

(No Model.)

3 Sheets—Sheet 1.

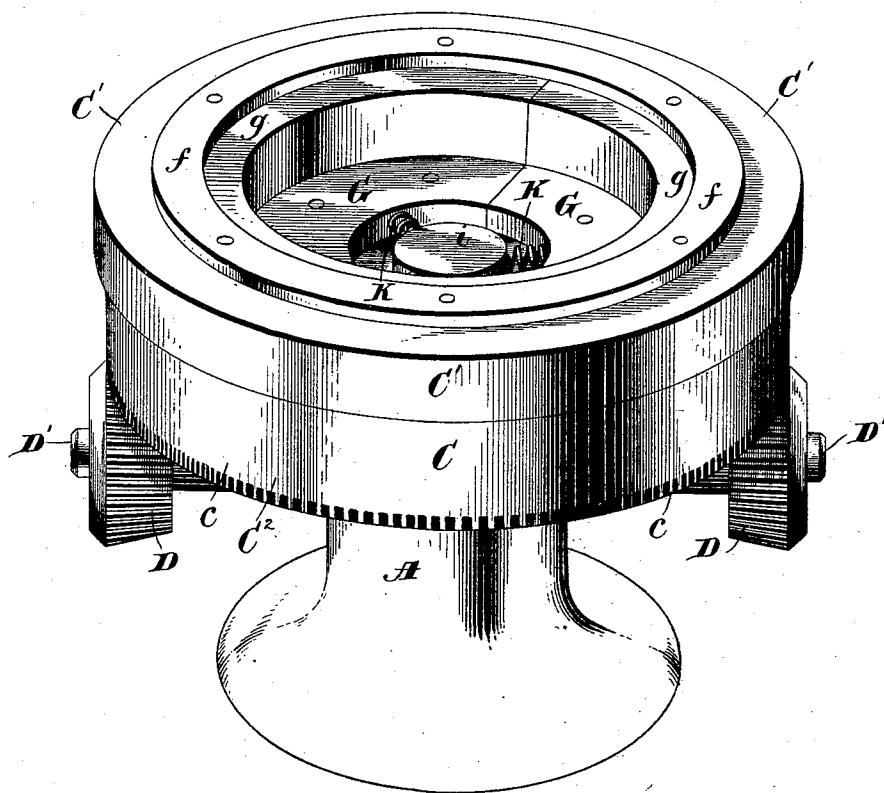
J. R. LITTLE.

MACHINE FOR UPSETTING OR SHRINKING TIRES.

No. 523,288.

Patented July 17, 1894.

Fig. 1



Witnesses:
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Fig. 2.

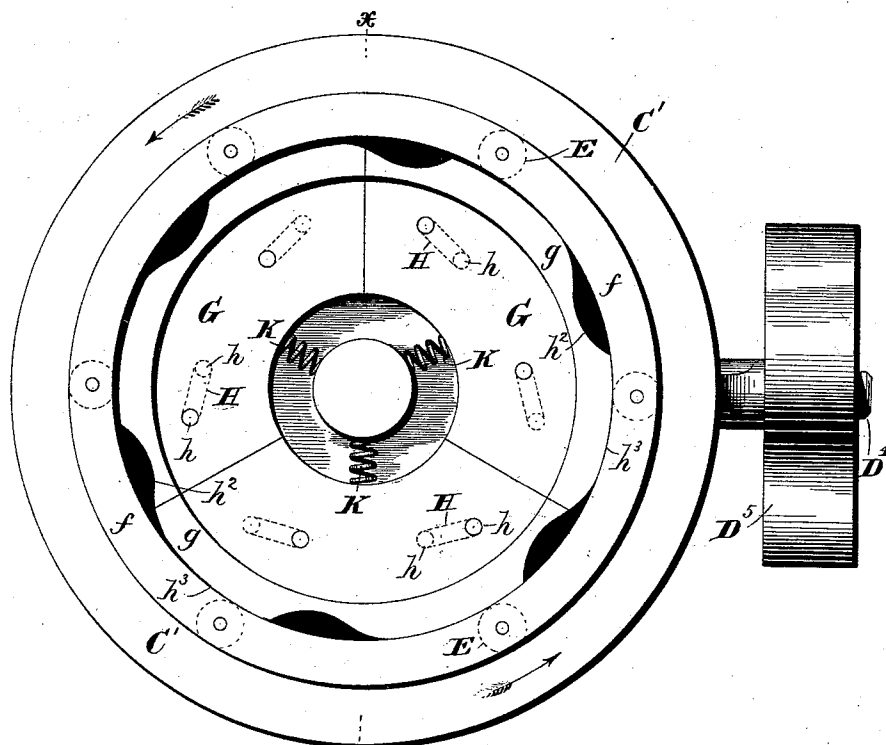
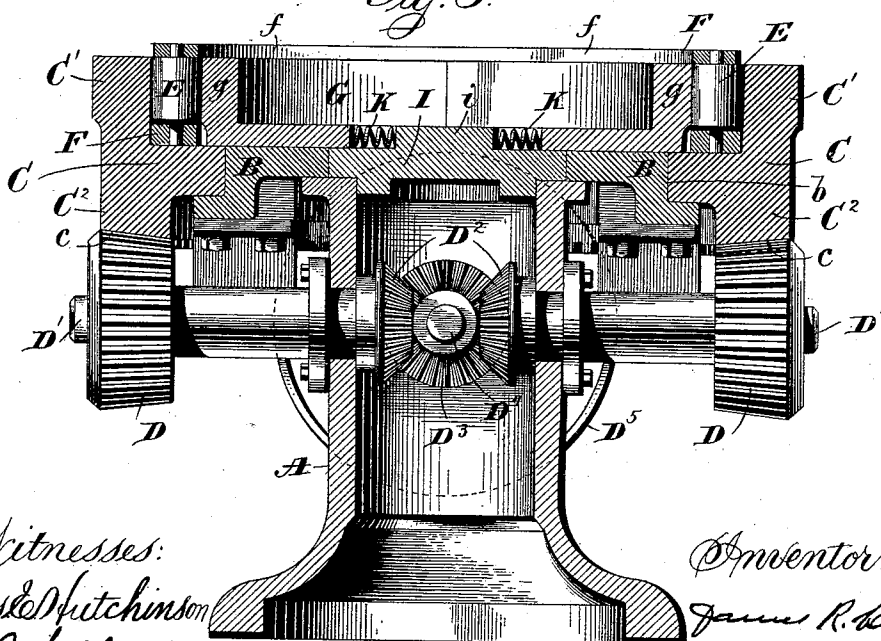


Fig. 3.



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Fig. 4.

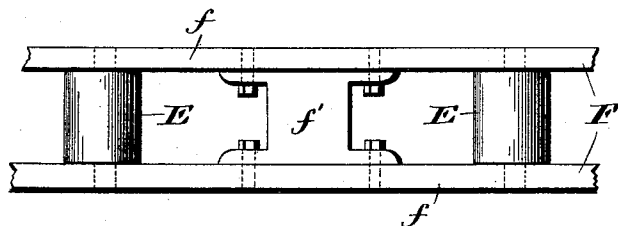


Fig. 5.

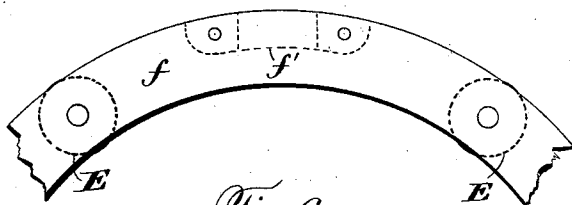


Fig. 6.

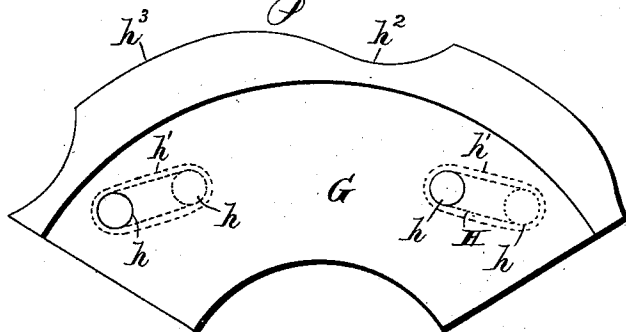
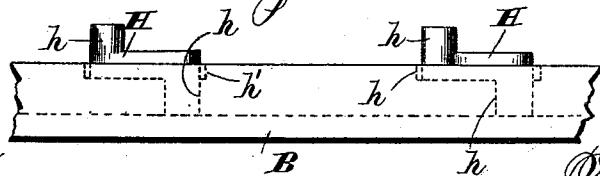


Fig. 7.



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UNITED STATES PATENT OFFICE.

JAMES R. LITTLE, OF QUINCY, ILLINOIS, ASSIGNOR TO THE J. R. LITTLE
METAL WHEEL COMPANY, OF SAME PLACE.

MACHINE FOR UPSETTING OR SHRINKING TIRES.

SPECIFICATION forming part of Letters Patent No. 523,288, dated July 17, 1894.

Application filed June 11, 1892. Serial No. 436,362. (No model.)

To all whom it may concern:

Be it known that I, JAMES R. LITTLE, a citizen of the United States, residing at Quincy, in the county Adams, and in the State of Illinois, have invented certain new and useful Improvements in Machines for Upsetting or Shrinking Tires; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 shows my apparatus in perspective; Fig. 2, a plan view of the same; Fig. 3, a view of a vertical section on line *x, x*, of Fig. 2; Fig. 4, a detail view on an enlarged scale, showing a portion of the roller frame, in elevation; Fig. 5, a plan view of the same; Fig. 6, a similar view of one of the jaws, and Fig. 7, a detail view showing in elevation a portion of the bed plate with the swinging supports for one of the jaws.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention has been to provide an improved machine or apparatus for upsetting or shrinking the tires of metal wheels, and to this end my invention consists in the apparatus and in the parts thereof, constructed, arranged, and combined as hereinafter specified.

In the drawings A designates a pillar or standard, which can be fixed upon a floor or other suitable support. Attached to the upper end of this pillar is the bed plate B, having the annular rebate *b*, which forms a bearing for the rotary ring C, whose upper face is on a level with the top of bed plate B. Around the outer side of such face, is an upwardly projecting annular flange or lip C', while on the under side of the ring is a downwardly projecting annular portion C² provided with gear teeth *c, c*, meshing with the two pinions D, D, on the outer ends of the two shafts D', D', which are journaled in suitable bearings on pillar A, and have their inner ends, within the latter, provided with the corresponding gear wheels D², D². These latter wheels mesh with and are driven by the gear wheel D³, which is on the inner end of the drive shaft D⁴ journaled in suitable bearings in the pillar, and carrying a driving pulley or wheel D⁵ on its outer end, which can

be driven by a belt or other connection from any desired source of motive power.

As shown, the gear wheels D², D², and D³ are bevel gears, but they can, of course, be of other forms. I prefer, however, to have them of the bevel form as illustrated in Fig. 3, though I do not intend to limit myself to such construction.

The inner wall of the flange or lip C' on ring C is made vertical, so as to bear squarely against the outer sides of the vertical rollers E, E, journaled in and carried by the annular frame F placed down within the circle of the flange. Such frame consists of the upper and lower rings *f f*, connected together by distance pieces or posts *f', f'*.

In the space within the annular roller frame, and resting on the bed plate B, are the jaws G, G, each having an upwardly projecting flange or lip *g* with curved inner face to engage a portion of the wheel tire or rim to be operated upon. As shown, there are three of these jaws, but there can be, instead, two, or more than three, if desired, without departure from my invention. The curvature of the inner face of flange or lip *g* on each jaw, is that which the portion of the wheel tire, that it is to engage, is to have in the finished wheel. To connect the jaws with the bed plate B, so that they can move in and out upon the same, I use two links H, H, for each jaw, each having on its opposite ends the pins *h, h*, engaging pivot holes in the jaw and bed plate, respectively. To allow for the swinging of these links as the jaw moves inward and outward, I recess the under side of the jaw, and top of the bed plate, as indicated at *h', h'*. For each jaw, there are two rollers in the roller frame F, adapted to engage cams *h², h²*, on the outside of such jaw, so as to force the latter inward, as the rollers are rolled around above the bed plate, by rotation of the ring C. While I do not intend to limit myself to any particular form or arrangement of such cams, I prefer that shown in the drawings, consisting of a depression having an abrupt end, and an outwardly extending incline, running from a point at or near such end outward to a concentric portion *h³* on the outer periphery of the jaw. In the machine, as illustrated, each jaw has one of these cams about midway be-

tween its sides, the incline of another cam beginning at one extremity of its flanged portion, and the abrupt portion of another cam depression at the other extremity. This arrangement can, obviously, be modified or departed from, without effecting any material departure from my invention, or change in the principle of the operation of the apparatus.

- 10 Upon the upper end of the standard or pillar A, is a plate I, having an upwardly projecting hub like part *i*, between which and the inner ends of the bases or plate portions of the jaws, are the springs K, K, for pressing
15 the jaws outward, after they have been forced inward, by the action of the rollers on the jaw cams, and then released by the rollers coming opposite the deeper abrupt ends of the cam depressions. Said plate can be a separate one placed upon the pillar, or can be
20 formed of or be in one piece with the bed plate.

- The operation of my apparatus, constructed and arranged, as above described and shown
25 in the drawings, is briefly, as follows:—While the jaws are in their outward positions, with the rollers E, E, in the deepest parts of the cam depressions, a tire, to be upset or shrunk, is placed within the space between the flanges
30 or lips on the jaws, and the driving shaft is rotated. This, through the gear wheels D², D³, and D³, causes the shafts D', D', to revolve, and these, in turn, through the pinions D, D, meshing with the rack on ring C, cause
35 the latter to revolve upon the bearing on the bed plate. By the engagement of the inner wall of the flange or lip C', the rollers E, E, in frame F, are rolled forward along the outer sides of the jaws, carrying said frame with
40 them. As they ride up over the inclines of the jaw cams, they force the jaws inward with great power, thereby diminishing the diameter of the circle in which the curved tire engaging faces of the jaw lie, and so compressing
45 the tire, so as to upset and shrink it into the form and size desired. The width of each jaw is, of course, to be such, that, when the jaws have been moved to the limit of their inward travel, the several tire engaging faces
50 come end to end, and will make a substantially complete circle, surrounding and inclosing the tire on all sides. The swinging connections between each jaw and the bed plate, consisting of the two links pivoted at
55 opposite ends, respectively, to the jaw and plate, while keeping the jaws from being moved around by the engagement of the rollers with the jaw cams, cause them to move easily directly inward and outward, and insure their taking accurately their proper positions, when they have been moved inward to compress or shrink the tire to the greatest extent. As the revolution of the ring C is continued, the rollers roll up off of the cam
65 inclines on to the concentric portions *h*³, *h*³, of the jaws. While they are passing around over such portions, the jaws are retained in

their inward positions, so that the tire will have an opportunity to become set, in the shape and size into which it has been forced. 70 After this period of rest, the jaws will, when the rollers pass the ends of the concentric portions *h*², *h*², be moved quickly outward by the action of the springs K K, K, so that the completed tire will be released, and can be taken 75 out and replaced by another, to be upset or shrunk, just as the first one was by the action of the jaws forced inward by the rollers riding over the cam inclines, as hereinbefore described. 80

The action of the apparatus can be made substantially continuous, as a completed tire can be readily removed and a new one dropped quickly into its place, without stoppage of the driving wheel being necessary. 85

Ordinarily, the tires, to be acted upon by this machine, are made somewhat larger than they are to be in the finished wheel. The jaws, constructed and operating upon a tire, as described, will, then, while forcing the lat- 90 ter into its desired perfectly round shape—compress it longitudinally, so that it will be of just the required size. The comparatively slow inward movement of the jaws, and their rest or delay in their inward positions, is es- 95 pecially well adapted to secure the desired compression in the best way, and make it permanent, because of the slow moving of the particles of the metal, and the opportunity that is given them to adjust themselves to their compressed condition, before the pressure of the jaws is taken off. 100

The mechanism used is simple, strong, and cheap in construction; is not liable to be broken or to get out of order; and, because 105 of the use of the roller and cam devices shown and described, for applying the compressing power to the jaws, is capable of being most easily driven with the least possible amount of sliding friction to be overcome by the 110 driving power.

The devices whereby the power driving the ring C is transmitted to the jaws, are such as to involve only a rolling friction, which offers the minimum of resistance to motion of the 115 parts of the machine.

Having thus described my invention, what I claim is—

1. As an improvement in machines for upsetting or shrinking tires, in combination 120 with a suitable base, a series of separate jaws thereon, capable of movement toward and from a common center, and each having one or more cams, and on its inner side provided with a concave face, a series of rollers jour- 125 naled in a movable frame, and a rotary piece engaging the outer sides of the rollers, substantially as and for the purpose specified.

2. As an improvement in machines for upsetting or shrinking tires, in combination with 130 a stationary base, a number of movable jaws of rigid material, each having a face to engage a portion of the tire to be acted upon, and one or more outwardly facing cams, con-

nections between the base and the jaws whereby the latter are guided on the former so as to be movable on the same toward and from a central point between the jaws, springs forcing the jaws outward, a series of rollers to engage the cams on the jaws a movable frame journaling said rollers, a rotary piece surrounding the rollers and engaging their outer sides, and means for rotating such piece to roll the rollers over the cams on the jaws, substantially as and for the purpose shown.

3. As an improvement in machines for up-setting or shrinking tires, in combination with a stationary base, a rotary piece, a series of rollers having their outer sides engaged by and rolling upon a part of such piece, a number of separate movable jaws of rigid material each having a face to engage a portion of the tire to be acted upon, one or more cam depressions, each engaged by one of the rollers, and concentric faces between such depressions, springs for forcing the jaws toward the rollers, and guiding connections between the jaws and the base, allowing the former to travel on the latter toward and from a point between them, while holding them from traveling around on the same with the rotary piece, substantially as and for the purpose described.

4. As an improvement in machines for up-setting or shrinking tires, in combination with a suitable base, a rotary piece, an annular frame having journaled in it a series of rollers whose outer sides are engaged by and roll upon a portion of the rotary piece, and a number of jaws having portions to engage the outer side of the tire and surfaces to be engaged by the rollers, having cam depressions and concentric parts, over which the rollers are rolled as the rotary piece revolves, substantially as and for the purpose specified.

5. As an improvement in machines for up-setting or shrinking tires, in combination with a suitable base, a rotary frame carrying journaled in it a series of rollers, a rotary piece having an annular flange or lip engaging the outer sides of the rollers, a number of jaws having portions to engage the outer side of the tire, and cams to be engaged by the rollers, and swinging connections between each jaw and the base supporting the same, substantially as and for the purpose shown.

6. As an improvement in machines for up-setting or shrinking tires, in combination with a suitable base, a rotary frame carrying journaled in it a series of rollers, a rotary piece having an annular portion engaging the outer sides of the rollers, a number of jaws having portions to engage the outer side of the tire and cams to be engaged by the rollers, and

two links for each jaw, each having its opposite ends pivoted to the jaw and base upon which the jaw moves, substantially as and for the purpose set forth.

7. As an improvement in machines for up-setting or shrinking tires in combination with a suitable base, a number of jaws having portions to engage the outer side of the tire, and two links for each jaw pivotally connected at opposite ends with the jaw and base, respectively, substantially as and for the purpose specified.

8. As an improvement in machines for up-setting or shrinking tires, in combination with a suitable base, a number of jaws having portions to engage the outer side of the tire, and the two links for each jaw situated in recesses in the jaw and base, and having their opposite ends pivoted to the jaw and base, respectively, substantially as and for the purpose shown.

9. As an improvement in machines for up-setting or shrinking tires in combination with a suitable base, a ring rotating thereon, provided with gear teeth, and with an upwardly projecting annular portion, the annular frame carrying a series of rollers engaging the inner face of the upwardly projecting part of the gear toothed ring, a series of movable jaws of rigid unyielding material having portions to engage the outer side of the tire and cams to be engaged by the rollers, so as to force the jaws inward, means for moving the latter outward, and one or more driving gear wheels to engage the teeth on the ring, substantially as and for the purpose set forth.

10. As an improvement in machines for up-setting or shrinking tires, in combination with a suitable base, the annular frame carrying journaled in it a series of rollers, the rotary ring engaging the outer sides of the rollers and provided with gear teeth, one or more rotary shafts carrying wheels meshing with such teeth, a number of separate jaws having portions to engage the outer side of the tire, and roller engaging surfaces provided with cam depressions and concentric faces between such depressions, and springs for forcing the jaws outward, when the rollers of the annular frame come opposite the depressions on the jaws, substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand this 31st day of May, A. D. 1892.

JAMES R. LITTLE.

Witnesses:

JOSEPH N. CARTER,
S. DEIDESHEIMER.