UNITED STATES PATENT OFFICE.

RALPH CONNABLE, OF JACKSON, MICHIGAN.

IMPROVEMENT IN PROCESSES OF MAKING CURVED EARTHENWARE PIPES.

Specification forming part of Letters Patent No. **143,671**, dated October 14, 1873; application filed August 22, 1873.

To all whom it may concern:

Be it known that I, RALPH CONNABLE, of Jackson, in the county of Jackson and State of Michigan, have invented a certain Improvement in the Art of Making Curved Pipes from Plastic Material, of which the following is a specification:

The first part of my invention consists in making curved pipes from plastic material of uniform temper with a single definite curve by forcing the material through an annular aperture either obstructed or contracted upon one side. The efflux of the material being thus retarded upon the contracted or obstructed side, the resulting pipe will assume a curved form, the degree of curvature depending upon the difference in the respective velocities with which the material issues at the obstructed side and at the unobstructed side of the aperture, which can be regulated by increasing or decreasing the contraction or obstruction.

Clay-pipe machines are known, and have been in use for many years, in which provision is made for correcting any tendency to irregular delivery by slightly contracting one side of the annular aperture through which the clay is forced to form the pipe. The sole object had in view with this adjustment of the aperture was to produce straight and square ended pipes; and it was wholly unknown, up to the date of my discovery, that this principle could be successfully employed for the production of curves.

Crude attempts have also been made to make clay curves by packing the receiver upon one side with clay less plastic than that upon the other side, and then forcing it through an annular aperture of even width all around. Any person skilled in the art will appreciate the difficulty, amounting almost to an impossibility, of making uniform curves by such a process; and the product, being of uneven texture, must necessarily be of inferior quality.

I am the first one to discover that a plastic material forced from a receiver through an annular aperture partially obstructed or contracted on one side will take a curvilinear direction, and to practically apply this principle to the manufacture of curved pipes.

The second part of my invention consists in providing a method for making pipes from plastic material with curves regulated at the will of the operator while the plastic material is forced in a continuous stream from a receiver through a pipe-forming die. This I accomplish by governing the relative rate of discharge of the clay on different sides of the pipe-forming die while the machine is in full operation.

I have illustrated and described in another patent of even date with this one form of machine by which both branches of my invention, as hereinbefore explained, may be practiced, and in which the sleeve or case surrounding the core of the forming-die is under the control of a lever, whereby it may be shifted instantly from a concentric to an eccentric position with reference to the core. By varying the contraction, and changing it from one side to the other of the annular aperture, the operator can draw the pipe into any desired form of irregular or reversed curves, while, by adjusting the case so as to contract one side of the annular aperture to a proper degree, and fixing it in the ascertained position, ordinary curves can be made.

The distinguishing characteristic of the second part of my invention consists in regulating the relative rate of discharge without stopping the efflux, which, and which alone, enables the manufacturer to successfully curve pipes to any definite prescribed curvature upon a machine of the character stated.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The art of making curved pipes by forcing the plastic material from a receiver through an annular aperture contracted or obstructed on one side.

2. The method of making pipes from a plastic material with curves regulated at the will of the operator by varying the relative rate of discharge of the material on different sides of a pipe-forming die while issuing therefrom in a continuous stream.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RALPH CONNABLE.

Witnesses:

JOEL SMITH,

RALPH M. CONNABLE, Jr.