No. 751,166. PATENTED FEB. 2, 1904.

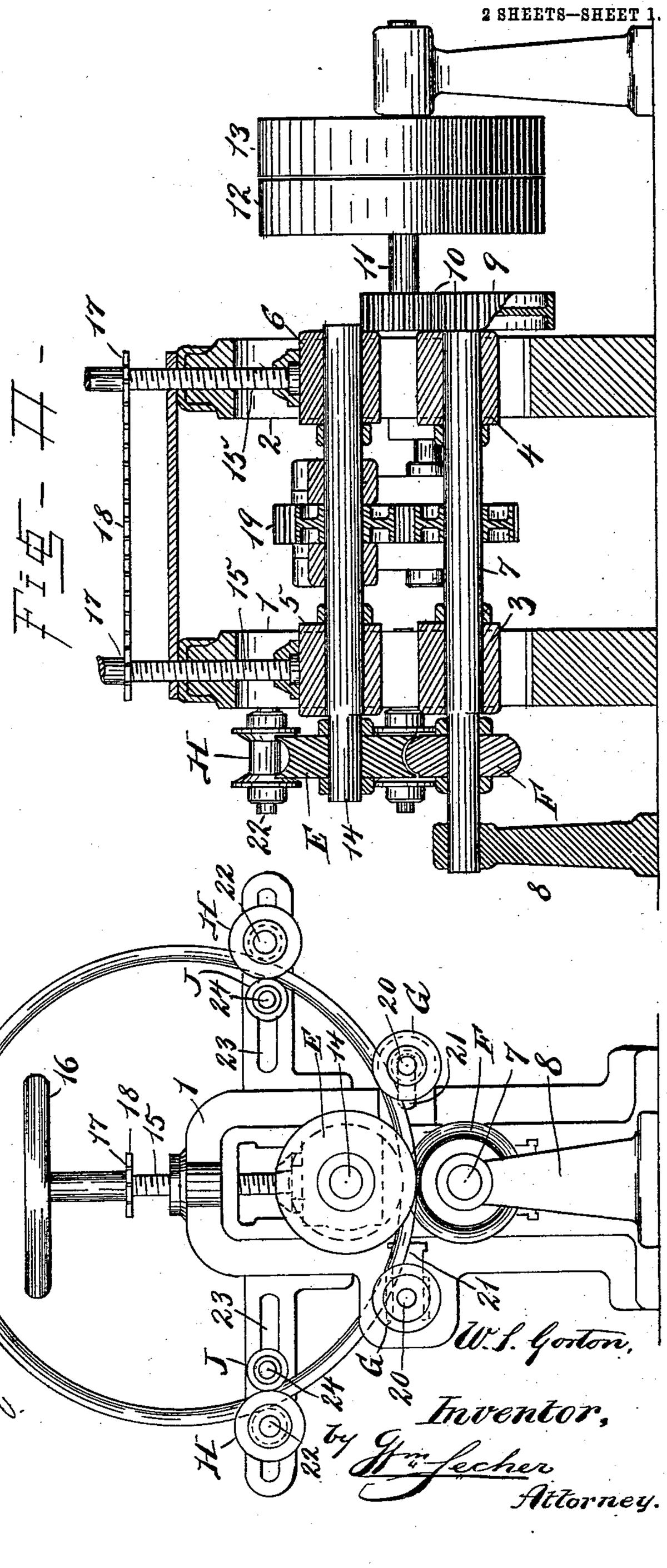
W. S. GORTON.

MACHINE FOR MAKING METALLIC WHEEL RIMS.

APPLICATION FILED DEC. 26, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 1.



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NO MODEL. 2 SHEETS—SHEET 2.

FIG. V.

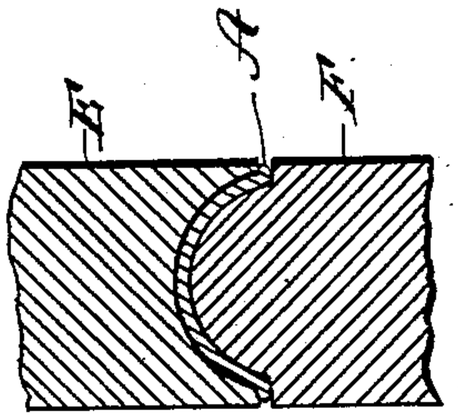


FIG. VI.

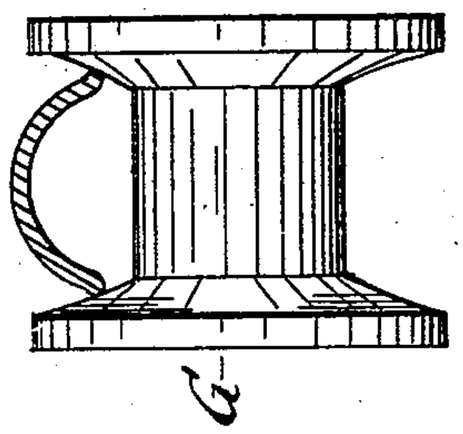


FIG. IV.

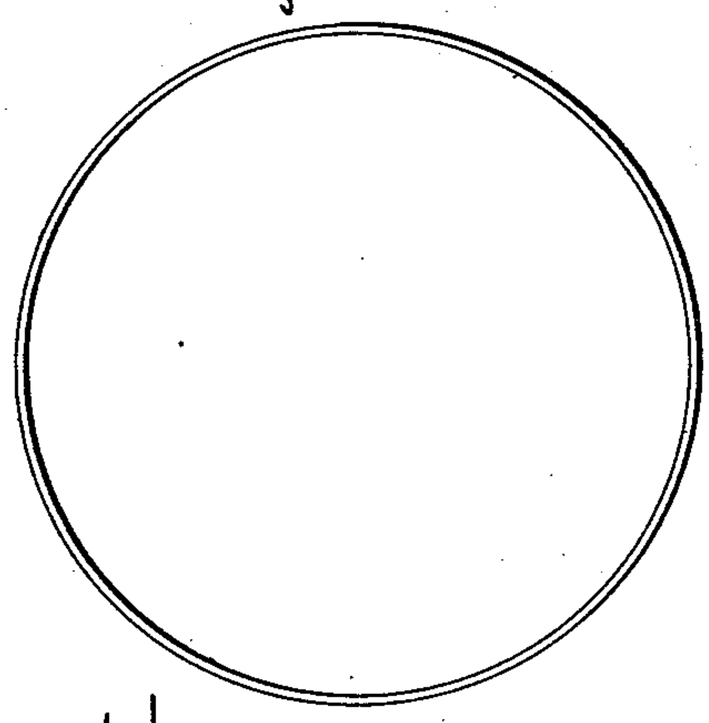
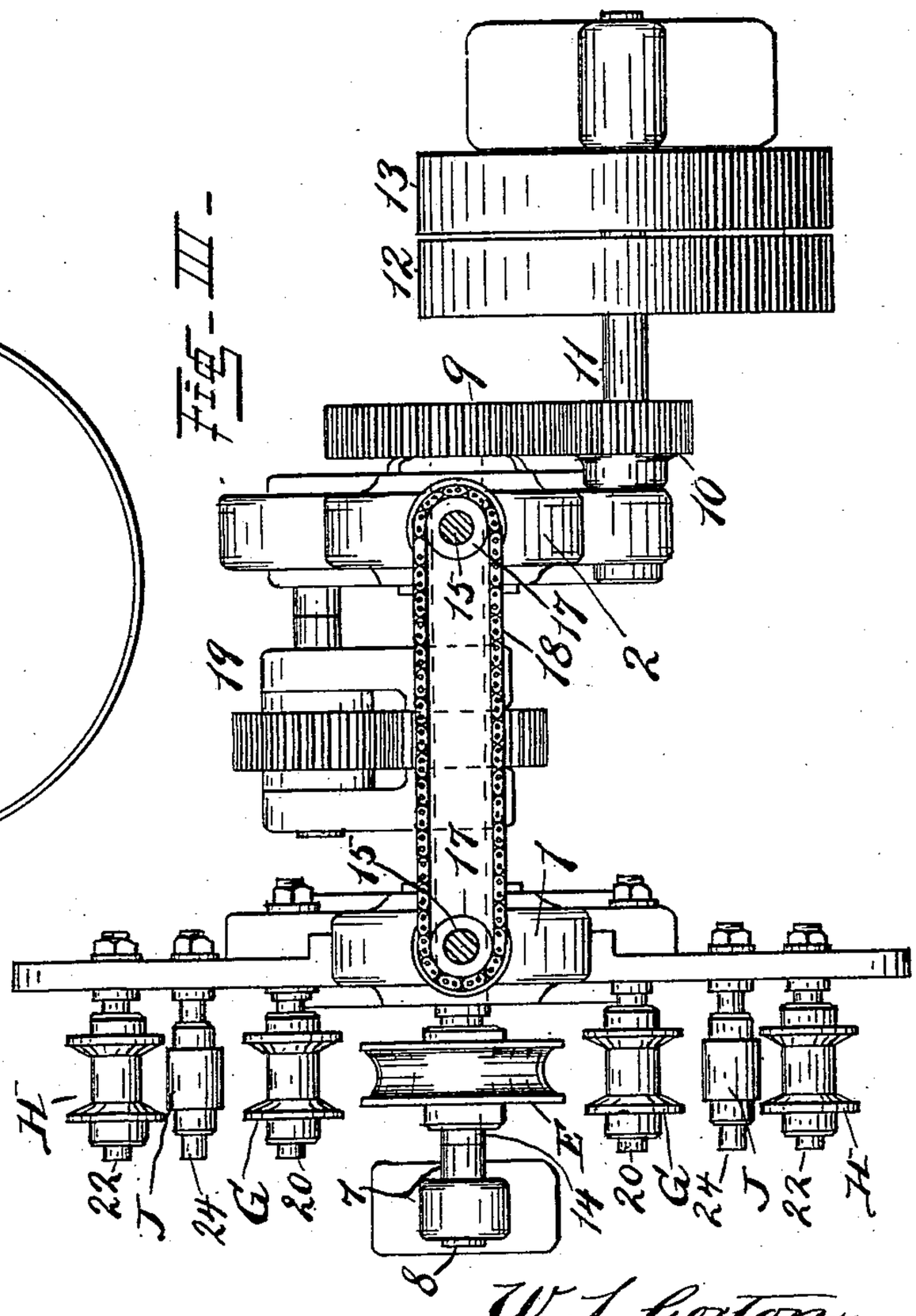


FIG. III.



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No. 751,166. Patented February 2, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM S. GORTON, OF CLEVELAND, OHIO.

MACHINE FOR MAKING METALLIC WHEEL-RIMS.

SPECIFICATION forming part of Letters Patent No. 751,166, dated February 2, 1904.

Application filed December 26, 1902. Serial No. 136,715. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. GORTON, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Machines for Making Metallic Wheel-Rims, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The annexed drawings and the following description set forth in detail one mechanical form embodying the invention, such detail construction being but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings, Figure I represents a front view of the machine for carrying out my invention; Fig. II, a longitudinal section of the same; Fig. III, a top plan view; Fig. IV, a sectional detail view of a pair of shaping-rolls and the rim between the same; Fig. V, a view of the hoop to be treated in the machine; and Fig. VI, a detail view of one of the concave guide or retaining rolls, showing the rim in operative position against the concave face of the roll.

Heretofore metallic wheel-rims have usually been made by bending a strip or strips of metal of the desired cross-sectional shape to the arc or circle segment it or they is or are to form and thereupon uniting the ends of the shaped strip or strips by brazing or riveting. Later such union has been made by electric welding; but the joining of such shaped strip or strips has not been entirely satisfactory on account of the difficulty in correctly fitting the shaped ends. I have devised a machine which will transversely shape an endless hoop of flat metal to the desired cross-sectional shape and in so doing practically obliterate the joint or joints of the electrically-welded strip or strips without strain upon the metal of the strip or strips or at the joints.

The machine has two vertically-slotted uprights 1 and 2, having two rigidly-secured boxes 3 and 4 at the lower ends of the slots and two boxes 5 and 6 sliding in the slots. A shaft 7 is journaled in the rigid boxes and has its end journaled in an upright 8'a distance in front of the forward upright. A roll F, having a convex face of the cross-sectional shape of the concave outer face of the rim to be shaped, is secured upon this shaft between the forward upright and the upright 8. A cog-wheel 9 is secured upon the rear end of the shaft and meshes with a pinion 10 upon a driven shaft 11, having a fixed pulley 12 and a loose pulley 13, to which the driving power is conveyed by a suitable belt. A shaft 14 is journaled in the vertically-sliding boxes, and a roll E, having a concave face of the cross-sectional shape of the convex inner face of the rim to be shaped, is secured upon the forward end of said shaft. The headed ends of screws 15 are journaled in the caps of the vertically-sliding boxes, and said screws are threaded in the tops of the slotted uprights. One of the screws has a hand-wheel 16, and both screws have sprocket-wheels 17, around which a sprocket-chain 18 passes, which chain thus causes both screws to rotate together when the hand-wheel is turned, so that both boxes and both ends of the shaft therein may be raised and lowered together. Suitable cog-wheel gearing 19 is provided at the middle of the roll-shafts to communicate rotary motion to the upper shaft from the lower shaft. The forward upright has horizontal slots 21, in which stub-shafts 20 are adjustably secured. Rolls G, having concave faces, are journaled upon said stub-shafts, and the concave faces are preferably formed by inwardly-inclined flanges sloping down to cylindrical centers of the rolls. Similarly-shaped concave rolls H are journaled upon stub-shafts 22, adjustably secured in horizontal slots 23 in the forward upright. The slots 23 have stub-shafts 24 adjustably secured in them, upon which stub-shafts flat-faced rolls J are journaled to bear against the inner periphery of the blank and rim.

In practice the flat steel hoop A, which has previously been trued up as nearly as possible to the shape of a circle, is placed upon the lower shaping-roll F and the lateral rolls G and H, the upper shaping-roll E having been raised and the lateral rolls having been

properly adjusted to hold the rim to the arc of the circle to which the rim is to be finished. The upper roll is now forced down by means of the hand-wheel and screws, the rolls having in the meantime been started, and the hoop will gradually be rolled into the shape of the finished rim. The blank is cold, and the action of the shaping-rolls upon the same is cold rolling and drawing. The inside rolls J are used during the first rolling of the rim to hold the latter against the concave guide-rolls. The greatest diameter of the convex-faced roll is the same as the smallest diameter of the concave-faced roll, so that the peripheral speeds of the rolls at the middle of their faces will be the same, the rolls being geared to revolve together. The middle of the rim will thus be rolled without any peripheral drag, so that the inner circumference and diameter of the rim will not be increased by the rolling, the metal from the middle being laterally crowded into the flanges of the concave rim, where it will be longitudinally drawn by the increased peripheral speed of the larger-diameter flanges of the concave-faced roll. The inner peripheral length and diameter of the rim will thus be substantially maintained, and the strain upon the blank in shaping the same will not be so severe as to injure the fiber of the cold metal. When the concave-faced lateral guide-rolls have once been adjusted to their positions for the mean diameter and periphery of the rim to be rolled, their concave faces will admit of the flanges of the rim increasing in diameter as they are drawn out, as they will also be forced closer together and may thus enter deeper into the concave faces of such guide-rolls. Where complicated cross-sectional shape of the rim is required, the preliminary shaping of the rim may be done on one set of shaping-rolls, and the finishing may be done on another set of rolls. The concave lateral guide-rolls serve not only to guide the rim to travel and be cold-rolled into a true circle, but serve also to retain the rim in its transversely-bent shape. The finished rim will be cross-sectionally shaped and circularly trued, ready for drilling to receive the spokes and other later finishing treatment not affecting the shape and circular form.

By thus cold-rolling a flat steel hoop into the shape of the rim the fiber of the metal is drawn into shape and tension in the form it is to be used, so that no unnatural strains will be exerted upon the finished rim, as are likely to be exerted in a rim formed from a strip or strips of metal transversely shaped, then bent or curved into shape, and finally joined at the ends. In such rim the strains in the finished rim will not be in accordance with the structure of the rim received in forming and shaping it. In the rim produced in my machine the fiber of the metal is distributed during the shaping of the rim into the arrangement remaining in the final shape and during use. The welded joint or joints will be rolled out with the remainder of the rim, so that the fiber of the metal in said joint or joints will be rolled and arranged similar to the fiber of the balance of the rim and no different strain will be exerted in the joint or joints from the strain in the balance of the rim.

Other modes of applying the principle of my invention may be employed for the mode herein explained. Change may therefore be made as regards the mechanism thus disclosed, provided the principles of construction set forth, respectively, in the following claims are employed.

I therefore particularly point out and distinctly claim as my invention—

1. In a machine for making metallic wheel-rims, the combination of a convex-faced and a concave-faced shaping-roll having means for revolving them together and the convex-faced roll having its greatest diameter equal to the smallest diameter of the concave-faced roll, and means for moving one of said rolls toward and from the other.

2. In a machine for making metallic wheel-rims, the combination with a pair of rim-shaping rolls, of a pair of rolls arranged at opposite sides of the shaping-rolls in the path of the rim and having concave faces engaging the edges of the shaped rim to keep the same from spreading.

3. In a machine for making metallic wheel-rims, the combination of a convex-faced and a concave-faced shaping-roll having means for revolving them together and the convex-faced roll having its greatest diameter equal to the smallest diameter of the concave-faced roll, means for moving one of said rolls toward and from the other, and idle guide-rolls arranged laterally to the pass between said rolls and in an arc to such pass concentric with the rim to be shaped in said pass and to bear against the outer periphery of the same.

4. In a machine for making metallic wheel-rims, the combination of the concave-faced roll E, the convex-faced roll F, means for driving said rolls, the laterally-adjustable and idle concave guide-rolls G, the laterally-adjustable and idle concave guide-rolls H, and the laterally-adjustable flat guide-rolls J opposed to said latter rolls.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 5th day of May, A. D. 1902.

WILLIAM S. GORTON.

Witnesses:
WM. SECHER,
H. SUSSER.