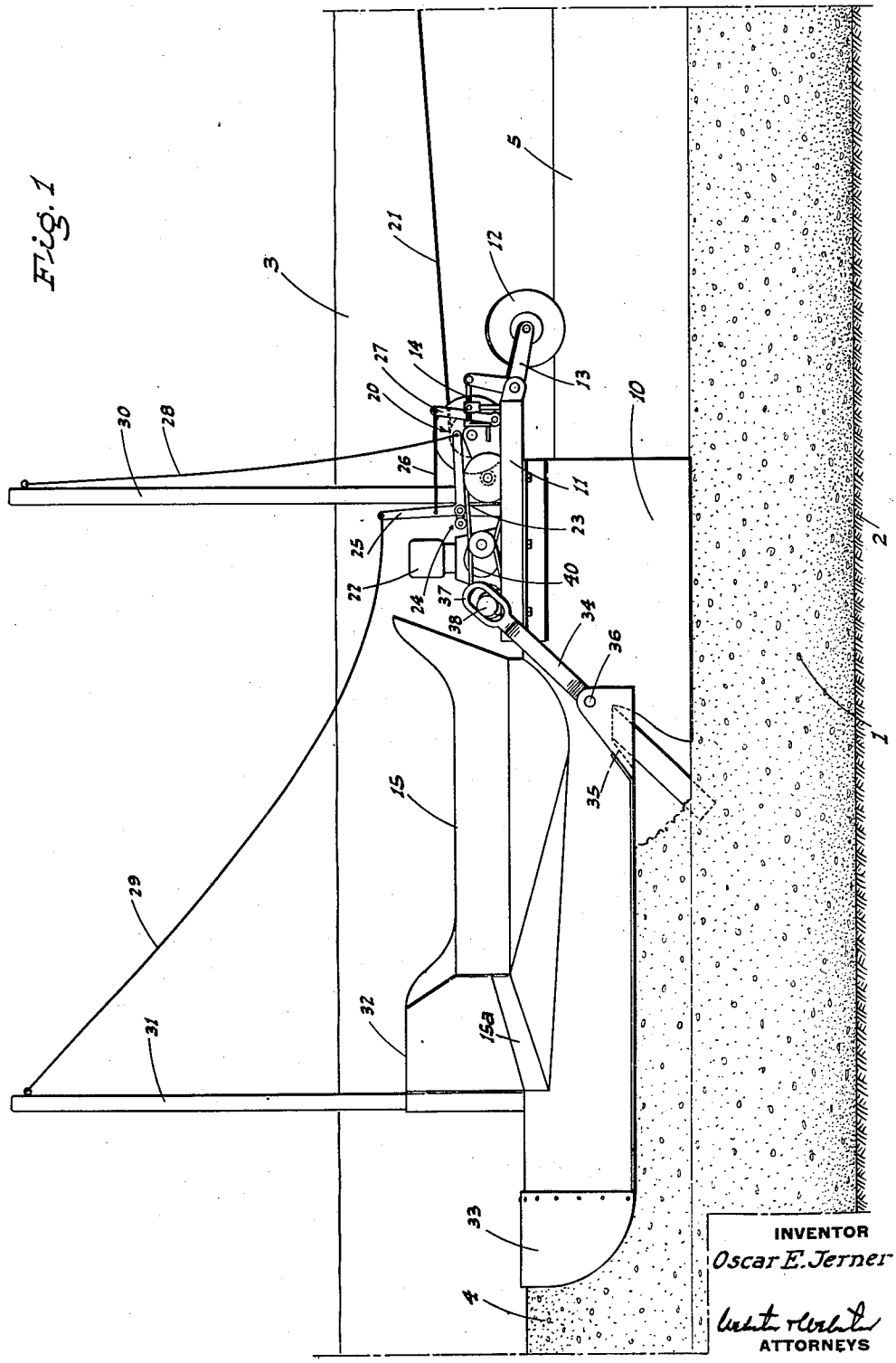
Nov. 6, 1951 O. E. JERNER 2,574,213

MACHINE FOR FORMING THE UPPER SEGMENT OF IN-PLACE CONCRETE PIPES

Filed Feb. 27, 1950 2 SHEETS—SHEET 1

Fig. 1



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Fig. 2

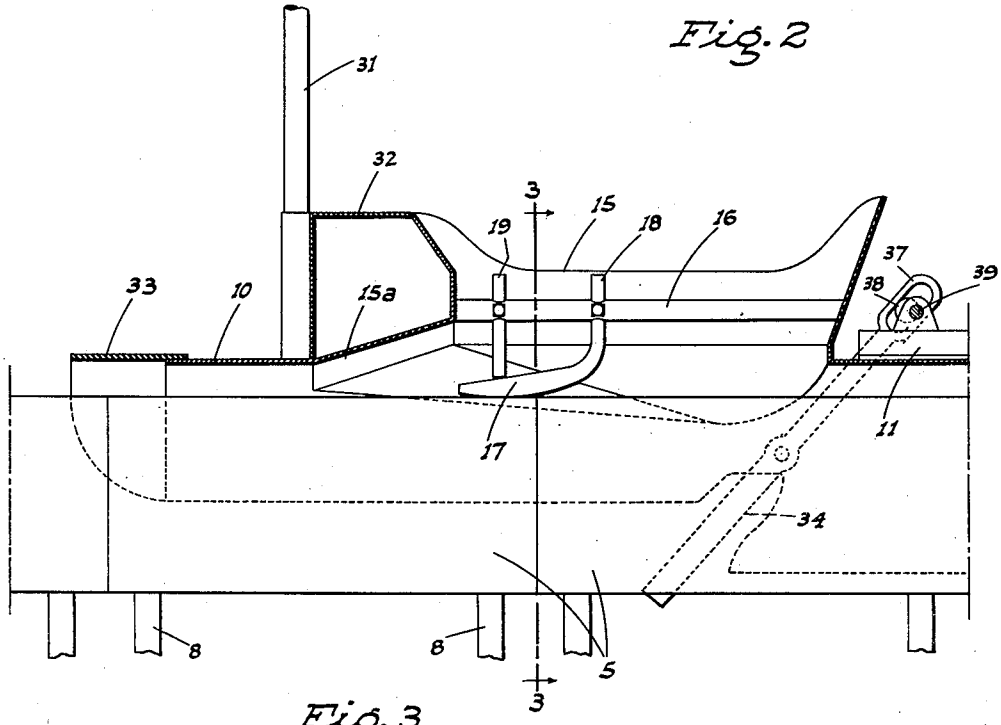
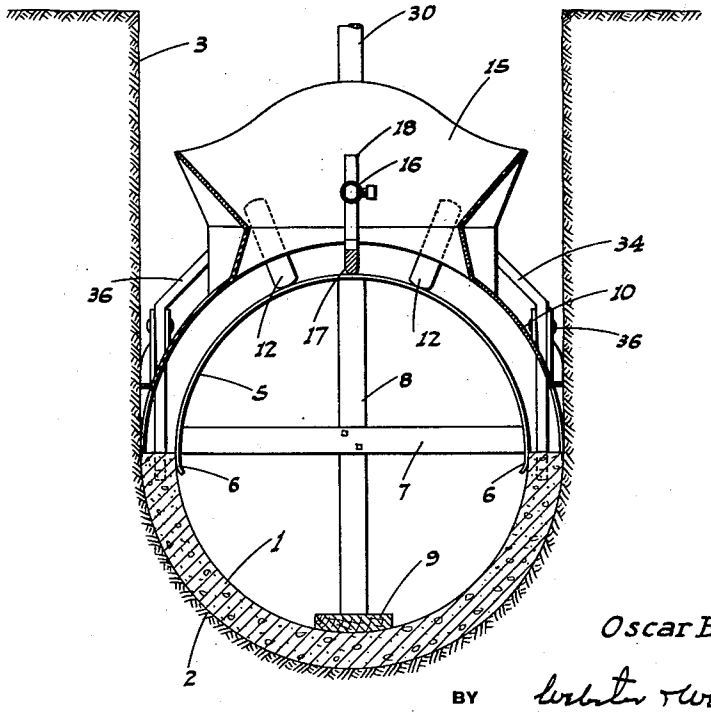


Fig. 3



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MACHINE FOR FORMING THE UPPER SEGMENT OF IN-PLACE CONCRETE PIPE

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Application February 27, 1950, Serial No. 146,521

5 Claims. (Cl. 25—32)

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The present invention is directed to, and it is a major object to provide, a novel machine operative to form the upper segment of in-place concrete pipe; i. e. concrete pipe which is poured and shaped directly in a pre-dug trench.

The lower half or segment of the formed in-place pipe is shaped by the machine shown in copending application, Serial No. 146,522, filed February 27, 1950; an object of the present invention being as aforesaid, to form the upper half of segment of said pipe.

A further object of the invention is to provide a machine, for the purpose described, which includes a novel, upper form assembly; the latter being simple in structure and rugged, yet very effective when in use.

Another object of the invention is to provide the machine with novel power mechanism operative to cause the machine to advance in the trench so that a continuous pour or run can be accomplished; such mechanism including readily accessible manual controls.

An additional object of the invention is to provide the machine with power driven puddling arms which work the fresh concrete at the longitudinal lines of juncture of the upper and lower segments whereby to produce a complete bond retween the same.

It is also an object of the invention to provide a machine, for forming the upper segment of in-place concrete pipe, which is designed for ease and economy of manufacture.

Still another object of the invention is to provide a practical and reliable machine for forming the upper segment of in-place concrete pipe, 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 side elevation of the machine as in operation.

Fig. 2 is a fragmentary, longitudinal section of the machine.

Fig. 3 is a transverse section of the machine, taken through the hopper.

Referring now more particularly to the characters of reference on the drawings, the present machine is constructed as follows:

After the lower segment 1 of the concrete pipe has been formed in the half-round bottom 2 of a pre-dug trench 3, by the machine shown in the above identified copending application, the

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present machine follows, before the concrete of the lower segment 1 has set firm, and forms the upper segment 4 of said pipe in a continuous operation.

The numeral 5 indicates half-round, arch-type inside forms which are set longitudinally in end to end abutment in the trench after formation of the lower segment 1; such inside forms 5 including depending longitudinal lips 6 which engage in stabilizing relation within the upper edge portions of the lower segment 1.

The inside forms 5 are maintained against diametral contraction by cross bars 7, and said forms are supported from the bottom of each lower segment 1 by center posts 8 which extend from the top of each such form, adjacent the ends thereof, and carry pedestal blocks 9 at their lower ends for wide resting engagement on said bottom of the lower implement. In this manner the inside forms 5 are effectively positioned for use.

An outside, concave or saddle-like form 10 is adapted to travel along the row of inside forms 5 in symmetrical but spaced relation thereto; the form 10 being supported as follows:

At its forward end the outside form 10 is fitted with a horizontal, forwardly projecting frame 11, and a pair of transversely spaced supporting wheels 12 are mounted in connection with the front end of such frame by bellcranks 13 adjustable through the medium of crank units 14. The transversely spaced supporting wheels 12 are canted so that they ride the top of the inside forms 5 at substantially a right angle thereto. This aids in assuring of proper tracking of the machine.

Rearwardly of the frame 11, the outside form 10 is provided with an elongated, upstanding hopper 15, and within said hopper there is fixed a longitudinal mounting bar 16. A supporting shoe 17 rides centrally on the inside forms 5 directly below the mounting bar 16, and said shoe includes a standard 18 adjustably attached to such bar. Additionally, the bar 16 is fitted with a vertically adjustable stabilizing post 19 which bears downwardly on the supporting shoe 17.

Thus, with the transversely spaced supporting wheels 12, and the shoe 17, arranged as described, the outside form 10 is supported in proper spaced relation above, and for movement along, the row of inside forms 5.

The following power mechanism is employed to advance the outside form 10 in the trench along said row of inside forms 5:

At the front end thereof the frame 11 provides the support for a winch 20, and a cable 21 leads forwardly from the winch to connection with an anchor point (not shown).

Rearwardly of the winch 20 the frame 11 carries an engine 22 connected to the winch by a normally slack endless belt and pulley unit 23; such endless belt and pulley unit being adapted to be brought into driving operation by a belt tightener 24 carried on bellcrank lever 25.

A link 26 is pivotally connected between an upstanding leg of the bellcrank lever 25 and the upper end of a winch brake release lever 27. Therefore, upon swinging of the bellcrank lever 25 in a given direction, the belt tightener 24 places the endless belt and pulley unit 23 in operation, and at the same time swings the lever 27 in a winch brake release direction. When this occurs the winch 20 is actuated, pulling in on the cable 21 and causing the outside form 10 to slowly advance.

The bellcrank lever 25 is manually controlled by either a pull cord 28 connected to the forwardly projecting leg of said lever, or a separate pull cord 29 connected to the upper end of the other lever; said pull cords 28 and 29 extending upwardly to connection with the upper ends of posts 30 and 31 mounted on the outside form 10 at the front and rear thereof, respectively.

An operator's platform 32 is formed on the outside form 10 directly to the rear of the hopper 15.

As the outside form 10 is slowly advanced, concrete is poured into the hopper 15 and thence is shaped by the outside form 10 and adjacent inside form 5 intot he upper segment 4; there being a tapered throat 15a, in the outside form 10, extending rearwardly of, and adapted to receive material from, said hopper 15. The purpose of the tapered throat 15a is to assure of proper distribution of the fresh concrete from the hopper 15 to between the forms 5 and 10.

A flexible rubber drag 33 on the rear end of the form 10 serves to smooth the outside surface of said upper segment 4.

The operation is continuous, and advance of the machine is controlled by an operator from his station on the platform 32, such control being accomplished through the medium of the pull cord 29. Additionally, should an operator outside the trench desire to control advance of the machine, the pull cord 28 is readily accessible for this purpose.

As the machine advances, a complete bond is formed between the adjacent longitudinal edges of the lower segment 1 and the upper segment 4, and such bond is produced by the following structural arrangement:

A pair of transversely spaced puddling arms 34 are disposed on opposite sides of the form 10 adjacent the front end of the hopper 15; said puddling arms 34 extending at a rearward and downward incline through side slots 35, and having vertical lower end portions which extend between the forms 5 and 10. The puddling arms 34 are pivoted, intermediate their ends, as at 36, for rocking motion in a longitudinal plane; said arms being of a length below the pivots 36 such that when the arms rock their lower ends work up and down across the adjacent longitudinal line of engagement between the segments 1 and 4.

At their upper ends the arms 34 are formed with longitudinally slotted heads 37, and an eccentric 38 works in each slot; the eccentrics being mounted on a cross shaft 39 driven from the engine 22 by an endless belt and pulley unit 40.

When the machine is in operation, with the engine 22 running, the eccentrics 38 constantly rock the arms 34 so that the lower ends of the latter constantly work or puddle the concrete at the longitudinal lines of engagement of the segments 1 and 4, producing a complete bond of the concrete at said lines, so that when said upper segment 4 is cast it is an integral part of the lower segment 1.

With the above described machine, working in cooperation with the machine of the identified copending application, continuous, integral concrete pipe can be formed effectively, relatively rapidly, and with economy.

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

While this specification sets forth in detail the present and preferred construction of such device, still in practice such deviations therefrom 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 machine for forming the upper segment of in-place concrete pipe in a pre-dug trench, comprising a longitudinal transversely arched inside form, means adapted to support the inside form from an in-place lower segment of the pipe, a longitudinal transversely arched outside form spaced from the inside form, a hopper on and opening through the top of the outside form, and means adapted to support the outside form from and for advance along the inside form while maintaining said spacing, the supporting means including transversely spaced supporting members at the front of the outside form riding the inside form, a separate supporting member riding the inside form below the hopper, and a mounting bar intersecting the hopper, said separate member being a shoe secured in connection with the mounting bar.

2. A machine, for forming the upper segment of in-place concrete pipe in a pre-dug trench, comprising a longitudinal transversely arched inside form, means adapted to support the inside form from an in-place lower segment of the pipe, a longitudinal transversely arched outside form spaced from the inside form, a frame atop the front portion of the outside form, a pair of transversely spaced supporting wheels mounted on the frame and riding the inside form, a longitudinal hopper on and opening through the outside form rearwardly of the frame, and a shoe mounted in connection with the outside form riding the inside form rearwardly of the wheels and adjacent the hopper.

3. A machine, for forming the upper segment of in-place concrete pipe in a pre-dug trench, comprising a longitudinal transversely arched inside form, means adapted to support the inside form from a fresh concrete, in-place lower segment of the pipe, a longitudinal transversely arched outside form spaced from the inside form, means adapted to support the outside form from and for advance along the inside form while maintaining said spacing, a hopper on the outside form in position to deliver between the inside and outside forms, and power driven mechanism mounted in connection with the outside form adapted to work and merge the fresh con-

crete at the longitudinal lines of engagement of the lower and upper segments of the pipe.

4. A machine, for forming the upper segment of in-place concrete pipe in a pre-dug trench, comprising a longitudinal transversely arched inside form, means adapted to support the inside form from a fresh concrete, in-place lower segment of the pipe, a longitudinal transversely arched outside form spaced from the inside form, means adapted to support the outside form from and for advance along the inside form while maintaining said spacing, a hopper on the outside form in position to deliver between the inside and outside forms, and power driven mechanism mounted in connection with the outside form adapted to work and merge the fresh concrete at the longitudinal lines of engagement of the lower and upper segments of the pipe; said power driven mechanism including puddling arms movably mounted in connection with the outside form and projecting downward to a work between said forms at said lines, an engine on the outside form, and driving means between the engine and puddling arms.

5. A machine, for forming the upper segment of in-place concrete pipe in a pre-dug trench, comprising a longitudinal transversely arched inside form, means adapted to support the inside form from a fresh concrete, in-place lower segment of the pipe, a longitudinal transversely

arched outside form spaced from the inside form, means adapted to support the outside form from and for advance along the inside form while maintaining said spacing, a hopper on the outside form in position to deliver between the inside and outside forms, and power driven mechanism mounted in connection with the outside form adapted to work and merge the fresh concrete at the longitudinal lines of engagement of the lower and upper segments of the pipe; said power driven mechanism including puddling arms longitudinally rockably mounted on the outside form and projecting downward to work between said forms at said lines, a cross shaft on the outside form, eccentrics on the cross shaft cooperating with the arms to rock the same, and an engine on the outside form driving said cross shaft.

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