

(No Model.)

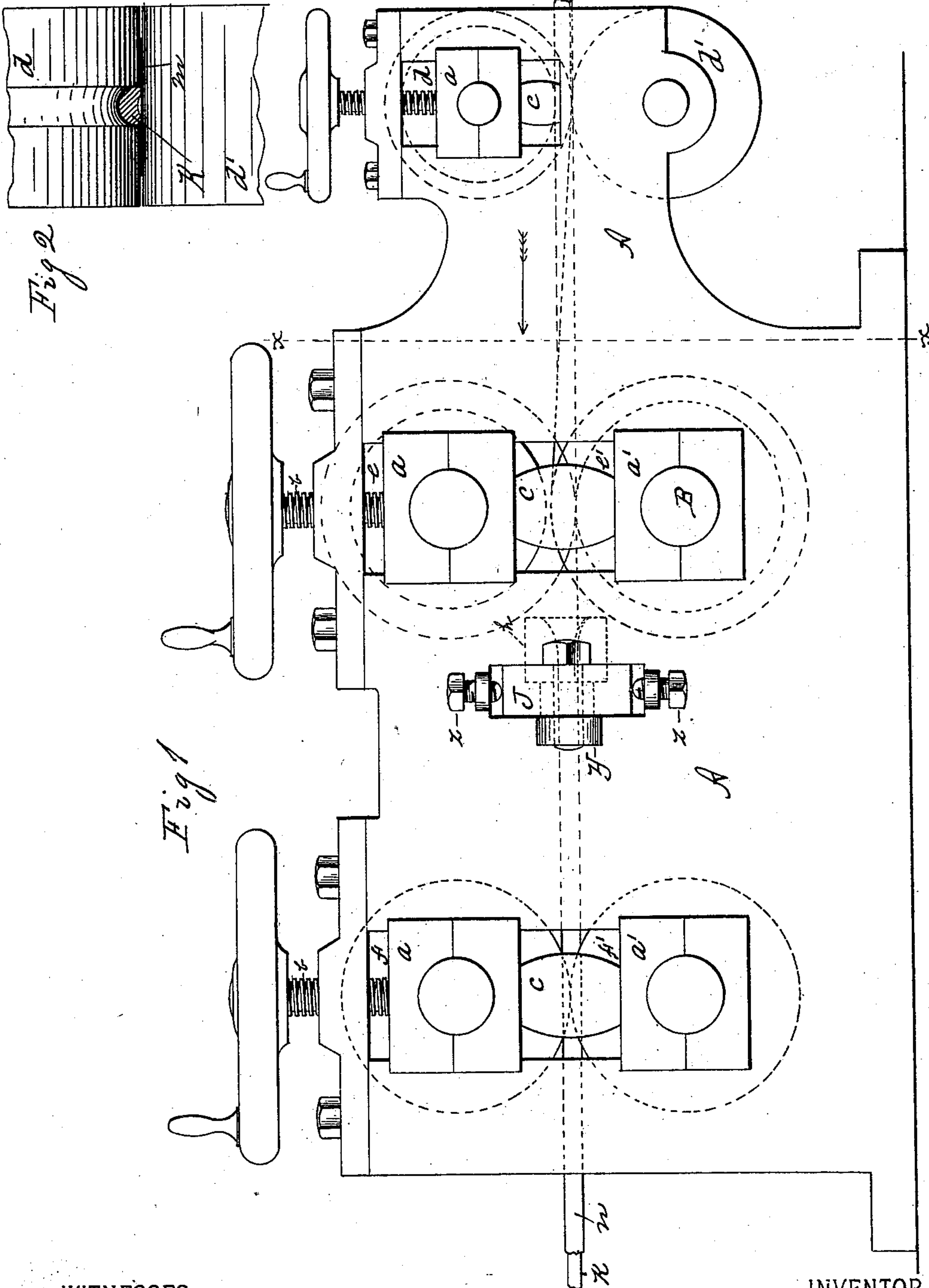
2 Sheets—Sheet 1.

G. T. WARWICK.,

MACHINE FOR FORMING HOLLOW METALLIC WHEEL RIMS.

No. 360,936.

Patented Apr. 12, 1887.



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(No Model.)

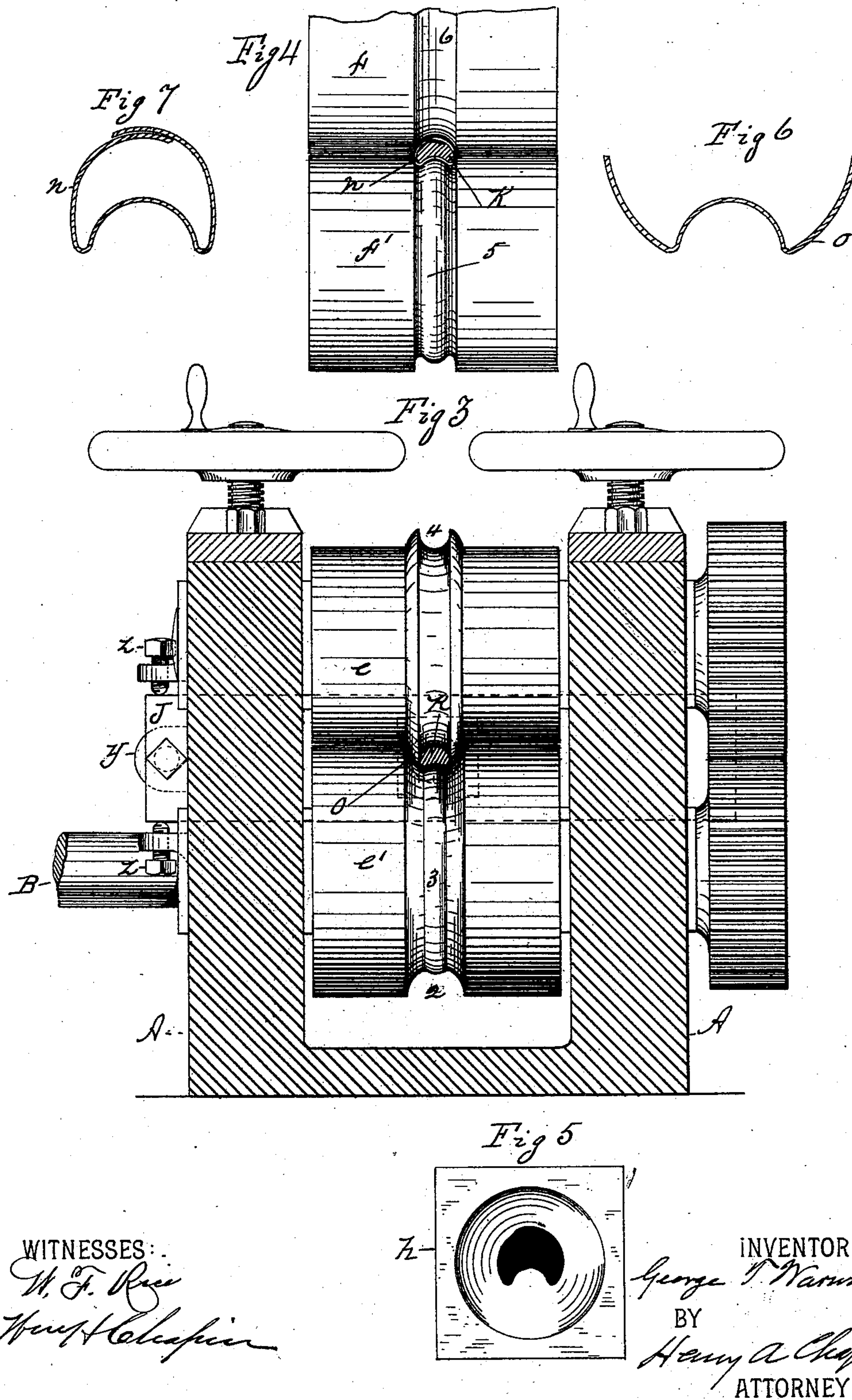
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UNITED STATES PATENT OFFICE.

GEORGE T. WARWICK, OF SPRINGFIELD, MASSACHUSETTS.

MACHINE FOR FORMING HOLLOW METALLIC WHEEL-RIMS.

SPECIFICATION forming part of Letters Patent No. 360,936, dated April 12, 1887.

Application filed January 2, 1886. Renewed September 29, 1886. Serial No. 214,841. (No model.)

To all whom it may concern:

Be it known that I, GEORGE T. WARWICK, a citizen of England, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Machines and Devices for Rolling Hollow Metallic Wheel-Rims, of which the following is a specification.

This invention relates to improvements in machines and devices for rolling hollow metallic wheel-rims, the object being to provide in one machine improved means for forming hollow wheel-rims from a flat strip of sheet metal, said rims being delivered from said machine in a condition ready to be cut to proper length and bent to circular form after having their joint soldered.

In the drawings forming part of this specification, Figure 1 is a side elevation of a machine for rolling hollow metallic wheel-rims embodying my improvements. Fig. 2 is a front-elevation of portions of the receiving or feed rolls of said machine, showing between said rolls an end view of the metal strip from which the rim is formed and a section of the mandrel on which said strip is rolled. Fig. 3 is a section of the machine through line *x x*, Fig. 1, showing the rolls back of said feed-rolls, a section of said mandrel, and an end of the partly-formed rim-strip. Fig. 4 is a front elevation of one roll and a portion of the other through or between which the rim-strip and mandrel finally pass, and whereby the complete form is given to the rim-tube, said figure showing an end view of the latter and a section of the mandrel between the rolls. Fig. 5 is an end elevation of a forming-die interposed between the second and third pairs of rolls. Fig. 6 is a transverse section of the partly-formed tube-strip, and Fig. 7 is a like view of the completely-formed rim-tube.

In the drawings, A is the frame of the machine, in which are fitted suitable boxes, *a*, to serve as vertically-moving bearings for the ends of forming-rolls, and *b* are adjusting-screws having their ends bearing on the said boxes, the bearing-boxes *a'* for the lower rolls resting in frame A, and rubber or other suitable lifting-springs, *c*, being located between said lower and upper boxes. The feed-rolls *d* and *d'* are hung, respectively, in said movable

boxes *a* and in the frame A of the machine, and the boxes of the roll *d* have interposed therebetween and said frame a spring like to said springs *c*, as shown.

The machine consists of three pairs of rolls, *d d'*, *e e'*, and *f f'*, and a forming-die, *h*, the latter supported in a cross-bar, *i*, in the rear of the rolls *e e'*, and said rolls being connected by a suitable train of gearing, a portion of which is shown in Fig. 3, whereby motion is imparted to all of said rolls through a driving-shaft, B, one end of which is shown in Fig. 3, projecting from the end of roll *e'*, said rolls being revolved in a direction which will carry the metal through the machine from which the wheel-rims are made in the direction indicated by the arrow on frame A in Fig. 1.

The sheet-metal strip *m*, Fig. 2, is of suitable width and thickness to form the rim-tube *n*, and in practice has its forward end tapered to facilitate its entrance between the rolls *e e'*, and into the forming-die *h*, behind the latter. A mandrel, K, having in cross-section substantially the form of the interior of the finished tube *n*, is run through the machine in connection with the tube-strip *m*, the latter being formed around said mandrel, and the latter being drawn out of the tube after the latter comes from the machine. The said feed-rolls consist of the plain-faced roll *d'*, having the grooved roll *d* bearing thereon, the groove in the latter being substantially of the form of upper or rounded side of the mandrel K.

The second pair of rolls which acts on the strip *m* consists of the rolls *e e'*, the latter having the semicircular groove 2 therein, with the curved-faced rib 3 at the bottom thereof, and the roll *e* having the grooved rib 4 thereon, whose sides fit said groove 2 in roll *e'*, and whose groove conforms to the shape of the said upper or rounded side of the mandrel K, or, in other words, the said groove in the said rib 4 is substantially of the form of the groove in the feed-roll *d*.

A die-bar, J, is secured in frame A, directly behind the rolls *e e'*, by a bolt at each end passing through said bar into a lug, *y*, on said frame. An adjusting-screw, *z*, on the frame above and below bar J, at each end thereof, is provided for the purpose of adjusting the die

5 *h*, held in said bar, to a correct position opposite the meeting-points of the rolls *e e'*. The said die *h* has a flaring open end adjoining the sides of rolls *e e'*, and its general form is shown
 10 in Fig. 5, and in dotted lines in Fig. 1. The outlines of the black center in said Fig. 5 indicate the form in cross-section (said figure being a front elevation of said die) of the most reduced part of the opening in or passage
 15 through said die, said outlines indicating approximately the general form of the exterior of the rim-tube *n*, a section of which is shown in Fig. 7. The curves, however, of the opposite sides of said passage are not concentric, as
 20 clearly shown in Fig. 5, one side thereof being formed to correspond with the curve of that side of said tube whose edge is undermost at the lap-joint and the other side to correspond with the curve of the opposite side of
 25 said tube. When a butt-seam tube is drawn, the curves of both sides of said die are alike.

The third pair of rolls, which acts on the rim-tube *n* after it has passed through the die *h*, consists of the rolls *f f'*, Fig. 4, the latter
 30 thereof having a groove, 5, therein, conforming with the shape of the under side of the rim-tube *n*, and extending slightly up on the opposite sides of the latter, as shown in Fig. 4, and roll *f* has a groove, 6, therein, conforming
 35 substantially to the shape of the rounded side of said rim-tube *n*, but being adapted to roll against the overlapping edge of the latter and force it against the under edge of the tube, leaving said edges in the relative positions
 40 shown in Fig. 7. The mandrel *K*, remaining in said tube while it passes through said rolls, serves as a species of anvil, against which the tube is forced by the rolls to give the latter its properly-finished form.

45 The operation of my improvements is as follows: The tube-strip *m* and the mandrel *K*, the latter lying centrally on said strip, are fed together endwise between the rolls *d d'*, and, emerging from the latter, are caught between
 rolls *e e'*, entering the grooves of the latter, and the strip is thereby brought to the form in cross-section shown in Fig. 6, and at *o* in Fig. 3. The partly-formed strip *o* and mandrel, after passing between said rolls *e e'*, en-

50 ter the die *h*, forced forward by said rolls, and by said die the strip *o* is brought very nearly to the rim-tube form, as shown in Fig. 7, and it is finally completed by the action of the rolls *f f'*, as above set forth.

55 The rim-tube has the mandrel therein during its formation by the machine, and after leaving the latter it is drawn off from said mandrel, cut to proper length, and bent to the requisite circular form for a wheel-rim.

60 The metal strip forming the rim-tube may be worked either cold or hot; but it is preferable to work it cold.

65 The end of the mandrel *K* which enters between the rolls *e e'* with the said tapered end of the metallic strip is in practice somewhat tapered, to facilitate its easy entry therebetween.

What I claim as my invention is—

1. A machine for forming hollow metallic wheel-rims, consisting of the feed-rolls *d d'*, the
 70 former having a circular groove therein, the forming-rolls *e e'*, the latter provided with the semicircular groove 2, having the rib 3 therein, and the former having the grooved rib 4 therein, whose sides fit said groove 2, the
 75 forming-die *h*, located in the rear of said rolls *e e'*, and the finishing-rollers *f f'*, to receive the rolled and drawn tube from said die, combined with the mandrel *K*, substantially as set forth. 80

2. The combination, in a machine for forming hollow metallic wheel-rims, of the rolls *e e'*, for partially forming said rims, having, respectively, the semicircular groove 2, within which is the rib 3, and the grooved rib 4, whose
 85 sides fit said groove 2, the forming-die *h*, located in the rear of said rolls *e e'*, and the finishing-rollers *f f'*, to receive the rim-tube from said die, and the mandrel *K*, substantially as set forth. 90

3. The combination, with the mandrel *K*, of the rolls *f f'*, co-operating with said mandrel to compress and unite the edges of the rim-tube, substantially as described.

GEO. T. WARWICK.

Witnesses:

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