2 Sheets—Sheet 1.

E. GRIFFIN.

MACHINES FOR FORMING SHEET-METAL PIPE COUPLINGS.

No. 193,082. Patented July 17, 1877.

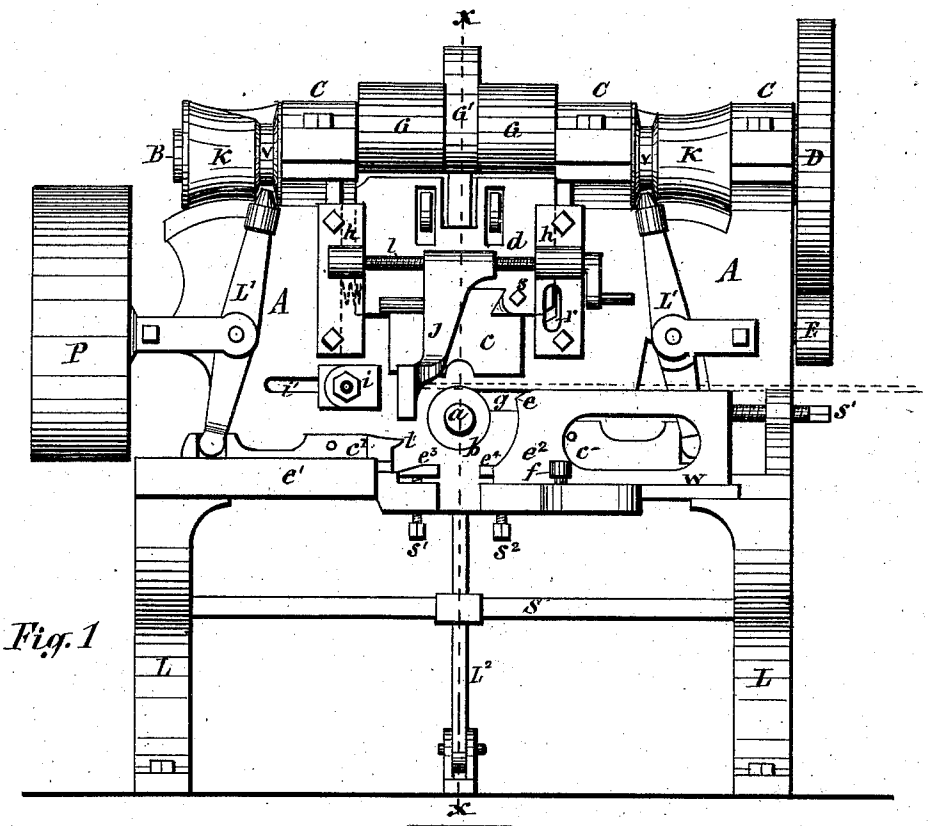


Fig. 1

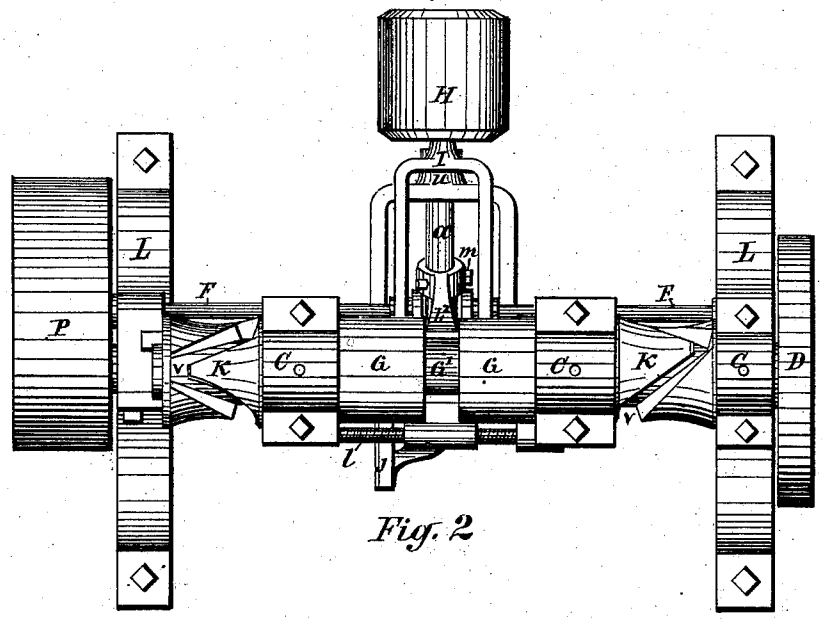


Fig. 2

WITNESSES: J. C. A. de Lima, E. Brendish

INVENTOR: Ebenezer Griffin, per E. Laass Atty.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

E. GRIFFIN.

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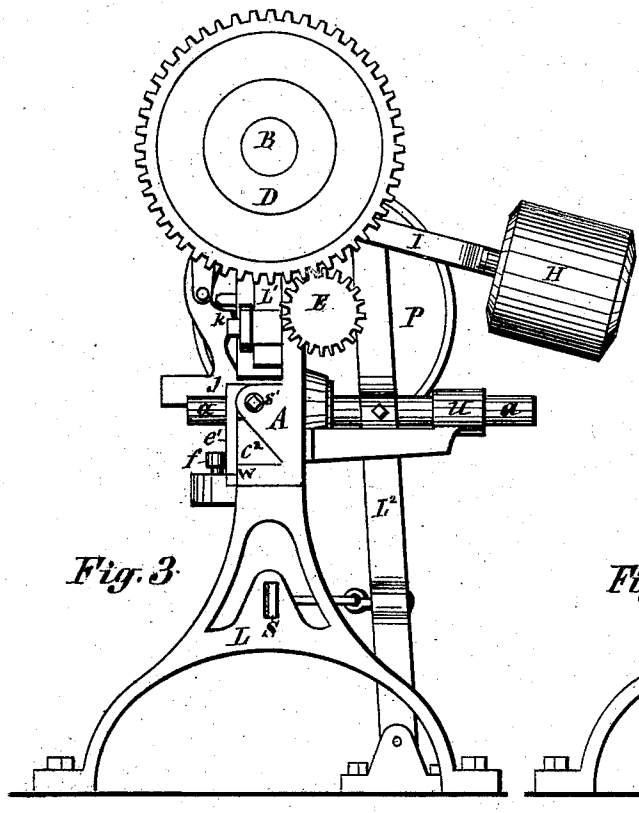


Fig. 3.

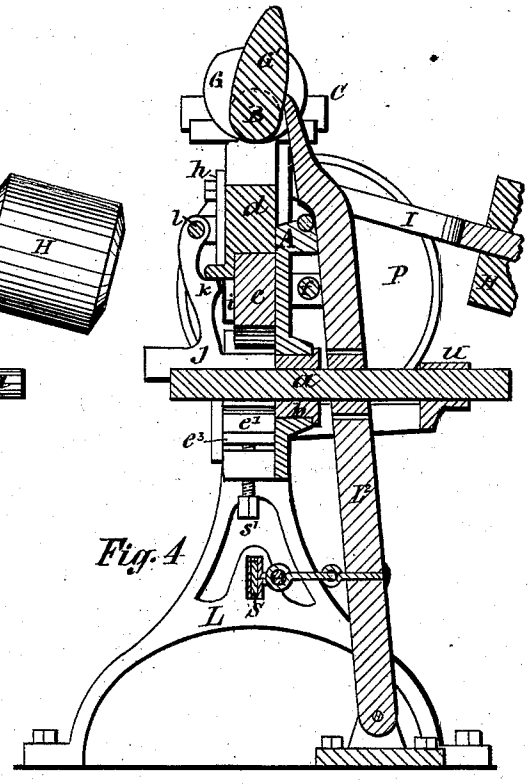


Fig. 4.

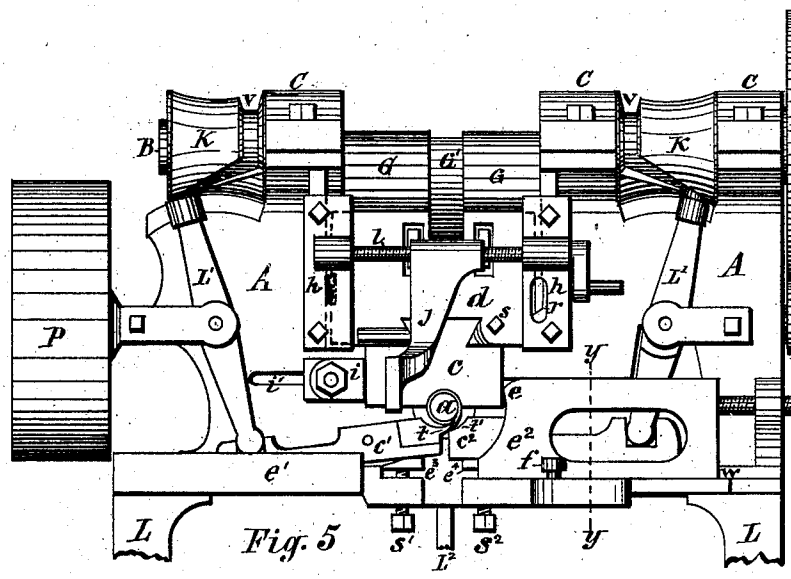


Fig. 5.

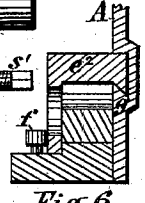


Fig. 6.

WITNESSES: J. C. A. de Lima
E. N. Bendixsen

INVENTOR: Ebenezer Griffin
per E. Saabs
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UNITED STATES PATENT OFFICE.

EBENEZER GRIFFIN, OF SYRACUSE, NEW YORK.

IMPROVEMENT IN MACHINES FOR FORMING SHEET-METAL PIPE-COUPLINGS.

Specification forming part of Letters Patent No. **193,082**, dated July 17, 1877; application filed May 23, 1877.

To all whom it may concern:

Be it known that I, EBENEZER GRIFFIN, of Syracuse, in the county of Onondaga and State of New York, have invented a new and useful Machine for Forming Wrought-Metal Pipe-Couplings, Ferrules, &c., of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

The purpose of this invention is to form, direct from band or sheet metal, pipe-couplings, thimbles, ferrules, and other similar cylindrical and conical bodies, ready for welding them at the seam.

The invention is fully illustrated in the accompanying drawings, wherein Figure 1 is a front view of the machine in position for receiving the material from which the cylindrical or conical body is to be formed. Fig. 2 is a top view of same; Fig. 3, an end view; Fig. 4, a vertical transverse section on line *x x* of Fig. 1. Fig. 5 is a front view of the machine, showing its position when completing the process of forming either a cylindrical or conical body; and Fig. 6, a section on line *y y* of Fig. 5.

Similar letters of reference indicate corresponding parts.

A is a strong substantial vertical plate or frame, having a horizontal base, mounted on pedestal or legs L L, to which frame the principal parts of the machine are attached. *a* is a mandrel, upon which the cylindrical or conical bodies are formed. It passes through a bush or sleeve, *b*, in the frame A, and projects at both sides at right angles from said frame. Above the mandrel is a die, *c*, consisting of a square or rectangular block, having on its under side a semicircular or segmental recess of a diameter sufficiently greater than that of the mandrel to allow for the thickness of the material to be operated on. It is carried vertically by the plunger or piston *d*, to which it is detachably connected by a dovetail joint and a set-screw, *s*. At the sides of the mandrel, and below the center of same, are dies c^1 c^2, moving horizontally, respectively, in guides e^1 e^2, on the base of the frame A, as will be hereinafter more fully described.

The die c^1 is provided at its end nearest the mandrel with a forward-projecting thin-edged tongue, *t*, extending across the upper edge of the die, and parallel with the line of the mandrel. The opposite die c^2 has on top of its end nearest the mandrel a slight concavity or depression, *t'*, extending across the entire width of the die, and from its end a short distance rearward.

At the forward end of the guides e^1 e^2 are, respectively, adjustable guide-blocks e^3 e^4, supported on set-screws s^1 s^2, which pass through the base of the frame A, and are operated underneath. The guide-block e^3, in front of the die c^1, is beveled to form an ascending surface toward the mandrel. The two guide-blocks are, by means of the set-screws s^1 s^2, set at such relative elevations as to carry, when the machine is in operation, the tongue *t* of the die c^1 between the mandrel and the concavity *t'* of the die c^2, as illustrated in Fig. 5 of the drawing.

The guide e^2 consists of an L-shaped casting, resting in an inverted position, with its vertical limb movably on ways *w* on the outer edge of the base of the frame A, and held in a vertical position by a stud, *f*, in a projection of the base of the frame, and by a groove on the side of its horizontal portion fitted to a corresponding groove, *g*, in the frame A. The top of the horizontal portion forms a table or guide, upon which to convey to the machine the material of which the bodies are to be formed, as indicated by dotted lines in Fig. 1 of the drawing. At the end nearest the mandrel this top surface of the guide e^2 is slightly beveled downward, and terminates with a square or sharp edge parallel to the line of the mandrel, as shown at *e*.

The plunger *d* moves in guides *h*, and, when elevated, has a lateral play between the jambs of the guides. It is held against the jamb over the guide e^2 by a spring at the opposite side, as indicated by dotted lines in Fig. 1 of the drawing. The lower portion of the space between the jambs is contracted by a beveled projection, *r*, on the jamb over the guide e^2, and the plunger has a corresponding beveled end or recess in its side, so that the plunger, with the die *c*, in its descent, is, by the beveled projection *r*, gradually forced toward the opposite side.

The guide e^2, by means of the set-screw s^1, is set to bring the top of the bevel e on the end of the feed-table nearly or quite in coincidence with the end of the die c when elevated. As the said die is brought down by the plunger d, and gradually carried to one side, it will, in conjunction with the opposing beveled end e of the guide e^2, cut on a bevel from the material placed upon the feed-table, a blank of which the body is to be formed.

To brace the die c against the side thrust resultant from this shearing operation, and guide it in its descent upon the mandrel after cutting the blank, a guide, i, is secured at the opposite side of the mandrel, and made adjustable to the width of the die by its attaching-bolt passing through a horizontal slot, i', in the frame A.

J is a gage for regulating the length of the blank of which the body is to be formed. It is pendent from a horizontal screw-shaft, l, journaled in boxes on the guides h h, or other suitable bearings, to admit of revolving it, and thereby moving the gage bodily longitudinally. The gage is weighted at its lower extremity in such manner as to force it toward the face of the frame A by its own gravity.

In order to cause it to move automatically from under the die c, and prevent collision with same in its descent, the hanger or supporting-arm of the gage J is provided on its inner side with a beveled projection or shoulder, k, and the plunger with a similar projection, in such relative position that when the plunger is elevated the gage is allowed to fall into its operative position under the die, and during the descent of the plunger the contact of the aforesaid shoulders will force the gage out from under the die c.

Upon the top of the frame A, and extended the length of same, is a shaft, B, journaled in boxes C C, and provided at the end with a spur-wheel, D, which meshes in pinion E, attached to shaft F. The latter is extended horizontally along the rear of the frame A, and has attached to its opposite end the main driving-pulley P. Directly over the plunger d are two eccentrics or cams, G, attached to the shaft B, by which the plunger receives its downward pressure. Its upward movement is imparted by a counterpoise, H, on the end of lever I, which is fulcrumed on the rear of frame A, and engages with the opposite end of the plunger d. Over the dies c^1 c^2 the shaft B is provided, respectively, with cam-drums K K, having grooves v v, in which traverse the end of levers L^1 L^1 provided with friction-rollers thereat. The levers L^1 L^1 are pivoted, nearly or quite at their center, to the front of the frame A, and are connected at their lower extremity, respectively, to the dies c^1 c^2. The grooves v v in the drums K K are of such contour as to impart, by means of the levers L^1 L^1, an intermittent rectilinear reciprocating movement. The eccentrics or cams G and cam-drums K K are arranged upon the shaft B at such angles relative to each other as to cause the die c to approach the mandrel in advance of the die c^1, and the latter in advance of the die c^2, and recede either in like manner or simultaneously. The first die in its descent cuts, as before described, the blank from the band metal, which has previously been placed on the top of the guide e^2, and carried forward until it abutted against the gage J, and thence presses the blank around the top portion of the mandrel a until it gives the blank the shape of an inverted **U**. The die c^1, approaching, next mounts the incline of the guide-block e^3, and in its ascension bends one of the pendent ends of the blank around the bottom portion of the mandrel. Finally, the die c^2 brings the other end of the blank around the mandrel, and presses it over the end held by the tongue of the die c^1, as illustrated in Fig. 5 of the drawing.

In order to adapt the machine for forming cylindrical and conical bodies of various diameters, the mandrel is secured in the frame A by a detachable bush, b, so as to allow of inserting a larger or smaller mandrel, as may be required, and the dies are made detachable from their respective carriers to admit of the same change, and also of repairs or renewal of said parts.

L^2 is a lever arranged vertically and relatively central with the axis of the mandrel, pivoted at its lower extremity, and bearing with its upper end against a cam, G′, on the shaft B. Below the frame A it is connected with a spring-bar, S, which is extended from end to end of the machine, and secured at its ends to the pedestals L L. At the mandrel the lever L^2 forms an eye, in which it holds the rear portion of the mandrel by a set-screw, m, passing through the lever, and engaging a collar or bush attached to the mandrel. During the revolution of the shaft B the cam G′, with the aid of the spring S, imparts an oscillating movement to the lever L^2, which, in turn, reciprocates the mandrel. The cam G′ is of such form, and arranged on the shaft B at such an angle relative to the eccentrics G and cam-drums K K, that the mandrel is caused to remain stationary during the process of forming bodies on the mandrel, and be retracted when the said process is completed. In retracting the mandrel the body formed upon it is, by contact with the face of the frame A or bush b, forced toward the front end of the mandrel. Before the dies are again brought into action by their respective cams, the lever L^2 is released by the cam G′ and carried toward the machine by the spring S, bringing with it the mandrel a into its proper position for the reception of another blank. The next before-described movement of the mandrel causes one body formed upon the mandrel to force its preceding one off the end of the mandrel. The mandrel is supported at the rear end by a guide, u.

Having thus described my invention, what I claim is—

1. The combination and arrangement of the

mandrel a, dies c c^1 c^2, elevated guide-block e^3, beveled toward the die c^1, and supported on set-screw s^1, and the guide-block e^4 in front of die c^2, and having set-screw s^2, substantially in the manner and for the purpose described and shown.

2. The combination and arrangement of the guide e^2, having bevel e on top of its forward end, the die c, plunger d, and guides h h, having beveled projection r at one side of the plunger, and a spring at the opposite side thereof, constructed to operate substantially in the manner specified.

3. The combination and arrangement of the guide e^2, having the shape of an inverted L, resting with its vertical limb on way w, and having the end of its horizontal portion fitted in a groove, g, in frame A, the stud f, and set-screw s^1, as and for the purpose set forth.

4. The combination, with the die c, of the guide e^2, set-screw s^1, and gage i, secured in slot i' in frame A, substantially as and for the purpose described.

5. The combination of the plunger d, screw-shaft l, journaled in boxes on guides h h, and gage J, pendent from screw-shaft l, and weighted at its lower extremity, constructed and arranged as described and shown, for the purpose set forth.

6. The combination and arrangement of the shaft B, having cams or eccentrics G G, cam G′, and cam-drums K K, the plunger d, die c, levers L^1 L^1, dies c^1 c^2, lever I, counterpoise H, mandrel a, lever L^2, and spring S, all constructed to operate substantially in the manner described and shown, for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two attesting witnesses, at Syracuse, in the State of New York, this 18th day of May, 1877.

EBENEZER GRIFFIN.

Witnesses:
JON. CRIST. A. DE LIMA,
E. BENDIXEN.