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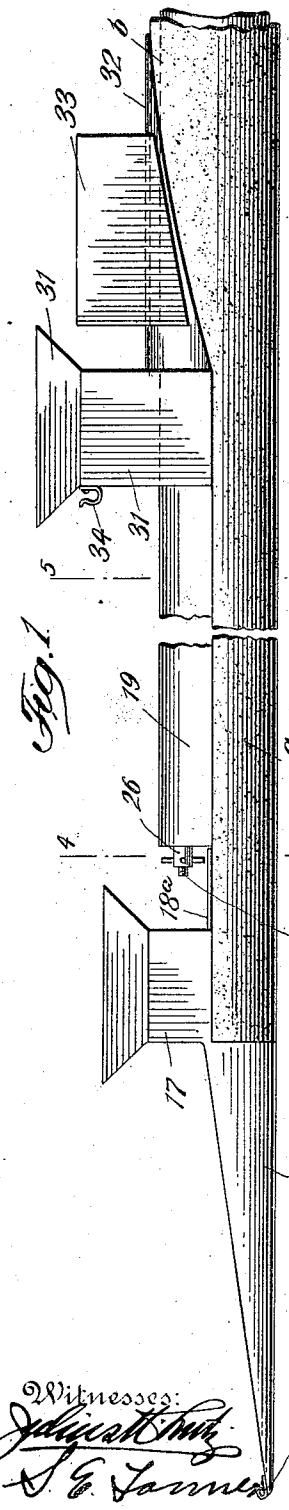
CONCRETE PIPE MOLD.

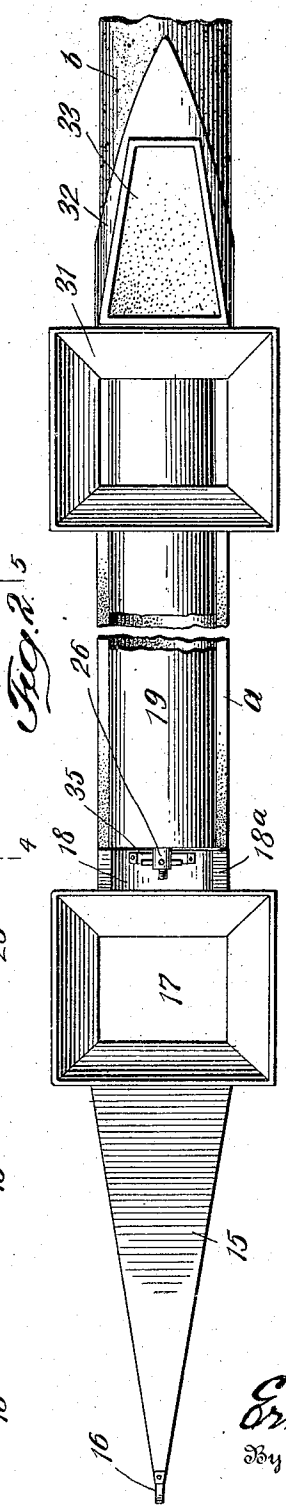
APPLICATION FILED JUNE 2, 1914.

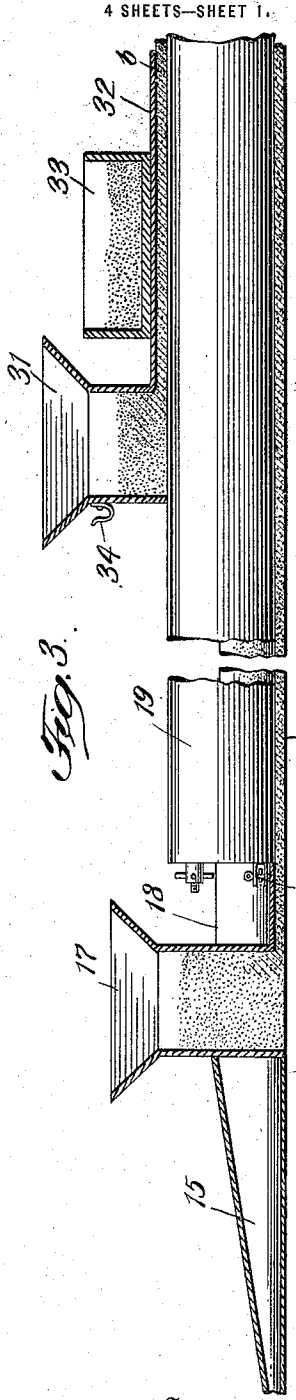
1,191,731.

Patented July 18, 1916.

4 SHEETS—SHEET 1.







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4 SHEETS—SHEET 2.

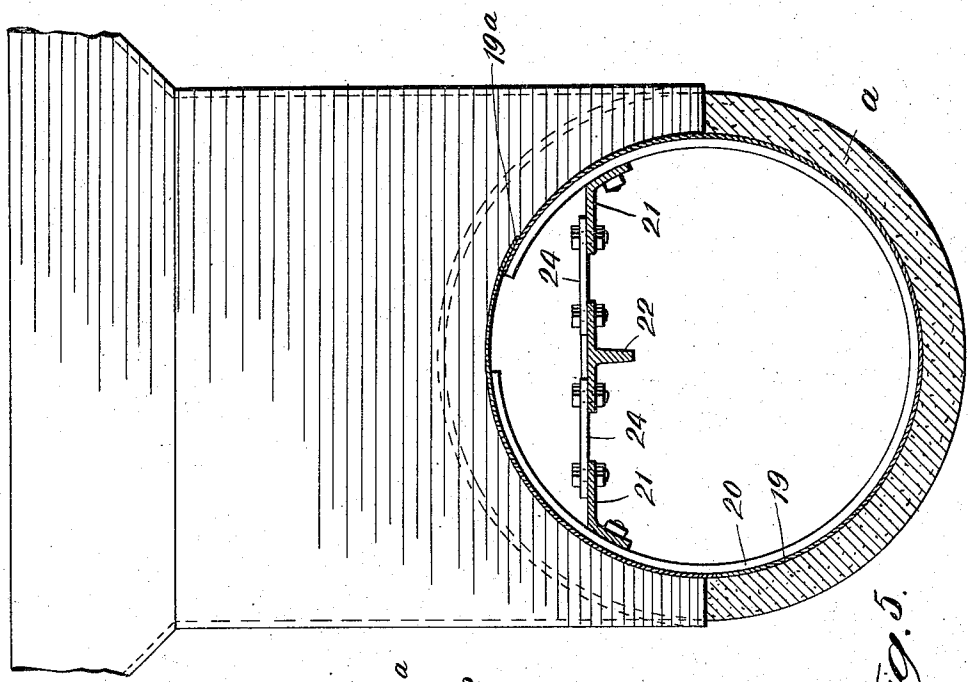


Fig. 5.

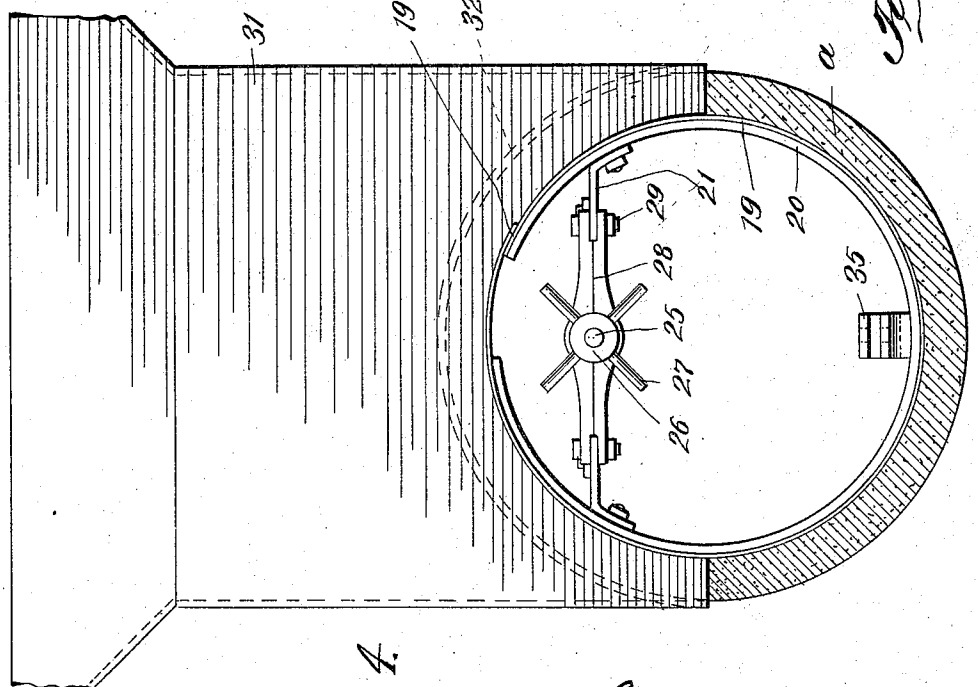


Fig. 4.

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4 SHEETS—SHEET 3.

Fig. 7

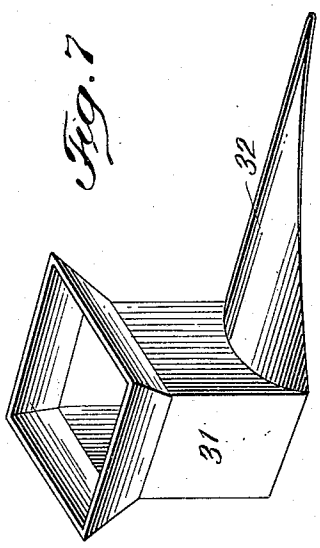
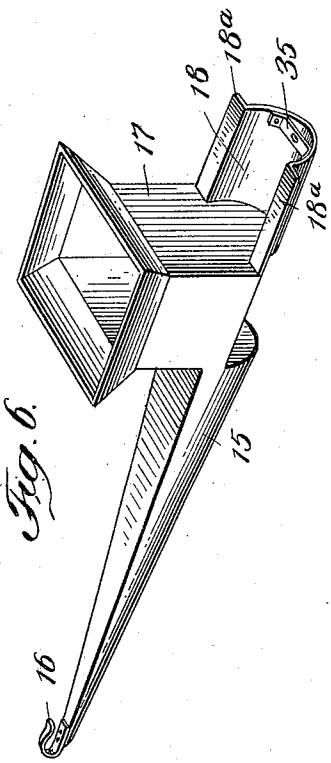


Fig. 6.



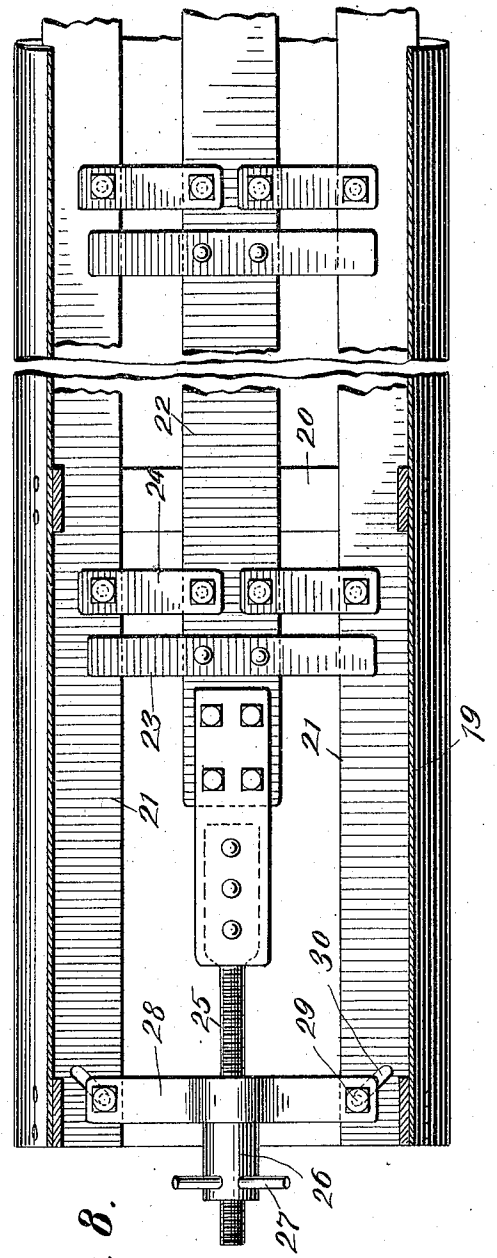


Fig. 8.

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CONCRETE PIPE MOLD.

APPLICATION FILED JUNE 2, 1914.

1,191,731.

Patented July 18, 1916.

4 SHEETS—SHEET 4.

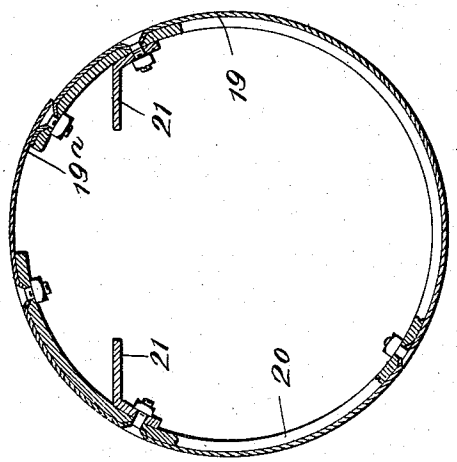


Fig. 10.

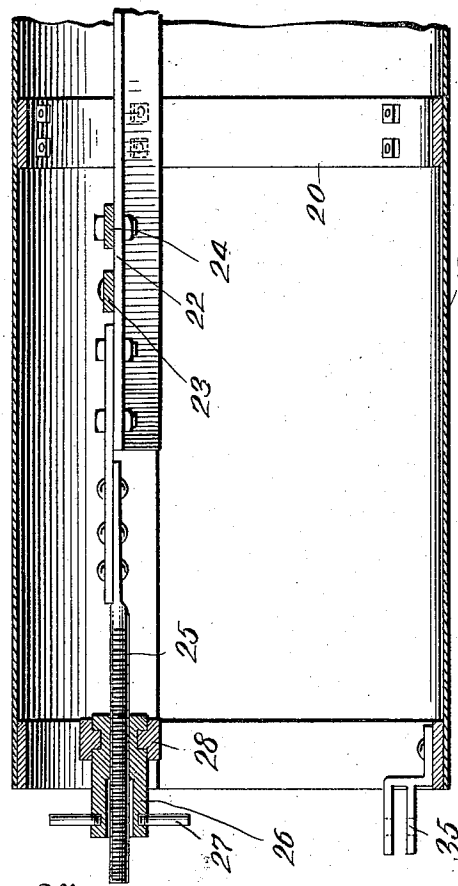


Fig. 9.

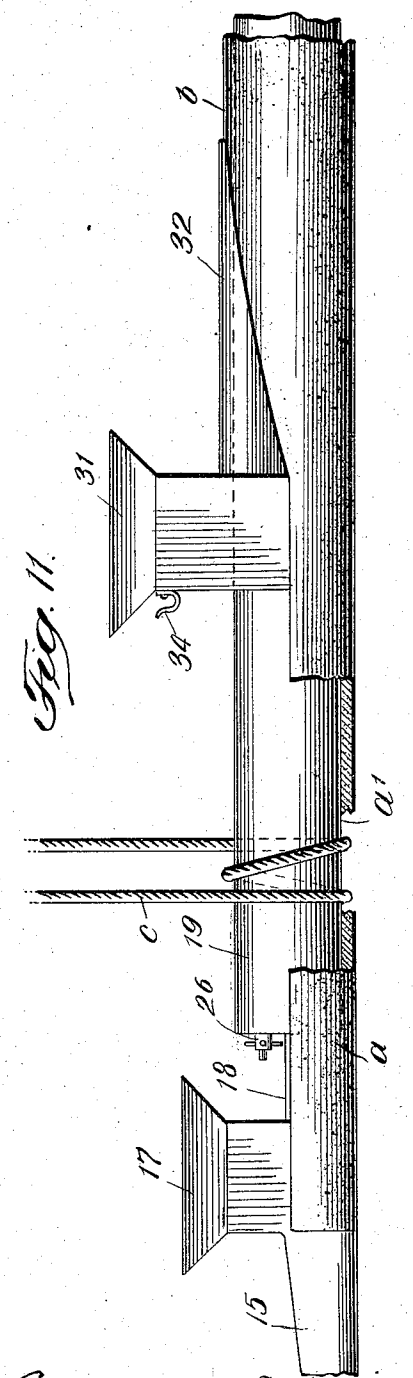


Fig. 11.

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UNITED STATES PATENT OFFICE.

ERNEST L. RANSOME, OF PLAINFIELD, NEW JERSEY.

CONCRETE-PIPE MOLD.

1,191,731. Specification of Letters Patent. Patented July 18, 1916.

Application filed June 2, 1914. Serial No. 842,452.

To all whom it may concern:

Be it known that I, ERNEST L. RANSOME, a citizen of the United States, and a resident of Plainfield, New Jersey, have invented certain new and useful Improvements in Concrete-Pipe Molds, of which the following is a description in such full, clear, and exact terms as will enable any person skilled in the art to which it pertains to make and use the same.

My invention relates to an apparatus for forming continuous lengths of concrete pipes such as sewer, drain and aqueduct pipes, the principal object of which is to provide for forming the "invert" or bottom half of the pipe simultaneously with the withdrawal of the core from the section of the pipe previously formed and hardened. This places the core in its new or advanced position with the invert formed ready to receive the cap or top section of the pipe which may be immediately formed by running the cap molding part over the core. This not only allows for the rapid formation of the pipe but allows the cap section to be set on the invert while the concrete is yet soft and thereby enables me to make a tight or integral bond between the two sections of concrete.

My invention further involves improvements in the structure of the core and the means for collapsing it to facilitate its withdrawal and various other features of importance all of which will be fully set forth hereinafter and particularly pointed out in the claims.

Reference is now had to the accompanying drawings which illustrates as an example the preferred practical embodiment of my invention.

In these drawings—Figure 1 is a side view of the complete apparatus showing it in relation to the pipe which it forms; Fig. 2 is a plan view of the same; Fig. 3 is a longitudinal section; Fig. 4 is a cross section on the line 4—4 Fig. 1; Fig. 5 is a cross section on the line 5—5 Fig. 1; Fig. 6 is a detail perspective of the invert mold; Fig. 7 is a similar view of the cap mold; Fig. 8 is a sectional plan of the core showing the means for collapsing it; Fig. 9 is a vertical section of the core; Fig. 10 is a cross section thereof; and Fig. 11 is a side view of the mold.

The pipe is usually laid in a trench in the earth or in another suitably prepared foundation, the bottom half *a* of the pipe being the invert and the top half *b* the cap. For many years it has been the practice to cast the latter on the former and both around the core which is usually constructed of sheet metal so arranged that it may be collapsed or constricted when desired so that it may be withdrawn from the hardened section of concrete and advanced in position for the section next to be laid. At that time the core is extended or again restored to its normal diameter which is the internal diameter of the concrete tube being formed.

The invert mold as shown best in Fig. 6 comprises a shoe 15 which lies in the trench and has a hook or other means 16 for the attachment of a draft apparatus by which the invert mold and core are drawn ahead from time to time as the pipe is formed. Behind the shoe is a hopper 17 in which the plastic concrete is charged and which is furnished with an open bottom through which the concrete is discharged. Behind the hopper is the invert mold proper 18 which consists of a curved metal plate shaped according to the invert and having at its upper side edges flanges 18^a which are designed to run on the top edges of the concrete forming the invert as the drawing (particularly Figs. 1 and 2) clearly show.

In forming the invert the mold is drawn through the trench, care being taken to keep the hopper 17 filled with wet or plastic concrete. This concrete will by gravity feed itself out through the open bottom in a layer the thickness of which is determined by the elevation of the mold proper 18 above the bottom of the shoe 15. As the mold proper 18 passes over this curved layer of concrete it presses and shapes the same and in fact forms the invert leaving it in position to receive the cap and harden. But it is necessary to retain the invert and cap in their proper shape until they harden or partly harden so that they may stand of their own strength. This is one of the functions of the core which is shown at 19 in the drawings and is formed of a flexible metal sheet rolled into cylindrical form with its edges loosely overlapped as shown at 19^a so that it may be expanded or collapsed as before described. The core may be suitably strengthened by interior bands 20 riveted to the sheet metal of which the core is formed.

For the purpose of expanding and collapsing the core I provide (see Figs. 8, 9 and 10) longitudinal ribs 21 interiorly located and fastened to the bands 20 so that they ex-

tend horizontally through the core. Between the ribs 21 a bar 22 extends longitudinally and is supported by cross bars 23 fastened to the bar and resting loosely on the ribs 21. Links 24 are pivoted to the bar 22 and to the ribs 21 so that as the bar is moved longitudinally independently of the core the draft on the links pulls the ribs 21 toward each other or pushes them away from each other according to the direction of movement of the bar. This it will be seen (by reference, for example to Fig. 10) will collapse or extend the core as before explained.

The before described independent longitudinal motion of the bar 22 is effected through a screw 25 which is fastened to the front end of the bar and is threaded into a nut 26 furnished with spokes 27 for its manual rotation and seated to turn in a cross bar or bridge 28 the ends of which have pins 29 fitted in slots 30 in the ribs 21. This arrangement of the cross bar or bridge holds it with sufficient firmness and yet allows for the collapsing of the core. Rotation of the nut 26 will enforce a longitudinal movement of the bar 22 in direction according to the direction of rotation of the nut.

From Figs. 2, 3 and 9 it may be seen that the core is joined to the rear of the invert mold proper by a coupling 35 so that the core follows the progressive movement of the invert mold. Now when a section of the pipe has been formed and hardened sufficiently to allow a new section to be formed the invert mold is drawn ahead forming the invert as before explained. But the core follows this movement, it having been previously collapsed by the manual operation of the gear shown in Fig. 8 thereby allowing the free movement of the core out of the hardened section of the pipe. It is most important to note that the result of this operation is simultaneously to form the invert, pull the core out of the finished section and lay it on and over the newly formed invert to retain the same while it is hardening and the cap is being formed.

The cap is formed on and over the core to meet the upper edges of the invert and this is performed by the cap mold the same comprising a hopper 31 for the concrete and a following mold proper 32 which later is curved to conform to the shape of the cap and serves to shape and compress the concrete as its passes through the open bottom of the hopper (see Fig. 3).

33 is a box which is (or may be) set on top of the mold 32 to weight the same and hold it steady.

34 is a draft hook on the hopper 31 to which a draft means may be connected to draw the cap mold forward as the work progresses.

The cap mold, it will be seen, has no direct connection with the invert mold but is supported on the core and in the edges of the invert and is moved forward to form the cap very shortly after the invert is formed so that the plastic concrete of the cap meets the not yet hardened concrete of the invert and a practically integral bond effected by the natural union of the two masses of concrete without the necessity of an artificial bonding means.

From the aforegoing it is believed that the operation and advantages of my invention will be apparent. The core is a continuous structure which may be of any reasonable length and each section of pipe molded will be of the length of the core. The core must then rest and the operation of construction cease until the section formed is sufficiently hardened after which the invert mold and core are advanced followed by the cap mold which movements result in forming the next section of the pipe. The simultaneous withdrawal of the core and casting off the invert greatly reduces the interval of rest of the molding parts and therefore increases the speed with which the pipe may be formed.

While I have illustrated the invention as embodied in a structure with a single core, it is plain that the same principles may be utilized in an apparatus having a plurality of cores to form a number of parallel pipes or passages in the construction, for example, of conduits for electric wires and cables. It should further be noted that the bar 22 and links 23 are preferably terminated short of the rear end of the core to give that part of it a higher degree of elasticity than that of the other or main part. The virtue of this is that the front end of the hardened section of concrete pipe will not be in danger of being cracked or fractured when the core is withdrawn to its forward position and expanded with its rear end in the front end of the pipe. There are various situations in which the expansion of a rigid rear end of the core in the front end of the pipe would crack or injure the pipe and this is obviated by the arrangement referred to.

Fig. 11 illustrates the manner in which the core may be cleaned and greased *i. e.*, by leaving an opening *a'* in the invert and passing a greased rope or band *c* around the core. This rope or band is drawn back and forth as the core is advanced and after the task is finished the gap *a'* in the invert may be closed up by tamping concrete into it manually.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. In an apparatus for forming concrete pipes, an invert mold operating on the interior of the pipe and a core connected to advance simultaneously.

2. An apparatus for forming concrete pipes having an invert mold operating on

the interior of the pipe, a core connected to advance with the invert mold and a cap mold adapted to advance over the projected core.

3. An apparatus for forming concrete pipes having an invert mold operating on the interior of the pipe and a hopper for the plastic concrete, whereby the advance of the mold supplies the concrete to the trench and simultaneously shapes and presses the invert.

4. An apparatus for forming concrete pipes having an invert mold operating on the interior of the pipe and a hopper for the plastic concrete, whereby the advance of the mold supplies the concrete to the trench and simultaneously shapes and presses the invert, and a core connected to advance with the invert mold.

5. An apparatus for forming concrete pipes having an invert mold including a hopper for the plastic concrete, whereby the advance of the mold supplies the concrete to the trench and simultaneously shapes and presses the invert and a core connected to advance with the invert mold and a cap mold including a hopper for the plastic concrete adapted to advance over the extended core for the purpose specified.

6. An apparatus for forming concrete pipes comprising a shoe adapted to run in the trench, a hopper to supply the plastic concrete and an invert mold behind the hopper operating on the interior of the pipe, the hopper having an open bottom to discharge the concrete under the invert mold in combination with a core connected to advance simultaneously with the invert mold.

7. An apparatus for forming concrete pipes comprising a shoe adapted to run in the trench, a hopper to supply the plastic concrete and an invert mold behind the hopper operating on the interior of the pipe, the hopper having an open bottom to discharge the concrete under the invert mold in combination with a core connected to advance simultaneously with the invert mold and a cap mold adapted to advance over the extended core.

8. An apparatus for forming concrete pipes having an invert mold comprising a shoe adapted to run in the trench, a hopper to supply the plastic concrete and a mold proper behind the hopper, the hopper having an open bottom to discharge the concrete under the mold proper and in combination with a core connected to advance simultaneously with the invert mold and a cap mold adapted to advance over the extended core and the cap mold also having an open bottom hopper to supply the plastic concrete under the mold proper.

In testimony whereof I have hereunto signed my name in the presence of two witnesses.

ERNEST L. RANSOME.

Witnesses:
JOSEPH P. CASEY,
M. L. ORPHAL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."