E. M. HAMILTON & C. N. EARL.

Apparatus for Making and Laying Continuous Concrete-Pipe.

No. 220,757. Patented Oct. 21, 1879.

FIG. 1

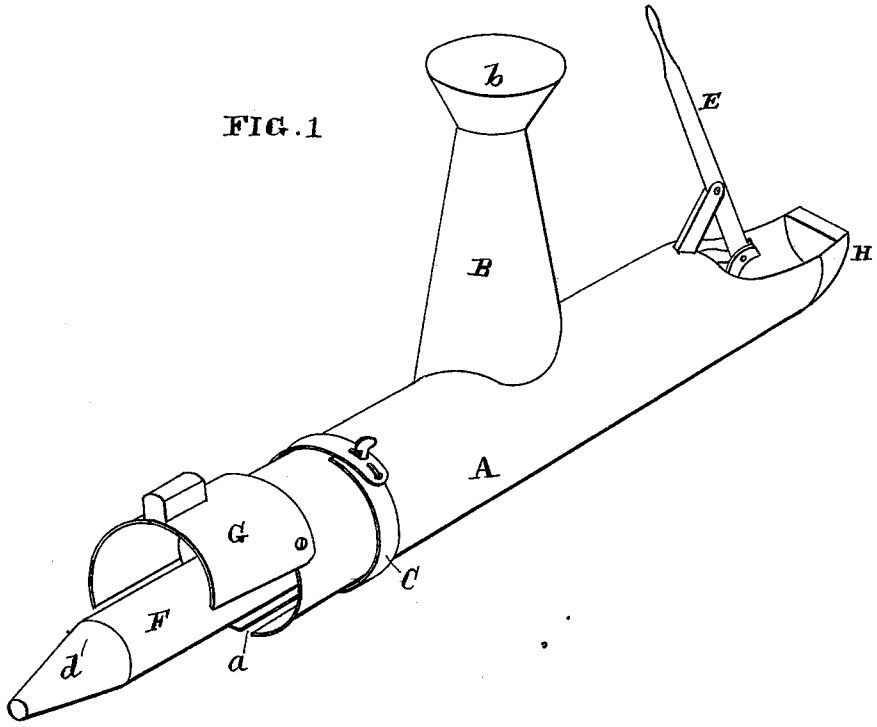
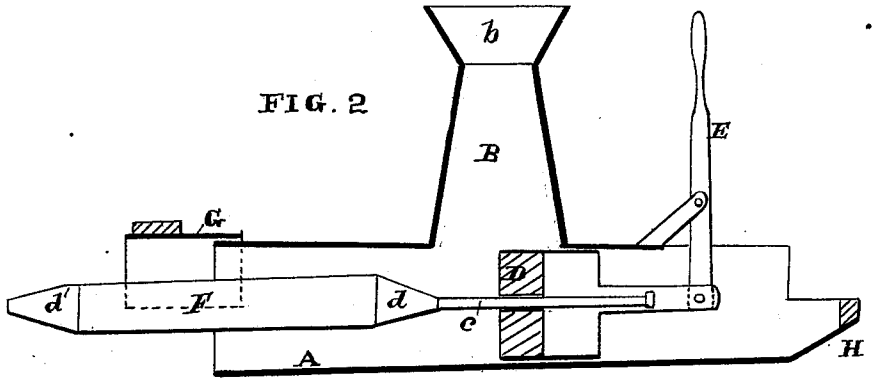


FIG. 2



Witnesses.

Horace N. Brooke

J. F. Towne

Inventors

Ezra M. Hamilton and

Charles N. Earl

By Dewey & Co. Attys.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EZRA M. HAMILTON AND CHARLES N. EARL, OF LOS ANGELES, CALIFORNIA.

IMPROVEMENT IN APPARATUS FOR MAKING AND LAYING CONTINUOUS CONCRETE PIPE.

Specification forming part of Letters Patent No. **220,757**, dated October 21, 1879; application filed July 9, 1879.

To all whom it may concern:

Be it known that we, EZRA M. HAMILTON and CHARLES N. EARL, of the city and county of Los Angeles, and State of California, have invented an Apparatus for Making and Laying Continuous Concrete Pipe; and we hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to an improved method and apparatus for the manufacture of concrete or cement pipe; and it consists of a cylinder or case which is laid horizontally in the trench prepared for the pipe, said cylinder being provided with a piston or plunger, which is operated by hand, and which forms the pipe from the mortar or cement, which is fed to the cylinder from a feed tube or hopper on top.

A flexible core is attached to the end of the piston, which forms the orifice through the pipe, the pipe being thus made in a continuous piece without joints of any kind, so that all leakage is avoided.

The operation of the lever attached to the piston, while it forms the pipe, serves also to force the cylinder or case along the trench gradually as the pipe is made and laid by the same operation, as is more fully described in the accompanying drawings, in which—

Figure 1 is a perspective view of my apparatus. Fig. 2 is a longitudinal section.

The case or cylinder A is largest at the rear end, in order to avoid any friction of mortar inside of it, and so that the earth may be pressed firmly to support the pipe when it is bedded after leaving the cylinder, as hereinafter described. This case is split or divided, as shown at *a*, behind the feed-tube B, so that the diameter may be increased or decreased at will.

A draw-band, C, passes around this end of the pipe, so as to keep it at any desired diameter, in order that different-sized pipe may be made with the same cylinder. This draw-band is made with elongated slots on one end, and a thumb-key on the other, said key fitting into the slots, so as to hold the band or hoop to any desired diameter, and thus regulate the size of the cylinder.

The feed-tube B, which is provided with a hopper, *b*, opens into the cylinder A at about the middle, and is made tapering from the cylinder upward, as shown, the larger end opening into the cylinder, so as to prevent the mortar from sticking or clogging.

A piston, D, works easily in the case or cylinder, and is operated by a lever, E, at the front end of the cylinder, said lever projecting upward, as shown.

Working loosely through the piston-head is a rod, *c*, having a nut or head upon the front end, and attached to a cone, *d*, at the rear end. This cone *d* forms one end of the flexible core F, and another cone, *d'*, is fixed to the other end of said core. The office of this flexible core is to form the bore of the pipe.

To the rear end of the case is hinged a hood, G, weighted on top, as shown, which follows along on the pipe to prevent its being upset by the pressure of the piston after it has left the cylinder or case.

The operation of our device is as follows: The cylinder is laid in the trench with the feed-tube upright. A man stands in the trench at the end of the machine in which the lever is placed, and as he works the lever he moves along backward in the trench. The mortar or cement placed in the hopper passes readily down the tapering feed-tube into the case or cylinder behind the piston. A stroke of the piston forces the mortar back in the case and around the cone *d*, to which is attached the flexible core, thus forming the pipe, and at the same time driving the machine ahead correspondingly, or about two inches per stroke.

The case is largest at the rear end, to avoid the friction of mortar inside of it and to press the earth in the trench firmly, so that the pipe shall be well supported or bedded after leaving the cylinder. Loose earth is shoveled into the trench alongside of the forming-cylinder as it is being worked; but in loose sandy soils the machine will plow its way so as to properly bed the pipe. In order to facilitate the movement of the cylinder the front end is rounded or turned up, as shown at H.

The flexibility of the core is necessary in order to prevent cracking or breaking the pipe in passing curves or following undulations in the bottom of the trench. It must be long enough—say, about three feet—to preserve the bore of the pipe against the pressure in the cyl-

inder, or clods rolling on it while moving the cylinder. This core is drawn ahead by the rod which works in the piston, as described. The reciprocating motion of the core smooths the bore of the pipe and closes any small cracks or holes, acting in this respect like a trowel in the hands of a plasterer. The weight on the hood keeps said hood down on the pipe, making it smooth and preventing its cracking in an undulating trench.

The concrete or mortar may be mixed on the ground and fed into the hopper, coming out of the cylinder in the form of a continuous pipe. As the piston is worked and the mortar is crowded back around the cone and core and against the cylinder, each stroke of the piston moves the cylinder ahead in the trench by the piston impinging on the end of the newly-formed pipe.

The cone and core do not necessarily have the same stroke as the piston by reason of the rod connecting them with the piston passing freely through said piston. On the forward stroke of the piston the core is drawn ahead, so that the cone may form the hole and the core smooth the same. On the back-stroke a certain freedom of motion is allowed to both cone and core, so that they shall not be necessarily pushed back, but will remain, so that the concrete or mortar will be crowded around them.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The outwardly-enlarging case or cylinder A, with its tapering feed-tube B and hopper *b*, in combination with the piston D, provided with the movable cone *d* and flexible core F, whereby the plastic material is forced back and formed into a pipe shape, and the central hole formed at the same time, substantially as herein described.

2. The pipe-forming cylinder A, with its piston and lever D E, core F, and cone *d*, and provided with the slots *a*, in combination with the regulating draw-band C, whereby the diameter of the cylinder is changeable and the size of the pipe determined, substantially as herein described.

3. In combination with the pipe-forming cylinder A, with its piston D and flexible core F, the weighted hood G, whereby the pipe is prevented from being pressed out of shape after leaving the cylinder, substantially as herein described.

4. The pipe-forming cylinder A, with its piston D and lever E, in combination with the flexible core F, attached to said piston by the rod *c*, and provided with the cone-shaped ends *d d'*, whereby the core or opening through the pipe is formed smoothly and breakage prevented in turning corners or on undulating ground, substantially as herein described.

5. The cylinder A, with a feed-tube, B, with its splits or slots *a* and draw-band C, provided with the hopper *b* and weighted hood G, and having the piston D and lever E, said piston having connected with it the flexible cone-ended core F, the whole adapted to be placed in a trench, along which it is moved by the action of the lever and piston in forming the pipe, whereby the pipe is made and laid at the one operation and at the same time in a continuous piece, substantially as herein described.

In witness whereof we have hereunto set our hands and seals.

EZRA M. HAMILTON. [L. S.]
CHARLES N. EARL. [L. S.]

Witnesses:
D. B. GUTHRIE,
JOHN TRAFFORD.