(No Model.) 2 Sheets—Sheet 1.

J. R. JONES.

MACHINE FOR ROLLING CAR WHEELS.

No. 457,922. Patented Aug. 18, 1891.

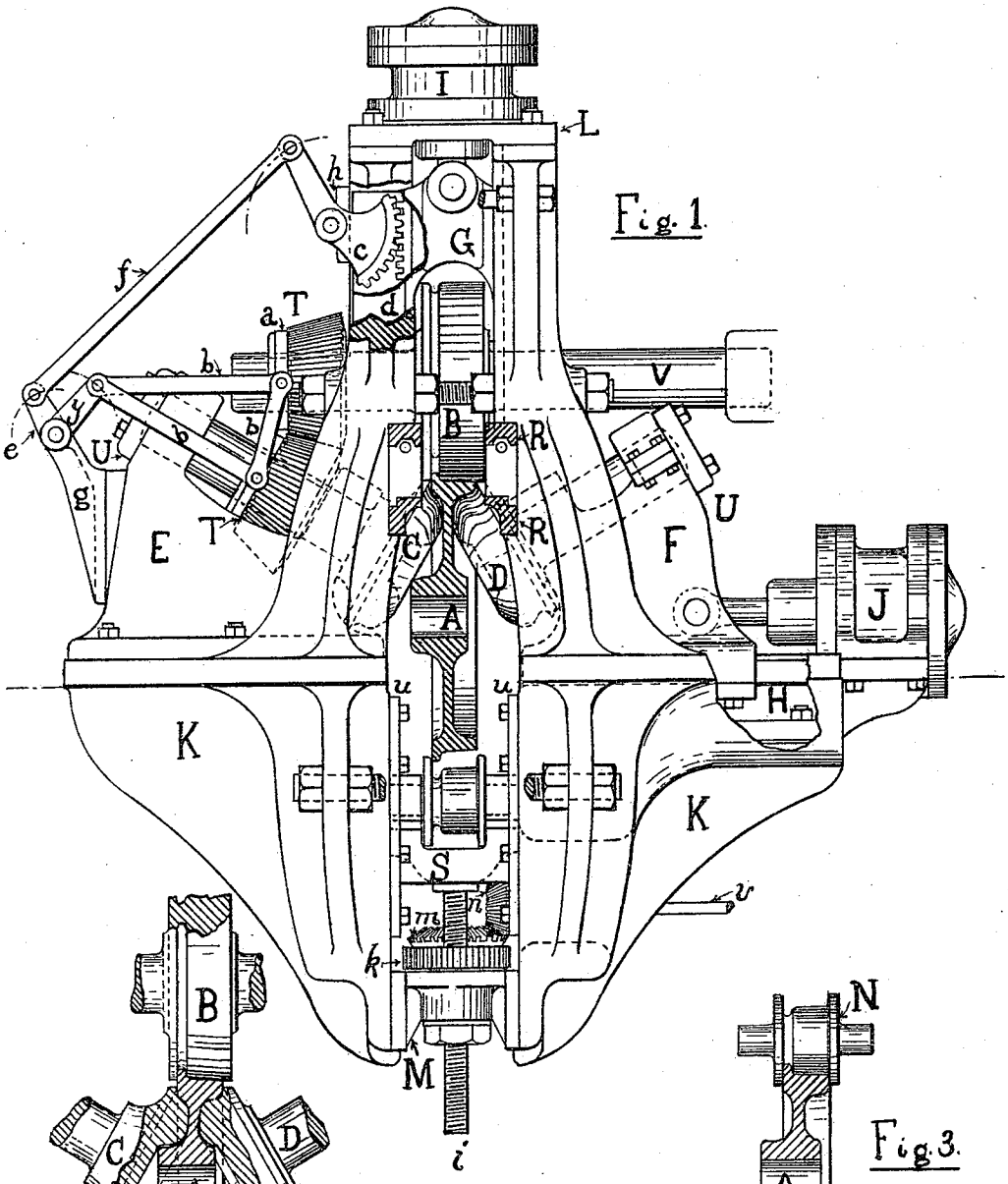


Fig. 1.

Fig. 2.

Fig. 3.

WITNESSES.

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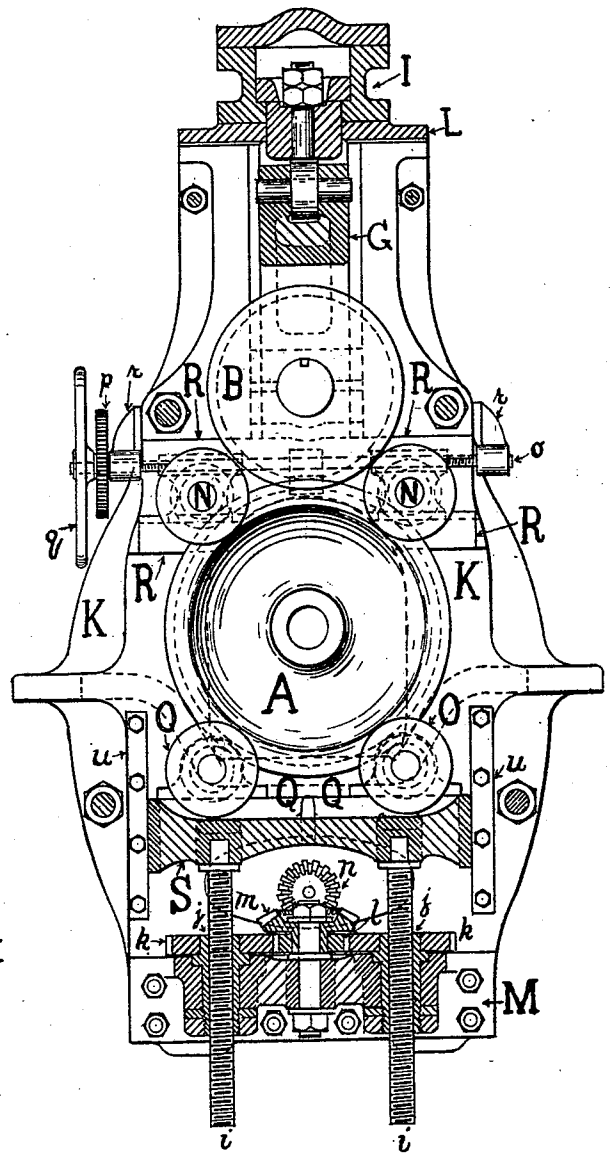


Fig. 4

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UNITED STATES PATENT OFFICE.

JOHN R. JONES, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR ROLLING CAR-WHEELS.

SPECIFICATION forming part of Letters Patent No. 457,922, dated August 18, 1891.

Application filed December 22, 1890. Serial No. 375,536. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. JONES, a citizen of the United States, residing in the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Machines for Rolling Car-Wheels, of which the following is a specification.

The object of my invention is to produce metal car-wheels having the metal of the tread, rim, and web, and hub hardened and evenly condensed in radial and peripheral lines. In accomplishing my object I prefer to use cast-steel car-wheel blanks or blooms, having the hub near the desired proportions and the web and rim thicker than is desired in the finished wheel. This object I accomplish by means of the combination of a movable driven tread-roll with two side rolls, one of which operates in sliding bearings, but is not driven, and the other being driven and rotating in fixed bearings. The movable tread-roll on its sliding bearings is made to approach the side rolls during the continuance of the operation. My tread-roll is driven and has grooves on its face of such form as will give size and shape to the tread and flange of the wheel and is movable by means of screws or hydraulic pressure to compress, harden, and extend the wheel to any desired diameter and operates on the ingot or bloom, which is supported and revolved by the side rolls. My side rolls operate on, compress, and harden the web of the wheel, assist in revolving the ingot or bloom, and act as supporting-clamps, holding it in position to be acted upon by the tread-roll. One of these side rolls runs in fixed bearings, and the other, which is on sliding bearings, moved by means of screws or hydraulic pressure, rolls down the web of the wheel, elongates it, hardens and compresses the metal, and lays it in concentric layers. In so doing it is moving inward toward the fixed side roll. These side rolls are of greater diameter than one-half the diameter of the wheel to be operated upon and are of such shape as will compress the metal outward from the center toward the rim. They continue to rotate, compress the metal, carry the ingot around with them, and act as clamps, supporting the metal and holding it in place by pressing on the web and the inside of the rim until the operation is completed. The metal of the hub is rolled, compressed, and hardened by means of the co-operation of the side rolls with steadying-rolls. This is done by holding the side rolls on fixed bearings while rotating them and bringing pressure to bear upon them through the ingot from the steadying-rolls O O. This pressure can be greater or less, as desired, and can be secured from the main shaft V through the pulleys on the shaft *v* and its pinions and sliding cross-head S to the rolls O O.

In the accompanying drawings like letters represent like parts.

Figure 1 is a front view of the entire machine with its bearings and connections, showing the finished wheel in position between the rolls at the completion of operations, the roll O being withdrawn to show it in full lines, its normal position, however, being against the lower edge of the wheel. Fig. 2 is a sectional view of the rolls B, C, and D, showing the wheel in place at the beginning of the operation. Fig. 3 shows the position of the steadying-rolls N and O and the wheel during the operation. Fig. 4 is a side view of machine at half-section, showing the wheel A in full.

A is a finished wheel in position between the rolls. The tread-roll B is coupled to the main shaft V. The coupling is so constructed as to permit the roll B to move up and down on its slides in the housings. G, a movable housing or yoke, carries the tread-roll B in its boxes.

I is a hydraulic cylinder which presses the tread-roll B against the tread of the ingot A.

C and D are side rolls, so designed that as the wheel nears its required size the rolls B, C, and D nearly envelop the metal of the tread.

C is a driven roll revolving on fixed bearings, and D is a friction-roll rotating on sliding bearings, movable under pressure.

The housing E, which supports the roll C, is fixed and is bolted to the main housing K. The housing F, which supports the roll D, is worked inward and outward upon a slide H and by the pressure of the cylinder J can be made to advance or can be held in any position while the wheel is being finished, or can be made to recede to allow the wheel to be removed. The

side roll D has no positive motion. Its only motion is such as it receives through the ingot from pressure against the side roll C. The side roll C has a positive motion through the bevel gear-wheels T and T from the main shaft V. These bevel gear-wheels T T are kept in gear and at the same pitch-line by means of the bell-crank *c*, with its levers *e y* and the links *f* and *b b b*, which is controlled and operated by the rack *d*, which is bolted on the sliding yoke G. The bevel gear-wheels T T slide on the shafts of the rolls B and C over a key fastened to the shafts. The sliding motion is secured through the bell-crank *c*, its links and levers, by the movement of the rack *d* on yoke G. The bell-crank *c* is supported by the housing K and is connected with the rack *d* by means of cog-gearing, and any motion of the rack is communicated through the link *f* to the levers *e* and *y*, which are supported in bearings on the housing E, and from them through the links *b b* to the wheels T T, either pushing them forward on their shafts or withdrawing them, thus keeping them in gear and on the same pitch-line.

Fig. 4 shows the machine at half-section, exposing partly to view the steadying-rolls N N O O. The top rolls N N always bear on the wheel to stop its lateral motion and to prevent the formation of fins while the wheel is being rolled. As the wheel increases in diameter, the rolls are moved slightly apart to suit by means of the screws *o o*, which are turned by the hand-wheel *q*, and gearing to each other with wheels *p p*, one only being shown in the drawings. The screws *o o* are each cut with a right and left hand thread and are held in position by the bearings *r r*. The boxes which bear the steadying-rolls N N are threaded to suit the screws *o o* and move along the slides R R. As the wheel nears completion, the lower steadying-rolls O O are brought into play. They in their bearings Q are fastened to the cross-head slide S, which moves up and down on the inside of the main housing, and are held in place by the bolted shoes *u u*. As these rolls N N O O, which are grooved and shaped to inclose the tread and flange of the wheel, are brought against it, the pressure of the side rolls is continued, while the tread-roll B, pressing slightly on the ingot, rolls it around on the steadying-rolls O O, finishing off and rounding up the wheel to its proper size. If from any cause the wheel has been rolled slightly above size, pressure on both the tread-roll and the steadying-rolls O O would reduce it to some extent. The movement of the lower cross-head S is controlled by the operator through the main shaft V, which is belted by means of an open and a cross belt to the pulleys on the shaft *v* to give reverse motion. A friction-pulley, or, in fact, any means, can be employed to give forward and reverse motion to the shaft *v*. This shaft *v* is set in the machine-pit, supported by bearings, and has on its end the bevel gear-wheel *n*, which gears to the idle set *m* and *l*, rotating on a stud fastened to the girt M, the pinion *l* on the set transmitting the power and motion to the open gears *k k*, which are keyed to the bronze nuts *j j*. These revolving nuts *j j* raise and lower the screws *i i*, keyed and pinned to the hubs of the cross-head S. This moves the cross-head S and lower steadying-rolls O O to the desired position. When the wheel is rolled to the proper size and the metal is set enough, so that it can be handled, the cylinders I and J are reversed, the yoke G and roll B are raised from the tread, the housing and roll D are moved back, the cross-head S and rolls O O are lowered, and the wheel A can be removed.

I claim as my invention—

1. In a mill for rolling car-wheels, the combination of the movable driven tread-roll B with the stationary driven side roll C and the sliding roll D, with their respective shafts, pinions, and bearings, substantially as set forth.

2. In combination with the bevel gear-wheels T and T, the bell-crank *c*, with its levers *e* and *y*, its links *f b b b*, the rack *d*, and the yoke G, as and for the purpose set forth.

3. In combination with the driven and movable tread-roll B, its shafts, pinions, and bearings, the rolls O O and their shafts, pinions, and bearings, as and for the purpose set forth.

4. The combination of the driven tread-roll B, the side roll C, and the side roll D with the steadying-rolls O O, with their shafts, pinions, and bearings, as and for the purpose set forth.

5. The combination of the tread-roll B, the side roll C, and their shafts and bevel gear-wheels T T, with the bell-crank *c* and its levers *e* and *y* and its links *f b b b*, and the sliding rack *d*, as and for the purpose set forth.

6. The combination of the tread-roll B, the side roll C, the side roll D, and their shafts and bevel gear-wheels T and T, and the bell-crank *c* and its levers *e* and *y* and its links *f b b b*, with the rolls O O, with their sliding cross-head S and its screw *i*, stud M, the bevel gear-wheel *n*, geared to the idle set *l* and *m* on the shaft *v*, with its pulleys, as and for the purpose set forth.

7. The combination of the side rolls C and D and their shafts and pinions with the steadying-rolls O O and their shafts and pinions, as and for the purpose described.

JOHN R. JONES.

Witnesses:
SAML. P. HANSON,
E. S. SLOUGH.