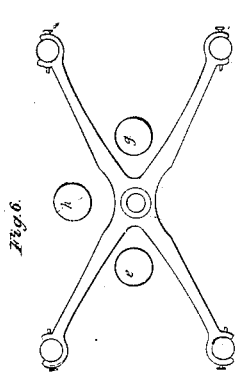
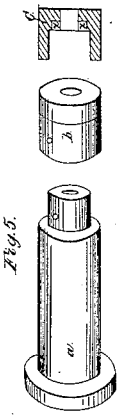
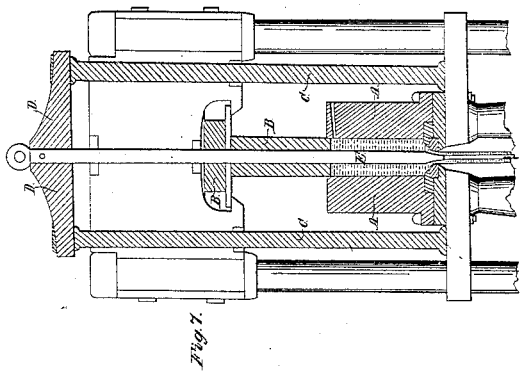
G. N. TATHAM & B. TATHAM, Jr.

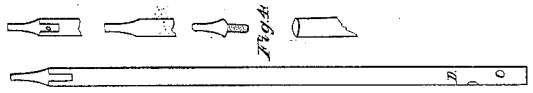
MAKING LEAD PIPE.

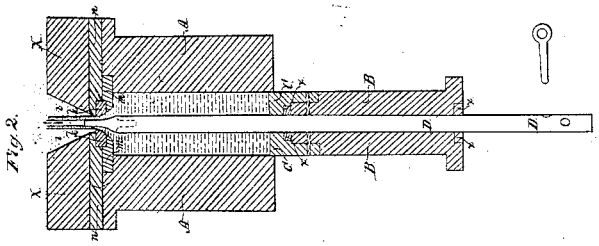
No. 2,296. Patented Oct. 11, 1841.

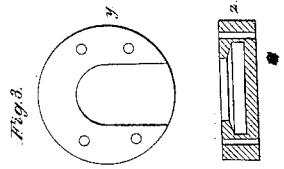


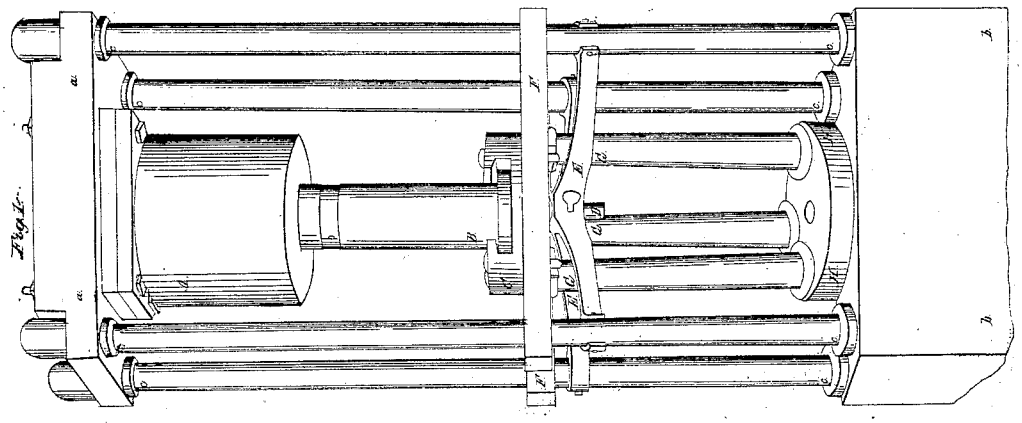












UNITED STATES PATENT OFFICE.

GEO. N. TATHAM AND B. TATHAM, JR., OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR MAKING PIPES OR TUBES OF LEAD, TIN, AND OTHER METALLIC SUBSTANCES.

Specification of Letters Patent No. 2,296, dated October 11, 1841.

To all whom it may concern:

Be it known that we, GEORGE N. TATHAM and BENJAMIN TATHAM, Jr., both of the city of Philadelphia and State of Pennsylvania, have invented certain new and useful improvements in machinery or apparatus for making and manufacturing pipes and tubes of lead, tin, and other metallic substances and their alloys; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making part of this specification.

Our invention of these certain improvements applies principally to the "machinery or apparatus for making or manufacturing pipes and tubes from lead or a mixture or compound of lead with other metals as tin or zinc or any other compound or alloy of soft metals capable of being squeezed or forced by means of great pressure from out of a cylinder or receiver through or between apertures dies and cores when in a solid state" described and set forth in the specification of a patent granted to Thomas Burr of Great Britain, and also described in the first volume of the first series of the *London Journal of Arts and Sciences* as therein will appear: and our said invention is applicable in part also to other machinery for manufacturing leaden and other metallic pipes which will be hereinafter referred to.

In the plan described by Thomas Burr the core (for the formation of the inner diameter or caliber of the pipe) is attached to the end of the piston, and advancing before it through the cylinder, became bent and twisted out of center with the dies, thus preventing or destroying the uniformity of thickness or the centrality of the bore of the pipes. This defect resulted from the difference of expansion and contraction, and from the extreme pressure required to drive out the solid metal, and from several other causes the effect of which was to render that plan ineffective and ineligible. These defects it is the object of our improvements to remedy.

Our said improvements may be fully understood by referring to the accompanying drawings and to the explanations thereof contained in this specification.

We use a powerful hydraulic press, which is partially represented at Figure 1. In this figure, *a*, *a*, is the cap or top of the press: *b*, *b*, the base or frame of the bottom thereof, inclosing the great cylinder and the ram, which are not here exhibited. *c*, *c*, *c*, *c*, are the upright wrought iron pillars of the press. The pipes, the safety valve and other parts of the hydraulic press are not here represented. This engine is so well known, and may be constructed in such variety of forms, as to render a description of it unnecesasry, and the figure in the annexed drawings is intended only to exhibit the relative arrangements of the other parts of the apparatus.

We use a strong iron cylinder constructed in a manner substantially resembling that described by Thomas Burr, and intended for precisely the same purposes. The die is secured at the upper end of the cylinder, between a circular plate, and the top of the cylinder, in an aperture or recess fitted to receive it. The top of the cylinder is attached by means of screws or bolts or otherwise thereto, so as to be easily removed and replaced.

The cylinder, with its several appurtenances, is to be firmly bolted or secured to the top of the hydraulic press. It is represented in perspective at A in Fig. 1, and in section at A, A, in Fig. 2. *k*, *k*, Fig. 2 is a section of the die, which is a polished steel ring. *m*, *m*, is the circular plate, with a large aperture through it for the passage of the metal toward the die. *n*, *n*, is the top of the cylinder. X, X, Fig. 2, is a section of a part of the top of the hydraulic press, which part has an aperture (*i*, *i*,) in the form of an inverted cone, to allow access to the cylinder, for the purpose of charging it through the dies or other apertures, and for the passage of the pipes or tubes. This aperture is hidden at Fig. 1. The piston B, B, (operating within the cylinder) is bored accurately throughout its length so as to receive, and fit a long core holder, upon which it is to move or slide easily up and down being at the same time furnished with proper packing.

The hollow piston is exhibited in its place, in perspective at B Fig. 1: and in section at B, B, Fig. 2. Its parts are shown detached at *a* and *b* in Fig. 5, and a section of the face at *c*. Its packing (around the long core holder) consists of tight rings occupying the places indicated at Fig. 2, by the letters *x*, *x*, but it may be packed in other ways in common use and well known

to machinists. The face *c* should be made of cast steel. It is secured to the body of the piston by means of bolts or screws.

The piston is secured in its place, upon the table or platform of the hydraulic press in any convenient manner. We employ a cast iron fixture, open in front to receive the piston head, grasping the same, and being firmly bolted to the table, is strong enough to bear the high degree of force, often required to extract the piston from the cylinder, after it has been driven home. This instrument is represented in its place, upon the table, at C in Fig. 1, and in plan at Fig. 3, *y* and in transverse section at *z*.

We employ a long coreholder which is a strong, round rod of iron or steel, accurately turned and polished, so as to move or slide easily and truly through the hollow piston, fitting the same exactly. One end of this long coreholder is to be securely attached (by a pin or otherwise) to strong iron frame work below the table or platform of the press. The coreholder is to be sufficiently long to pass upward through the table or platform, through the piston, and through the middle of the cylinder, to its discharging end, where it is to hold (in the center of the die) a core or mandrel, attached, screwed or bolted into its end; or is itself to be tapered, if necessary, to the size required for the interior diameter or caliber of the pipes or tubes. The long coreholder is exhibited in its place at D, Fig. 1, and in section D, Fig. 2, and detached at D Fig. 4, where several different plans for its construction next the core are exhibited. The iron framework, securing the end of the long coreholder, is to be made with several arms each to be firmly attached to one of the wrought iron pillars of the hydraulic press. This frame is represented in perspective, in its place at E, E, in Fig. 1, and in plan at Fig. 6, where the relative positions of the pillars, that support the table or platform of the press, are exhibited at *e*, *h*, *g*.

The lower part of the frame work must be placed at such a distance above the hydraulic ram head as not to interfere with the rising of the same, when the press is in action. This distance should be of the length of the piston at the least. The table or platform of the press is to be supported by strong iron pillars two, three or four in number, standing between the arms of the framework fixture, last described. The table is seen at F, F, Fig. 1. It is to slide upon the wrought iron pillars of the press, which thus serve as guides to it. The pillars supporting the table are represented at G, G, G, in Fig. 1. They are to stand upon the ram head, which is a solid iron fixture upon the top of the ram itself, and is seen at H in Fig. 1. The ram head is to contain an aperture large enough to permit the end of the long coreholder to descend into the hollow of the ram, when occasion may require the removal of the piston, or a change in any of the different instruments.

The operation of the machinery is in most respects the same as that described by Thomas Burr, to whose specification we here particularly refer. The several parts being adjusted in their places as at Fig. 1, the piston being lowered, the cylinder is filled with melted metal through the aperture between the die and the core; or, if preferred, through an aperture made for the purpose in the cylinder which is to be stopped with a screwplug or otherwise. The space occupied by the metal in the cylinder is represented in the sectional drawings by a tint of red color. Upon the metal in the cylinder becoming "Set" or solid, the press is to be set in action, and as the ram of the press rises upward, carrying with it the pillars, and the table or platform upon them, the piston (sliding upon the stationary long coreholder) is driven into the cylinder, and the metal therein is forced upward between the core and the die, and issues above the top of the press in the shape of a pipe or tube. Lead, perfectly cold, and even harder metals may be driven by this machinery and formed into pipes or tubes.

We do not intend to limit or confine ourselves to the precise plan here above described of forcing the piston upward into the cylinder and of causing the pipe to issue above the press, since the same results will be produced when the action of the machinery is reversed, by securing the piston to the under part of the top of the hydraulic press, and bolting the cylinder upon the table or platform; thereby causing the cylinder to advance upon the stationary piston and forcing the pipe downward through an aperture in the table made to admit its passage. In this reversed mode of operation it would be necessary to construct upright shafts or pillars standing upon and secured to the table, and made to slide through boxes fitted in the top of the press. These uprights are to be connected above the top of the press by a strong cross-beam, to the center of which the end of the long coreholder is to be attached. The coreholder should slide through a box in the top of the press, and also through the stationary hollow piston, and reaching to the bottom of the cylinder, it must there hold the core or mandrel in the center of the die, as before described. When the press is set in motion, the core holder will rise with the upright framework and the cylinder, fixedly preserving its relative position with the die at the bottom of the cylinder.

Fig. 7 is a representation (partly in sec-

tion) of this reversed mode of operation. A is the cylinder reversed, having the die now at the bottom. B is the hollow piston secured to the top of the press. C, C, are the upright pillars of the framework. D, D, is the cross beam thereof. E is the long core holder depending from the cross-beam. In this latter form or manner of arrangement we intend to apply the foregoing improvements to the apparatus for manufacturing pipes or tubes from lead or other metallic substances invented by Charles and John Hanson of Great Britain, for which Letters Patent of the United States were granted to the present inventor Benjamin Tatham Jun, and to Henry B. Tatham of the city of Philadelphia, under assignment from the said Charles and John Hanson, before patent issued, and recorded preparatory thereto, which Letters Patent are dated the twenty ninth day of March A. D. eighteen hundred and forty one.

We do not claim as our invention any part of the cylinder, nor of the dies nor of the arrangement thereof in the cylinder, nor the manner of adapting these to the hydraulic press, nor the mode of operation generally, all of which have been substantially described in the specifications of the patents of Thomas Burr and of Benjamin and Henry B. Tatham, assignors of Charles and John Hanson heretofore referred to. But

What we do claim as constituting our invention, and desire to secure by Letters Patent, are,

1. The long core or coreholder, formed, and held stationary with relation to the dies, as described.

2. We claim the constructing of the piston B, hollow, in the manner described; and the combination of the same with the long core or coreholder, upon which the piston slides.

3. We claim, as a modification of our invention, the arrangement and combination of the several parts above mentioned, as exhibited in, what has been termed, "the reversed arrangement" shown at Fig. 7 in the accompanying drawings.

GEORGE N. TATHAM.
BENJN. TATHAM, Jr.

Witnesses to the signature of G. N. Tatham:

Chas. B. Tatham,
William P. Tatham.

Witnesses to B. Tatham's signature:

Samuel Congdon,
Chas. B. Tatham.