

No. 734,041.

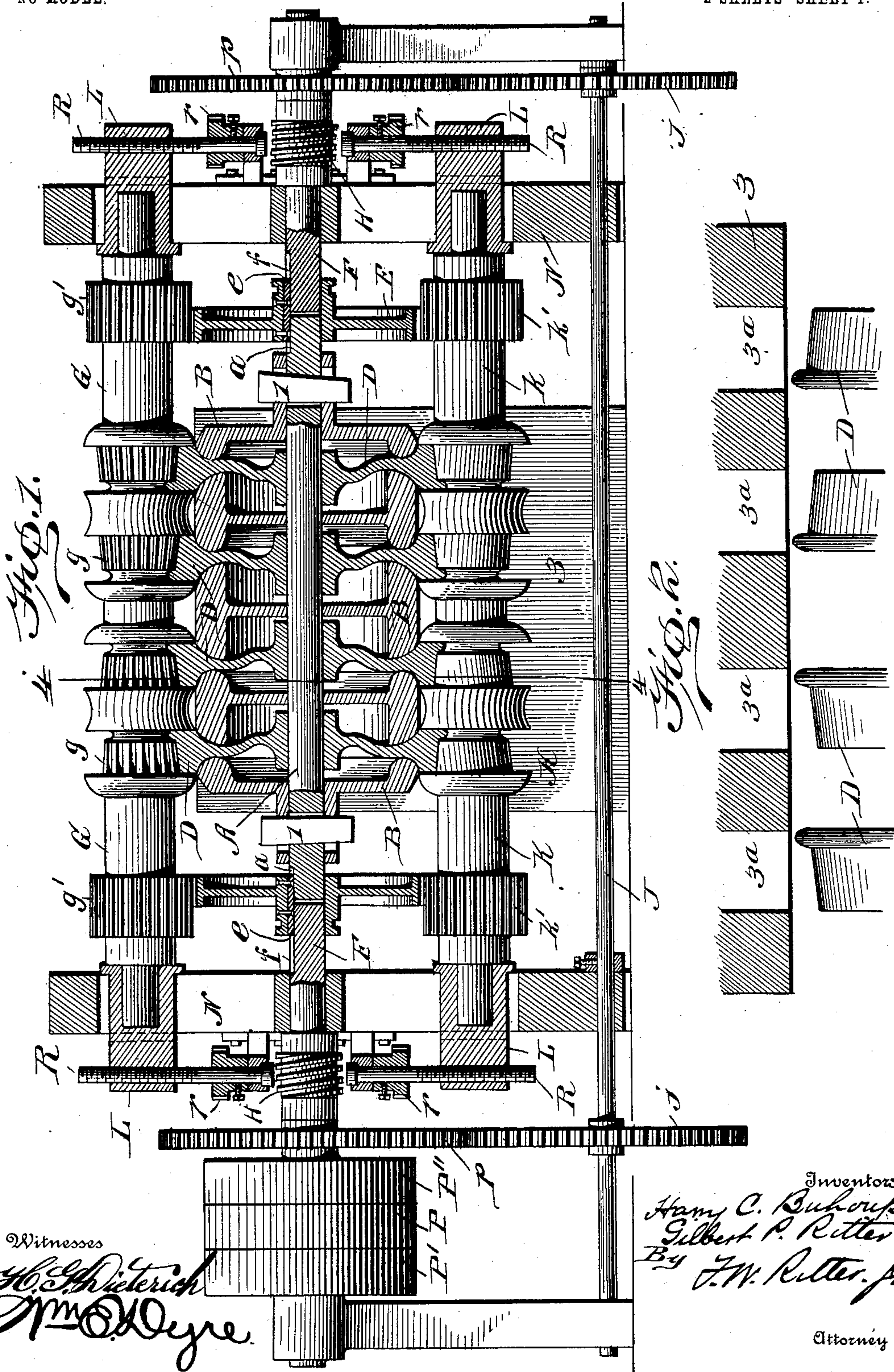
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MANUFACTURE OF CAR WHEELS, TIRES, &c.

APPLICATION FILED OCT. 7, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



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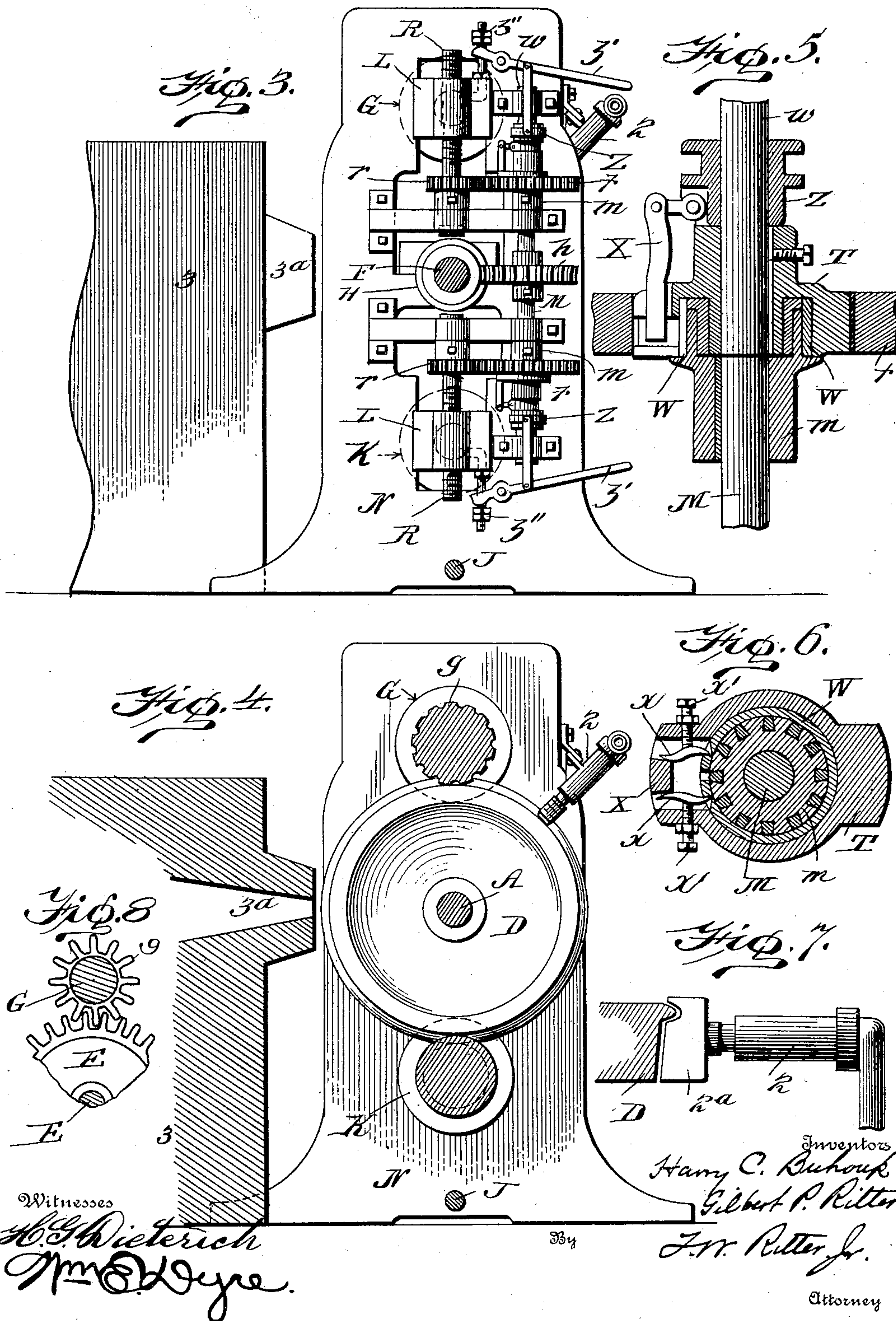
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# UNITED STATES PATENT OFFICE.

HARRY C. BUHOUP AND GILBERT P. RITTER, OF CHICAGO, ILLINOIS.

## MANUFACTURE OF CAR-WHEELS, TIRES, &c.

SPECIFICATION forming part of Letters Patent No. 734,041, dated July 21, 1903.

Application filed October 7, 1902. Serial No. 126,291. (No model.)

*To all whom it may concern:*

Be it known that we, HARRY C. BUHOUP and GILBERT P. RITTER, citizens of the United States, and residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in the Manufacture of Car-Wheels, Tires, &c.; and we hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical central section, the rolls and driving mechanism being in elevation, of a rolling-mill embodying our invention. Fig. 2 is a view showing the relation of the furnace-openings to the wheel-blanks, the furnace being in section and the wheel-blanks in elevation. Fig. 3 is an end elevation of the mill and furnace. Fig. 4 is a section on the line 4 4, Fig. 1. Figs. 5 and 6 are enlarged detail sections of the clutch mechanism which causes the rolls to approach the work. Fig. 7 is a view showing the relation of the planishing and condensing hammer and the wheel, the hammer being in elevation and the wheel-blank in section. Fig. 8 is a partial detail view of the roll-pinion and driving-pinion having elongated intermeshing gear-teeth.

Like symbols refer to like parts wherever they occur.

Our invention relates to the manufacture of car-wheels, tires, and like articles, and has for its object to provide means for producing a car-wheel or tire having a smooth condensed tread or tread and flange.

To this end the main feature of our invention embraces a plurality of work-rolls, comprising both plain and corrugated, in combination with means for automatically changing the position of the rolls to and from the axis of the work, whereby the periphery of a car-wheel blank may be successively corrugated and condensed and finished.

A second feature of our invention embraces the combination, with a plurality of work-rolls, comprising both corrugated and plain rolls, of a furnace so arranged with relation to the rolls as to cause the heat from the furnace to

impinge on the periphery of the work at a point between the rolls.

A third feature of our invention embraces the combination, with a plurality of work-rolls, comprising both corrugated and plain rolls, of a hammer and a furnace relatively arranged with each other and with the rolls to heat and condense the work at a point or points intermediate of the rolls.

There are other minor features of invention, all as will hereinafter more fully appear.

We will now proceed to describe our invention more fully, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A is a mandrel, on which, by means of the clamps B and wedge-keys 1 1, which pass through slots in the mandrel A, are secured the wheel-blanks D.

E E are long-toothed gear-wheels which mesh with the roll-pinions  $g' g'$  and  $k' k'$ , and thus rotate the rolls, while permitting their approach toward the wheel-blanks, and said gear-wheels E E are slidably mounted on the mandrel A and on the shafts F F of the worm H and adapted by the feathers  $ee$  and splines  $ff$  and  $aa$  of the shafts F F and mandrel A, respectively, to cause the before-noted shafts and the mandrel A to rotate together.

The rolls G and K, the former of which is corrugated, as at  $g$ , for a purpose which will hereinafter more fully appear, have the general outline of the flange and tread of a car-wheel, and said rolls are journaled in lineally-movable boxes L L, which are slidably mounted in the cheeks or standards N N and are controlled in their movements by the roll-adjusting screw-rods R R.

R R are the roll-adjusting screw-rods, which engage the tapped portion of the roll journal-boxes L L and by their rotation advance or withdraw the rolls from the wheel-blanks D.

Secured to one end of each of the adjusting-rods R is a pinion  $r$ , which meshes with a pinion  $t$ , (see Figs. 3 and 5,) attached to the clutch member T, and which is driven by the worm H and gear-wheel  $h$  through the clutch mechanism, which will be presently described, thus changing the relation of the



axes of the rolls with respect to the axis of the mandrel A. The clutch mechanism, which may be of any approved form, has a wood-filled hub *m*, which is secured to the shaft M, that carries the gear-wheel *h*.

W is an annular metal split ring, which surrounds the hub *m*.

T is a case or hub fixed to the shaft *w* and carrying the gear-wheel *t*, which meshes with the pinion *r* of the adjusting screw-rods R.

*x x* are levers adapted to oscillate on the points of the adjustable set-screws *x' x'*, and X is a lever having a wedge-shaped end and mounted on a slidable grooved collar Z, which may be moved by a forked shipping-lever *z'*, which is automatically operated by a nut *z''*, adjustable on the roll journal-boxes L L or equivalent device to operate the levers automatically, and thus independently control the movement of the rolls G and K, throwing them out of action at any desired point.

The rotation of the shafts M and *w* in unison is effected by sliding forward the grooved collar Z by movement of the shipping-lever *z'*, thus causing the wedge end of the lever X to act upon and force apart the outer ends of the twin oscillating levers *x x*, contracting the annular split ring W and causing it to clasp the wood-filled hub *m*, attached to the shaft M.

P, P', and P'' are respectively a fixed and two loose pulleys by means of which and straight and crossed belts (not shown) power may be applied to the fixed pulley P in the usual manner, thus operating the mechanism through the shafts F F and their gear-wheels *p p* and E E and the shaft J and pinions *j j* in either direction, accordingly as the straight or crossed belt is on the fixed pulley.

Attached to the cheeks or housing N and radially disposed with relation to the work or blank that is being operated upon is a motive-fluid hammer 2, having its operative face 2<sup>a</sup> in the form of the tread or tread and flange of a car-wheel. In the drawings one such hammer is shown for each wheel; but a plurality of the same may be employed, if desired. These hammers we prefer to have strike with great rapidity and with but moderate impact.

3 is a furnace, preferably a blast, having openings or nozzles 3<sup>a</sup> closely adjacent to the peripheries of the blanks which are being operated upon and so controlled by any proper heat-regulating devices that the periphery of the blank may be held at a substantially uniform rolling heat until the rolling and planishing operations are completed.

The construction being substantially such as herein pointed out, the operation of the device will be as follows: The rolls having been separated to a sufficient degree by the application of the crossed belt to the fixed pulley P and the clutch-lever actuating-nuts *z''* having been adjusted to successively throw out of operation the corrugating and finishing rolls G and K, a series of wheel-blanks D

(either cold or at a rolling heat) and their clamps B will be arranged upon the mandrel A and secured thereto by the keys 1 1. The pinions E E will then be slid back on the shafts F F, the wheel-blanks, clamps, and mandrel introduced, and the pinions E E be moved toward each other to engage the ends of the mandrel A. The straight belt is then applied to the fixed pulley P, thus causing the mandrel A, with the wheel-blanks, to revolve and also causing the revolution and drawing together of the rolls G and K, while the motive-fluid condensing and planishing hammers 2 are simultaneously put in operation. The tread and flange of the wheels being kept constantly at a rolling heat without affecting the webs thereof are first corrugated and condensed by the roll G, and as the portions of the wheel-blanks which have been corrugated pass under the smooth roll they are further condensed and the fiber of the metal is laid parallel to the peripheries of the wheel-blanks, this action being followed by that of the motive-fluid hammers, which still further condenses the tread and flange and act upon the same in lines normal or radial to the peripheries of the blanks. When the corrugating-roll G has advanced the desired distance toward the wheel-blanks D, the nuts *z''*, carried by the journal-boxes L of this roll, act upon the clutch mechanism, thus terminating further action of the roll-adjusting screw-rods R, while the roll G continues to revolve without further advance or action on the blanks D. The smooth or finishing roll K and the planishing-hammer 2 continue in operation until the desired diameter of the finished wheel is obtained, the mandrel A supporting the blanks, when the clutch mechanism for this roll is actuated in a similar manner to that previously described for the corrugating-roll G. The motive fluid for the hammers may be at the proper time cut off manually or automatically, if preferred. The direction of power applied to the mill is then reversed (by shipping the straight belt and applying the crossed one to the fixed pulley P) and the rolls withdrawn, after which the mandrel A and the finished wheels may be taken out by sliding the pinions E E away from each other, when the mill is again ready for the introduction of other blanks D.

It will be evident to one skilled in the art that a plurality of either corrugated or smooth rolls, or both, may be employed and that the same may be arranged in pairs or otherwise to mutually support each other, as is commonly practiced.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a machine for manufacturing car-wheels and tires, the combination of a corrugated roll and a plain roll, means for supporting the blank intermediate of the rolls, and means for heating the blank arranged adjacent to the rolls and in a plane which passes



between the rolls, substantially as and for the purposes specified.

2. In a machine for manufacturing car-wheels and tires, the combination of a corrugated roll for corrugating the periphery of the blank, a hammer for condensing and smoothing the corrugated periphery of the blank, means for supporting the blank so that it may be consecutively operated upon by the corrugated roll and hammer, and means for maintaining the periphery of the blank at a working temperature during the operation of the corrugated roll and the hammer, substantially as and for the purposes specified.

3. In a machine for manufacturing car-wheels and tires, the combination of a corrugated roll for corrugating the periphery of the blank, a hammer for condensing and smoothing the corrugated periphery of the blank, a smooth roll for finishing the periphery of the blank, and means for maintaining the periphery of the blank at a working heat during the operation of the rolls and hammer, substantially as and for the purposes specified.

4. In a machine for manufacturing car-wheels and tires, the combination of means for corrugating the periphery of the blank, means for smooth-finishing the corrugated periphery of the blank, means for supporting the blank under the operation of the two means first named, and means adjacent to said two means first named for maintaining the heat of the blank during the operation of said corrugating and finishing devices, substantially as and for the purposes specified.

5. In a machine for manufacturing car-wheels and tires, the combination with a plurality of work-rolls provided with pinions, of means for automatically changing the position of said rolls to and from the axis of the

work, and interposed driving-pinions having elongated gear-teeth which mesh with the pinions of the work-rolls, substantially as and for the purposes specified.

6. In a machine for manufacturing car-wheels and tires, the combination with a plurality of work-rolls provided with pinions, of interposed driving-pinions which mesh with the pinions of the work-rolls, and an axially-disposed work-mandrel located between the work-rolls and coupled with the driving-pinions, substantially as and for the purposes specified.

7. In a machine for manufacturing car-wheels and tires, the combination with a plurality of work-rolls provided with pinions, of interposed driving-pinions having elongated gear-teeth which mesh with the driving-pinions of the work-rolls, a work-mandrel located between the rolls and coupled with the driving-pinions, and mechanism for changing the rolls to and from the axis of the work, said mechanism actuated from the shaft of one of the driving-pinions, substantially as and for the purposes specified.

8. In a machine for manufacturing car-wheels and tires, the combination of a plurality of work-rolls comprising corrugated and plain rolls, means for advancing said rolls toward the axis of the work operated upon, and means to limit the advance of the corrugated roll, substantially as and for the purposes specified.

In testimony whereof we affix our signatures, in presence of two witnesses, this 3d day of October, 1902.

HARRY C. BUHOUP.  
GILBERT P. RITTER.

Witnesses:

WM. E. DYRE,  
HUGH M. STERLING.