

(No Model.)

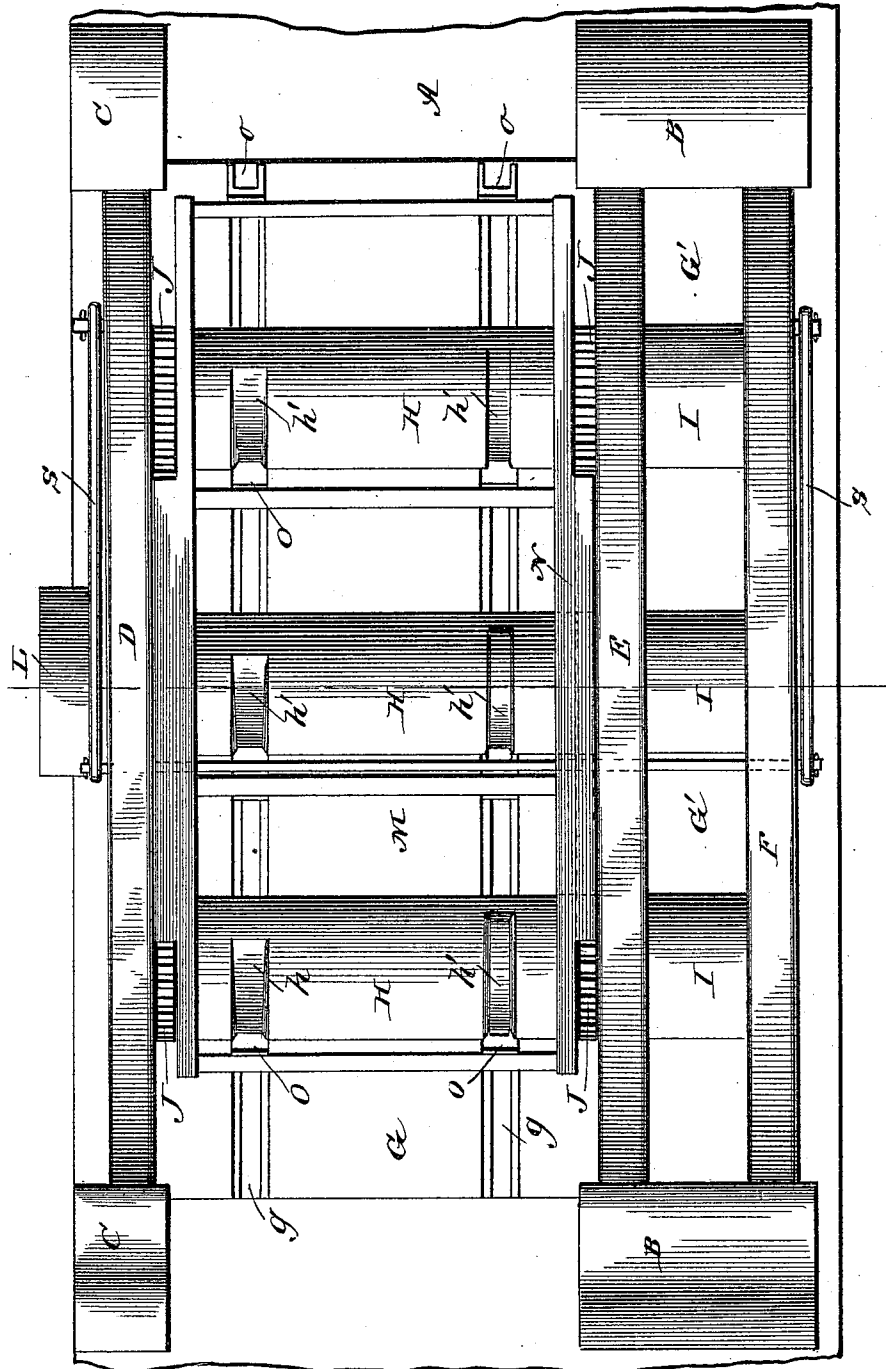
4 Sheets—Sheet 1.

J. S. PATTEN.  
MACHINE FOR ROLLING AXLES.

No. 463,541.

Patented Nov. 17, 1891.

Fig. 1.



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(No Model.)

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Fig. 3.

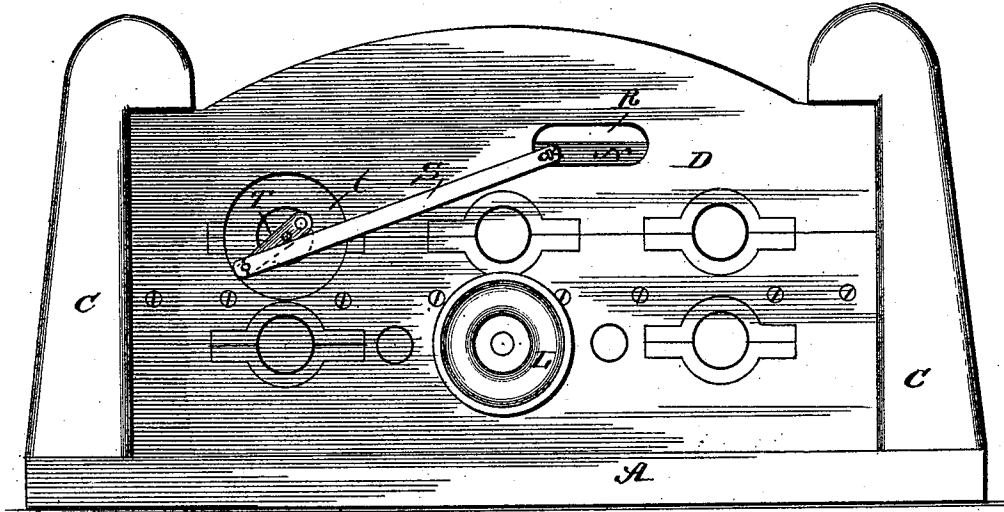


Fig. 2.

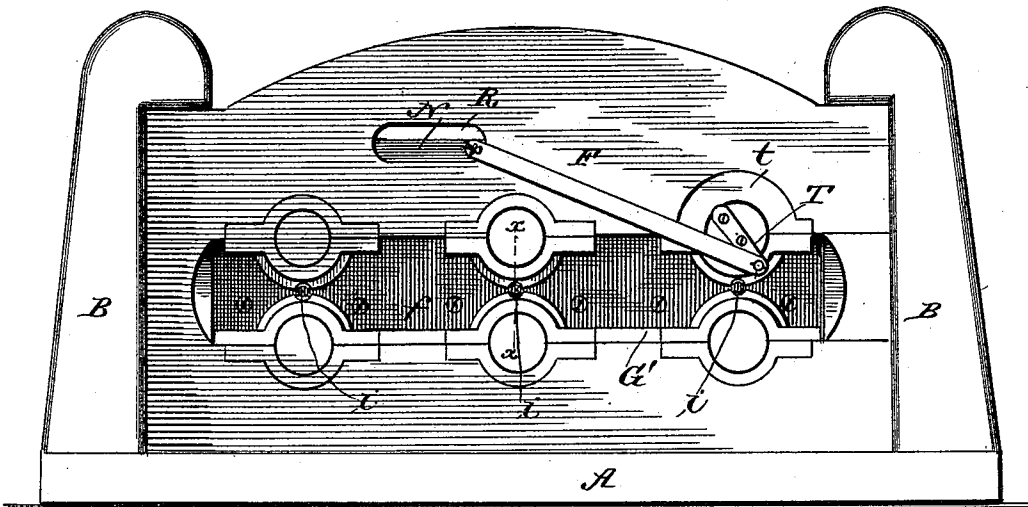
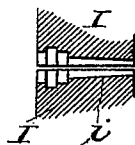


Fig. 7.



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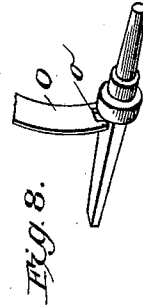
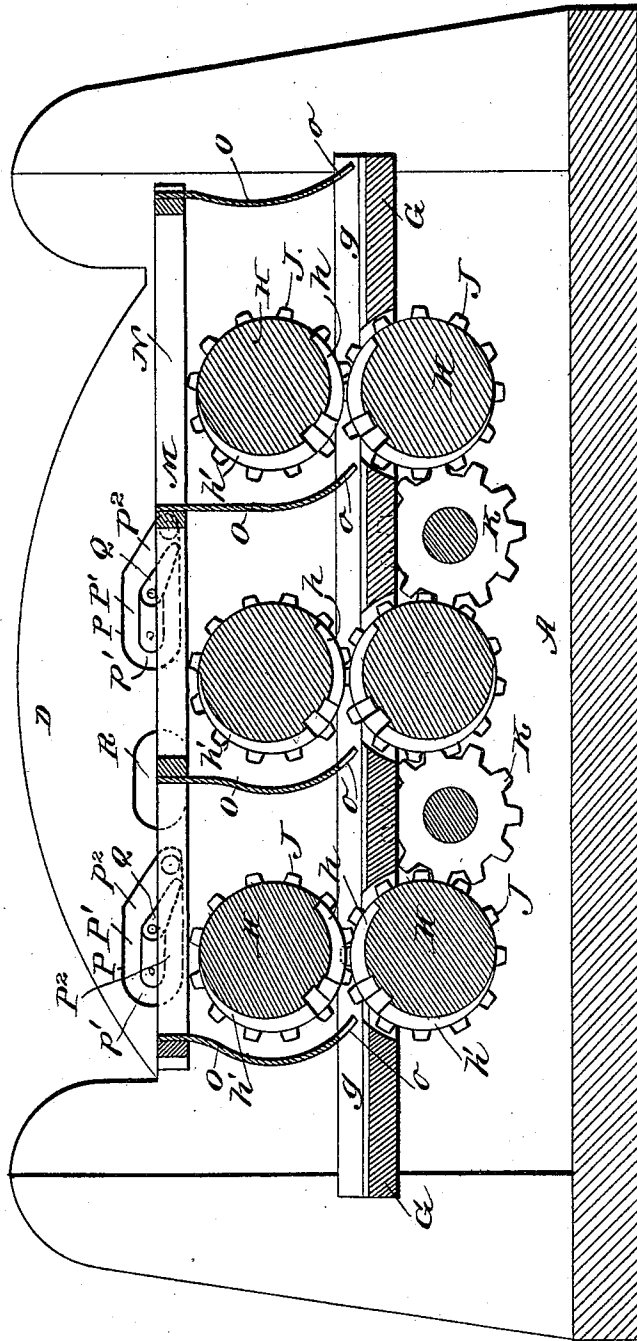
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Fig. 4.



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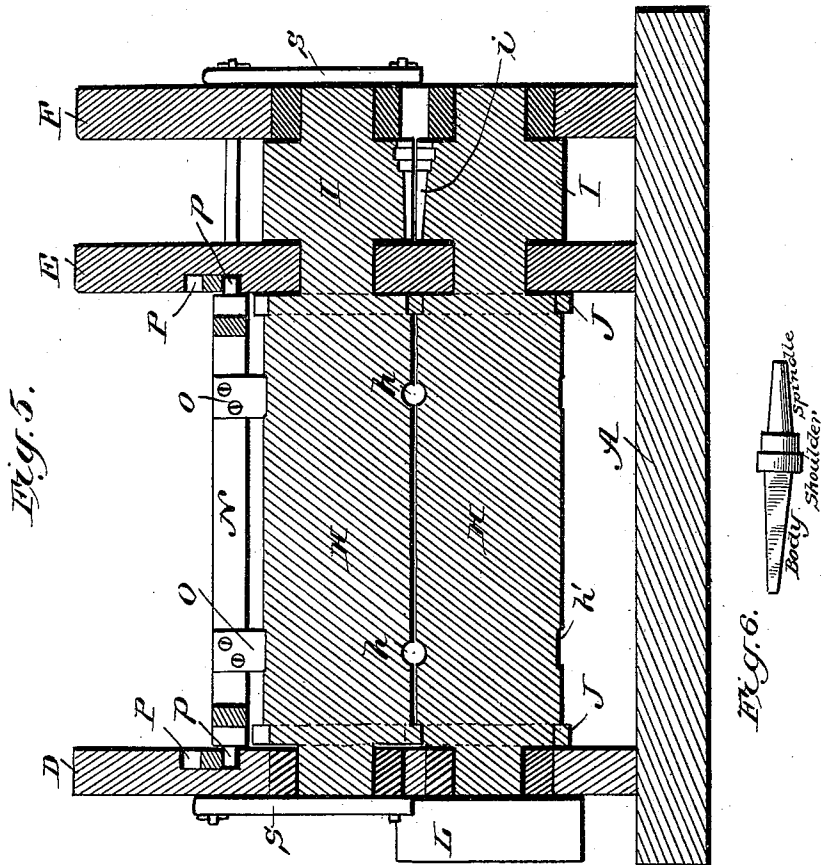


Fig. 5.

Fig. 6.

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# UNITED STATES PATENT OFFICE.

JAMES S. PATTEN, OF BALTIMORE, MARYLAND.

## MACHINE FOR ROLLING AXLES.

SPECIFICATION forming part of Letters Patent No. 463,541, dated November 17, 1891.

Application filed January 17, 1891. Serial No. 378,165. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES S. PATTEN, of Baltimore city, in the State of Maryland, have invented a new and useful Improvement in Machines for Rolling Axles, of which the following is a specification.

My invention is an improved machine for rolling vehicle-axles, and has for its objects, among others, to provide a simple novel construction whereby to roll both the spindle or arm and the body portion of the axle-section, such as shown in Figure 6; to provide a simple, easily-operated, and effective feed for the axles, and to provide certain improvements in the general construction of the machine; to which ends the invention consists in certain novel constructions and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the drawings, Fig. 1 is a top plan view of my machine. Fig. 2 is a side elevation showing the rolls for forming the spindles of the axles. Fig. 3 is an elevation of the side opposite that shown in Fig. 2. Fig. 4 is a longitudinal section of the machine. Fig. 5 is a cross-section of the machine. Fig. 6 is a detail view of the completed article rolled in my machine. Fig. 7 is a detail section on about line 7 7 of Fig. 2, and Fig. 8 illustrates how the feeder-plate engages the shoulder of the axle.

In the construction shown the frame is formed of a base A, end uprights B B and C C, a side plate or frame D, extended between the uprights C C, and the side plates or frames E and F, extended between the uprights B B, the frames D and E being arranged sufficiently apart to admit the main or long rolls between them and the frames E F being arranged sufficiently apart to receive between them the short rolls for forming the spindles upon the axle-bars, as presently described. A table G, Fig. 4, is arranged in about a horizontal line with the contact-surfaces of the rolls of the several pairs, and is provided with longitudinal guide grooves or channels *g* to direct the axles in the passage thereof through the machine. The rolls are arranged in pairs and in line, so that the axle may pass directly from one pair of rolls to the next.

In the construction shown I employ three pairs of rolls, each having the main rolls H

for forming the body or axle proper, and the rolls I for forming the spindles of the axles. The rolls of each pair are geared together by means of gears J J, and the lower roll of each pair is geared with that of the next pair or pairs by intermediate gears K, so that the several rolls are properly driven as desired. A suitable band-pulley L is provided on the shafts of one of the rolls. I provide the gears J J and K at the ends of the main rolls, as shown in Fig. 5. In the end rolls I are formed the cavities or grooves *i*, extended longitudinally in the direction of the axis of the rolls and leading out of the ends of such rolls. The grooves of the upper and lower rolls I are shaped to form the spindle and collar of the axle, and in operation the billet is placed at one end sidewise to or parallel the rolls I and then passed sidewise between the said rolls.

In practice the several pairs of rolls I are preferred, as the first pair will give the general form to the spindle, the next pair bring such spindle into better shape, and the third pair finish the formation of the spindle, as will be readily understood.

It should be understood that my machine is intended for use in rolling carriage and wagon axles of that class which are made in two sections welded or otherwise united at their inner ends, the present machine being designed for rolling such sections from suitable billets or blanks. Now in operation the rolls I operate to roll the spindle and collar portion, (see Fig. 6,) while the main rolls H serve to roll the body portion, also shown in said Fig. 6. It will be seen, therefore, that the billet suitably held is placed at one end sidewise to the first pair of rolls I passed there-through, and so on through the several pairs of said rolls I. This completes the shoulder and spindle portions, leaving the body part unrolled. Now the article is fed to the main rolls H, the grooves *h* thereof being adapted to receive the rolled spindle and shoulder, and the article being fed through the rolls H the body part will be properly rolled into the form shown in Fig. 6. The manner in which the feeder engages the axle is clearly shown in Fig. 8.

For the purpose of affording easy access to the rolls I it is preferred to provide a slot or

opening *f*, Fig. 2, in the side plate or frame F. It will be noticed that a table or platform G', Fig. 2, is provided between the frames E F at the bottom of the slot *f*. The main rolls H are provided with circumferential grooves *h*, having portions to receive the finished spindle parts and portions *h'* to form the body of the axles. The portions *h'*, Fig. 4, in the successive rolls approach the completed shape of the body of the axles until the final rolls finish the axles, as will be readily seen.

In practice I provide the rolls H with several sets of grooves *h*, adapted to roll the different varieties of axles, so that the machine may be used for rolling any of the ordinary forms of axles. The grooves *h* are arranged in line with the grooves or ways *g*, so that the said grooves *g* serve to direct the billets or bars to the grooves *h* and out of the machine. In feeding the billets or bars from the rolls H to the next pair and from the last pair of such rolls out of the machine I employ a feeder M, Fig. 4, consisting of a frame N and feeding-plates O, preferably of spring metal, depending therefrom and having their lower free ends forked at *o* and movable forward within and back above the grooves or channels *g*. I provide the frame N with as many sets of feeding-plates O as there are pairs of rolls H to feed the axles to such rolls and also one extra set to feed the axles from the last pair of rolls out of the machine. Each set of plates has as many plates O as there are grooves *h* in the rolls H, as will be readily understood from the drawings. The frame N is given a forward movement in one plane and a backward movement in a higher plane, being lifted at the beginning of its backward stroke and lowered at the end of such stroke. This is effected by providing guide grooves or ways P for the lateral pins *p* of the frame, such ways P being formed, as shown, with upper and lower longitudinal portions P' P<sup>2</sup>, a rear connecting portion *p'*, and a front connecting portion *p*<sup>2</sup>. This portion *p*<sup>2</sup> is controlled by a pivoted drop-leaf Q, which lifts as the pin *p* engages its under side at the end portion of the forward movement of the main frame, and then forms an inclined guide, up which the pins *p* travel to the upper portion P' of the guideway P at the beginning of the backward stroke of the frame. The operation of this construction as the feed-frame is reciprocated will be readily understood. To effect the reciprocation of this frame N, I connect it with one of the rolls, preferably in the manner shown, in which slots R R are formed in the outer frames D and F, and the feed-frame has a rod or bar projecting through the said slots and connected with one end of pitmen S, which are connected at their other ends to crank-arms T on one of the rolls. By preference the roll with which the pitman connects is arranged with reference to the point of connection of the pitman with the frame, substantially as shown, so that the pitman will

operate with a pushing action in forcing the studs of the frame to ride up the pivoted drop leaves or gates Q of the guideways P. The side frames D F are recessed at *t* for the crank-arm T, so that the pitman can be arranged close to the said side frames, as shown.

In operation the billets or bars are applied to the side rolls in the manner described and the spindles are rolled thereon. The billets are then placed in the grooves *g* at the front of the machine and are fed by the feeder to the first pair of rolls, the feeder being adapted to grasp the axle just back of the collar and being so timed with reference to the movement of the rolls that it will feed the spindle properly into the part of the roll formed to receive it. After being drawn through the first pair of rolls the next feeding-plate grasps the axle and feeds it to the next pair of rolls, and so on. Manifestly the number of rolls may be increased at will, and it will also be understood that the form of the cavities in the rolls may be varied to roll any desired form of spindle or axle-body. In rolling it is usual to apply water in suitable manner to the iron for the purpose of removing scale.

Having thus described my invention, what I claim as new is—

1. An improved machine, substantially as described, comprising a framing, a pair of main rolls having around their circumference grooves or cavities adapted to form the body of the axle, and a pair of end rolls provided with grooves or cavities adapted to form the spindle of the axle, such grooves being formed to open out at the end of the end rolls and being extended in a line parallel to the axis of said end rolls, all substantially as and for the purposes set forth.

2. A machine, substantially as described, comprising the framing having plates or frames D, E, and F, the main rolls arranged between the plates D and E, and the end rolls arranged between the plates E and F, the plate F being provided with a slot or opening whereby to permit access to the end rolls, substantially as set forth.

3. A machine, substantially as described, provided with rolls having cavities adapted to form the axle-spindles, such cavities being arranged to extend to and open out of one end of the rolls and being arranged in a direction parallel to the axis of the said end rolls, all substantially as set forth.

4. An improved machine comprising the main frame having upright plates or frames D, E, and F, and having the frame F provided with a slot *f*, and the rollers having the main rolls and the end rolls, such rollers being arranged in pairs and geared together, the end rolls being adapted to form the spindle and the main rolls being adapted to form the body of the axle, all substantially as and for the purposes set forth.

5. The combination of the rolls, the feeding-frame provided with depending plates adapted to engage the axle, and means for

reciprocating such feed-frame, substantially as set forth.

6. In a machine, substantially as described, the combination of the rolls, the frame having ways provided with upper and lower portions and with pivoted leaves or gates, and the feed-frame having lateral studs operating in said ways, all substantially as and for the purposes set forth.

7. In a machine, substantially as described, the combination of the rolls, the frame having the ways provided with the pivoted leaves or gates, the frames having studs operating in said ways, a pitman connected with said feed-frame, and a crank to which said pitman is connected, substantially as set forth.

8. In a machine, substantially as described, the combination of the rolls arranged in a number of pairs following each other and the framing having a table arranged in a plane approximating the plane of contact of the rolls and provided with grooves or ways in line with the grooves or cavities in the rolls, all substantially as set forth.

9. The combination, in a machine, substantially as described, of the framing having plates or frames D, E, and F, the plates D and E being provided with grooves or ways hav-

ing pivoted gates or leaves, the feed-frame having studs to operate in said ways and also having laterally-projected rods or bars, the cranks, and the pitmen connecting such cranks and rods, substantially as set forth.

10. The improved machine herein described, comprising the framing having the guide grooves or ways provided with pivoted gates, the rolls having grooves or cavities, the platform having grooves in line with the grooves of the rolls, the feed-frame provided with depending plates having forked ends arranged to operate in the grooves of the table and having lateral studs arranged to operate in the said guide grooves or ways of the framing, and mechanism by which to reciprocate such feed-frame, substantially as set forth.

11. In a machine, substantially as described, the combination of the rolls, the feeder having parts arranged to engage the object being rolled, and guiding devices whereby the said feeder is moved forward in one plane and in the opposite direction in a higher plane, substantially as set forth.

JAMES S. PATTEN.

Witnesses:

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