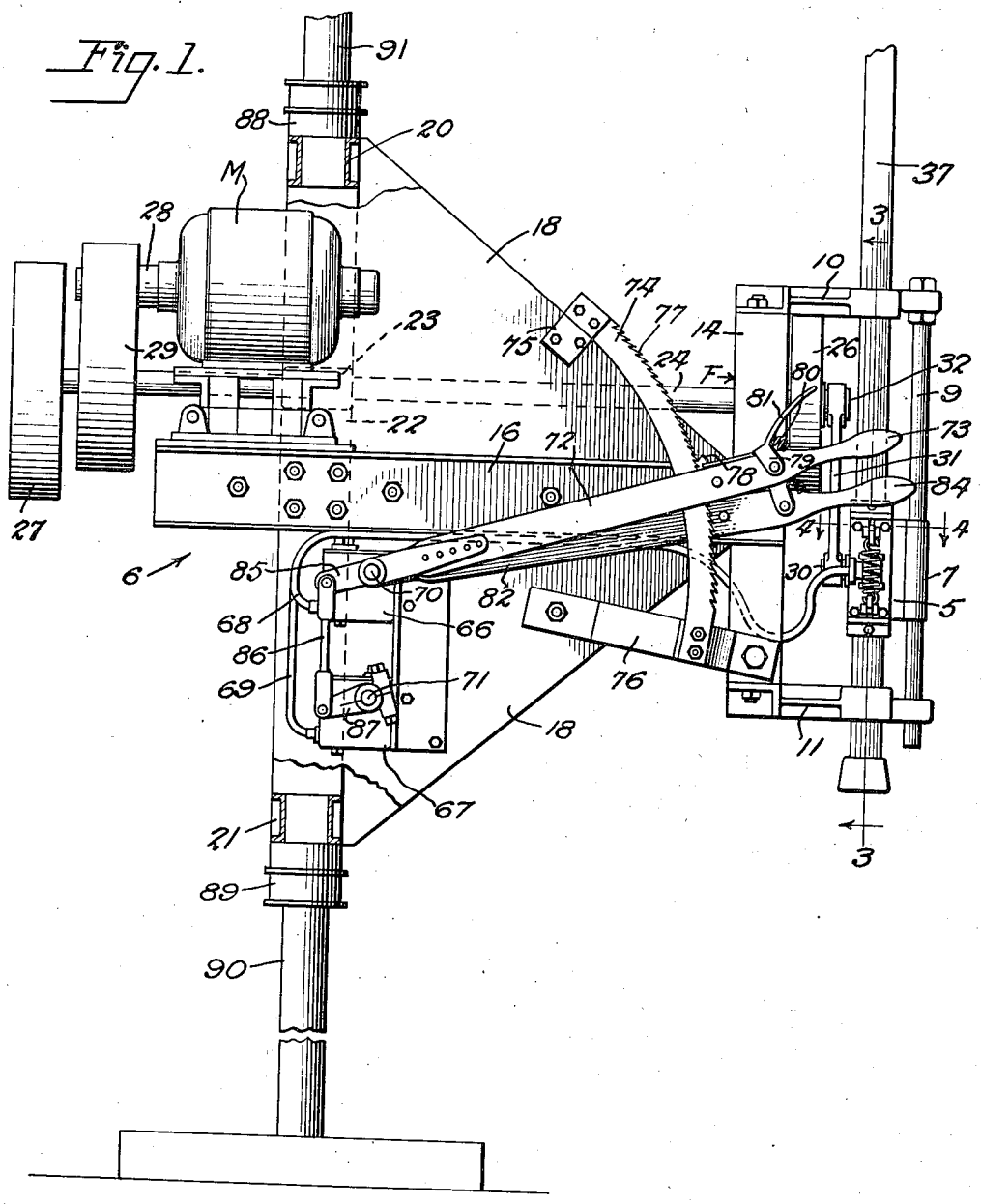
May 20, 1941. C. A. WALLACE 2,242,690

PIPE MOLDING MACHINE

Filed March 31, 1938 2 Sheets-Sheet 1

Fig. 1.



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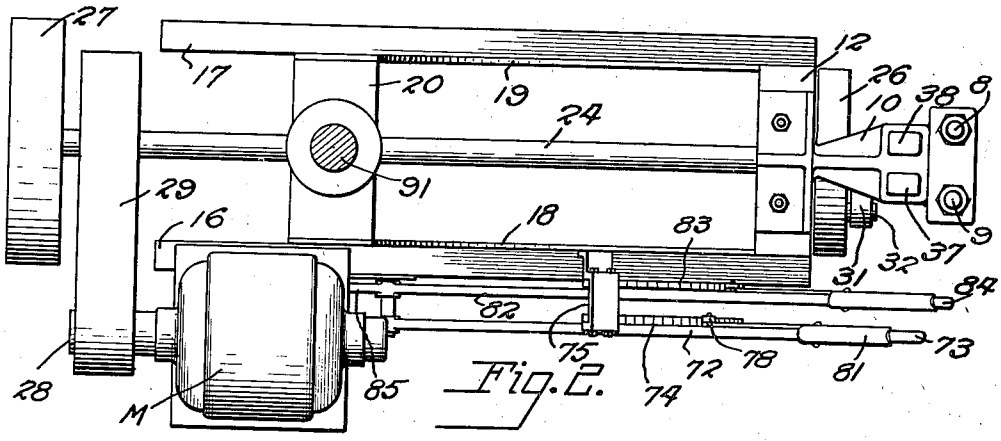


Fig. 2.

Fig. 3.

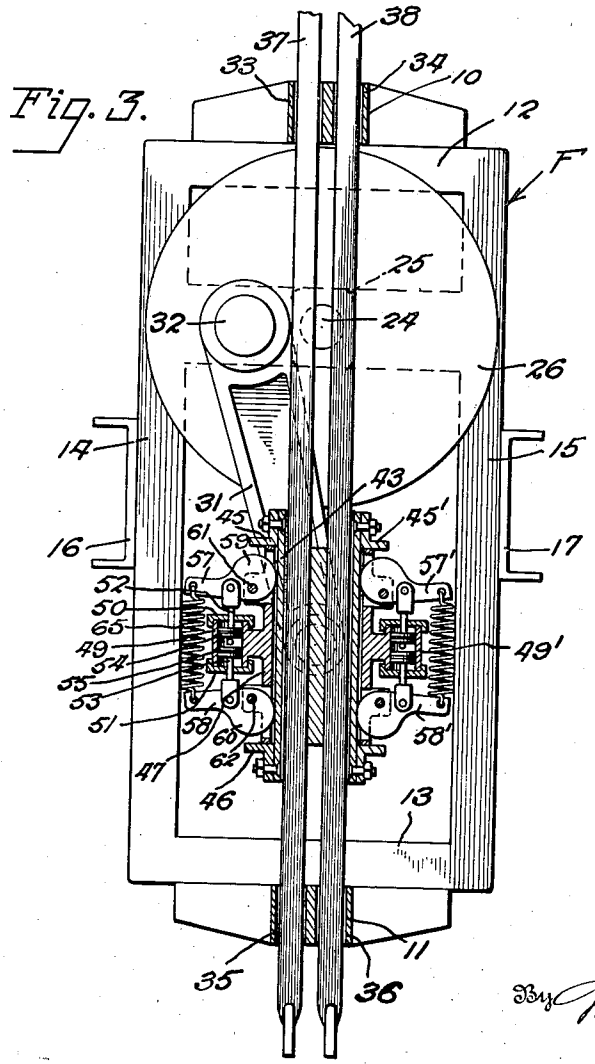
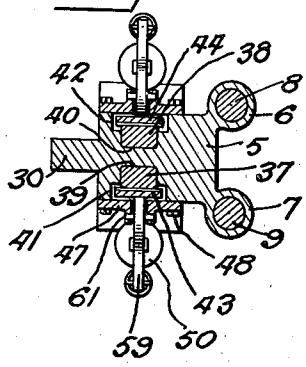


Fig. 4.



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2,242,690

PIPE MOLDING MACHINE

Charles Augustus Wallace, Columbia, S. C.

Application March 31, 1938, Serial No. 199,238

13 Claims. (Cl. 25—37)

This invention relates generally to machines for making concrete pipes, such as are used in the construction of sewers, culverts, pipe lines and the like; and more particularly to tamping heads employed in such machines for tamping dry concrete into a pipe mold.

In the tamping machines commonly employed for this purpose by the manufacturers of pipe making machinery, tamping bars of hickory or steel are frictionally secured in a vertically reciprocating sliding head, actuated to reciprocate the tamping bars about four hundred times a minute. As dry concrete is placed in the pipe molds, which revolve under these tamping bars, the reciprocating head is set in operation and strikes about four hundred blows a minute on the concrete fed into the mold beneath said bars. As the concrete is added to the mold, the tamping bars rise up through their friction clutch members, the friction of which is adjusted to determine the force of the blows struck on the concrete by the tampers.

As the tamping bars rise through their clutch devices, it frequently becomes necessary to adjust the friction which holds these bars in place on the cross head. In the old machines, this adjustment is effected by means of a screw impinging against a plate provided with a friction surface usually in the form of a strip of leather. Due to the rapidity with which the cross head reciprocates, it is practically impossible for an operator to regulate this friction manually. Therefore, it is usually necessary for the operator to stop the tamping machines during this process of adjusting the friction-regulating screws.

The main object of the present invention is to provide a tamping machine of the general character referred to, with means whereby the frictional engagement of the clutch members with the tamping bars, can be regulated or adjusted whenever desired without the necessity of stopping the machine for this purpose.

Other objects of the invention will become apparent as the detailed description thereof proceeds.

In the drawings:

Figure 1 is a fragmentary side elevation of the tamping parts of a machine for manufacturing concrete pipes and the like;

Figure 2 is a top plan view of the machine shown in Figure 1;

Figure 3 is a vertical section, to an enlarged scale, taken on the line 3—3 of Figure 1; and

Figure 4 is a horizontal section, taken on the line 4—4 of Figure 1.

As shown in the drawings, the invention begins with a tamping head 5, provided with sleeves 6 and 7 slidable on guide rods 8 and 9 which are suitably fixed, at their opposite ends, to a pair of horizontal brackets 10 and 11. These brackets 10 and 11 project from and are secured to the upper and lower cross bars 12 and 13 of a substantially vertical, rectangular bearing frame F having its sides 14 and 15 bolted, or otherwise fixed, to the horizontal channel irons 16 and 17 of the supporting framework of the machine.

Substantially triangular supporting plates 18 and 19 are suitably secured, respectively, to the channel irons 16 and 17, and are held in substantially parallel, vertical planes by spacers 20 and 21. An intermediate spacer 22 supports a bearing 23 for a horizontal shaft 24 which projects at one end through a bearing 25 formed integral with the frame F. A crank disk 26 is secured to the end of the shaft 24 where it projects through its bearing in the frame F, and a flywheel 27 is secured to the other end of the said shaft. A motor M supported on the upper flange of the channel iron 16 has its shaft 28 connected by a belt 29, through suitable pulleys on the shafts 24 and 28, to impart rotation to the said shaft 24.

The tamping head 5 has a pivot pin 30 projecting laterally from the rear face thereof to receive the lower end of a pitman 31, the upper end of which is pivoted on the pivot pin 32 projecting from the face of the crank disk 26 and offset radially with respect to the axis of rotation of said crank disk. It will be evident from inspection of the drawings that continuous rotation of the shaft 24 will cause the tamping head 5 to reciprocate along its guide rods 8 and 9 which form fixed parts of the framework of the machine.

The bracket 10 is provided with a pair of rectangular apertures 33 and 34, and the bracket 11 is provided with a pair of rectangular apertures 35 and 36. These two pairs of apertures are axially aligned to form guideways for the tamping rods 37 and 38. The tamping head 5 is provided with recesses 39 and 40 in which the respective tamping rods 37 and 38 are slidably mounted. The recesses 39 and 40 are expanded to form wider recesses 41 and 42 receiving the friction strips 43 and 44, respectively.

The strip 43 has its opposite ends secured to angle bars 45 and 46; and these angle bars, with

the strip 43 attached thereto, are secured in proper position on the tamping head 5 by means of a plate 47 which in turn is secured as by machine screws 48, to one side of the tamping head 5. The plate 47 has a cylinder 49 formed thereon and provided, at its opposite open ends, with cylinder heads 50 and 51 through which project the piston rods 52 and 53 secured at their inner ends to pistons 54 and 55, located on opposite sides of a liquid inlet 56.

The outer ends of the piston rods 52 and 53 are pivotally connected by yokes to the outwardly extending arms 57 and 58 of eccentrics 59 and 60, pivoted respectively to pins 61 and 62 secured to lugs projecting from the face of the plate 47 on opposite sides of slots 63 and 64 which receive the eccentrics 59 and 60, respectively, and permit pressure to be applied to the strip 43 by rotation of said eccentrics. The outer ends of the said arms 57 and 58 are connected to the opposite ends of a tension spring 65. As will be apparent from inspection of Figure 3 of the drawings, the tension of the spring 65, on the outer ends of the arms 57 and 58, will rotate the eccentrics 59 and 60 about their pivot pins 61 and 62, to decrease the pressure of the friction strip 43 against the adjacent side of the tamping rod 37 and thereby reduce its frictional contact with the bottom wall of the recess 39. It will also be obvious from inspection of Figure 3 that if liquid under pressure be forced into the cylinder 49 through the inlet aperture 56, it will cause the pistons to move apart and therefore increase the pressure of the eccentrics 59 and 60 on the friction strip 43, and through this increase on the strip 43 will increase the frictional contact between the tamping rod 37 and the tamping head 5, in proportion to the applied pressure.

Substantially the same mechanism is used on the other side of the tamping head to regulate the frictional contact of the tamping rod 38 with the bottom wall 40 of the recess in the head 5. The same reference characters primed are, therefore, used to indicate the corresponding elements for applying pressure to the tamping rod 38.

Master cylinders 66 and 67 are mounted on the triangular supporting plate 18, the master cylinder 66 being connected by the flexible tube 68 to the cylinder 49, and the master cylinder 67 being connected by the flexible tubing 69 to the cylinder 49'. These master cylinders are of the automotive brake type, and the pressures transmitted therefrom to their respective cylinders 49 and 49', are developed by rotation of the shafts 70 and 71 which project through a wall of each of said master cylinders in the usual manner and operate the usual pressure piston therein. To rotate the shaft 70, whenever desired, there is secured to this shaft a lever 72 terminating at one of its ends in a handle 73 located in convenient position for an operator. This lever swings over a quadrant 74 fixed at its opposite ends to brackets 75 and 76 projecting laterally from and suitably secured to the triangular supporting plate 18. The outer edge of the quadrant 74 is notched to form teeth 77 adapted to be engaged by a pawl 78 which latter is pivoted at one end to a yoke member 79, pivoted in turn, on the lever 72 near the handle end thereof. The pawl 78 is normally maintained in locking engagement with the teeth 77 by means of a compression spring 80 interposed between the handle 73 and a hand grip 81 integral with the pivoted yoke 79.

To operate the shaft 71 of the master cylinder 67, a lever 82 is pivoted between its ends to the shaft 70. This lever 82 is mounted to swing over a quadrant 83 similar in every respect to the quadrant 74 and likewise supported by the brackets 75 and 76 which are secured to the triangular supporting plate 18. The outer end of the lever 82 is constructed to form a handle 84 and is also provided with spring actuated pawl mechanism adapted to engage the teeth on the outer edge of the quadrant 83 for the purpose of locking the lever 82 in adjusted position with respect to that quadrant 83.

The lever 82 extends beyond the shaft 70, on which it is pivoted, to form an arm 85, the outer end of which is pivoted to one end of a link 86, the other end of which is pivoted to the outer end of an arm 87 projecting radially from and fixed to the shaft 71 of a master cylinder 67. The arms 85 and 87 are substantially the same in length, and the distance between the pivot axes connecting the opposite ends of the link 86 to the said arms, is the same as the distance between the axes of the shafts 70 and 71. This linkage construction between the lever 82 and the shaft 71 is designed for the purpose of mounting the levers 72 and 82 in substantially the same convenient position for operation.

It will be evident from inspection of the drawings that the frictional engagement between either of the tamping rods 37 and 38 and the tamping head 5 can be very finely regulated by an operator standing adjacent to the tamping head, and without the necessity of stopping the machine for this purpose. The handles 73 and 84 of the levers 72 and 82, respectively, are located to swing about a common axis and over concentrically mounted locking quadrants, thereby enabling the operator to adjust these control levers without changing his position relative to the tamping head.

The spacers 20 and 21 have cylindrical collars 88 and 89 suitably secured thereto or formed integral therewith. The collar 89 is adapted to seat on the upper end of a standard 90 extending upwardly from a floor or other base support (not shown). The collar 88 is adapted to receive a depending rod, or bar, 91 coaxial with the standard 90. These members 90 and 91 form part of the framework of the machine. The present invention is chiefly concerned with the hydraulic mechanism for varying the pressure on the tamping rods while the tamping head and the rods are reciprocating at any speed, high or low speed.

It will be obvious to those skilled in the art that the arrangement of parts and the details of construction of the invention may be varied considerably without departure from the spirit of the invention, which is not to be considered as in any way limited except as indicated by the scope of the claims appended hereto.

What I claim is:

1. In a pipe molding machine, a support, a head mounted to reciprocate vertically on said support, a tamping rod slidable on said head, means for pressing said rod into frictional contact with said head, and mechanism adjustable on said support for operating said means to vary the pressure on said rod.

2. In a pipe molding machine, a support, a head mounted to reciprocate vertically on said support and provided with a vertically extending recess, a

tamping rod slidable in said recess, a friction strip secured to said head and extending across said recess, means on said head adjustable to press said friction strip against said tamping rod, and mechanism adjustable on said support and controlling said adjustable means to vary the frictional contact of said strip with said tamping rod.

3. In a pipe molding machine, a support, a head mounted to reciprocate vertically on said support and provided with a recess extending in the vertical direction, a tamping rod slidable in said recess, a friction strip secured to said head and extending across said recess and tamping rod, a cam rotatable on said head and having a surface in contact with said friction strip, and cooperating hydraulic mechanism mounted on said support and head for moving said cam to vary the frictional contact of said strip with said tamping rod.

4. In a pipe molding machine, a support, a head mounted to reciprocate vertically on said support and provided with a recess extending in the vertical direction, a tamping rod slidable in said recess, a friction strip secured to said head and extending across said recess and tamping rod, a cam rotatable on said head and having a surface in contact with said friction strip, cooperating hydraulic mechanism mounted on said support and head for moving said cam to vary the frictional contact of said strip with said tamping rod and means adjustable on said support to control the operation of said mechanism.

5. In a pipe molding machine, a support, a head mounted to reciprocate vertically on said support, a tamping rod slidable on said head, fluid operated mechanism mounted on said head and support for clamping the tamping rod in adjusted position on said head, and means adjustable on said support to operate said mechanism.

6. In a pipe molding machine, a support, a head mounted to reciprocate vertically on said support, a tamping rod slidable on said head, cooperating means on said support and head for pressing said rod into frictional contact with said head, and means mounted on said support to control the operation of said cooperating means.

7. In a pipe molding machine, a support, a head mounted to reciprocate vertically on said support, a tamping rod slidable on said head, cam mechanism mounted on said head for clamping the tamping rod in adjusted position on said head, hydraulic means mounted on said head and support for operating said mechanism, and a lever pivoted to said support and connected with said means to control the operation thereof.

8. In a pipe molding machine, a support, a head mounted to reciprocate vertically on said support, a tamping rod slidable on said head, cam mechanism mounted on said head for clamping the tamping rod in adjusted position on said head, hydraulic means mounted on said head and support for operating said mechanism, a lever pivoted to said support and connected with said means to control the operation thereof, and means for locking said lever in adjusted position.

9. In a pipe molding machine, a support, a head mounted to reciprocate vertically on said support, a tamping rod slidable on said head, means for clamping said rod frictionally to said head, said means including a cylinder mounted on said head, a piston reciprocable in said cylinder and connected to said clamping means, a master cylinder mounted on said support, flexible tubing connecting said cylinders to each other, and a lever pivoted to said master cylinder and operating the same to transmit pressure therefrom to the first named cylinder, said cylinders being adapted to be filled with liquid for transmitting pressure under the control of said lever.

10. In a pipe molding machine, a support, a head reciprocable vertically on said support and provided with vertically extending recesses, a tamping rod slidable in each recess, friction strips fixed to said head and extending across said recesses and rods, and cooperating hydraulic mechanism on said support and head for clamping said friction strips against said rods.

11. In a pipe molding machine, a support, a head reciprocable vertically on said support and provided with vertically extending recesses, a tamping rod slidable in each recess, friction strips fixed to said head and extending across said recesses and rods, cooperating hydraulic mechanism on said support and head for clamping said friction strips against said rods, and levers pivoted to swing about a common axis on said support and connected to said mechanism to control the operation thereof.

12. In a pipe molding machine, a support, a head reciprocable vertically on said support and provided with vertically extending recesses, a tamping rod slidable in each recess, friction strips fixed to said head and extending across said recesses and rods, cooperating hydraulic mechanism on said support and head for clamping said friction strips against said rods, levers pivoted to swing about a common axis on said support and connected to said mechanism to control the operation thereof, and cooperating means on said levers and support for locking said levers in any desired position of angular adjustment.

13. In a pipe molding machine, a support, a head reciprocable vertically on said support and provided with vertically extending recesses, a tamping rod slidable in each recess, friction strips fixed to said head and extending across said recesses and rods, cooperating hydraulic mechanism on said support and head for clamping said friction strips against said rods, levers pivoted to swing about a common axis on said support and connected to said mechanism to control the operation thereof, toothed quadrants fixed to said support with said axis as a common center, and pawls on said levers engageable with the teeth on said quadrants for locking said levers in adjusted positions on their respective quadrants.

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