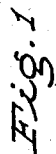


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DITCH PIPE FORMING MACHINE

2 Sheets-Sheet 1



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Fig. 2

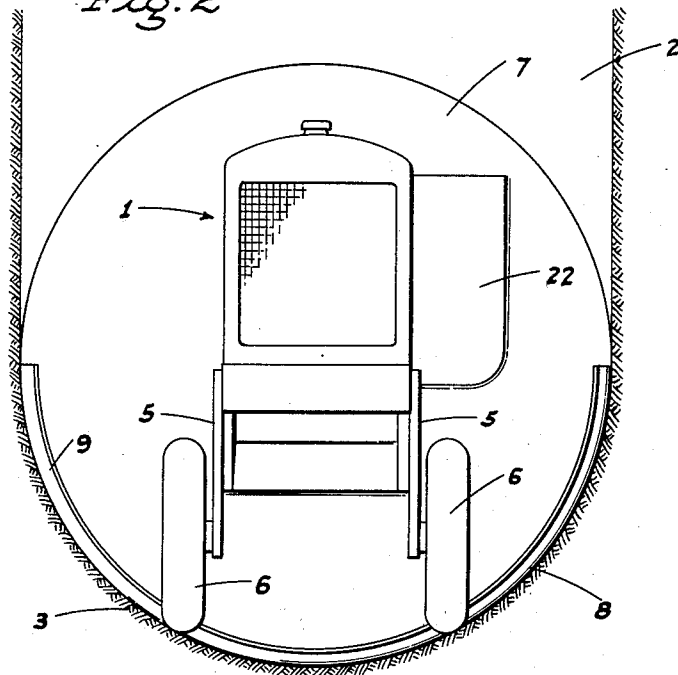
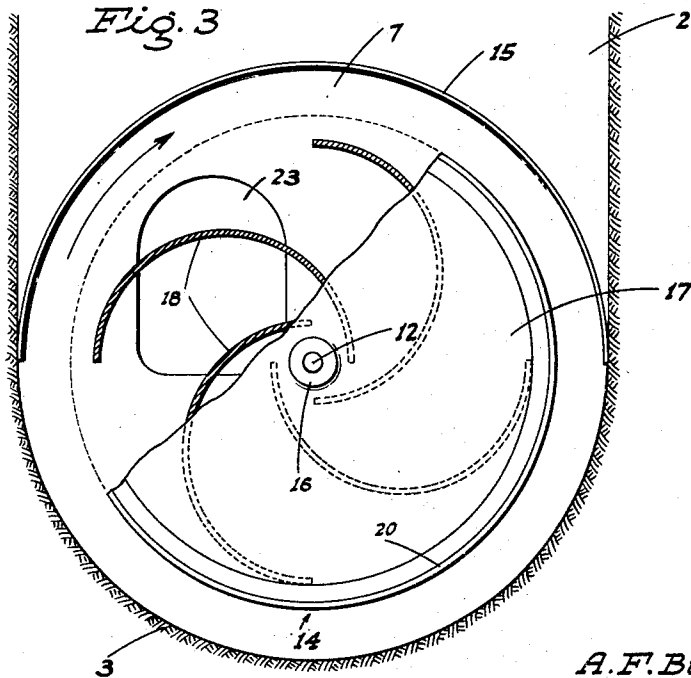


Fig. 3



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DITCH PIPE FORMING MACHINE

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4 Claims. (Cl. 25—32)

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This invention is directed to, and it is an object to provide, a novel, power-actuated machine operative to form continuous in-place pipe in the bottom of a previously excavated ditch; the machine traveling in the latter.

Another object of the invention is to provide an in-place pipe forming machine which comprises, with a wheel-supported frame, a novel pipe form, and cement mix distributing rotor; the frame having an engine mounted thereon coupled in driving relation to said rotor.

An additional object of the invention is to provide an in-place pipe forming machine, as in the preceding paragraph, adapted for use in a pre-excavated ditch having a semi-circular bottom; the latter complementing a semi-circular top half form on the machine to complete the 360° or full-circle form for the pipe.

A further object of the invention is to provide a machine of the type described wherein the rotor runs within said full-circle form comprising one-half of the semi-circular ditch bottom, and there being means to feed cement mix to the rotor while it is in operation whereby the pipe is formed continuously.

A further object of the invention is to form a practical and reliable ditch pipe forming machine, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a sectional elevation illustrating the machine as in use.

Fig. 2 is a front elevation of the machine, as in use.

Fig. 3 is a rear elevation of the machine as in use; the rotary back wall being partly broken away.

Referring now more particularly to the characters of reference on the drawings, the machine, as indicated generally at 1, is adapted to work in a previously excavated ditch, indicated generally at 2, which ditch has a bottom 3 which is semi-circular in a transverse plane. The machine, as will hereinafter appear in detail, is operative to continuously form in-place concrete pipe in the ditch 2.

The machine 1 comprises a longitudinal main frame 4 supported, adjacent its forward end, by a pair of transversely spaced standards 5 fitted with wheels 6 below the main frame 4.

At its rear end the main frame 4 is fixed in

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connection with a vertically disposed circular front wall 7; said front wall being stationary or non-rotary.

The lower half of the non-rotary front wall 7 is provided with a forwardly projecting, semi-circular shoe 8 which runs on the semi-circular bottom 3 of the ditch in supporting relation to the rear end portion of the machine. The leading edge of the semi-circular shoe 8 is intumed as a lip 9 to prevent said shoe from digging in with advance of the implement.

Above the wheels 6 the main frame 4 carries an engine 10 which drives through a transmission 11 to a longitudinal and rearwardly projecting drive shaft 12. Such drive shaft 12 extends through a central bearing 13 mounted on the non-rotary front wall 7; the shaft projecting rearwardly beyond said bearing and there being fitted with a cement mix distributing rotor, indicated generally at 14. This rotor 14 will hereinafter be described in detail.

In surrounding relation to the upper half of the rotor 14 there is a semi-circular top half form 15 which projects rearwardly from the periphery of the top half of the non-rotary front wall 7; said semi-circular form 15 being concentric to, but spaced outwardly from, the rotor 14 a distance predetermined as the thickness of the pipe to be formed. Also, the semi-circular top half form 15 is of substantially the same diameter as the semi-circular bottom 3 of the ditch 2, and complements said bottom to form therewith a 360° or full-circle form.

The rotor 14 comprises, in fixed relation on the rearward projecting portion of the shaft 12, a hub 16 which supports a rotary back wall 17 in adjacent but spaced, facing relation to the stationary front wall 7.

A plurality of arcuate blades are secured to the rotary back wall at the front and radiate in circumferentially spaced relation from the central portion of said back wall; said blades being disposed with the convex side extending in the direction of rotation of the rotor 14. The blades are of a radial extent substantially equal to the diameter of the back wall 17, and are of a width substantially spanning the space between the walls 17 and 7 but running clear of the latter.

At its periphery the rotary back wall 17 includes an annular, rearwardly and outwardly inclined or beveled, rotary trowel 19, while the latter carries at its rear edge another rotary trowel 20 which is relatively narrow and parallel to the rotor axis. The trowel 20 is the finish trowel and works in spaced parallel relation to

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the rear end portion of the top half form 15, this spacing equaling the predetermined thickness of the pipe to be formed.

With the above structure, there is a cement mix distributing chamber 21 formed between the non-rotary front wall 7 and the rotary back wall 17 and in which chamber the blades 18 travel, and the cement mix is fed into said chamber 21 by a feed port 23 through wall 7 between a hopper 22 and chamber 21.

In operation of the above described ditch pipe forming machine, the machine is disposed in the ditch 2 in the manner illustrated. Thereafter, with the rotor 14 driven or rotating, a relatively dry mix of fast drying cement is delivered from the hopper 22 into the chamber 21, whence such mix is distributed partially by the blades 18, rotor 14 against and about the 360° form comprising the semi-circular bottom 3 of the ditch and the complementary semi-circular top half form 1, 5.

As the cement mix is so distributed by the rotor blades, it is compacted and worked first by the bevel trowel 19 and then by the finish trowel 20 to form an in-place pipe 24, which pipe is made continuously with advance of the machine. The machine may advance by reason of the rotation of the rotor 14 and the pressure of the mix against the front wall 7, or said machine may be advanced by independent power mechanism, as preferred.

The mix as fed to and worked by the machine is such that as the machine advances, the pipe holds its form in the ditch, without tendency to fracture or collapse.

The described machine provides a very effective, practical, and reliable device for the construction of in-place concrete pipe in a previously excavated ditch; the device while relatively simple in its structure being very effective in its operation, making possible the placement of pipe in a ditch much faster and more economically than otherwise.

From the foregoing description it will be readily seen that there has been produced such a device as will substantially fulfill the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. A ditch pipe forming machine comprising a supporting frame, wheels supporting the forward end of the frame from the ground, an annular wall fixed on the rear end of the frame, a semi-cylindrical supporting shoe about the lower periphery of the wall and projecting forwardly therefrom, a power unit on the frame, such power unit including a drive shaft projecting through and journaled in the wall, a rotary wall on the free end of the drive shaft, such rotary wall being spaced from the fixed wall to form a cement mix

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receiving chamber between the two, means to feed a cement mix into said chamber, the diameter of the rotary wall being less than that of the fixed wall, arcuate distributing blades fixed edgewise on the inner face of the rotary wall with the convex faces thereof extending in the direction of travel of the rotary wall, such blades radiating outwardly from the axis of the rotary wall to substantially the outer periphery of the latter and being of a width to substantially span the space between the two walls, a semi-cylindrical form projecting inwardly from the upper portion of the outer periphery of the fixed wall in overhanging relation to the rotary wall, and a trowel element projecting rearwardly from the periphery of the rotary wall and in spaced relation to the inner face of said form.

2. An in-place pipe forming machine adapted to work in a ditch having a substantially semi-cylindrical bottom, such machine comprising a mobile frame supported for movement in and along the ditch, a front plate on the frame disposed transversely of the ditch, the lower edge of the front plate conforming to the semi-cylindrical bottom of the ditch, a substantially semi-cylindrical half form connected with and projecting rearwardly from the upper edge of the front plate, the lower edges of the half form merging with the upper portion of the curved ditch bottom, a rear plate spaced from the front plate, such rear plate being of a lesser diameter than that of the front plate and such rear plate being disposed within the space defined by the ditch bottom and the half form, a substantially cylindrical trowel element fixed to the peripheral edge of the rear wall and projecting rearwardly therefrom, the ditch bottom and half form, the front wall, and the trowel defining a mold for the pipe wall, means to discharge a concrete mix into the space between the front and rear walls, and means in said space operative to move the mix radially out into the mold.

3. A machine as in claim 2 in which said last named means consists of a plurality of arcuate blades set edgewise between the front and rear walls, power means on the frame and operatively connected with said blade to rotate the latter, the convex sides of the blades extending in the direction of rotation thereof.

4. A machine as in claim 3 in which the blades are fixed to the rear wall whereby said wall and the trowel will rotate with the blades.

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