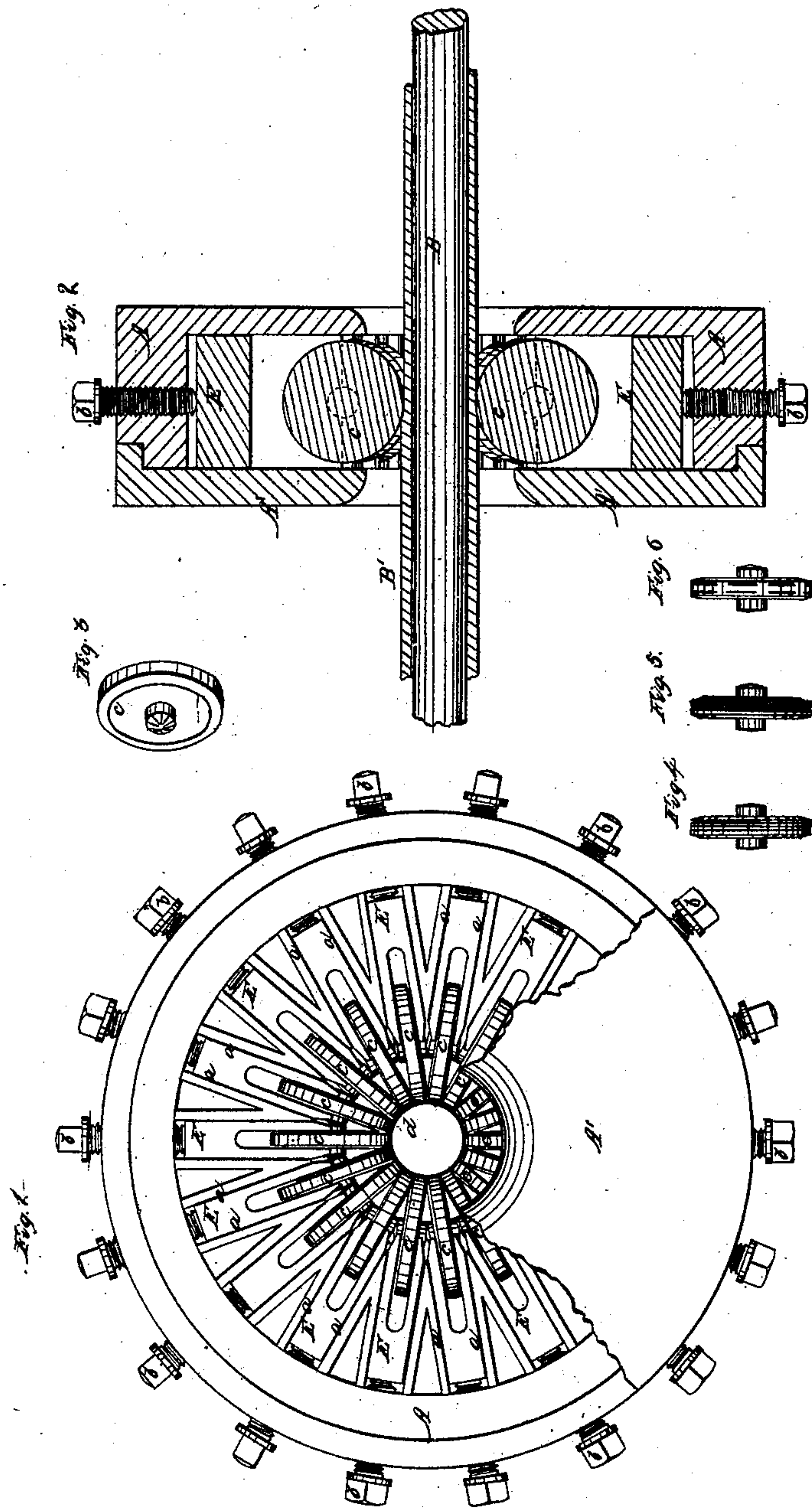


T. D. JACKSON.
DIE FOR MAKING SEAMLESS TUBES.

No. 10,569.

Patented Feb. 28, 1854.



UNITED STATES PATENT OFFICE.

TIMOTHY D. JACKSON, OF NEW YORK, N. Y.

DIES FOR MAKING SEAMLESS METAL TUBES.

Specification of Letters Patent No. 10,569, dated February 28, 1854.

To all whom it may concern:

Be it known that I, TIMOTHY DEMARK JACKSON, of the city, county, and State of New York, have invented an Improved Die to be Used in Making Seamless Metal Tubes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing of the same, which makes part of this specification, and in which—

Figure 1 represents a side elevation of my improved die, a part of the cover of the case being broken off to expose more fully its interior. Fig. 2 represents a section through the axis of the die, and of a tube in the act of being drawn through the same. Fig. 3 represents a view in perspective of one of the rolls detached. Figs. 4, 5, and 6, represent views of rolls of various forms, which may be used when necessary for ornamenting or finishing the tube, or for any other reason that may render it expedient to employ them.

Dies for drawing metal tubes have heretofore been made in which the eye was formed of two or four grooved rolls, the grooves in the rolls being curved, so as to correspond to the circle or periphery of the eye, such dies have not proved practically successful, and the cause of their failure, I have discovered to be, the unequal motion of the edges and the bottom of the grooves in the peripheries of their rolls, owing to the unequal radius of these parts, which difference in motion causes the middle of the face of each roll, to extend the metal of that part of the tube in contact with it, at a rate as much slower than the metal is extended at that part of the tube in contact with the edges of the rolls, as the motion of the edge is greater than the motion of the middle. This unequal extension strains and cracks the surface of the tube produced in this way, greatly deteriorates its strength, and leaves it with a rough and unfinished appearance.

The object of my invention is to remedy this defect, which I do by forming the eye of the die, of a series of narrow rolls with peripheries transversely straight or flat, these rolls being narrow so that the eye of the die will be formed of a series of very short segments, each of which is the side of a many sided polygon, which must closely approximate, when the tube is thin, a circle of the mean radius of the polygon.

At A is represented a strong metal box,

which should be of a circular or polygonal form; along its bottom a number of grooves are cut radially as seen at *a, a*. There are to be as many such grooves as the box is to contain rolls, and they form the guides in which the blocks carrying the rolls play; holes are also bored and tapped with threads to receive set screws as shown at *b, b*, one or more set screws to a groove, as may be judged best to resist the pressure upon the rolls. A cover (*A'*) is accurately fitted to the box as shown. A hole to receive the metal to be acted on is made through the box and its cover. The rolls are seen at (*c*) and are disks of metal. The axes I prefer to form by turning them out of the solid, and they are of such a length that the ends abut (diagonally) against each other, when the whole train is in the box as clearly seen in Fig. 1. This also determines "the set" for when the screws are properly turned up, and the axes touch, the inner corners of all the rolls should touch on both sides, thus imparting great solidity to the die. The plummer blocks which hold the rolls are represented at *E, E*. These are formed to play in the grooves (*a*). The journals of the rolls drop in a half round groove cut in the inner ends of the blocks, one half of the roll being embraced within the slot cut down through said block as represented. Any block and its roll may be taken out of the box without disturbing the others. The screws (*b*) act against the back, or outer ends of the plummer blocks, and thus they set up the rolls as previously described. To make pipes and tubes in this manner, a number of dies are required, and they must be graduated in the size, so that their central openings (*d*) will be of different diameters, as it is by passing the metal through said series that it is gradually drawn or rolled down to the given diameter and thickness. Preparatory to commencing operation with the die an ingot or form of metal is cast. The form is that of a thick hollow cylinder of suitable diameter and length. This is put upon a mandrel, and one of the dies of the proper size to begin with is then fixed to a draw bench, and the end of the mandrel (*B*) with the ingot (*B'*) upon it is forced through the hole (*d*), and the grippers secured to them. In order that the ingot may go through, the end is reduced small enough to pass with the mandrel. The rest of the operation is the same

as drawing a pipe through a dead die. As the ingot is drawn through successive dies, its thickness is reduced and its length increased. The pressure of the rolls acting on small spaces on all sides prevents the separation of the particles by lateral pressure. Hence the quality and finish of the pipe is the same as if made from sheet metal, with the additional advantage of being without a seam. After the ingot has been drawn through and reduced as far as practicable by one die, a second is placed on the draw-bench or the pipe removed to another draw-bench, where the next size is already fixed, and is passing through in the same manner. This operation of putting the pipe through successive dies is continued until the pipe has been reduced to the required size. If before that time it should be found necessary to anneal it, that operation is performed in the usual manner. In passing through the rolls a low ridge is left upon the pipe indicating the place where the rolls meet each other. To remove this ridge it will be necessary to draw the pipe finally through a dead steel die, which gives it a perfectly smooth finish by compressing and smoothing down all the protuberances; or the pipe may be drawn through a die made

with a series of very narrow rolls whose periphery is curved to the circle of the eye to bring it nearer to the required shape, preparatory to drawing it through the dead eye. Finally the pipe and mandrel are separated, and another ingot put upon the mandrel as before, and the same operation which has been already described repeated. Ornamental pipes and tubes may be made by engraving the periphery of the rolls, with some fancy device or figure, as seen in Figs. 4, 5, and 6 the impression being given at the last time of passing the pipe through.

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

A die for drawing seamless metal tubes, constructed with an eye, whose periphery is formed of a series of narrow friction rolls, which produce a substantially equable extension of every part of the circumference of the tube being drawn as herein set forth.

In testimony whereof, I have hereunto subscribed my name.

TIMOTHY D. JACKSON.

Witnesses:

L. PITKIN,
WILLIAM DIXEY.