. An upright clutch-lever $P^6$ has its lower end forked and operatively connected with collar $P^4$ in any approved manner. Clutch-lever $P^6$ is horizontally fulcrumed at or near its upper end to any stationary object—such, for instance, as a horizontally-arranged lug $P^7$ of a stationary bracket $P^8$. (See Fig. 16.)

A brake-wheel Q, instrumental in arresting the operation of the drum-bearing shaft, is operatively mounted upon said shaft in suitable proximity to one of the pulleys upon the shaft.

Q′ designates the band that traverses and extends circumferentially of the peripheral surface of the brake-wheel, and the two ends of said band are suitably attached to opposite ends, respectively, of a suitably-supported tilting lever $Q^2$, by actuating which in the one direction or the other the brake-band is tightened or loosened upon the brake-wheel.

The brake-band-engaging lever in the case illustrated is operatively mounted upon the horizontally-arranged shaft $Q^3$, located a suitable distance above the drum-bearing shaft. An upright hand-lever $q$, within convenient reach of the operator, is instrumental in operating the clutch-lever and is also instrumental in operating the brake-band. Said hand-lever is, therefore, fulcrumed near its lower end at $q'$ a suitable distance above and at right angles to the fulcrum of the clutch-lever to and between the pair of lugs or ears $P^9$ formed upon the upper end of the clutch-lever, and the interposition of the hand-lever between said ears on the clutch-lever establishes operative connection between the two levers, as required, to operate the clutch-lever through the medium of the hand-lever.

The hand-lever (see Fig. 16) extends a suitable distance below its fulcrum and at its lower end is operatively connected by means of a link $q^2$ with an upright arm or lever $Q^4$ operatively mounted upon the brake-band-lever shaft. Link $q^2$ at or near its end located farthest from lever-arm $Q^4$ is provided with an external shoulder or collar $q^3$, whose inner end is adapted to be engaged by the lower end of the hand-lever. When, therefore, the hand-lever is tilted upon its fulcrum to move its lower extremity in the direction of the collar-bearing end of link $q^2$, lever-arm $Q^4$ and the connected brake-band-engaging lever are actuated in the direction required to tighten the brake-band upon the brake-wheel, and when the hand-lever is released the brake-band, of course, is released relative to the brake-wheel.

To avoid application of the brake-band during the operation of the hand-lever in rendering one of the aforesaid clutches operative, the link $q^2$ that connects said lever with the lever $Q^4$ of the brake mechanism extends centrally through a hole $P^{10}$ (shown in dotted lines, Figs. 15 and 16) in the lug or bearing $P^7$, upon which the clutch-lever is fulcrumed. It will, therefore, be observed that one and the same hand-lever answers for the operation of the brake-band and the clutches employed in establishing operative connection between the drum-bearing shaft and the one or the other pulley upon said shaft.

Concluding, I would remark that the clay employed in the manufacture of pipe should be thoroughly ground and sufficient water should be incorporated therewith, so that the clay will have a consistency most desirable for molding into pipe. In the normal position of parts—that is, while the cylinder of the pipe-press is being supplied with clay—the plunger or piston employed for compressing the clay within said cylinder and for forcing the clay downwardly through the die or mold formed at the lower end of the cylinder to form a pipe-section is within the upper portion of the space had between the press-cylinder and the steam-cylinder, and the piston in the steam-cylinder is in the upper portion of said cylinder. As soon as the press-cylinder is properly charged with clay the operator effects the actuation of the valve within the steam-chest in the direction required to admit steam into the upper portion of the steam-cylinder and thereby drives the piston within said cylinder downwardly and causes the plunger or piston adapted to operate upon the clay to enter and operate upon the clay within the press-cylinder. The press piston or plunger is allowed to descend until enough pipe has issued from the die or mold at the lower end of said cylinder for one length of pipe. If there is not enough clay remaining in the clay-cylinder for another length of pipe the operator gives the reverse movement to the valve within the steam-chest so as to cut off the supply of steam to the upper half of the steam-cylinder and admit steam to the lower half of said cylinder, and thereby effect the withdrawal of the piston or plunger from the press-cylinder and accommodate a recharging of said cylinder with more clay, and as soon as said plunger or piston has been elevated the distance required to accommodate the introduction of more clay into the press-cylinder the supply of steam to the lower half of the steam-cylinder is automatically cut off by the actuation of the valve in the steam-chest in the opposite direction, and this reversal of the valve is automatically accomplished by a vertically-tilting lever O, whose one arm (see Figs. 1 and 2) is adapted to be engaged by the upper face of the piston or plunger of the pipe-press and whose opposite end is operatively connected by means of an upwardly-extending link or rod O′ with the other end of valve-lever $W^5$, and hence when the pipe-press piston or plunger has upon its elevation from the press-cylinder come into engagement with lever O a further elevation of said plunger or piston will actuate said lever in the direction required to effect the reversal of the valve in the valve-chest, so as to cut off the supply of steam to the steam-cylinder and cause the piston within the steam-cylinder and the pipe-press piston or plunger to come to a standstill. If, however, after plunging out one length of pipe enough clay remains in the cylinder for one or more additional lengths of pipe, the operator only actuates the valve of the steam-chest into an intermediate position, in which position steam is cut off altogether from the steam-cylinder, and the steam-cylinder piston and the press piston or plunger are kept at a standstill until the pipe already made is cut off or severed from the clay remaining in the pipe-press cylinder by the cut-off mechanism hereinbefore described, and when this completed length of pipe has been removed the valve in the steam-chest is again actuated in the direction required to admit steam into the upper half of the steam-cylinder, when the operation is repeated. The pipe as it emerges from the die or mold of the press-cylinder rests upon the table or follower T.

A stationary index or pointer (not shown) should be provided upon the second or middle floor near the pipe-table bearing-rod to enable the operator to see when a length of pipe has issued from the mold or die.

What I claim is—

1. In apparatus of the character indicated, the combination with the valve of the steam-chest; knife or cutter; reversible shaft operatively connected with the cutter, and mechanism for reversing the rotation of said shaft; of a hand-lever operatively connected with said reversing mechanism and the aforesaid valve in such a manner that the valve or reversing mechanism is actuated according as said lever is swung in the one or the other of two planes arranged at right angles to each other, substantially as set forth.

2. In apparatus of the character indicated, the combination with the valve of the steam-chest, and clutch-lever instrumental in effecting the reversal of the cutter-shaft; of a hand-lever fulcrumed to the clutch-lever at right angles to the fulcrum of the clutch-lever, said hand-lever, at its fulcrum, being provided with a laterally-projecting arm and a link or rod operatively connected, at one end, with said lever-arm, and operatively connected, at its opposite end, with the aforesaid valve, and the arrangement of parts being such that the valve or the clutch-lever shall be operated according as the hand-lever is swung in the one or the other of two planes arranged at right angles to each other, substantially as set forth.

3. In apparatus of the character indicated, the combination with the valve of the steam-chest, and clutch-lever instrumental in effecting the reversal of the cutter-shaft and provided with two ears arranged parallel with and at opposite sides, respectively, of its fulcrum; of a hand-lever fulcrumed to and between said ears at right angles to the fulcrum of the clutch-lever and provided, at its fulcrum, with a laterally-projecting arm, and the link or rod operatively connected, at one end, and by means of a swivel-joint, with said hand-lever arm, and operatively connected, at its opposite end, with the aforesaid valve, all arranged and operating, substantially as shown, for the purpose specified.

4. In apparatus of the character indicated, the combination with the press-cylinder and a reciprocating rod or bar arranged in line with the press and provided, at the end adjacent to the press, with a table adapted to be engaged by the pipe discharged from the press; of the suitably-actuated drum-bearing shaft, means for reversing the rotation of said shaft; two corresponding conical drums operatively mounted upon said shaft a suitable distance apart and provided, upon their periphery, with circumferential spiral grooves or corrugations; cables engaging said drums at one end end and operatively connected, at their opposite ends, with the aforesaid cable-bearing bar or rod, the arrangement of parts being such that the drums shall commence to pay out the engaging cables at their smaller ends, and shall commence to wind up the engaging cables at their larger ends; another conical and spirally and circumferentially grooved drum operatively mounted upon the drum-bearing shaft; a counterbalancing-weight-bearing cable engaging said additional drum, and the weighted cable-engaging drum being engaged to wind up the engaging cable at its smaller end and commence to pay out the cable at its larger end, substantially as shown, for the purpose specified.

5. In apparatus of the character indicated, the combination with the press-cylinder; a reciprocating rod or bar arranged in line with the press and provided, at the end adjacent to the press, with a table adapted to be engaged by the pipe discharged from the press; the suitably-actuated drum-bearing shaft; means for reversing the rotation of said shaft; a brake-wheel upon the reversible shaft, and brake-band adapted to frictionally engage the peripheral surface of said wheel and thereby be instrumental in arresting the operation of the shaft; of a hand-lever operatively connected with the brake-band and the aforesaid reversing mechanism in such a manner that the reversing mechanism or the brake-band shall be operated according as the lever is actuated in the one or the other of two planes arranged at right angles to each other, substantially as set forth.

6. In apparatus of the character indicated, the combination with the press-cylinder; a reciprocating rod or bar arranged in line with the press and provided, at the end adjacent to the press, with a table adapted to be engaged by the pipe discharged from the press; the suitably-actuated drum-bearing shaft; two pulleys loosely mounted upon the shaft; means for rotating said pulleys in opposite directions, respectively; a clutch for each pulley for establishing and interrupting operative connection between the pulley and the shaft, the clutch-lever instrumental in establishing and interrupting operative connection between the companion members of the clutches; a brake-wheel upon the pulley-bearing shaft; a band adapted to frictionally engage the peripheral surface of said wheel; of a hand-lever fulcrumed to the clutch-lever at right angles to the fulcrum of the clutch-lever, and mechanism operatively connecting said hand-lever with the brake-band, and the arrangement of parts being such that the clutch-lever or the brake-band shall be operated according as the hand-lever is actuated in the one or the other of two planes arranged at right angles to each other, substantially as set forth.

7. In apparatus of the character indicated, the combination with the press-cylinder; a reciprocating rod or bar arranged in line with the press and provided, at the end adjacent to the press, with a table adapted to be engaged by the pipe discharged from the press;

the suitably-actuated drum-bearing shaft; the two pulleys loosely mounted upon the shaft, means for rotating said pulleys in opposite directions, respectively; a clutch for each pulley for establishing and interrupting operative connection between the pulley and the shaft; the clutch-lever instrumental in establishing and interrupting operative engagement between the companion clutch members; the brake-wheel upon the pulley-bearing shaft, and the band adapted to frictionally engage the peripheral surface of said wheel; of the hand-lever fulcrumed to the clutch-lever at right angles to the fulcrum of the clutch-lever; another shaft arranged parallel, or approximately parallel, with the pulley-bearing shaft; a tilting lever operatively mounted upon said other shaft and having its opposite ends suitably attached to opposite ends, respectively, of the brake-band; another lever operatively mounted upon the brake-band-operating shaft; a link operatively connected with the outer end of said last-mentioned lever and extending centrally through the fulcrum of the clutch-lever and provided with an external shoulder or collar adapted to be engaged by the lower end of the hand-lever in actuating the lower end of said lever outwardly from the fulcrum of the clutch-lever, all arranged and operating substantially as shown, for the purpose specified.

In testimony whereof I sign this specification, in the presence of two witnesses, this 25th day of November, 1895.

WILLIAM W. WALLACE.

Witnesses:
ELLA E. TILDEN,
C. H. DORER.