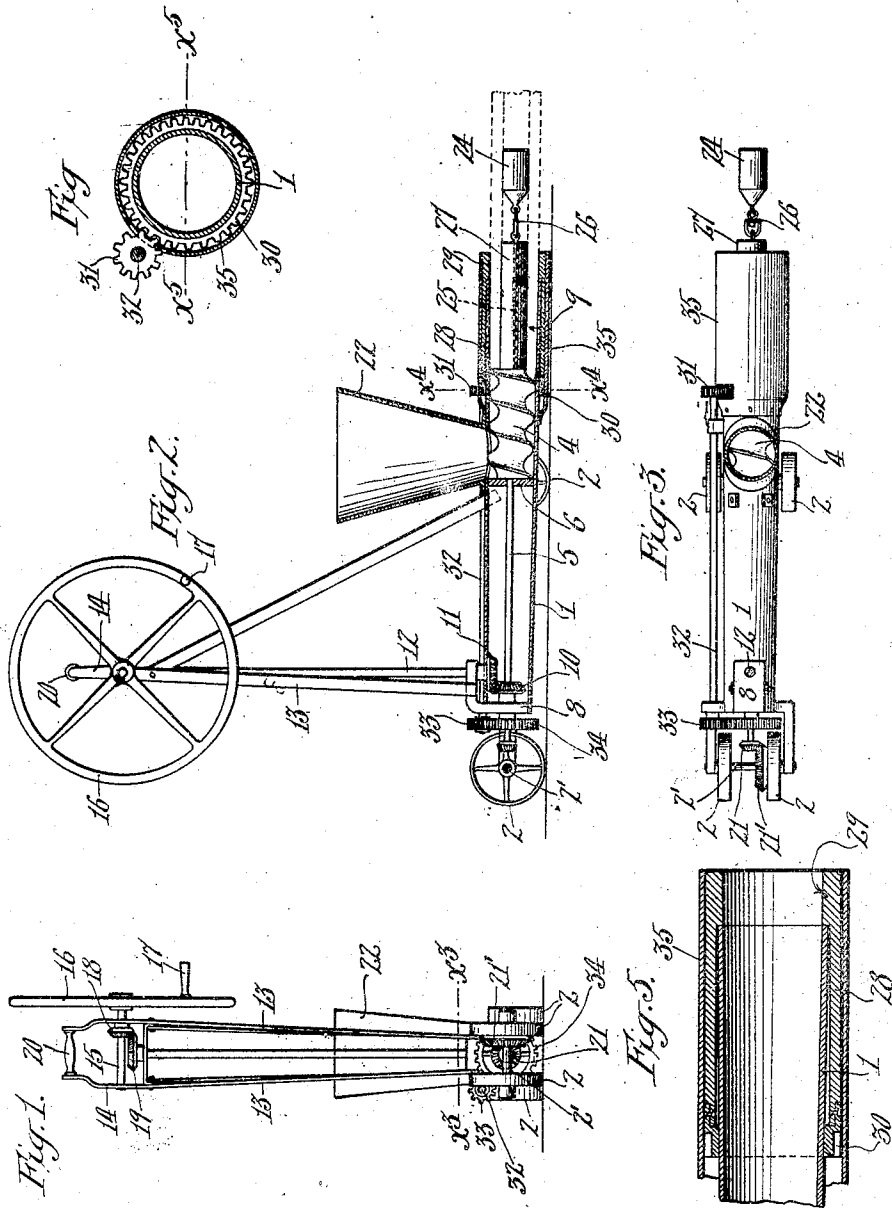


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MACHINE FOR MAKING CONTINUOUS PIPES.  
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938,223.

Patented Oct. 26, 1909.



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# UNITED STATES PATENT OFFICE.

ROBERT F. DOCKERY, OF SANTA MONICA, CALIFORNIA.

MACHINE FOR MAKING CONTINUOUS PIPES.

938,223.

Specification of Letters Patent.

Patented Oct. 26, 1909.

Application filed September 3, 1908. Serial No 451,609.

*To all whom it may concern:*

Be it known that I, ROBERT F. DOCKERY, a citizen of the United States, residing at Santa Monica, in the county of Los Angeles and State of California, have invented a new and useful Machine for Making Continuous Pipes, of which the following is a specification.

This invention relates to improvements on the type of machine shown in my Patent No. 536,376, dated March 26, 1895.

An important object of the present invention is to provide means for smoothing and polishing the interior of the pipe.

Another object of the invention is to provide means for smoothing the exterior of the pipe.

Another object of the invention is to eliminate the liability of cracking of the pipe due to strain produced on the pipe by the molding apparatus in the motion thereof.

A further object of the invention is to improve the operating mechanism shown in the above mentioned patent in such manner that a smooth, even motion will be produced.

The accompanying drawings illustrate my invention.

Figure 1 is a front elevation of the machine. Fig. 2 is a vertical longitudinal section thereof. Fig. 3 is a horizontal section on the line  $x^3-x^3$  Fig. 1. Fig. 4 is a section on the line  $x^4-x^4$  Fig. 5. Fig. 5 is a vertical section through the rear part of the casing of the machine.

The machine comprises a tubular body or casing 1, mounted on wheels 2, of which four are preferably provided, arranged in pairs, the wheels of one pair being at the respective sides of the machine and near the front end thereof and the two wheels of the other pair being at the respective sides of the machine, intermediate the ends thereof.

The pipe forming apparatus is at the rear end of the tubular casing and comprises a worm or screw member 4 carried by the shaft 5 which extends longitudinally and axially of the casing, being journaled adjacent to the said worm in a plate 6 which extends across the tubular casing and closes the molding chamber 9 at the front end thereof, the forward end of said shaft being journaled in a bracket 8 extending vertically at the front end of the tubular casing. Said shaft 5 carries near its forward end a bevel gear 10, engaged by a bevel gear 11 on a vertical shaft 12, which is journaled

near its lower end in the bracket 8 and near its upper end in a vertical frame 13 which extends upwardly from the bracket 8. In an upward extension 14 of the said frame is journaled a cross-shaft 15 carrying a fly wheel 16 provided with a crank handle 17, said cross-shaft 15 carrying a bevel wheel 18 engaging with the bevel wheel 19 on the upper end of the vertical shaft 12 so that by operation of the crank handle 17 the shafts 15, 12, 5 are operated to turn the worm, the fly wheel 16 serving to balance or steady the movement. The upward frame extension 14 has at its upper end a cross-piece 20 serving as a handle for holding the machine with one hand while the crank handle is operated by the other hand. Shaft 5 also carries a bevel gear 21 engaging a bevel gear 21' on shaft 2' of front wheel 2 in order to cause forward traction of the machine by the manual operating means. The worm or screw 4 extends in the molding chamber 9 and fits snugly within the casing 1 so that its threads work close to or against the sides of the casing. Above the forward end of this worm or screw the casing has a feed opening over which is placed a feed hopper 22 for the reception of the cement or material to be molded into pipe.

The tubular casing 1 has a slight rearward flare and extends rearwardly beyond the rear end of the screw member 4 to fit around the formed cement pipe and support it temporarily. A core 27 extends rearwardly and axially from the screw member 4 to enter within the formed pipe and temporarily sustain the same and by its rotary motion aid in the formation and compacting of the pipe. Said core is preferably flexible to enable it to accommodate itself to any slight deflections in the relative directions of the machine and pipe without breaking and cracking the pipe already formed. For this purpose said core member is preferably formed of elastic material, for example, soft rubber, said member being in that case formed as a shell or being of tubular construction. A follower member 24 is connected to core member 27 or in case said core member is of elastic material as stated, to the rear end of the screw member 4, as by means of the draw bar 25, the connection being made through a swivel joint 26 which enables the core and screw members to rotate while they draw the latter forward. The

core member 27 and the body of the follower member 24 are both cylindrical and substantially of the same diameter, and the forward end of the follower member is tapered, as shown, to enable it to move within the cement tube without scraping or roughening the surface. Means are also provided for smoothing and pressing and compacting the other face of the cement pipe, said means consisting of a sleeve 28 surrounding the rear end of the tubular casing and having an annular flange 29 whose inner diameter is substantially the same as that of the rear end of the casing, said sleeve 28 carrying an annular gear 30 engaged by a gear wheel 31 on a side shaft 32, which at its forward end carries a gear 33 engaged by a gear 34 on the axial shaft 5 aforesaid, so that the sleeve 28 is continuously rotated in the operation of the machine. A shield 35 attached to tubular casing 1 surrounds the rotating sleeve 28, to enable it to rotate without undue friction.

The operation is as follows: The machine being placed in the ditch where the pipe is to be formed *in situ*, and cement being continuously or intermittently supplied to the hopper 22; crank handle 17 is operated continuously to turn the screw member, which forces the cement falling onto it from the hopper, backwardly into the tubular casing forming a cement pipe in the space between the core member 27 and the rear portion of the tubular casing. As the pipe so formed is ejected by the pressure from the tubular casing and rests on the ground, the further operation of the machine causes a forward reaction on the machine tending to advance it in proportion as the pipe is formed, the machine being guided and held in proper position by means of the handle 20. The positive traction means 21, 21' also serves to propel the machine forwardly, this being especially necessary with large pipe. At the same time the core member 27 by its rotary motion compacts and molds the pipe formed. This rotary operation in connection with the forward movement is liable to leave a rifling or helical formation on the inner surface of the pipe, and to remove this formation and leave the interior of the pipe in a smooth, polished condition the follower 23 is provided, which, being held from rotation, and frictionally contacting with the interior of the pipe, smooths out the rifling and gives a surface which presents minimum friction to the fluid passing in the pipe. The outer surface of the pipe is smoothed and pressed at the same time by the rotating motion of the flange ring 29 on the outer sleeve 28. As the pipe leaves the outward supporting casing 1, it is liable to be slightly cracked by the temporary removal of support, and the outer forming ring 29 aforesaid engages the ce-

ment pipe at this moment to immediately close the cracks so formed and compress the cement into compact, solid condition.

What I claim is:

1. In a machine for making a continuous pipe, the combination with a tubular casing, of a worm therein, means for feeding cement to the worm, and a cylindrical core member connected and extending rearwardly from the worm, means for rotating the worm and core member, and a follower having a swivel connection with the rotating worm, and adapted to non-rotatably engage and smooth the interior of the pipe, said follower having a cylindrical body of substantially the same diameter as the core member.

2. In a machine for making a continuous pipe, the combination with a tubular casing, of a worm therein, means for feeding cement to the worm, a cylindrical core member connected and extending rearwardly from the worm, means for rotating the worm and core member, and a follower having a swivel connection with the rotating worm, and adapted to non-rotatably engage and smooth the interior of the pipe, said follower having a cylindrical body of substantially the same diameter as the core member, and the forward end of said follower being tapered.

3. In a continuous pipe machine, the combination with a tubular casing, of a worm therein, means for supplying cement to said worm, means for rotating said worm, the rear end of the tubular casing extending rearwardly beyond the said worm to form a temporary support for the cement pipe, and an outer member rotatably mounted on the tubular casing and having a portion extending rearwardly of the discharge opening of the tubular member to temporarily surround the cement pipe as it issues from the tubular casing, and means for rotating said outer member for the purpose set forth.

4. In a continuous pipe machine, the combination with a tubular casing, of a worm therein, means for supplying cement to said worm, means for rotating said worm, the rear end of the tubular casing extending rearwardly beyond the said worm to form a temporary support for the cement pipe, and an outer member rotatably mounted on the tubular casing and having a portion extending rearwardly of the discharge opening of the tubular member to temporarily surround the cement pipe as it issues from the tubular casing, means for rotating said outer member for the purpose set forth, and a shield surrounding said outer member and attached to the tubular casing.

5. In a machine for making a continuous pipe, the combination with a tubular casing, of a worm therein, means for feeding cement to the worm, and a core member connected and extending rearwardly from the worm, means for rotating the worm and core mem-

ber, a follower having a swivel connection  
with the rotating worm, and adapted to non-  
rotatably engage and smooth the interior of  
the pipe, pairs of wheels connected to the  
5 tubular casing to support the same, and a  
connection between the worm-rotating means  
and a pair of said wheels to move the ma-  
chine forward.

In testimony whereof, I have hereunto set  
my hand at Los Angeles, California, this 10  
26th day of August, 1908.

ROBERT F. DOCKERY.

In presence of—

GEORGE T. HACKLEY,  
FRANK L. A. GRAHAM.