2 Sheets—Sheet 1.

G. D. GOODRICH

Machine for Enlarging the Ends of Clay Tubular Bodies and Forming Collars thereon.

No. 200,791. Patented Feb. 26, 1878.

FIG. 1.

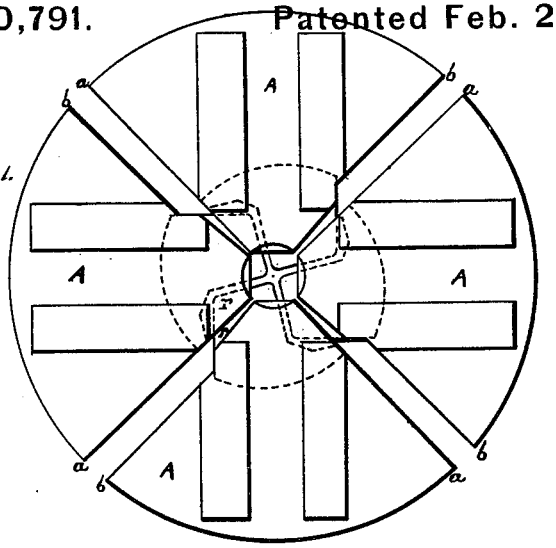


FIG. 2.

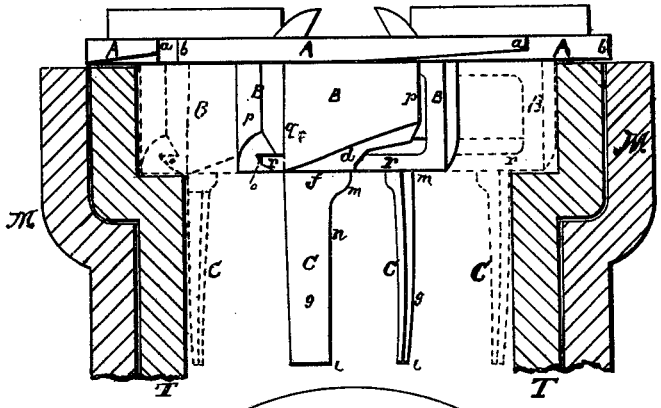


FIG. 4.

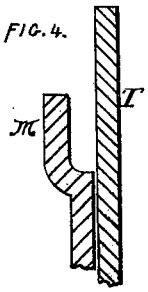


FIG. 5.

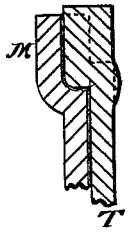
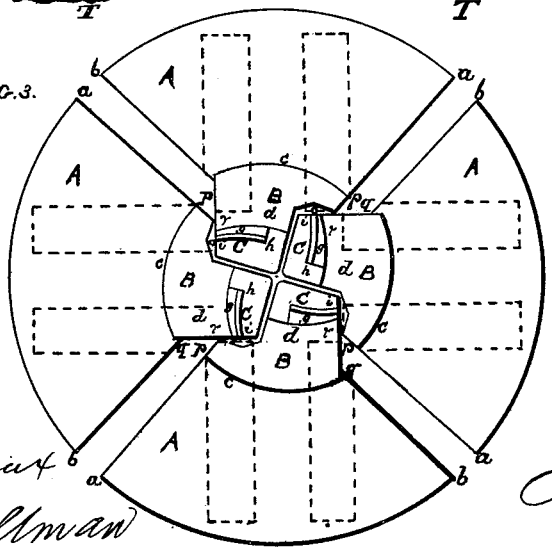


FIG. 3.



WITNESSES.

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2 Sheets—Sheet 2.

G. D. GOODRICH.

Machine for Enlarging the Ends of Clay Tubular Bodies and Forming Collars thereon.

No. 200,791. Patented Feb. 26, 1878.

Fig. 6.

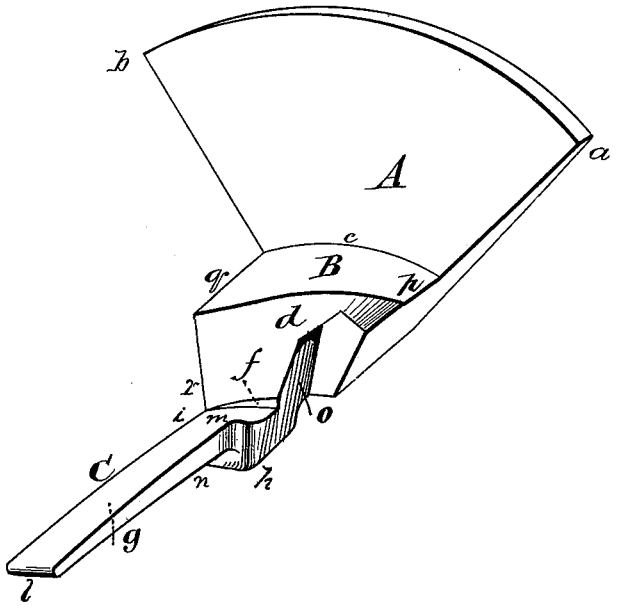
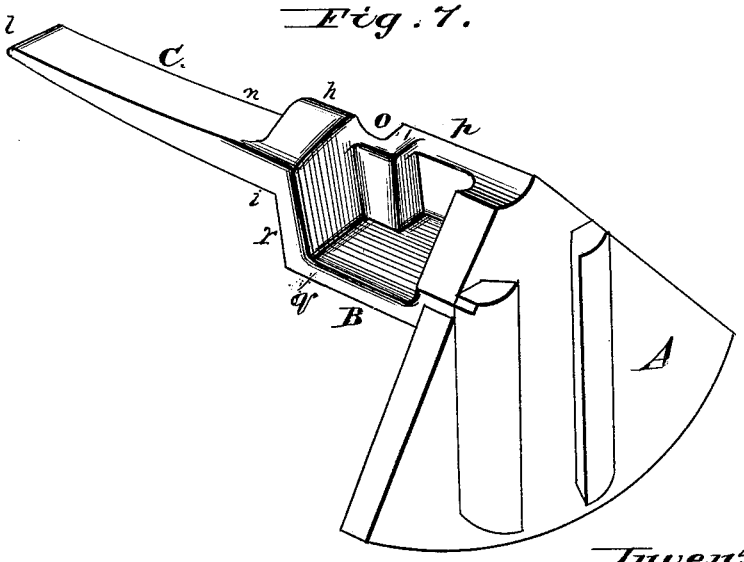


Fig. 7.



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UNITED STATES PATENT OFFICE.

GEORGE D. GOODRICH, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR ENLARGING THE ENDS OF CLAY TUBULAR BODIES AND FORMING COLLARS THEREON.

Specification forming part of Letters Patent No. **200,791**, dated February 26, 1878; application filed August 11, 1877.

To all whom it may concern:

Be it known that I, GEORGE D. GOODRICH, of Boston, county of Suffolk and State of Massachusetts, have invented a certain new and useful Machine for Enlarging the Ends of Clay Tubular Bodies and Forming Collars Thereon, of which the following is a specification:

This invention relates to certain improvements in the apparatus for enlarging the ends of clay pipes or tubes, for which Letters Patent of the United States were granted to me January 26, 1869, No. 86,148, in which an expanding head, composed of a series of segmental sections, is adapted to be moved outwardly from a common center to force the end of the pipe, while in a plastic condition, into the enlarged portion of a mold, whereby the desired enlargement is effected; and it has for its object to provide for supporting that portion of the pipe within the mold below the point of enlargement, to prevent the material from being upset, and the consequent malformation of the pipe at such point; and, further, to provide for more closely fitting the segmental sections together, whereby the enlarged portion of the pipe is more perfectly shaped; and to this end my invention consists, first, in the combination, with a segmental projection on the expanding segmental sections, of a downwardly-projecting finger, constructed and arranged to act, in conjunction with said sections, to pass the material of the pipe below the point of enlargement against the sides of the mold, whereby any upsetting is prevented; and, second, in the combination, with the segmental sections, of a notch and arm, whereby a series of such projections may be made to fit more closely together than heretofore, as more fully hereinafter specified.

In the accompanying plate of drawings, Figure 1 is a front face view of my improved device or appliance for the purpose stated, showing four of them, as arranged about a common center; Fig. 2, an edge view; Fig. 3, a rear face view; Figs. 4 and 5, detail views, to be hereinafter referred to. Fig. 6 is a top perspective view of one of the expanding-sections, segmental projection, and finger, hereinafter described; and Fig. 7 is a bottom perspective view of the same.

I will now proceed to the description of my said improved enlarging device or appliance, A in the drawings representing the expansive head-piece; and B, segmental projections, which are secured to the rear face of said expansive head-piece A, which rear face is beveled off or inclined, so that it is thinner at one end or edge, *a*, than at the other edge, *b*, the thinner edge *a*, under the rotation of the carrying-head, being the advance edge of its expansive piece A. The segmental projection B is situated on its carrying expansive head-piece A, so that its end *p*, which is toward the advance edge *a* of said head-piece, will be nearer to the axis of rotation of the head-piece A than the rear or hinder end *g*, which makes the outer arc-shaped side *c* of the projection B eccentric to said axis of rotation; and, again, the head of said projection the farther removed from its said head-piece A has a face, *d*, which gradually inclines downwardly from the forward end *p* of the projection to its hinder or rear end *q*. This face *d* has a width substantially equal to the extent or dimensions in width of the interior enlargement to be made on a pipe by the use of this improved device.

C is a finger or prong, which projects from the rear end *q* of the head *f* of the segmental projection B, and in such projection has a direction which is in part parallel, as hereinafter described, to the axis of rotation of the segmental projection, and a location just within the innermost circle described by the inclined face *d* of said projection B in its rotation, as aforesaid. The outer face *g* of this finger C is slightly rounded, and it is eccentric to the axis of rotation of the segmental projection B, so that its advance edge *h* is nearer to said axis of rotation than its rear or hinder edge *i*; and, again, it has a slight curve from its outer end *l* toward its inner end *m* for a portion of its length, leaving the balance, which is the part *n*, the nearer to the head *f* of the segmental projection, practically parallel to the axial line of rotation of the projection.

o is a notch at the lower end of the forward edge *p* of the segmental projection B, for the arm portion *r* of another segmental projection B to sit in when a series of segmental pro-

jections are used about a common axis, so that they can the more closely approach each other and be brought the nearer to the center.

In the use of this improved device, the tube of clay T which is to be enlarged at one end is first placed in a mold corresponding to the shape to be given to the end of the pipe, and, in so placing it, it is left to project some from the end of the mold, (see Fig. 4,) and then this projecting part is forced back into the mold, so as to fill the enlarged opening therein, (see Fig. 5,) after which the segmental projections B and expanding-plates A are brought to bear and to work on it, pressing and molding the clay of the pipe to such enlarged part of the mold which gives the desired enlargement of the end of the pipe, as shown by dotted lines in Fig. 5, and also in Fig. 2, wherein the outward position of the segmental projections B, &c., is shown by dotted lines.

In this action of the segmental projections B their fingers or prongs C press upon the inside of the pipe beyond the enlarged head or end, and thus work and hold it to its proper shape while the enlargement is being made by the segmental projections. This finger or prong is essential, for, obviously, in putting the clay back into the mold, as described, the clay will more or less bulge within the pipe just beyond the enlargement of the mold, which bulge of the clay must be pressed back, and also the clay there held against its tendency to be pressed out from the pressure of the segmental projections and expansive heads, all of which the finger or prong to each segment successfully and practically accomplishes. One or more segmental projections may be used to work at one time upon a pipe.

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

1. The combination, with a segmental projection, B, of a finger or prong, C, constructed and arranged to act in relation thereto, substantially as described, for the purpose specified.

2. The segmental projection A with a notch, *o*, and arm *r*, so that a series of them may fit together, substantially as described.

GEORGE D. GOODRICH.

Witnesses:

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