

J. M. HANSEN.
MANUFACTURE OF CAR WHEELS.
APPLICATION FILED NOV. 11, 1909.

1,007,944.

Patented Nov. 7, 1911.

2 SHEETS-SHEET 1.

FIG. 1

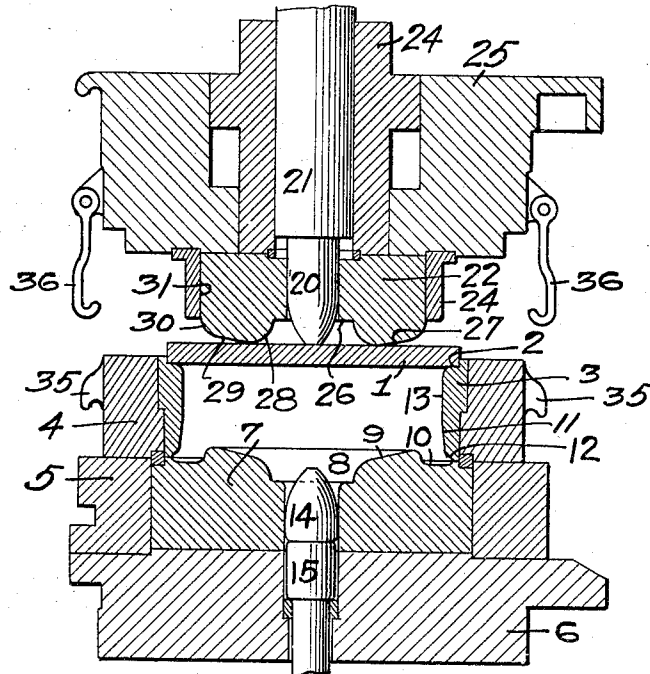
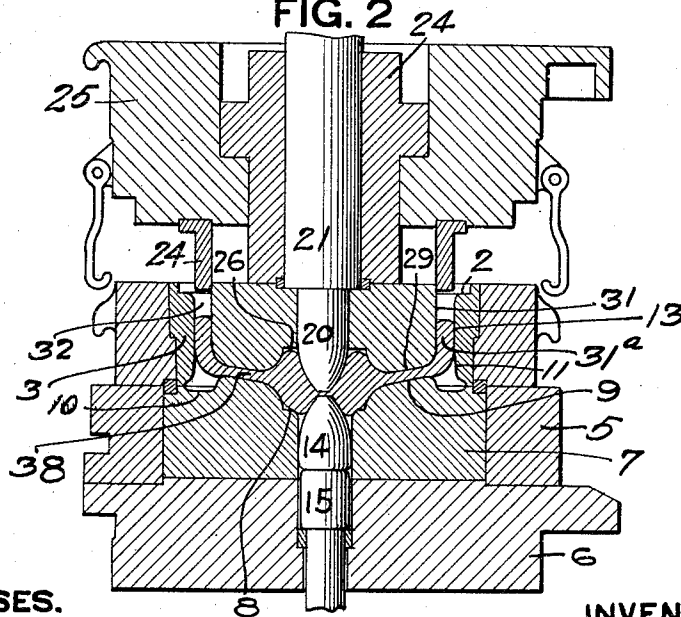


FIG. 2



WITNESSES.

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FIG. 3

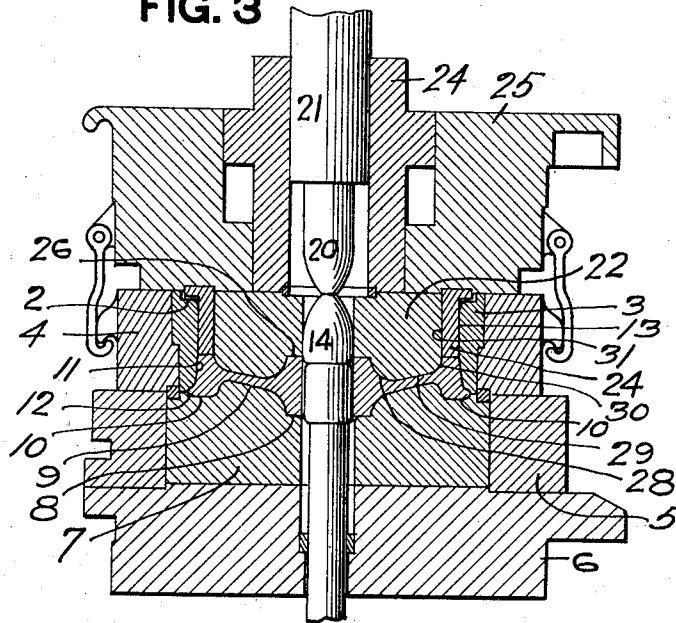
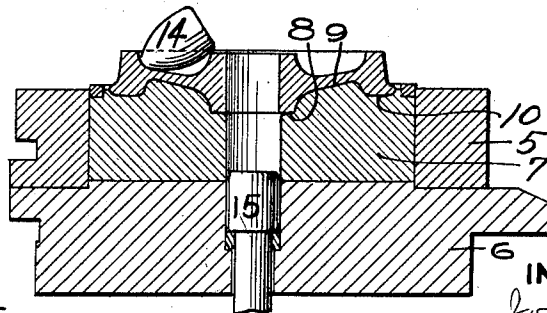
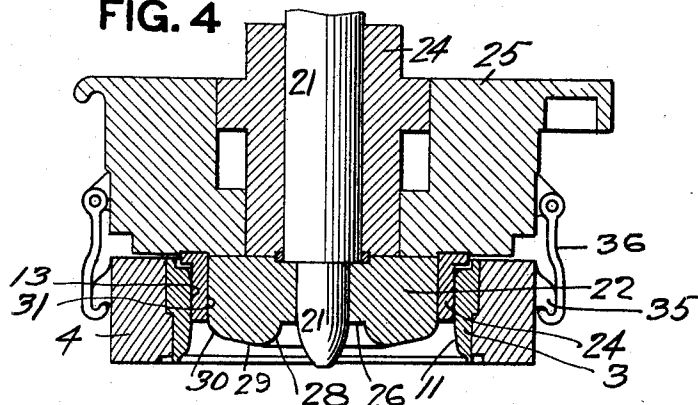


FIG. 4



WITNESSES.

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UNITED STATES PATENT OFFICE.

JOHN M. HANSEN, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO FORGED STEEL WHEEL COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MANUFACTURE OF CAR-WHEELS.

1,007,944.

Specification of Letters Patent.

Patented Nov. 7, 1911.

Application filed November 11, 1909. Serial No. 527,484.

To all whom it may concern:

Be it known that I, JOHN M. HANSEN, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in the Manufacture of Car-Wheels; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to forged steel or similar wheels.

Its object is to produce by the operation of proper forging dies a finished car wheel or like wheel at one heat within a single forging press.

The present invention is included within an application filed by me of even date herewith Serial No. 527,481, in which the wheel is produced from a heated blank by first developing the hub portion and while the blank is confined in a forging die, forging the rim portion thereof, said method being illustrated in two forms, one in which a portion of the web is first forged and while so confined, a separate annular die forges the rim and completes the forging of the web, and one in which the entire web is first forged and while confining the blank, the rim portion is forged. The present invention relates to the latter method.

It consists, generally stated, in first forging a heated slab to form the web and hub portion of the wheel and turn the edge portion thereof upwardly and while the web portion and the upwardly turned edge portion are confined between the matrix die and the web forming die, forging said edge portion downwardly past the web portion to form the wheel rim.

In the accompanying drawing Figure 1 illustrates the blank before the first forging step; Fig. 2 shows the position of the dies after the first forging step; Fig. 3 shows the position of the dies upon the completion of the forging operation; and Fig. 4 shows the dies open to withdraw the blank.

To the practice of my invention, I prefer to employ the method in Letters Patent previously granted to me, such as Letters Patent No. 866,020, for the first forging operation, and I may employ any suitable press for the purpose, a hydraulic press of great power being necessary, and a press generally suited being shown in Letters Patent No. 922,392 granted to Andrew Christian-son, May 18, 1909, though it is not consid-

ered necessary to illustrate the press or more than describe the movement of the different dies to produce the finished wheel.

As illustrated in Fig. 1, the blank 1 which is shown as a heavy rolled slab rests upon the shoulder or seat 2 of the ring die 3, which is carried on the annular die holder 4 which is normally seated on the ring portion 5 of the anvil 6, though as hereafter described the blank 1 may be raised on such anvil. The bottom die 7 rests within the ring portion 5 and upon the anvil 6, the ring die and bottom die 7 together forming the matrix or female die for the forging of the blank. The bottom die 7 has the central hub cavity 8 and extending out from the same the web forming face 9, and beyond said face is the annular rim forming seat 10. The lower portion of the ring die 3 together with the annular seat 10 form the flange forming recess 12, while the face 11 forms the molding face for the tread of the wheel. Above the tread forming face 11, which is inclined according to the desired taper of the tread face, is the vertical wall 13 for confining the blank as it is bent down into bowl shape as illustrated in Fig. 2. Centrally of the hub cavity 8 is the piercing mandrel 14, which is operated by a suitable hydraulic plunger 15 to raise the mandrel through the hub portion of the blank and expand the same as part of the wheel forging operation. The hydraulic plunger 15 is made of less diameter than the mandrel 14 and has a stroke long enough to force the piercing mandrel through or practically through the blank so that the mandrel is discharged from the blank on the upper or delivery face thereof, the hydraulic plunger being withdrawn downwardly at the completion of its stroke. Above the matrix, as so described, are the reciprocating and operating dies for developing the wheel, and an upper mandrel 20 is supported centrally of the blank and is operated by the mandrel carrier 21 the main annular die 22 connected to the die carrier 24 connected to the die carrier 25. The annular die 22 has the hub forming cavity 26 and beyond the same the web forming face 27 which extends from the hub cavity 26 for the full width of the web, said web forming face having the inner convex face 28, the main web forming face 29, the outer curved face 30 which leads up to the vertical wall

31 which wall is opposite the vertical wall 13 of the ring die 3 and together with it forms an annular chamber for confining the edged portion of the heated blank. The annular die 24 enters within the annular space 32 between said vertical walls 13 and 21, corresponding substantially in thickness to the width of said space to operate upon the edge 31 of the blank as confined in said space. Its lower edge corresponds in shape to one face of the finished wheel rim, being illustrated as flat, as described in said application Serial No. 527,481. Means are provided for raising the ring die 3, such as lugs or hooks 35 on the ring die holder 4 and swinging hooks 36 on the annular die carrier 25.

In the practice of the invention as above described, a suitable heated blank, such as the thick flat rolled slab 1 is fed to the dies, for example by placing the same on the seat 2; and the mandrel 20 and annular die 22 are forced downwardly as illustrated in Fig. 2, compressing the metal of the blank and thinning the web portion 38 thereof forcing the metal displaced on the major portion thereof inwardly into the hub cavities 8 and 26 and around the mandrels 14 and 20, so developing the hub of the blank. The flat slab as illustrated will thus be bent into bowl shape with its edges 14 bending up between and confined between the vertical faces 13 and 31 of the matrix and the reciprocating die 22, and its body compressed between the die 22 and the bottom die 7 as illustrated. It will be seen from the drawing that the up-turned edge portion of the blank is reduced in thickness, being brought between the matrix die and the edge forming die to the desired thickness for the edge portion of the wheel rim. The outer annular die 24 then descends and forces the metal which is confined between the vertical faces 13 and 31 downwardly into the cavity for forming the wheel rim, forcing the metal into the molding space formed by the rim forming seat 10, and the edge-forming seat 11 of the matrix die, and in forming car wheels forces the metal out into the flange forming recess 12, the edge metal of the blank being thus forced past the web portion of the blank and into the recess below the web forming space to bring the rim about central of the web. While the metal is thus distributed a final compression upon the wheel body, that is, the web and rim portions, is obtained by forcing down together the web forming die 22 and the rim forming die 24, so further compacting the body of the wheel, operating upon the same as though said dies 22 and 24 were of a single piece. While the metal is confined between

the dies 7 and 22, the piercing mandrel 14 is raised by the plunger 15, and as illustrated in Fig. 3 is forced substantially through the blank, so compressing the metal within the hub forming cavities 8 and 26 and forming the axle eye of the wheel. The stroke of the plunger 15 is sufficient to force the mandrel entirely through the wheel or practically through the same so that it may be delivered therefrom in the same direction in which it enters, the custom being usually to force it sufficiently through the same that its rounded or tapered base permits its easy withdrawal. Upon the completion of the forging of the wheel as the die carrier 25 descends into its lowest position, the hooks thereof engage with the hooks on the annular die holder 4, and as the die carrier is raised, the ring die is lifted from the finished wheel exposing it for withdrawal. A fresh mandrel 14 can then be placed within the hub forming cavity 8 resting upon the plunger 15 and the apparatus is ready for the formation of another wheel.

I am thus enabled to forge the wheel at a single heat and by a single operation of the forging press, so producing a finished forged wheel very rapidly and at low cost.

What I claim is:

1. The improvement in the art of forging steel car wheels and the like, consisting in forging a heated blank to develop the web and hub portion of the wheel and turn the edge portion of the blank upwardly, confining the edge portion of the blank between the matrix die and the web forming die, and then forging such edge portion downwardly past the web portion to form the wheel rim.
2. The improvement in the art of forging steel car wheels and the like, consisting in forging a heated blank to develop the web and hub portion of the wheel and turn the edge portion of the blank upwardly and thin the same, confining the edge portion of the blank between the matrix die and the web forming die, and then forging such edge portion downwardly past the web portion to form the wheel rim.
3. The improvement in the art of forging steel car wheels and the like, consisting in forging a heated blank to develop the hub portion and while confined within the forging dies forging the rim portion thereof and continuing the pressure of the forging dies by downward movement together.

In testimony whereof, I the said JOHN M. HANSEN have hereunto set my hand.

JOHN M. HANSEN.

Witnesses:

ROBERT C. TOTTEN,
J. F. WILL.