

UNITED STATES PATENT OFFICE.

ERNEST LESLIE RANSOME, OF OAKLAND, CALIFORNIA.

PROCESS OF MANUFACTURING MONOLITHIC CONCRETE PIPES IN SITU.

SPECIFICATION forming part of Letters Patent No. 507,521, dated October 24, 1893.

Application filed November 22, 1892. Serial No. 452,849. (No specimens.)

To all whom it may concern:

Be it known that I, ERNEST LESLIE RANSOME, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in the Manufacture of Monolithic Concrete Pipes in Situ; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

Heretofore in the manufacture of monolithic concrete pipe *in situ*, by the mode and molds for which I received Letters Patent Nos. 353,500 and 424,656 in 1886 and 1890 respectively, or by any other mode known in the art, it has been the universal custom to allow the concrete pipe to set and harden before "filling in" the earth of the excavation in which it has been made, lest the crown of the pipe should yield to the pressure of the earth and fall in. There has also been experienced a great difficulty in preventing the crown of the pipe from falling in of its weight as soon as the mold is withdrawn, so great as practically to amount to a prohibition of the manufacture of concrete pipe *in situ* of certain sizes by means of continually moving molds. This difficulty is overcome in the manufacture of the larger sized pipe, say, pipe ranging from twenty-four inches and upward, by the use of the plates described in my Patent No. 353,500, yet their use involves a large preliminary outlay, and the cost of placing and removing them is considerable, and they are inapplicable to the smaller pipes by reason of the difficulty of placing and removing them.

The object of my invention is to enable concrete pipe of any size up to a limit yet to be ascertained, but which is not below forty-two inch pipe, to be readily, quickly and cheaply manufactured *in situ* by the use of any of the well known, continually moving molds or machines and without the use of top plates.

To carry my invention into effect, while the manufacture of the monolithic pipe *in situ* is proceeding, and while the core or center portion of the mold is shaping and forming the interior of the pipe, and moving ahead within the pipe during its formation, upon this portion of pipe, at this time, while

it is yet soft, and is yet sustained by the mold within it, I pack the earth of the excavation, or other earth, between the banks of the excavation and the upper surface of the pipe, and between the banks above the pipe, packing and tamping or rolling it down hard and solid, until the excavation or ditch in which the pipe is made is filled to the top or if the excavation is very deep, until from one to several feet of hard packed earth is over the pipe. I have succeeded in holding up the crown of a forty-two inch pipe with an earth packing of one foot in depth above the top of the pipe, and therefore, do not limit myself to any exact depth; it being understood that the greater the depth ordinarily the better, and for a forty-two inch pipe, I should think two feet of packing little enough for general conditions. The earth being thus well compacted, within the banks of the excavation forms a firm, strong arch of itself, having all thrust taken up by the banks on either side, and embracing, adhering and cohering to the soft concrete upholds the latter, and when the mold core is withdrawn sustains it in position until it has set and hardened. Any ordinary soil or earth will answer for this purpose, from a loamy sand to a stiff clay, excepting it be very sandy, gravelly or rocky, in which cases I add to such unfavorable material a sufficient quantity of adhesive matter such as clay, loam, lime or cement to give to it the necessary binding qualities.

In practice for the purpose of giving room for placing and working the earth, I elongate my mold core or inside mold, extending it in the rear some ten or twenty feet beyond the other portions of the mold.

Having fully described my invention, what I desire to claim and secure by Letters Patent is—

1. The process of upholding the upper portion of concrete pipe built *in situ*, by packing earth against and over it during its formation, substantially as described.

2. The process of upholding the upper portion of concrete pipe built *in situ* by packing earth against and over it before it sets substantially as described.

ERNEST LESLIE RANSOME.

Witnesses:

LUCIUS PEERTSCHER,
W. W. SALMONT.