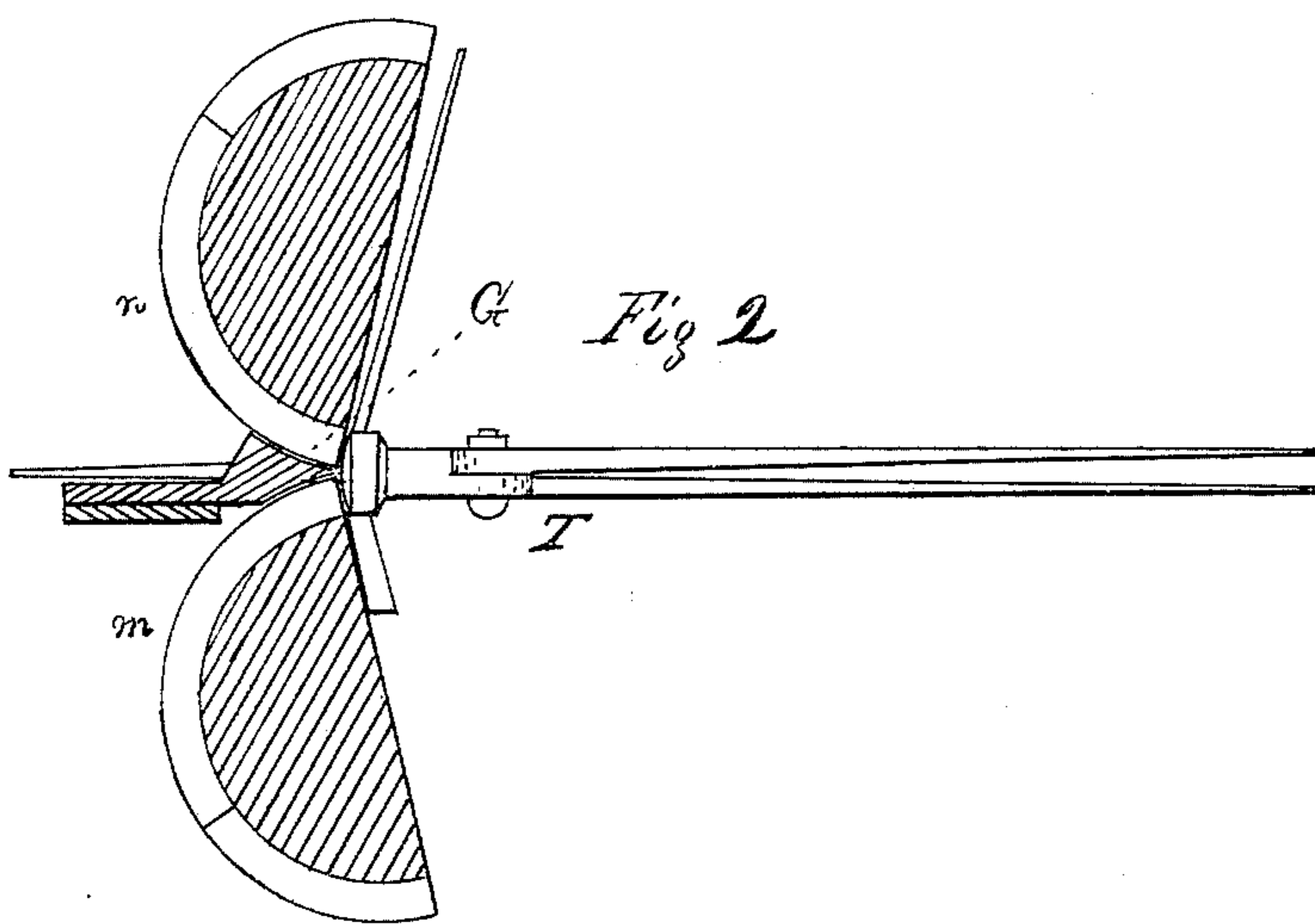
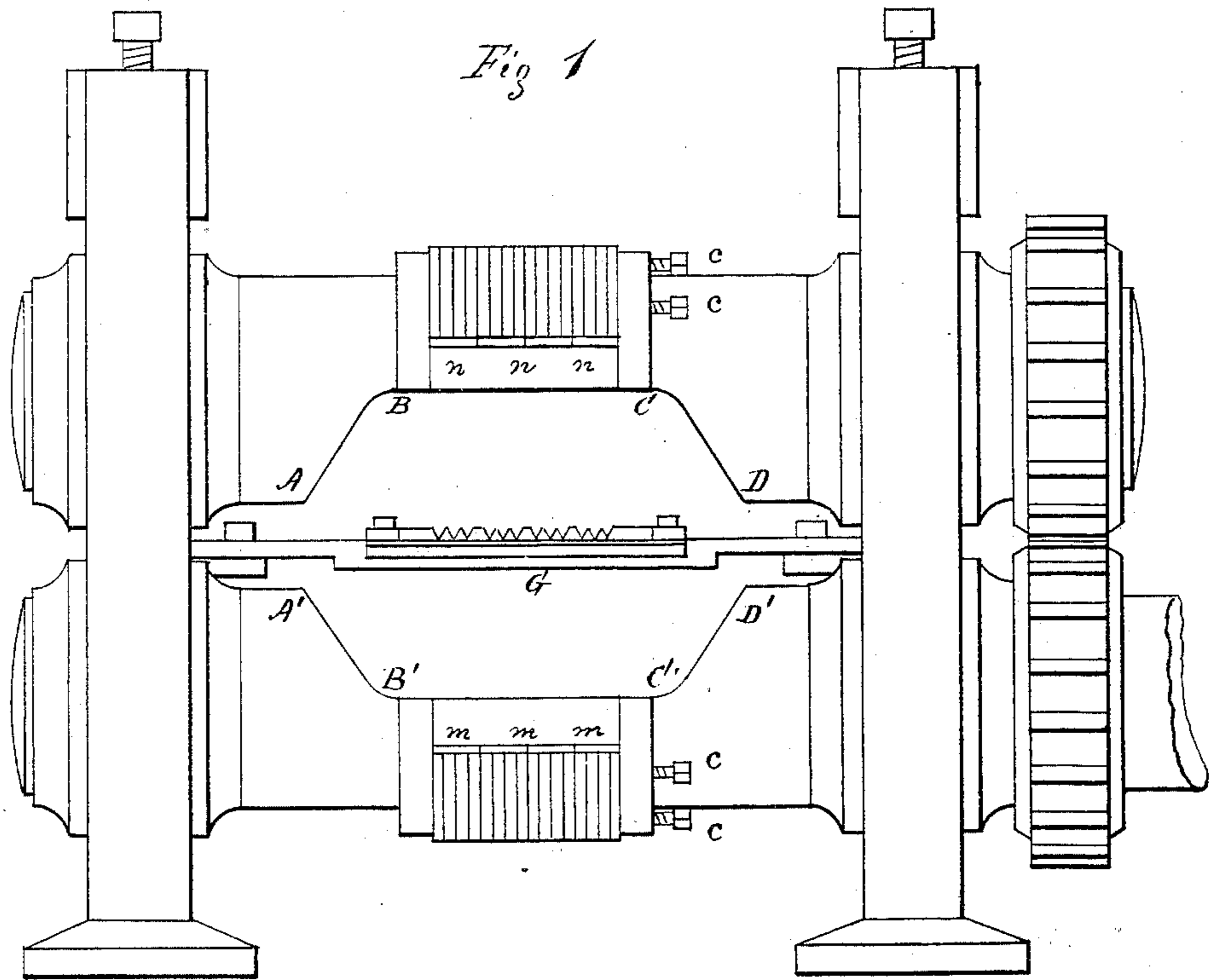


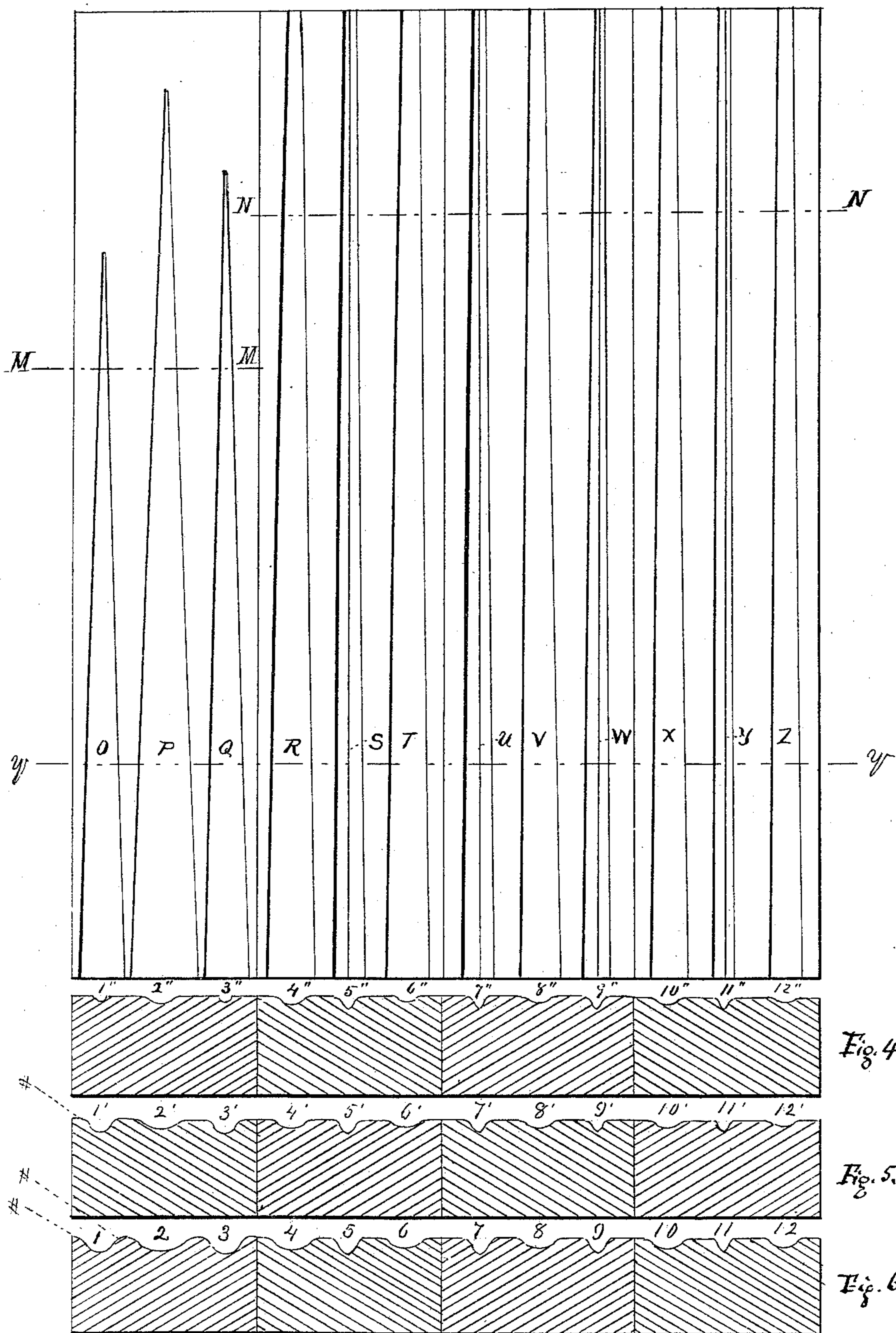
J. C. RICHARDSON.
Machines for Manufacturing Agricultural-Forks.
No. 223,246. Patented Jan. 6, 1880.



Witnesses
George W. Bailey

Inventor
J. C. Richardson,
per Geo. D. Walcott.
Atty

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Witnesses
E. L. Walcott.
M. C. Walcott.

Inventor
J. C. Richardson
per Geo D. Walcott
Att'y

UNITED STATES PATENT OFFICE.

JULIUS C. RICHARDSON, OF PITTSBURG, PA., ASSIGNOR TO WITHINGTON
& COOLEY MANUFACTURING COMPANY, OF JACKSON, MICH.

MACHINE FOR MANUFACTURING AGRICULTURAL FORKS.

SPECIFICATION forming part of Letters Patent No. 223,246, dated January 6, 1880.

Application filed February 25, 1879.

To all whom it may concern :

Be it known that I, JULIUS C. RICHARDSON, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Machinery for Drawing the Tines of Agricultural Forks and Garden-Spades, of which the following is a specification.

The invention relates to that class of machinery used for drawing or elongating steel or iron by passing it between rollers.

Heretofore it has been the practice to draw forks by means of trip-hammers, the tines being drawn on the horn of hammer-dies to proper length, and then, by means of several grooves formed in both top and bottom dies, swaged to their proper size and form.

By this arrangement very much is left to the skill and care of the operator, and the result is many uneven lumpy tines, or tines in many respects imperfect, unless unwarranted time is taken in finishing. With a view to obviate nearly all these objections, and produce a more perfect tine at reduced cost, I have invented the means hereinafter described and claimed. These means can best be explained and understood by reference to the accompanying drawings, in which similar letters indicate like parts.

Figure 1 is a vertical longitudinal view of the rolls, roll-dies, and standards, with gage and guide plate in position; Fig. 2, a vertical section of the rolls, roll-dies, and gage and guide plate; Fig. 3, Sheet 2, the series of grooves for two and three tined forks; Fig. 4, section of same on lines M M and N N; Fig. 5, section of same on lines y y; Fig. 6, a section of same grooves just back of front edge of the dies, the exact front being rounded over a trifle in each groove.

The first feature of this invention is the construction of the rolls. The bearings are the same as ordinary rolls, but between the bearings the rolls are quite different, being cut away on one side, commencing near the bearing on one end, at A A', cutting away gradually to the center of the roll, at B B'. From B to C and B' to C' the rolls are half cut away. From C to D and from C' to D' the cut gradually runs out. The shoulders B and C and

B' C', extending around the cylindrical part of rolls, are for holding the dies *n n n* and *m m m* in their position by means of the set-screws *c c c' c'*.

The object of thus cutting the rolls is to enable the operator to get the blank from which the fork-tines are to be drawn between the rolls and into position to be acted upon fully up to the shoulder of the tines by the dies as they approach each other and come into working by their rotation, the cutting away of the roll allowing the drawn tines, by slight inclination back, to stand up against upper or down against lower face of cutting, as will be readily seen by Fig. 2.

The second feature is the guide and gage plate G. This plate is fastened to a bar extending from one standard to the other in such position as to bring the series of grooves cut into it exactly in line with the series of grooves in the roll-dies, so providing a guide for each groove. This same plate is so placed that its edge next the center of machine forms a gage, against which the end of the tongs is placed in inserting the blank to be drawn between the rolls, said blank resting in a groove of guide-plate until, by the revolution of rolls, it is clasped at the shoulder and rolled to the end.

In a former machine for rolling sword-blades, on which I procured a patent for a guide-plate and also for a gage-bar, these were separate, the one in front of the rolls, and the other back of same. They answered the purpose there, but in drawing forks they will not, for the reason that forks have two or more tines projecting from the same shank and each tine has to be drawn from the shoulder next the shank. Consequently, the projecting tines that are not being worked upon must go up to the edge of roll-die at every operation, and as they project either up or down, to be able to do this the gage must be placed back of roll, instead of in front. This combination guide and gage plate is therefore a new and necessary feature.

In connection with this guide and gage plate I employ tongs which are made with an enlarged end, as shown in Fig. 2 at T. On the inner part of the jaws to these tongs an impression is made to correspond with that part of the fork-blank to be held to such an extent

that the tongs close about the blank and hold it firmly, and at the same time leave the tine to be drawn projecting from the end just far enough to allow the roll-dies to close about it fully up to the shoulder, the enlarged end of tongs forming a stop or shoulder that insures inserting the tine or blank the right distance between the rolls to be properly acted upon.

The different tines in each fork require tongs with different impressions for clasping the blank; but all tongs must have the enlarged end for a stop against the gage-plate when inserting the tine. The grooves in guide-plate answer for a rest or table.

I have previously used tongs with collar or shoulder for gaging against a bar; but as the gage, for reasons previously given, must be back of the rolls, and the space in front of vertical plane through center of rolls kept clear, the collar on tongs must be on extreme end.

The third feature is the series of grooves in the roll-dies. This series, for an ordinary oval-tined fork, is as follows: Referring to Fig. 6, Sheet 2, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 are cross-section of the several grooves near the front end of the dies. Fig. 5, 1' 2' 3' 4' 5' 6' 7' 8' 9' 10' 11' 12' are cross-section of grooves on line *y y*; Fig. 4, 1'' 2'' 3'', cross-section on line *M M*, and 4'', 5'', 6'', 7'', 8'', 9'', 10, 11'', and 12'' cross-section on line *N N*. The view of grooves on the face of dies is shown at O, P, Q, R, S, T, U, V, W, X, and Y, Fig. 6. The groove P is very flat and quite tapering, and is used for first operation on each tine. The grooves O and Q are similar to each other in form, deeper and narrower than P—in fact nearly half-round, for shaping the tine for the remainder of the grooves.

R, T, V, X, and Z are drawing-grooves, flat-oval in form, gradually diminishing in size to Z, which is the size of smallest finished tine. S, U, W, and Y are edging-grooves, all gradually diminishing in size and all so proportioned as to edge up a tine drawn in the flat groove first preceding it, that it may be drawn in the next flat groove without flash or edges that will not be rolled back into tines by next edging-groove without flaw.

To prevent the edges of the tines being rolled

too thin I grind away the edges of the grooves, so that any surplus stock may find room within the grooves, as shown in drawings.

In this series I alternate a very flat groove with an edging-groove, relying mainly on the flat groove to do the drawing and the edging-groove to force back the tine into such form that the next flat groove will elongate it very much without spreading it so as to cause fins or flashes on the edge. By this series I am enabled to make sound tines free from marks of any kind, very uniform in size, and perfect in shape.

Owing to the size and shape of the dies or die-grooves, as represented in the drawings, the point or outer end of the tine is first reduced to about its ultimate size, while the body of the tine is reduced afterward—that is to say, the point is practically reduced to shape by the time it leaves groove U, while the succeeding grooves, V, W, X, Y, and Z, work mainly on the body of the tine, in order to draw it out to its finished shape. By thus reducing the blank I get the outer and thinner end of the tine in shape before it loses its heat.

I claim—

1. In a machine for drawing the tines of agricultural forks, the combination, substantially as set forth, of die-rolls each of which is cut away back of its face or bed to the extent of at least a semi-cylinder, substantially as and for the purposes set forth.

2. In combination with the die-rolls, the guide and gage plate, formed or provided with guide-grooves and with a gage nose or beak, which is placed in advance of said grooves and between the rolls, substantially as set forth.

3. The series of dies and grooves for drawing oval tines, constructed and arranged to operate on the blank in the manner shown and described, to reduce the point or outer extremity of the tine first and the body of the tine afterward.

JULIUS C. RICHARDSON.

Witnesses:

J. H. HILLERMAN,
H. C. LYON.