

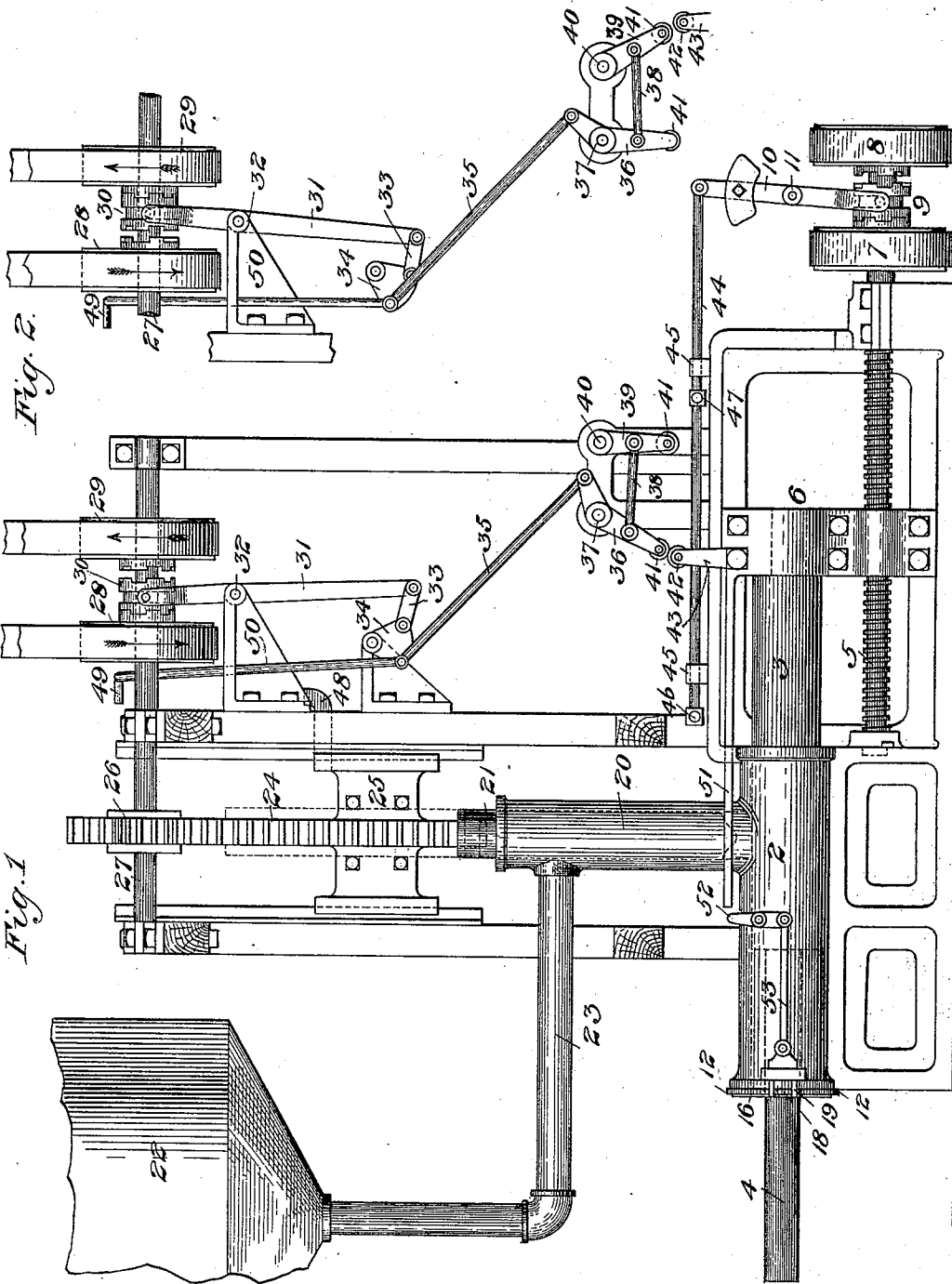
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3 Sheets—Sheet 1.

J. PETERS.
MACHINE FOR MAKING PAPER PIPES.

No. 465,414.

Patented Dec. 15, 1891.



Witnesses
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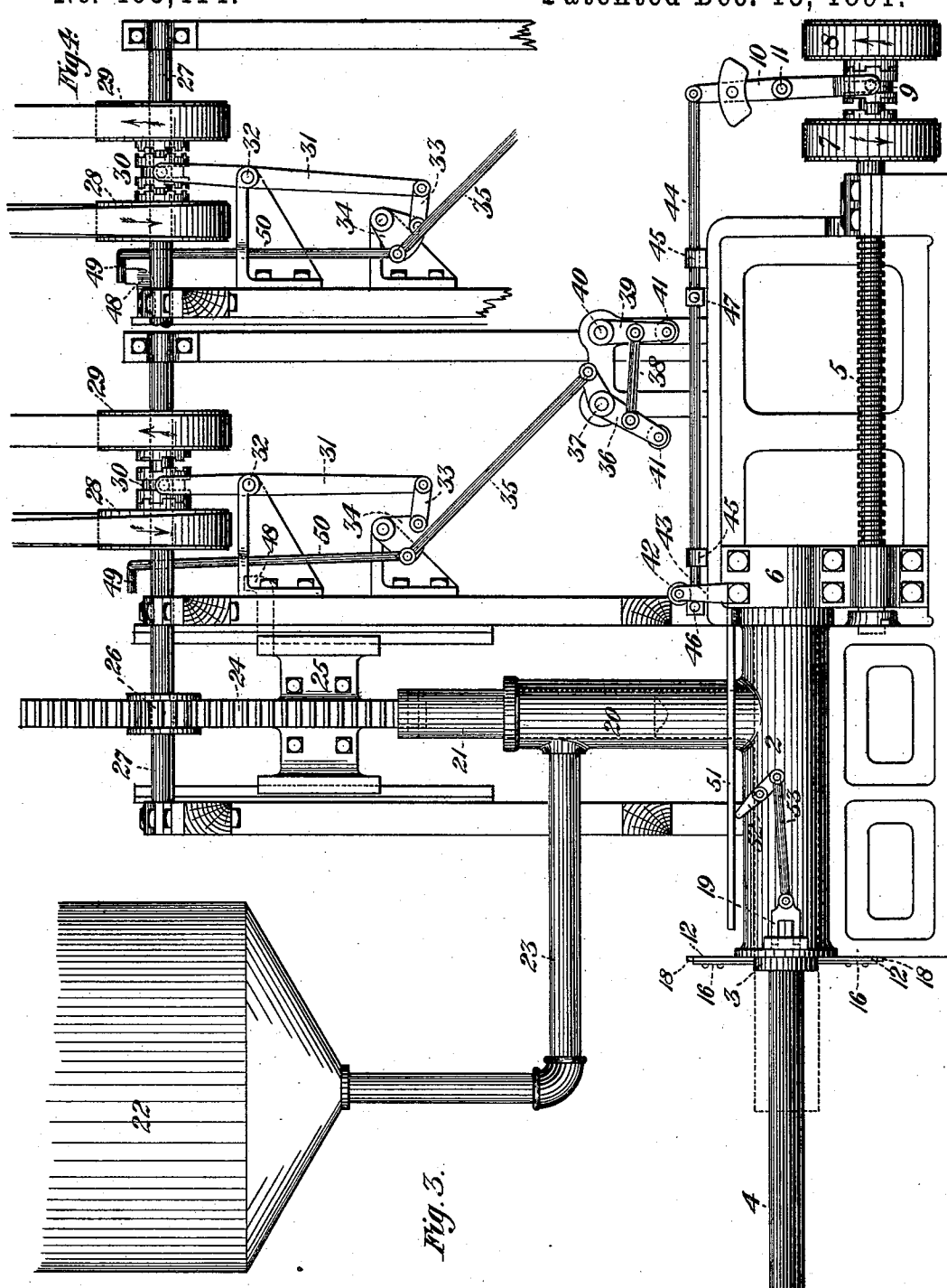
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WITNESSES.

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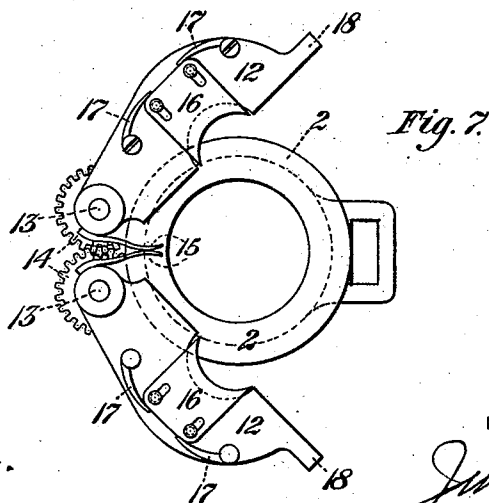
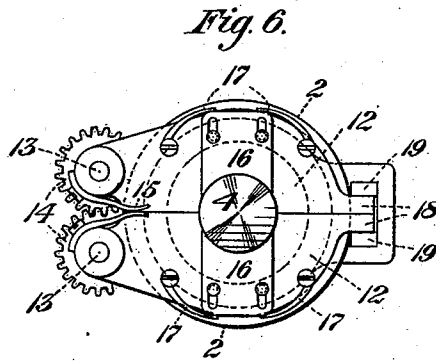
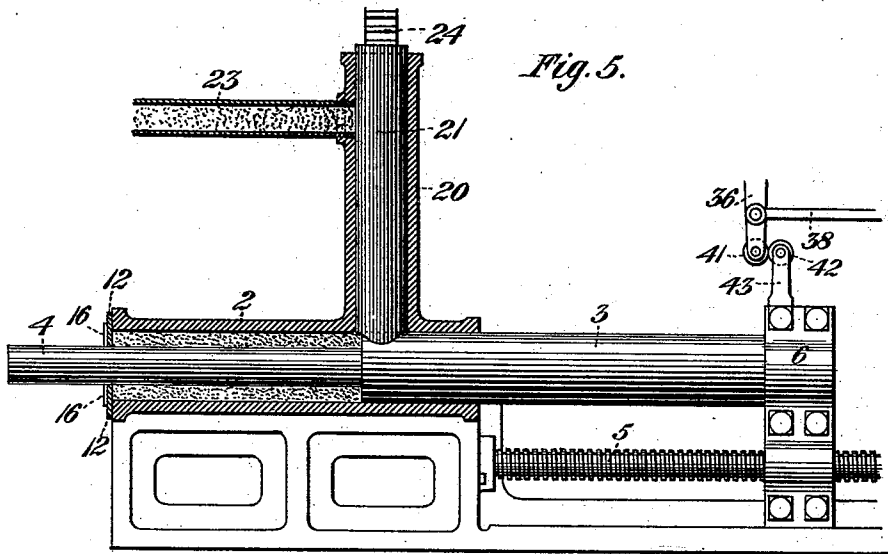
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MACHINE FOR MAKING PAPER PIPES.

SPECIFICATION forming part of Letters Patent No. 465,414, dated December 15, 1891.

Application filed March 9, 1891. Serial No. 384,203. (No model.)

To all whom it may concern:

Be it known that I, JAMES PETERS, of Latrobe, in the county of Westmoreland and State of Pennsylvania, have invented a new and useful Improvement in Machines for Making Paper Pipes, of which the following is a full, clear, and exact description.

The object of my invention is to provide means for making pipes from paper-pulp. Such pipes are intended for use as non-heat-conducting coverings for steam-conducting pipes and for other purposes. They are made from paper-pulp stock, which, being compressed so as to compact it and to expel the moisture, makes a very substantial pipe.

I shall now describe my improvement with reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved machine. Fig. 2 is a detail view showing the clutch-operating levers and clutch in a different position. Fig. 3 is a view similar to Fig. 1, showing the pipe-making plunger at the end of its stroke. Fig. 4 is a detail view similar to Fig. 2, showing the clutch out of gear. Fig. 5 is a vertical sectional view of the pipe-forming plunger and cylinder, showing the plunger at the point of cutting off communication between the forming-cylinder and the feed-cylinder. Fig. 6 is an end elevation of part of Fig. 5, showing the stop-gates at the end of the forming-cylinder closed. Fig. 7 is a similar view showing the gates open.

Like symbols of reference indicate like parts in each.

In the drawings, 2 represents the forming-cylinder of the machine, having a longitudinally-movable plunger 3 provided with a rod or mandrel 4, which extends axially through the cylinder and is of smaller diameter than the plunger and cylinder, so as to constitute a core around which the pipe is formed. The plunger 3 is moved longitudinally by suitable mechanism, preferably by a screw-shaft 5, which works in a threaded nut in a cross-head 6, attached to the plunger. The shaft is provided with pulleys 7 8, loosely mounted thereon and driven in opposite directions. Between these pulleys is a longitudinally-movable clutch 9, keyed to the shaft and rotatory therewith. By moving this clutch into en-

gagement with one of the pulleys or the other the screw-shaft is rotated to the right or to the left, accordingly as one pulley or the other operates as the driving-pulley. To move this clutch I employ a weighted lever 10, pivoted at 11 and connected with the clutch by a fork, as shown. The automatic mechanism for actuating this lever will be explained hereinafter. At the end of the cylinder 2 are gates 12, pivoted on axes 13, which are connected by spur-wheels 14, so that the gates shall move in unison. As shown in Fig. 6, they are adapted to be closed around the core 4, so as to close the end of the cylinder.

15 are springs which tend to throw the gates open into the position shown in Fig. 7.

16 are knife-edged blades, the ends of which are of circular arc, so as to form part of the circular opening of the closed gates. These blades are longitudinally movable on the gates and are provided with springs 17, which tend to force them toward each other. The ends of the gates have lugs 18, and when they are closed they are adapted to be held by means of a forked lock 19, Figs. 1 and 3, inclosing the lugs 18. This lock is adapted to be released automatically, as hereinafter explained.

For the purpose of feeding the paper-pulp to the cylinder 2 I employ an upright feed-cylinder 20, communicating with the cylinder 2, as shown in Fig. 5, and having a plunger 21, the lower end of which is concavely curved on the arc of the plunger 3. If desired, other than the plunger 21 may be used to feed the pulp, or it may be fed by direct action of gravity. The cylinder 20 is connected with a feed-hopper 22 by a connecting-pipe 23. The hopper is kept filled with paper-pulp, which enters the cylinder 20 through the connecting-pipe, as hereinafter explained. To operate the plunger 21, I may employ a toothed rack-bar 24, having a guiding cross-head 25 and driven by a pinion 26 on a shaft 27. On this shaft are two loose pulleys 28 and 29, which are driven in opposite directions, as indicated by the arrows. Between them is a clutch 30, constructed and arranged like the clutch 9, above described, and adapted to be moved by a lever 31, pivoted at 32, into contact with either of the pulleys, so as to rotate

the shaft in either direction. To operate the clutch automatically I connect it by a link 33 to a bell-crank lever 34, which, by a rod 35, is connected with a lever 36, pivoted at 37, and connected by a rod 38 to a lever 39, pivoted at 40. The levers 36 and 39 are preferably provided with rollers 41 at their lower ends, which rollers are so situated as to be engaged by a roller 42 on an arm 43, which projects from the cross-head 6. The clutch-lever 10 is connected with a rod 44, which moves longitudinally in guides 45, and is provided with projections 46 and 47, adapted to be engaged by the arm 43 at the ends of the stroke of the cross-head.

48 is a stop on the cross-head 25, which is adapted, at the upper end of the stroke of the plunger 21, to engage a projection 49 on a rod 50, connected with the bell-crank lever 37.

Suppose the parts to be in the position shown in Fig. 3. Then the plunger 3 has reached the end of its outstroke and has completed the formation of a pipe and has ejected it from the cylinder, as hereinafter described, the feed-plunger 21 being on its upstroke. At the end of the outstroke of the plunger 3 the arm 43 of the cross-head 6 engages the projection 46 on the rod 44 and draws the clutch-lever 10 forward, thereby moving the clutch 9 out of gear with the pulley 7 and into gear with the pulley 8, thus reversing the rotation of the screw-shaft 5. Thereupon the cross-head 6 begins to move back. When the cross-head 25 reaches the end of its upstroke, Fig. 4, the projection 48 engages the arm 49, thereby turning the lever 34 and the lever 31 and moving the clutch 30 out of engagement with the pulley 28 and stopping the upward motion of the plunger 21. This plunger has then moved above the end of the feed-pipe 23, and a charge of pulp enters the feed-cylinder from said pipe, the pulp being mixed with water and in sufficiently fluid condition to flow easily into said cylinder. As the plunger 3 continues its back-stroke the roller 42 passes under the roller 41 of the lever 36 without engagement therewith; but farther in its back-stroke it engages the roller of the lever 39, thereby moving this lever, and by means of the rod 48, lever 36, and bell-crank 34 moving the lever 31 and bringing the clutch 30 into engagement with the pulley 29. This pulley then drives the shaft 27 in the proper direction to cause the rack 24 to move the plunger 21 downwardly, Fig. 2. The action of this plunger in the cylinder 20 forces the pulp contained therein into the cylinder 2 around the core 4. As the plunger 3 continues its back-stroke the arm 43 engages the projection 47, thereby shifting the clutch-lever 10 and reversing the rotation of the screw-shaft 5, so as to cause the plunger to move forward in the cylinder and to compress therein the pulp which has been introduced as above described. When the end of the plunger 3 has reached the delivery end of the feed-cylinder 20, as shown in Figs. 1 and 5, the plunger 21 has also reached

the end of its downstroke. At that moment the roller 42 has engaged the roller on the arm 36, Fig. 1, and by moving said arm has shifted the clutch 30 into contact with the pulley 28, the effect of which is to elevate the feed-plunger. As the plunger 3 advances farther it compresses thoroughly the pulp in the cylinder against the closed gates 12 and ejects the water expelled by pressure from the pulp through the crevices at said gates. When the plunger has advanced far enough to complete such compression and to form the pipe, the end of a rod 51, which projects from the cross-head 6, engages a lever 52, which is connected by a link 53 with the latch 19, thereby moving the lever from the position shown in Fig. 1 to that shown in Fig. 3 and retracting the latch so as to free the gates 12, which thereupon spring open into the position shown in Fig. 7. Then as the plunger 3 continues to advance it ejects the pulp pipe from the cylinder. When the forming-plunger reaches the extreme limit of its outstroke, the operator of the machine brings together the gates 12, so as to cause the spring knife-blades 16 to fit around the core 4 at the front end of the plunger. Then as the screw-shaft is reversed, as above described, these knife-edges hold the pulp tube and cause the core to strip itself from within the same. When the core has receded, the tube drops into a suitable receiver.

The machine, as described above, is continuous and to a great extent is automatic in its action. The operations of feeding and compressing the pulp are continuous. The machine is therefor capable of large output and is adapted to make pipes of excellent quality.

Without limiting myself to the precise construction and arrangement of the parts, which may be modified in various ways, I claim—

1. In a machine for making paper pipes, the combination of a forming-cylinder having a plunger and an axial core, means for moving the plunger, a gate adapted to fit around the core, and a feed-cylinder entering the forming-cylinder, substantially as and for the purposes described.

2. In a machine for making paper pipes, the combination of a forming-cylinder having a plunger and an axial core, a gate adapted to fit around the core, a feed-cylinder entering the forming-cylinder, a plunger operating within the feed-cylinder, and means for moving the plungers, substantially as and for the purposes described.

3. In a machine for making paper pipes, the combination of a forming-cylinder having a plunger and an axial core, a gate adapted to fit around the core, a feed-cylinder entering the forming-cylinder, a plunger operating within the feed-cylinder, means for moving the plungers, and reversing mechanism operated by motion of the plungers to reverse the same periodically, substantially as and for the purposes described.

4. In a machine for making paper pipes, the combination of the forming-cylinder, a plunger having an axial core, means for moving the plunger, and movable gates adapted to fit around the core and to close the end of the cylinder, substantially as and for the purposes described.

5. In a machine for making paper pipes, the combination of the forming-cylinder, a plunger having an axial core, means for moving the plunger, movable gates adapted to fit around the core and to close the end of the cylinder, a lock for said gates, and mechanism actuated with the plunger and adapted to unlock the gates at the end of the compressing action of the plunger, substantially as and for the purposes described.

6. In a machine for making paper pipes, the combination of the forming-cylinder, a plunger having an axial core, means for moving the plunger, movable gates adapted to fit around the core and to close the end of the

cylinder, and spring-blades carried by said gates, substantially as and for the purposes described.

7. In a machine for making paper pipes, the combination of a forming-cylinder having a plunger and an axial core, a stop adapted to fit around the core, a feed-cylinder entering the forming-cylinder, a plunger operating within the feed-cylinder, driving mechanism for actuating said plungers, clutches for reversing the action of said driving mechanism, and levers operated by motion of one of the plungers and connected with said clutches to operate the same, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 26th day of February, A. D. 1891.

JAMES PETERS.

Witnesses:

W. B. CORWIN,
H. M. CORWIN.