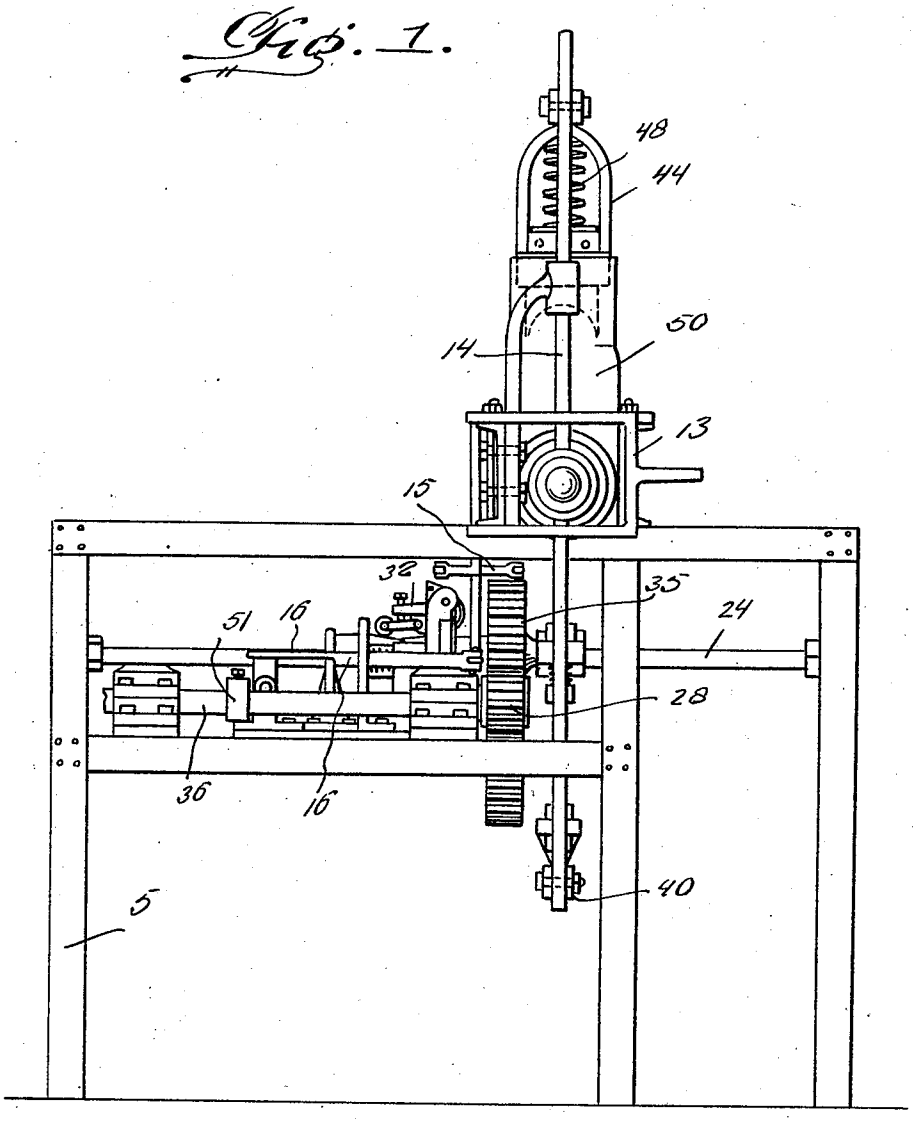
May 28, 1929. C. E. MUMMA ET AL 1,714,614

TILE MAKING MACHINE

Filed Oct. 19, 1927 4 Sheets-Sheet 1

Fig. 1.



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TILE MAKING MACHINE

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Fig. 5.

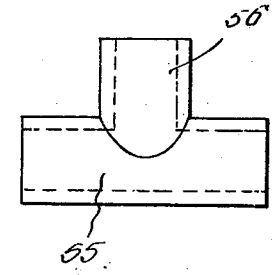
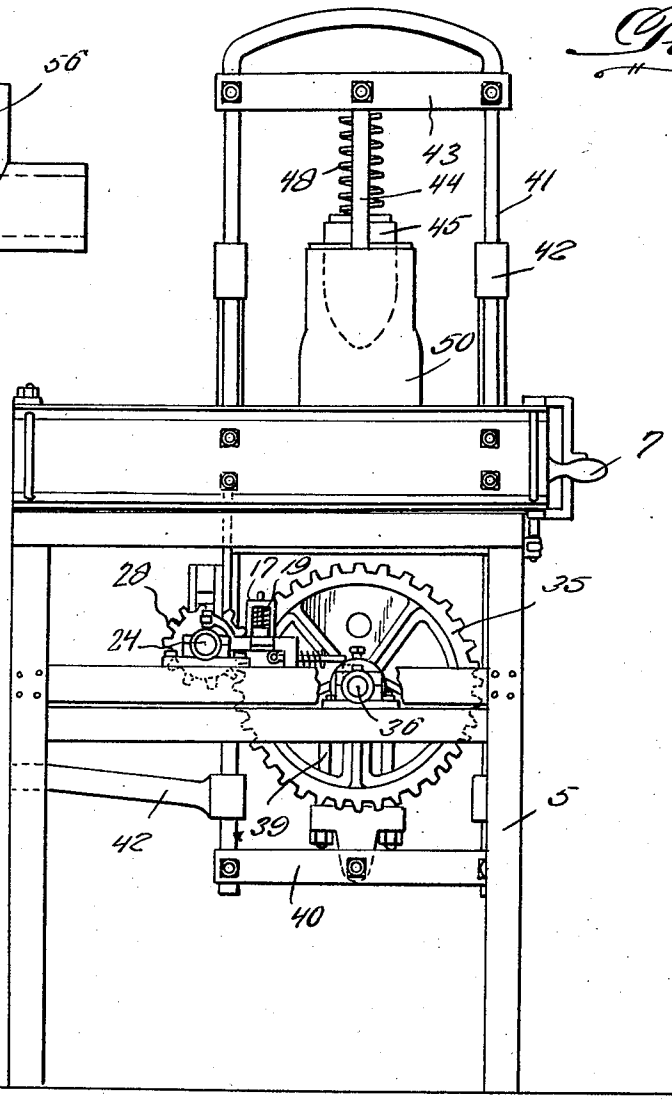


Fig. 2.



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Fig. 3.

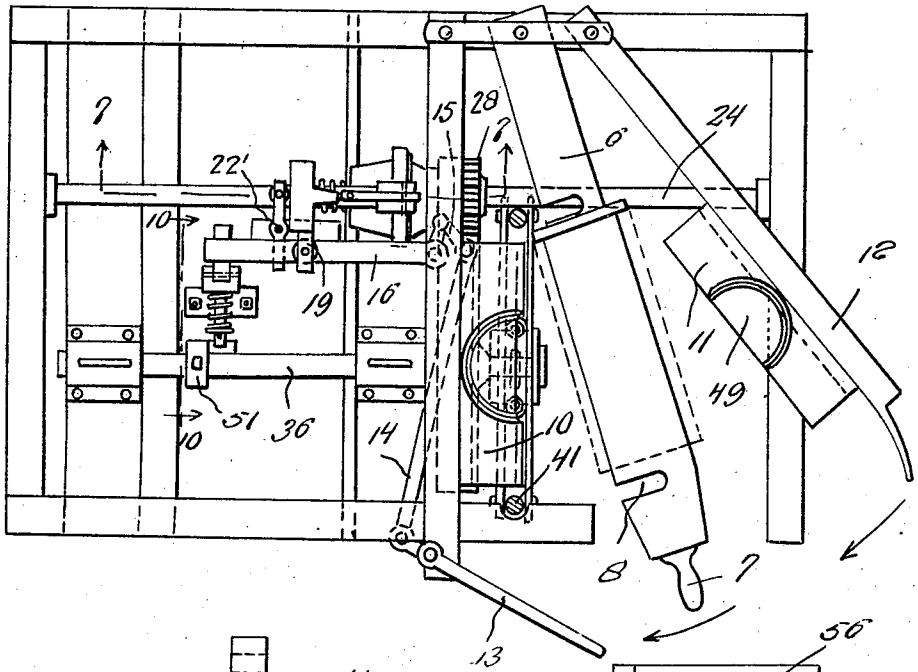


Fig. 4.

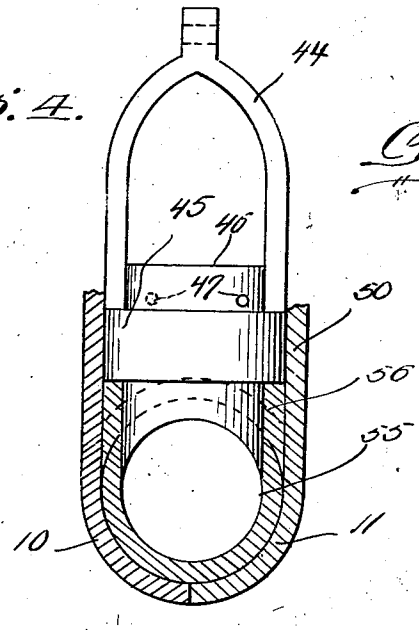
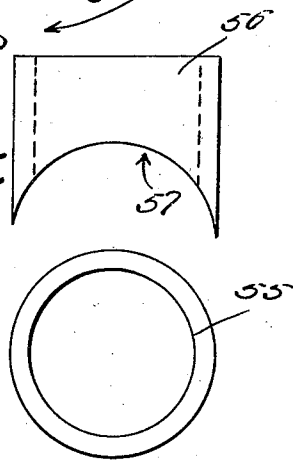


Fig. 6.



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TILE MAKING MACHINE

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Fig. 7.

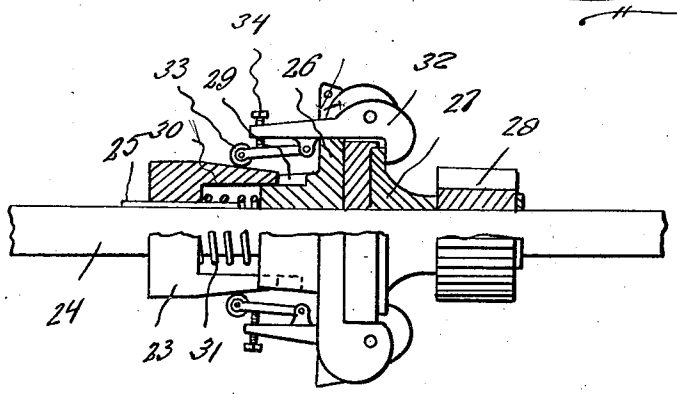


Fig. 8.

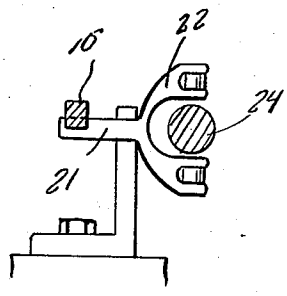


Fig. 9.

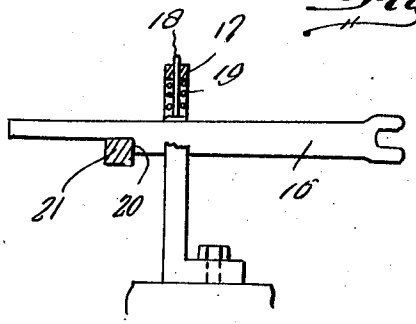
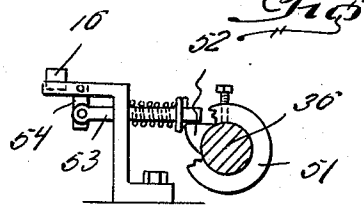


Fig. 10



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UNITED STATES PATENT OFFICE.

CLARK E. MUMMA AND CLARENCE M. MUMMA, OF HAVILAND, OHIO.

TILE-MAKING MACHINE.

Application filed October 19, 1927. Serial No. 227,224.

This invention relates to machines employed in the use of the manufacture of drain tile T and Y connections and has for a principal object to provide a mandrel adapted to receive a section of hollow tile in its plastic condition, associated with which is a plunger frame carrying the shank section of the tile formed in a relatively hardened condition and adapted through the operation of the apparatus to force one end of the shank through one side of the tile, thus causing an opening to be cut in the tile about which the shank is securely welded or attached upon the drying of the tile.

Another object of the invention is to provide a locking lever for the mandrel, which when secured in locked position operates to throw a clutch mounted on the machine arranged for controlling the movement of the plunger frame whereby to cause the operation of the same.

A still further object is to provide means for automatically disengaging the clutch at the completion of the shank attaching action of the plunger frame so as to throw the same out of operative position.

An additional object is to provide an apparatus of this character of simple and practical construction, efficient and reliable in performance, enabling the shank section of drain tile of this character to be formed in position on the tile in a uniform manner so that the finished article will be of an identical formation, which is inexpensive to manufacture and operate and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the special construction and combination of the various elements comprising the invention, reference being had to the accompanying drawings, wherein:—

Figure 1 is a side elevational view.

Figure 2 is an end elevational view.

Figure 3 is a top plan view.

Figure 4 is a view in elevation, with parts shown in section of the shank carrier for the plunger frame.

Figure 5 is a side elevational view of a complete T tile constructed through the use of our invention.

Figure 6 is a group view of the shank and tile section shown in detached relation.

Figure 7 is a longitudinal sectional view through the clutch mechanism taken substantially along a line 7—7 of Figure 3.

Figure 8 is a detail of the clutch collar operating yoke.

Figure 9 is a detail of the clutch control rod, and,

Figure 10 is a sectional view taken substantially along a line 10—10 of Figure 3 illustrating the automatic clutch release mechanism.

Referring to the drawings in detail, the invention comprises a frame 5 forming a support for the apparatus at one side of which is pivotally mounted a mandrel 6 for horizontal swinging movement, the free end of the mandrel being provided with a handle 7 and having notches 8 formed therein intermediate its end engageable with guide rods 41 attached to the frame whereby to guide the mandrel into the stationary section 10 of a longitudinally split tile mold.

The opposite section of the mold indicated at 11 is carried on a pivotally mounted arm 12 swingable on the frame in a horizontal plane in substantially parallel relation with the mandrel 6.

The free end of the mandrel and arm 12 are adapted to be secured in locked position by a pivotally mounted handle 13 having a link 14 attached thereto and operating a bellcrank 15 fulcrumed on the frame and operatively connected with a slidably mounted clutch control rod 16. The rod 16 is inserted through a slotted opening formed in a supporting bracket 17 attached to the frame, the rod being yieldably retained against upward movement by the pin 18 extending downwardly in the slotted opening in the bracket 17 and urged into engagement with the upper edge of the rod by a coil spring 19. The under side of the free end of the rod 16 is formed with a shoulder 20 adapted to engage the end 21 of a clutch operating fork 22 pivotally mounted at 22′ for horizontal swinging movement on the frame.

The opposite end of the fork 22 engages a clutch collar 23 slidably mounted on a drive shaft 24 and retained for rotation therewith by a key 25, the movement of the collar in one direction operating to cause the engagement of a pair of clutch plates 26, one of said plates being carried on a hub 27 and to which a gear 28 is attached. The

hub and gear are attached to its adjacent clutch plate for free rotation on the shaft, whereas the opposite clutch plate has its hub formed with a plurality of grooves 29 for receiving the fingers 30 formed on the collar whereby to cause the rotation thereof with the shaft.

A coil spring 31 interposed between the collar and the adjacent clutch plate normally retains the same out of engagement therewith. The clutch plates are adapted to be locked into engaged position for positive friction engagement with each other by means of latches 32 arranged for movement into locking position by means of rollers 33 slidable upon the periphery of the collar during the movement of the collar into such engaging position. Adjusting screws 34 maintain the rollers 33 in proper engaging position with the collar 23.

A gear 35 mounted on a counter-shaft 36 is operated through the drive gear 28, said gear 35 carrying a crank-pin operatively connected with a pitman 39 and to which is attached a plunger frame 40 having vertically extending guide rods 41 disposed for vertical sliding movement in guides 42 attached to the frame 5.

The upper ends of the rods 41 are provided with a crossarm 43 from which is suspended a punch mounting 44 having an annular collar 45 arranged at its lower end. A punch 46 is carried by the collar with its lower end extending therethrough, and supported upon the upper edge of the collar by means of pins 47 arranged at diametrically opposite sides thereof. A coil spring 48 is interposed between the upper surface of the punch and the mounting 44 yieldably urging the punch in downwardly extended position.

The upper face of the mold sections 10 and 11 are provided with semi-circular notches indicated at 49 combining with each other to form a circular opening in the mold and about the edges of which upwardly extending mold sections 50 are formed. Thus, when the sections 10 and 11 are arranged in engaged position, the same constitutes a completed mold of a T-shaped formation within which the T drain tiles may be fitted.

A cam collar 51 is mounted on the counter-shaft 36 having a cam 52 formed at one side thereof, adapted during the rotation of the shaft to engage a push rod 53 having its end attached to a bellcrank 54 disposed beneath the rod 16.

After the handle 13 has been closed over the mandrel and the clutch mechanism engaged through the release of the fork 22 by the sliding rod 16, the gear 35 will be rotated for one complete revolution to reciprocally operate the punch frame, after which the cam 52 will actuate the push rod thus causing the rod 16 to be moved upwardly releasing the end 21 of the fork from engagement by the shoulder 20 of the rod whereby to permit the spring 31 to move the collar 23 out of engaged position with respect to the clutch mechanism.

A section of drain tile of substantially cylindrical formation as illustrated in Figures 5 and 6 of the drawing and designated by the numeral 55 may be placed on the mandrel 6 while in its plastic state and a section of tile indicated at 56 adapted to form the shank thereof and having its lower edge shaped in conformity with the contour of the tile section 55 may then be placed upon the section 55 intermediate its ends and arranged so as to be received within the upwardly extended sections 50 of the mold.

Upon the swinging of the mandrel 6 and pivoted arm 12 into closed position, with the sections of tile placed in the mold, the movement of the handle 13 so as to lock the parts in engaged position will, as heretofore explained, throw the clutch mechanism into engagement so as to cause the lowering of the punch frame and move the die mounting carrying the die 46 downwardly through the upper ends of the vertical extensions 50 of the mold so as to engage the collar 45 upon the upper edge of the shank section 56 of the tile and thus press the same against the upper side of the tile section 55. At the same time the punch 46, which is of a slightly less diameter than the bore of the tile section 56 is inserted through said section to cut an opening within the upper edge of the tile section 55. The cam 52 is timed to throw the clutch mechanism out of engagement upon the return of the punch frame to its uppermost position whereupon the pivoted arm 12 and mandrel may be released from the handle 13 and the tile removed therefrom. The tile is then permitted to dry whereupon the sections are permanently sealed together.

It is obvious that the invention is susceptible of various changes and modifications without departing from the spirit and scope of the invention or sacrificing any of its advantages, and we accordingly claim all such forms of the invention to which we are entitled.

We claim:—

1. In an apparatus of the class described, a tile supporting mandrel, a vertically movable punch frame associated therewith, means for operating said punch frame and automatic means for periodically interrupting the operation thereof.

2. In an apparatus of the class described, a tile supporting mandrel, a tile mold associated therewith and coacting with the mandrel to support a plurality of tile sections in position for connecting the same with each other, a punch frame mounted for reciprocating movement above the mandrel,

operating means for the punch frame and means for automatically controlling the operation thereof whereby to throw the same out of operative position upon the completion of each cycle of operation of the same.

3. In an apparatus of the class described, a tile supporting mandrel, a tile mold associated therewith and coacting with the mandrel to support a plurality of tile sections in position for connection with each other, a punch frame reciprocally mounted above the mandrel, operating means for the punch frame, means for securing the mold in locked position with respect to the mandrel, control means for said operating means and actuated upon the locking movement of the mandrel and automatic means for disengaging said operating means upon the completion of each cycle of movement of the punch frame.

4. In an apparatus of the class described, a tile supporting mandrel, a sectional tile mold associated with the mandrel and adapted to retain a plurality of tile sections in position for engagement with each other on the mandrel, a handle arranged for locking the mold sections in engaged position, a punch frame supporting a punch for reciprocal movement above the mold and arranged in punching relation with respect to one of the tile sections whereby to form an opening therein, operating means for the punch frame and control means for said operating means including a clutch operatively engageable upon the movement of the handle into locking position with the mold and automatic means for throwing the clutch out of engagement upon the completion of each cycle of movement of the punch frame.

5. In an apparatus of the class described adapted to form lateral extensions on drain tile, comprising a mandrel for supporting one section of the tile while in a plastic condition, a sectional tile mold adapted to carry an additional tile section and cooperating with the mandrel to secure said tile sections in position for engagement with each other, a handle engageable with the mandrel and said mold section for locking the same in engaged position, a punch frame mounted for reciprocal movement above the mold, a punch carried by the frame and arranged in punching relation with respect to the tile sections, said punch being arranged for extending through one of said sections for penetrating another of the sections whereby to form an opening therein, operating means for the punch frame, and control means for said operating means comprising a clutch mechanism adapted for movement into engaged position upon the movement of the handle in locked position, and automatic means for throwing said clutch out of engagement upon the completion of each cycle of movement of the punch frame.

6. In a tile forming apparatus of the class described, a mandrel adapted to support a tile section in a plastic state, a plurality of tile mold sections, means formed on said sections for supporting an additional tile section in laterally extended relation with respect to the section of tile carried by the mandrel and coacting with the mandrel to retain said tile sections in engaged position with respect to each other, a handle engageable with the mandrel and the mold sections whereby to lock the same in engaged position, a punch frame mounted for reciprocating movement above the mold and including a punch adapted to be inserted longitudinally through the lateral tile section for penetrating the section of tile carried by the mandrel whereby to form an opening therein, operating means for the punch frame including a drive shaft having a clutch interposed between the frame and the punch frame, a clutch operating fork, a slidably mounted rod normally engaging the fork and operating through the sliding movement thereof to move the clutch into engaged position, means operatively engaging the rod with the mandrel locking handle and automatic means for releasing said fork out of engagement with the rod upon the completion of each cycle of movement of the punching frame, said automatic means comprising a counter-shaft operatively connected with the drive shaft, a cam arranged thereon, a push rod adapted for actuation through the cam, and means connecting the push rod with the sliding rod whereby to throw the latter out of engaged position with the clutch fork.

7. In an apparatus of the class described, a tile supporting mandrel, a vertically movable punch frame associated therewith, means for operating said punch frame, and means for automatically interrupting the operation thereof, upon the movement of the said frame to a predetermined extent.

8. In an apparatus of the class described, a tile supporting mandrel, a vertically movable punch frame associated therewith, means for operating said punch frame, and means for automatically operating said punch frame in accordance with said predetermined movement of said frame.

9. In an apparatus of the class described, a tile supporting mandrel, a vertically movable punch frame associated therewith, means for operating said punch frame, automatic means for periodically interrupting the operation thereof, and manually operable means for returning the operating means to its frame operating position.

10. An apparatus of the class described comprising a tile supporting mandrel, a reciprocally actuated punch frame associated

therewith, a drive shaft operatively connected to said punch frame, a clutch mechanism interposed therein adapted to interrupt the operation of the shaft, automatic clutch throw out means actuated upon the movement of said frame a predetermined extent, and manually operable means for returning the clutch to its shaft operating position.

11. An apparatus of the class described comprising a movable tile supporting mandrel, a reciprocably actuated punch frame associated therewith, means for releasably securing the mandrel in punching position with respect to said punch frame, a drive shaft operatively connected to said frame, a clutch mechanism interposed therein, and means for controlling said clutch mechanism through the operation of said mandrel securing means.

12. An apparatus of the class described comprising a movable tile supporting mandrel, a reciprocably actuated punch frame associated therewith, manually operable means for releasably securing the mandrel in punching position with respect to said punch frame, a drive shaft operatively connected to said frame, a clutch mechanism interposed therein, means connecting said mandrel securing means with the clutch adapted to move the latter into engagement upon the movement of the former into mandrel securing position, and means for automatically throwing the clutch out of engagement in accordance with the predetermined movement of the frame.

13. An apparatus of the class described comprising a movable tile supporting mandrel, a reciprocably actuated punch frame associated therewith, manually operable means for releasably securing the mandrel in punching position with respect to said punch frame, a drive shaft operatively connected to said frame, a clutch mechanism interposed therein, means connecting said mandrel securing means with the clutch adapted to move the latter into engagement upon the movement of the former into mandrel securing position, and means for automatically throwing the clutch out of engagement upon each reciprocating movement of the frame.

In testimony whereof we affix our signatures.

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CLARENCE M. MUMMA.