(No Model.) 2 Sheets—Sheet 1.

W. P. & J. W. BETTENDORF.

MACHINE FOR DIE ROLLING METALS.

No. 445,874. Patented Feb. 3, 1891.

Fig. 1.

on line 1-1

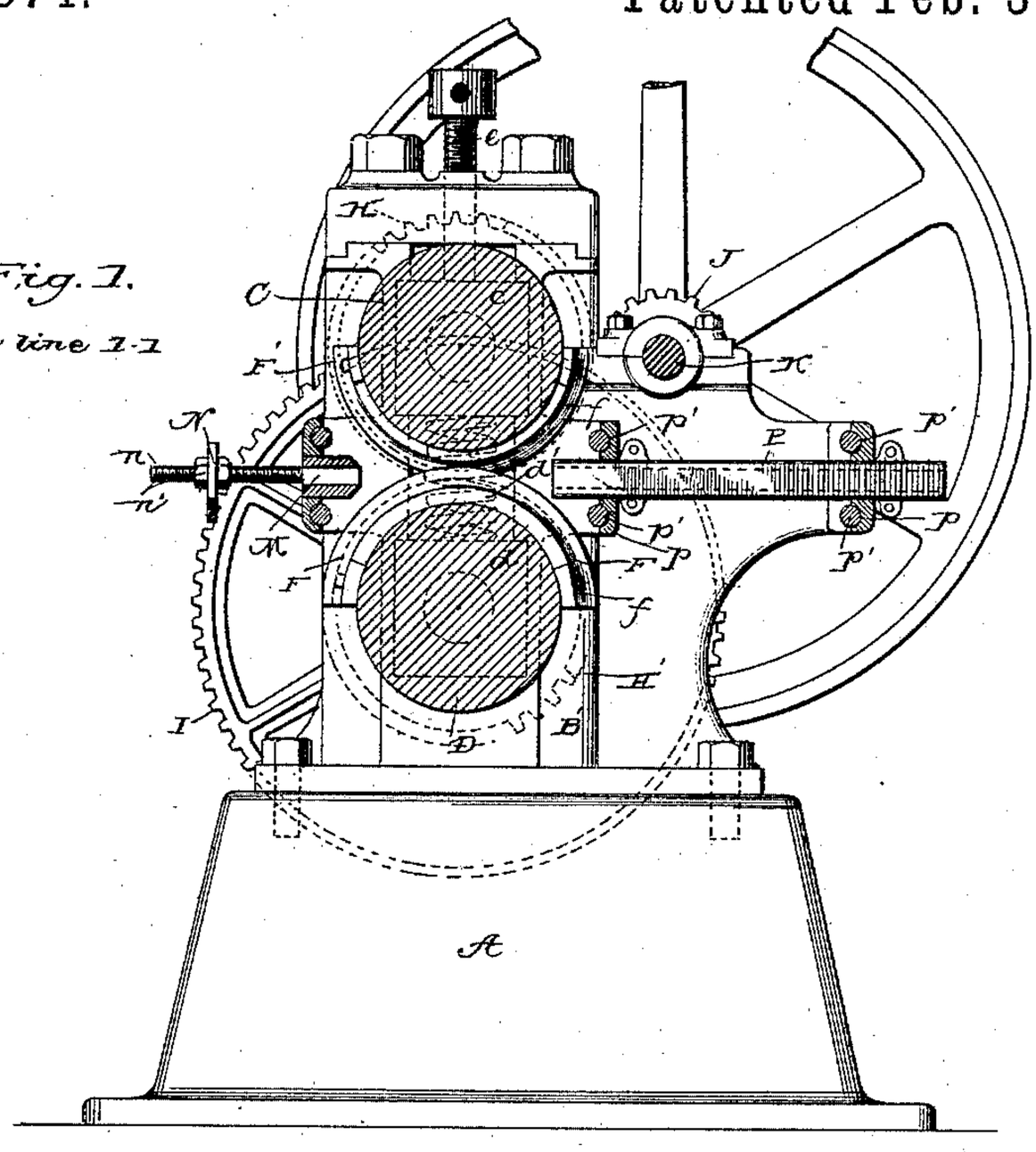
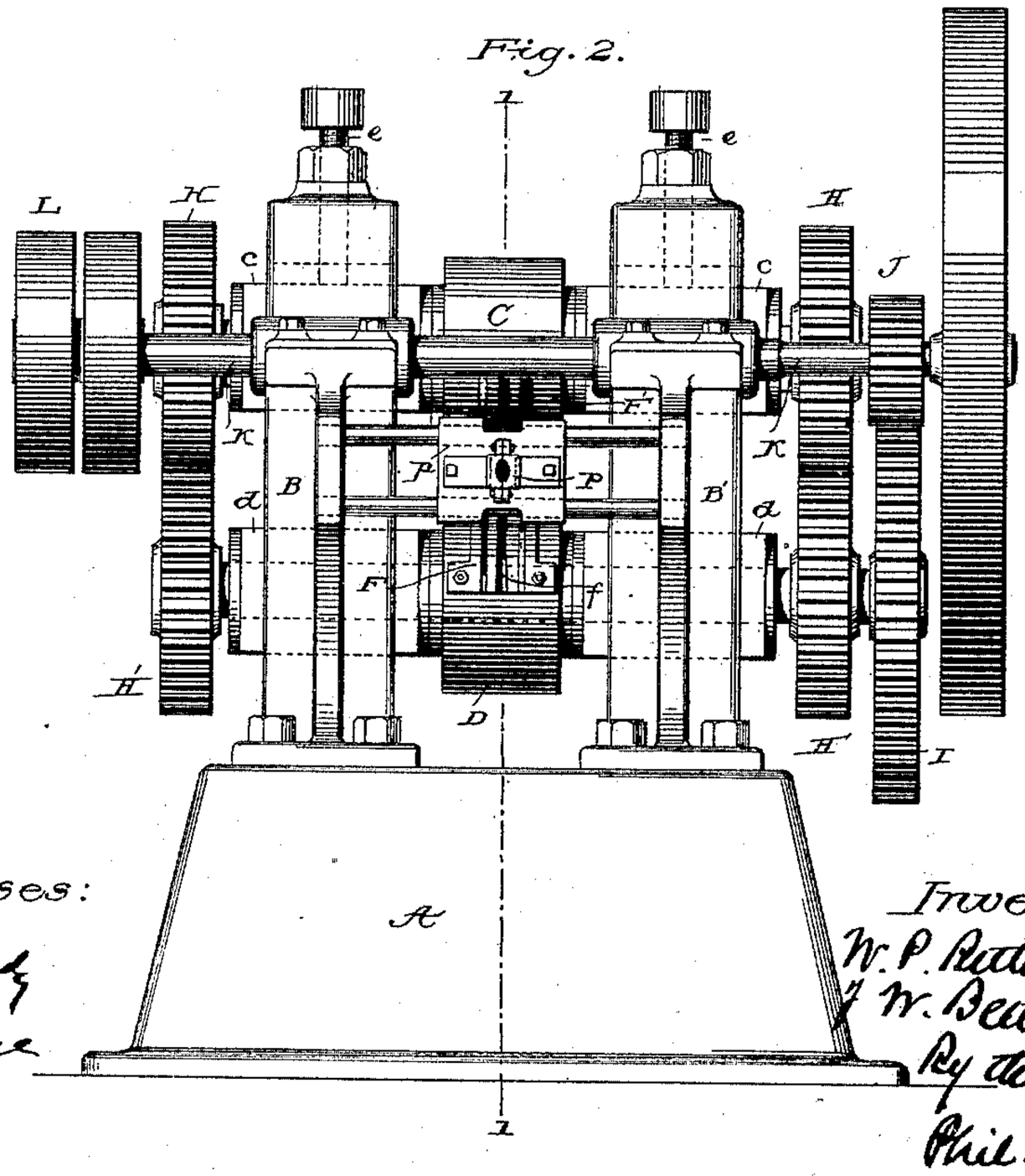


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

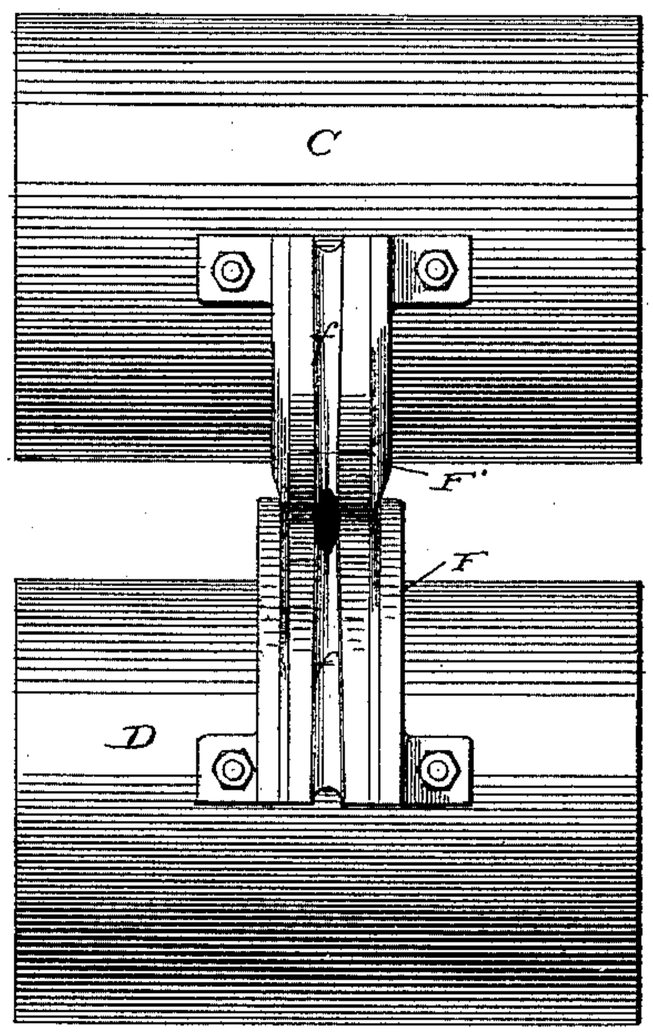


Fig. 6.

Fig. 7.

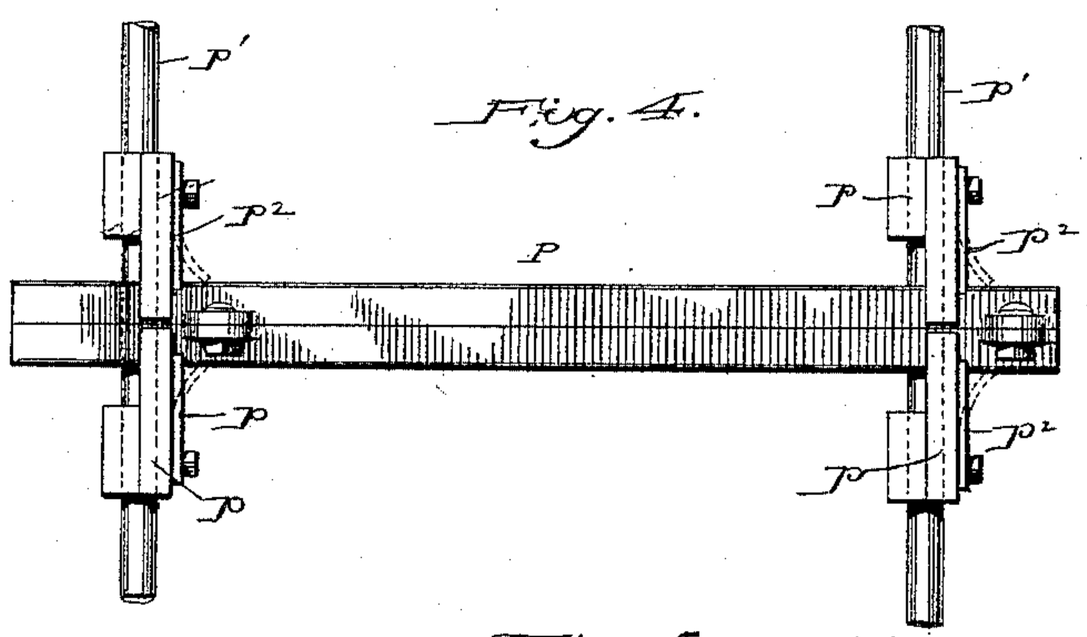
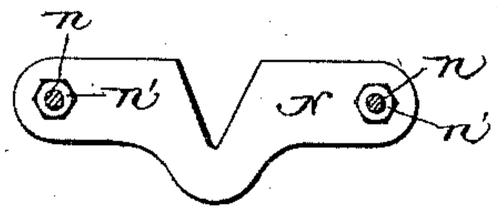


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM P. BETTENDORF AND JOSEPH W. BETTENDORF, OF DAVENPORT, IOWA.

MACHINE FOR DIE-ROLLING METALS.

SPECIFICATION forming part of Letters Patent No. 445,874, dated February 3, 1891.

Application filed June 7, 1890. Serial No. 354,576. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM P. BETTENDORF and JOSEPH W. BETTENDORF, of Davenport, in the county of Scott and State of Iowa, have invented certain Improvements in Machines for Die-Rolling Metals, of which the following is a specification.

The object of this invention is to provide a simple and rapidly-operating machine by which rods of elliptic or other form in cross-section and of uniform size may be reduced to a tapered form for use as spokes in the manufacture of metal wheels.

The machine is more particularly intended for rolling metal of an elliptic section to a tapered form in which it shall present at one end the original elliptic shape and at the opposite end a cylindrical shape.

In the accompanying drawings, Figure 1 is a vertical section through our machine from front to rear on the line 1 1 of Fig. 2. Fig. 2 is a rear elevation of the same. Fig. 3 is a front elevation, on a larger scale, of the rolls and dies. Fig. 4 is a top plan view showing the rear guide through which the finished blank is delivered. Fig. 5 is a face view of the front gage-plate. Fig. 6 is a view showing in side and end elevation a rod-blank such as our machine is intended to operate upon. Fig. 7 is a view showing in side elevation and in end view the finished blank or spoke.

Referring to the drawings, A represents a rigid main frame having at its sides two upright slotted standards B B′.

C and D represent two horizontal rolls having their journals mounted in boxes *c* and *d*, seated in the slots of the standards. The boxes of the lower roll are seated rigidly in position, while those of the upper roll are sustained by springs *d′* and acted upon by adjusting or tempering screws *e*, inserted through the top of the standards, this arrangement permitting the upper roll to be raised or lowered in relation to its companion in the manner commonly practiced in rolling-mills.

To the surfaces of the respective rolls we bolt or otherwise secure firmly the detachable co-operating dies F and F′, the outer faces of which are curved in lines concentric with the rolls by which they are carried and arranged to run in contact with each other. The lower die F is channeled or grooved circumferentially, in order to receive the outer edge of the die F′, so that as the rolls revolve the dies are kept in exact alignment and prevented from shifting laterally in relation to each other. In the outer edges of the dies we form complementary grooves *f* of such shape that a rod introduced between them during their rotation will be reduced to the required form. It will be observed that the dies extend but part way round the rolls, so that as the rolls are revolved constantly in one direction the dies will first be brought together and then carried outward from each other, leaving between the rolls an open space to permit the introduction of the rod to be treated.

Motion may be imparted to the rolls by gearing of any suitable character; but we commonly provide the rolls at both ends with connecting-pinions H H′, and also provide the lower roll at one end with a large driving-gear I, driven by a pinion J on a shaft K, seated in bearings in the top of the frame and provided with driving-pulleys L and a fly-wheel.

In front of the rolls we locate a stationary guide-tube M and in front of the guide-tube a gage-plate N, sustained by two horizontal rods *n*, fixed to the main frame and secured in place by means of nuts *n′*, applied to this rod, so that the distance of the plate from the rolls may be increased or diminished at will, according to the length of the rods to be treated or the length of the portion to be treated. This gage-plate is of the form shown in Fig. 5, with a groove in its upper edge. It acts to support the outer end of the rod as it is introduced into the machine, and also as a step against which the tongs holding the rod will abut, in order to determine the distance which the rod is projected between the rolls preparatory to being grasped by the dies. The grooves in the dies are so formed that the rolling operation progresses from the larger toward the smaller or round end of the finished blank. Any increase in the distance of the gage-plate from the rolls results, therefore, in a reduction in the length of the tapered portion of the rod.

In rear of the rolls is mounted a horizontal guide-plate P, into and through which the blank is delivered as it emerges from the rolls. This tube serves to guide the blanks in such manner that they are rolled in a straight form and prevented from twisting or bending out of shape. This guide-tube is inserted endwise through supporting-blocks p, which may be sustained by cross-rods p' on the main frame or in any other suitable manner. The tube is held normally in position and prevented from moving endwise by springs p^2, which are bolted to one of the supporting-plates and arranged to engage in notches in the tube. So long as the dies operate in the proper manner and produce the blanks without fins thereon they will pass freely through the tube, which will remain in position; but if for any reason the fins appear upon the blanks, so that they cannot enter the guide-tube, they will act to push the latter endwise out of its place as soon as the pressure becomes sufficient to overcome the resistance of the springs. This yielding action of the guide-tube serves the twofold purpose of preventing breakage of the parts and of directing the attention of the operator to the fact that the dies are operating imperfectly.

In operating the machine the rolls are driven continuously in the direction indicated by the arrow. The operator, grasping a headed blank in a pair of tongs, introduces the same at the time the dies are turned outward from each other through the forward guide-tube and between the rolls until the tongs encounter the gage at the front. As the reduction of the rolls continues the dies are brought together, and their forward ends grasp the blank between them. As the rotation continues the blank is carried forward between the dies, converted by their grooved surfaces into the required form, and finally ejected through the tube at the rear.

One of the advantages of our construction is that the dies may be quickly removed and replaced by others of different form, and thus the one machine adapted for rolling blanks differing both in length and in shape.

Another advantage is that the rolls may be driven continuously and at a high rate of speed, enabling the operator to feed the machine with great rapidity and without especial care in introducing the blanks.

Another advantage lies in the fact that the adjustable gage enables the attendant without changing the dies to taper the blanks for a greater or less portion of their length, as required.

Having thus described our invention, what we claim is—

1. The frame, the rollers therein, and gearing for driving the rolls constantly in one direction, in combination with the segmental dies removably secured to the rolls.

2. The co-operating roller-dies, one channeled to receive the other, substantially as described, whereby they are caused to register and prevented from getting out of line.

3. In combination with the roller-dies, the front gage-plate to limit the insertion of the blanks between the rolls.

4. In combination with the roller-dies, the front guide-tube and the adjustable gage-plate.

5. In combination with the roller-dies, the rear guide-tube.

6. In combination with the roller-dies, the rear guide-tube movably mounted in supports and yielding devices to hold said tube in position.

In testimony whereof we hereunto set our hands, this 14th day of May, 1890, in the presence of two attesting witnesses.

WILLIAM P. BETTENDORF.
JOSEPH W. BETTENDORF.

Witnesses:
G. N. MEVES,
THOS. B. CARSON.