J. B. COLLAN.

LEAD PIPE MACHINE.

No. 7,867. Patented Jan 1, 1851.

Fig: 2.

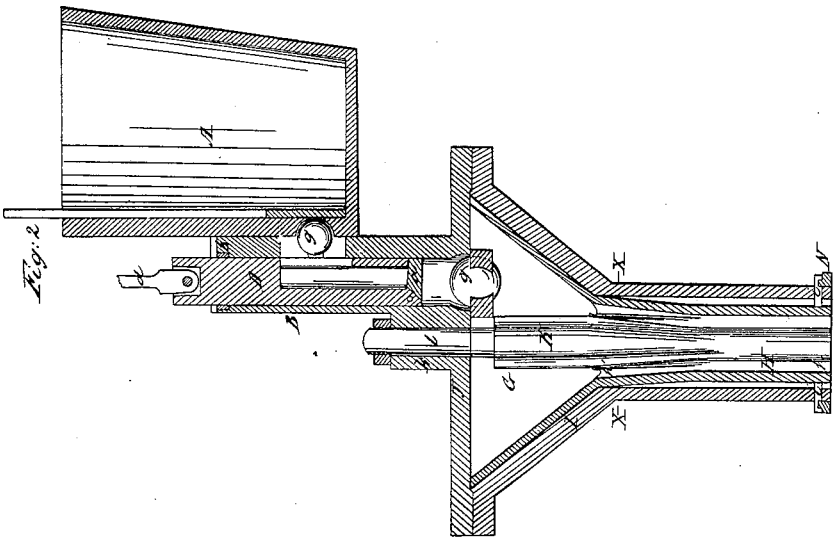


Fig: 3.

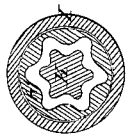
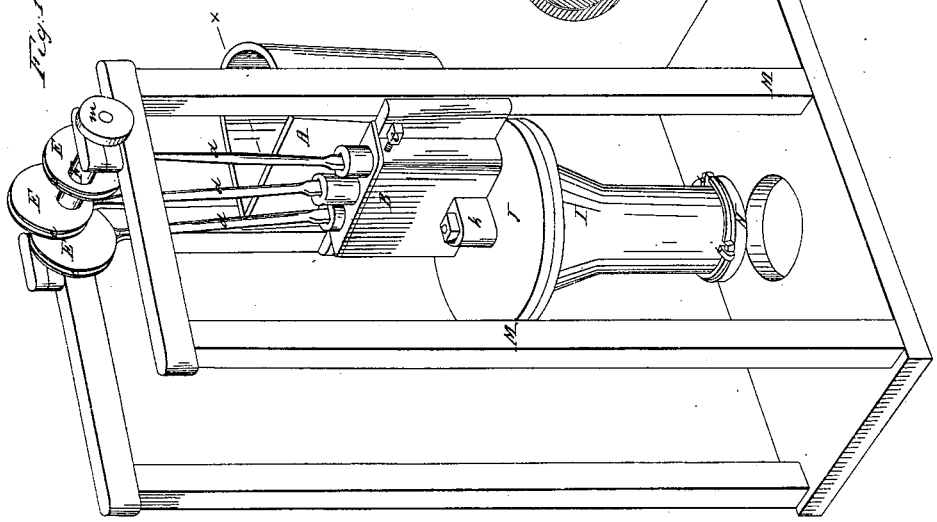


Fig: 1.



UNITED STATES PATENT OFFICE.

JNO. B. COLLAN, OF READING, PENNSYLVANIA.

NOZZLE FOR LEAD-PIPE MACHINES.

Specification of Letters Patent No. 7,867, dated January 1, 1851.

To all whom it may concern:

Be it known that I, JOHN B. COLLAN, of Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Making Lead Pipe, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing which forms part of this specification, and in which—

Figure 1 represents a view in perspective of my machine, Fig. 2 is a vertical section of the same at the line *p*—*p* of Fig. 1, and Fig. 3 a horizontal section at the line *x*—*x* of Fig. 2.

My machine is constructed to manufacture lead pipe by pumping melted lead through a corrugated nozzle or die in which a mandrel is supported; the nozzle and mandrel being constructed in such manner that in forming the pipe the lead in its passage through the tubular nozzle is strongly compressed thus forming pipe of increased density and freedom from flaws.

My machine is composed principally of a tubular nozzle with its mandrel, which give shape to the pipe, of a set of force pumps by which the melted lead is forced through the nozzle, and of a vessel or cistern in which the lead is melted or into which the lead previously melted is introduced and which supplies it to the pumps.

In the accompanying drawing A is the lead cistern into which lead previously melted is introduced or in which the lead is melted by the direct application of heat; it communicates near the bottom of one of its sides with the barrels of three force pumps B the mouths of the passages to these pumps being fitted with a gate C by which the supply of lead is regulated or shut off. The pump barrels in this example are all cast in one piece, each is fitted with a solid plunger or with one D, of the construction represented in section in Fig. 2; this latter description of plunger is hollow, having an opening in its side corresponding in position with the passage to the lead cistern; the lower extremity of this hollow plunger is closed by a valve *a* which opens as the piston is raised and closes as it is depressed. The escape of lead around the plunger where it passes through the upper extremity of the pump chamber is prevented by a metallic packing *b* which is set up by screws *c* as it wears away. Each plunger is connected by a connecting rod *d* with the strap *e* of an eccentric E secured to a driving shaft F directly above the three pumps, the three eccentrics being set on the shaft in such manner as will produce the most equable pumping of the lead. The lower part of each chamber communicates with a conical vessel G terminating in a tubular nozzle H from which the finished pipe is discharged. The passages from the pump chambers to the lead cistern and the conical vessel are each fitted with a ball valve *g*. The nozzle H is tubular, its lower extremity *h*, or that from which the finished pipe issues, is cylindrical, its upper extremity *h'*, or that which receives the lead, is enlarged and is fluted as represented in Figs. 2 and 3.

The nozzle and the conical vessel are formed in one piece. They are supported in a socket case I, of similar form, which is firmly secured to the frame work of the machine, and which is closed at top by a cap J, forming the base of the pump chambers B. A mandrel K is supported within the tubular nozzle by means of the cap J; this mandrel is cylindrical at its lower extremity but its upper is enlarged and is fluted, corresponding in this respect with the surrounding nozzle. The mandrel is firmly secured to the cap J, and concentric with the socket case I, by a long shank *l* which is secured in a tubular boss *k* on the cap. The lower extremity of the nozzle H is set concentric with the lower extremity of the socket case by means of three sliding pins *i* which are set simultaneously and equably toward the center of the mandrel by three equal spiral ribs secured to an annular turning plate N fitted to the exterior of the tubular extremity of the socket case. The several parts of the machine are secured to a strong frame M and the driving shaft F is fitted with a pulley *m* or a cog-wheel to which the power of the prime mover is transmitted by a belt or by gearing.

When lead pipe is to be made with this machine lead previously melted is to be introduced into the cistern; or the lead is melted in the cistern by the application of heat. The gate C is then raised, and the pumps being put in operation, the liquid lead is forced through the nozzle, and cooling in its progress issues in the form of a continuous pipe.

When the machine is first put in opera-

tion it becomes necessary to prevent the running through of the melted lead by closing the orifice of the nozzle until the lead accumulates in the conical vessel and sets in the nozzle, the operation then proceeds continuously, lead being introduced into the cistern as it is withdrawn by the pumps. In case the lead in its passage through the machine should not cool fast enough, it may be cooled by introducing water between the nozzle and the surrounding case. It will be perceived that the area of the fluted or upper end of the nozzle where the lead is cooled until it loses its fluidity and becomes of a pasty consistency, is considerably greater than that of the lower extremity of the nozzle, hence the lead in its passage downward is greatly compressed and increased compactness, density and freedom from flaws of the issuing pipe is insured. By fluting the nozzle and the mandrel, I am enabled to reduce the space occupied by the machine, while at the same time it enables me to cool the lead with greater ease. As an annular tapering column of set lead of a given perimeter is comprised within a much less circle when fluted or crimped than when plain, it follows that the pressure applied to force it through the vessel acts more directly, causing less lateral strain and friction.

It will be perceived that the pumps are furnished at their ingress and egress passages with ball valves which I have found to be superior for this purpose to any other tried by me as they are not liable to clog and are easily made. It will also be perceived that the nozzle H through which the lead is pumped to form the pipe is easily and quickly set concentric with the mandrel by means of the sliding pins which are simultaneously and equably moved by the turning of the plate N with its spiral ribs.

There are two distinct methods of making lead pipe in common use, by the one the pipe is formed after the lead is set or has lost its fluidity, by the other the pipe is formed of fluid lead and is cooled as it passes from the nozzle.

My method combines the advantage resulting from the greater ease with which the lead is handled in the liquid method, with the greater degree of compression to which the lead is subjected in the method of forming the pipe after the lead has set. The pipe produced is superior in density and in its freedom from flaws to that made by either of the other methods while at the same time it requires much less power than is necessary in the set method and but little more than is required in the fluid method.

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

Corrugated nozzle with its mandrel through which melted lead is pumped for the purpose of making pipe as herein set forth.

JOHN B. COLLAN.

Witnesses:
MATTHIAS MENGEL,
GEORGE W. BRUCKMAN.