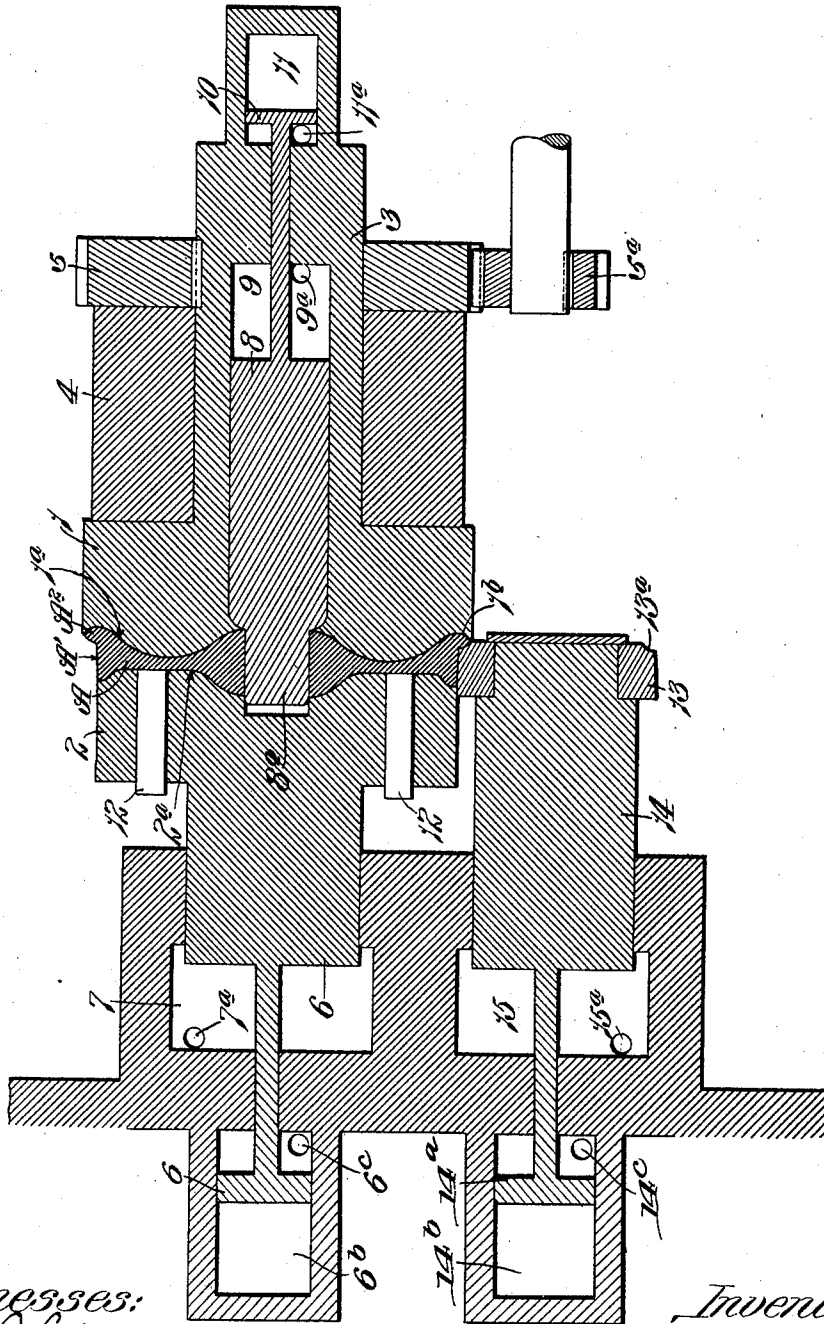


S. S. KNIGHT.
PRESSING AND ROLLING MACHINE.
APPLICATION FILED JAN. 30, 1911.

1,005,231.

Patented Oct. 10, 1911.



Witnesses:
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UNITED STATES PATENT OFFICE.

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PRESSING AND ROLLING MACHINE.

1,005,231.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, SHERWOOD S. KNIGHT, a citizen of the United States, residing at Webster Groves, Missouri, have invented a certain new and useful Improvement in Pressing and Rolling Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to machines that are used for shaping heavy metal articles.

One object of my invention is to provide a machine of novel construction that will press and roll a circular-shaped cast metal article while it is in a heated condition so as to thoroughly consolidate the metal and press out any irregularities in the surface of the article and also remove any surplus metal that has been forced outwardly into the peripheral edge portion of the article. And still another object is to provide a practicable machine of simple construction that will successfully press the body portion of a heated cast metal car wheel so as to consolidate the metal and force any surplus metal in the body outwardly into the tread and remove said surplus metal and roll the tread and flange of the wheel.

The figure of the drawings is a vertical sectional view of a pressing and rolling machine constructed in accordance with my invention that is adapted to be used in the manufacture of cast metal car wheels.

Referring to the drawings, 1 and 2 designate the cooperating members of a two-part shaping die, the face 1^a of the member 1 conforming to the shape of one side of a car wheel and the face 2^a of the member 2 conforming to the shape of the other side of the wheel. The member 1 is carried by a shaft 3 that is rotatably mounted in a stationary bearing 4, and means is provided for imparting rotary movement to said shaft. In the embodiment of my invention herein shown, the shaft 3 is provided with a gear 5 that cooperates with a suitable driving gear 5^a for imparting rotary movement to said shaft and to the die member 1 thereon but it will, of course, be understood that various other means could be used for this purpose without departing from the spirit of my inven-

tion. The die member 2 is carried by a ram 6 which reciprocates in a cylinder 7 to which some suitable operating medium is supplied through a port 7^a so as to force the die member 2 toward the die member 1. Said ram 6 is also provided with a piston 6^a that reciprocates in a cylinder 6^b to which the operating medium is supplied through a port 6^c so as to move the die member 2 in the opposite direction. A ram 8 which is reciprocatingly mounted in the cylinder 9 in the shaft 3 is provided with a mandrel 8^a that centers the car wheel A being operated on, and said ram 8 is provided at its opposite end with a piston 10 that reciprocates in a cylinder 11, some suitable operating medium, such, for example, as a fluid or liquid under pressure, being supplied to the cylinder 9 through a port 9^a to move the mandrel 8^a into engagement with the car wheel and to the cylinder 11 through a port 11^a to withdraw said mandrel from engagement with said wheel.

Pins 12 or some other suitable means are mounted on the die member 2 for ejecting the wheel from said die member after it has been pressed and rolled. The means for removing the surplus metal from the tread A' of the wheel and rolling said tread and also the flange A² of the wheel, consists of a roller die 13 loosely mounted on a ram 14 which reciprocates in a cylinder 15, to which a suitable operating fluid or liquid under pressure is supplied through a port 15^a, said ram having a piston 14^a arranged in a cylinder 14^b provided with an inlet port 14^c.

Any suitable mold or molding apparatus may be used for casting the wheel to approximate shape, and after the wheel has been removed from said mold, and while the wheel is still in a highly heated condition, it is placed in the press illustrated in the drawings. Pressure is admitted to the cylinder 9 so as to force the mandrel 8^a into the axle opening in the center of the wheel and thus center the wheel, and pressure is also admitted, preferably at the same time, to the cylinder 7. This causes the die members 1 and 2 to exert pressure on the opposite sides of the wheel and thus consolidate the metal in the wheel, the pressure being preferably from 1200 to 1500 pounds per square inch, so that any surplus metal in the body of the

wheel will be forced outwardly into the tread and flange of the wheel. After the die members have been closed as above described, rotary movement is imparted to the shaft 3 so as to revolve the die members 1 and 2 and the wheel clamped between same. The ram 14 which carries the roller die 13 is then moved into operative position by admitting pressure to the cylinder 15, thereby causing the roller die 13 to move transversely across the tread of the wheel and shear off any excess metal on the tread and simultaneously roll the tread and flange of the wheel.

The roller die 13 is provided with a tapered face and also a curved surface 13^a that coöperates with a similarly curved surface 1^b on the die member 1 to compress the metal in the flange A² of the wheel and roll said flange, and as the face of said die 13 is tapered the metal in the tread of the wheel will be forced inwardly and also toward the side die member 1 when said roller die moves transversely across the wheel, thereby consolidating and rolling the metal in the tread and imparting the required bevel to the tread of the wheel.

After the wheel has been compressed and rolled sufficiently to thoroughly consolidate the metal in the wheel and roll the tread and flange of the wheel, the various members or parts of the press are separated by admitting pressure to the cylinders in which the pistons are arranged so as to permit the wheel to be removed while still at a high temperature and placed in a soaking pit to anneal, the pins 12 in the die member 2 operating to positively eject the wheel from said member when said pins strike against the housing in which the ram 6 is mounted.

A machine of the character above described makes it possible to produce exceptionally strong and light-weight car wheels having perfectly true treads of uniform diameter because the pressing action to which the wheel is subjected while it is in a heated state, closes up any blow-holes and shrinks in the metal, welds the metal together, and forces any surplus metal in the body of the wheel outwardly into the tread, the roller die 13 operating to remove any surplus metal from the tread and also to roll the tread and flange and thus consolidate the metal in that portion of the wheel which is subjected to the greatest wear. Furthermore, such a machine makes it possible to produce a wheel which is formed entirely from very high-grade material so that the wheel is strong enough to successfully withstand shocks and shearing strains. The machine is of simple construction and easy to operate, and while I have described it as being used in the manufacture of a cast car wheel provided with a rolled tread and flange, it could, of course, be used in the manufacture of various other articles by

substituting different kinds of die members and roller dies.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A machine for finishing a cast metal article of circular-shape, comprising means for exerting pressure on the article while it is in a heated condition so as to consolidate the metal in same and force the surplus metal outwardly into the periphery of the article, and means for removing the surplus metal from the periphery of the article.

2. A machine for finishing a cast metal article of circular-shape, comprising means for exerting pressure on the body portion of the article while it is in a heated condition so as to consolidate the metal therein and force any surplus metal outwardly toward the periphery of the article, a roller die that is adapted to move transversely across the periphery of the article so as to remove the surplus metal, and means for revolving said article when the periphery of same is engaged by said roller die.

3. A machine for finishing a circular-shaped cast metal article, comprising means for pressing the body portion of the article while it is in a heated condition so as to thoroughly consolidate the metal therein and force the surplus metal into the periphery of the article, and means for removing the surplus metal from the periphery of the article and rolling said periphery.

4. A machine for the purpose described, comprising means for exerting sufficient pressure on the opposite sides of a cast metal car wheel while it is in a heated condition to consolidate the metal therein and force any surplus metal into the tread of the wheel, and means for simultaneously shearing off the surplus metal in the tread and rolling the tread and flange.

5. A machine for the purpose described, comprising means for exerting sufficient pressure on the opposite sides of a cast metal car wheel while it is in a heated condition to consolidate the metal therein and force any surplus metal into the tread of the wheel, a roller die for shaping the tread and flange of the wheel, means for causing said die to shear off the surplus metal that has been forced into the tread, and means for revolving the wheel while said die is in engagement with same.

6. A machine for the purpose described, comprising coöperating die members which conform to the shape of the side faces of a car wheel, means for causing said die members to exert pressure on a cast metal car wheel while it is in a heated condition, a roller die that is adapted to operate on the tread of the wheel, means for moving said roller die transversely across the tread

of the wheel so as to shear off some of the metal on the tread, and means for revolving the die members which embrace the wheel.

7. A machine for the purpose described, comprising coöperating die members which conform to the shape of a car wheel and which are adapted to receive a cast metal car wheel while it is in a heated condition, means for causing said members to exert pressure on the opposite side faces of the wheel and thus force any surplus metal outwardly into the tread, means for centering the wheel in said die members, means for removing the surplus metal in the tread and rolling the tread and flange of the wheel, and means for ejecting the wheel from said die members.

8. A machine for the purpose described, comprising a shaft provided with a die member, a coöperating movable die member, said die members being constructed to receive a cast metal car wheel after it has been removed from the mold in which it is cast and while it is still in a heated condition, means for rotating said shaft, a roller die, means for moving said movable die member toward the die member with which

it coöperates, means for moving said roller die transversely of the tread and into engagement with the flange of the wheel, and a movable mandrel in said shaft for centering the wheel between said die members. 30

9. A machine for the purpose described, comprising a shaft provided with a die member, a coöperating movable die member, a movable mandrel for centering an object between said die members, a roller die for shearing off metal from the periphery of the object between said die members and rolling said periphery, rams which carry said movable die member, said mandrel and said roller die, and cylinders for said rams, said cylinders having means for admitting an operating medium into same so as to force the members on said rams into engagement with the object being operated on. 35 40 45

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this twenty seventh day of January 1911. 50
SHERWOOD S. KNIGHT.

Witnesses:

WELLS L. CHURCH,
GEORGE BAKEWELL.