

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

1,007,943.

Patented Nov. 7, 1911.

2 SHEETS—SHEET 1.

FIG. 1

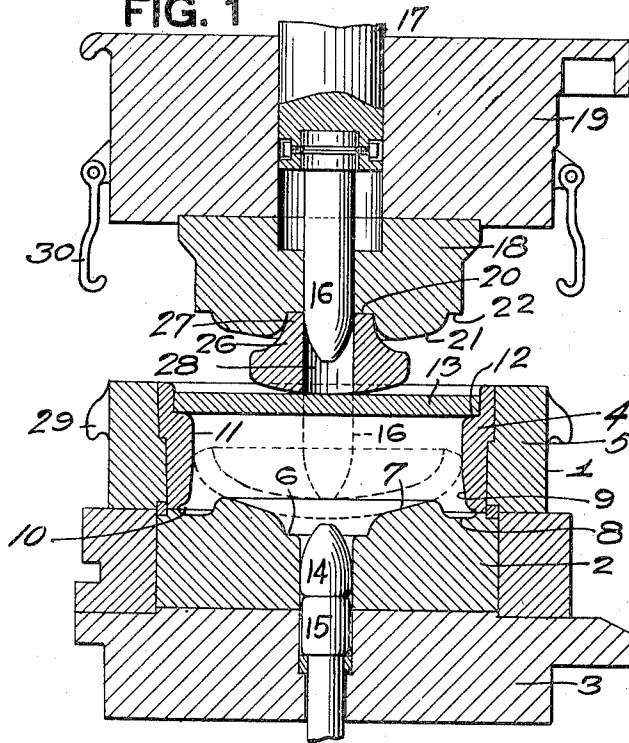
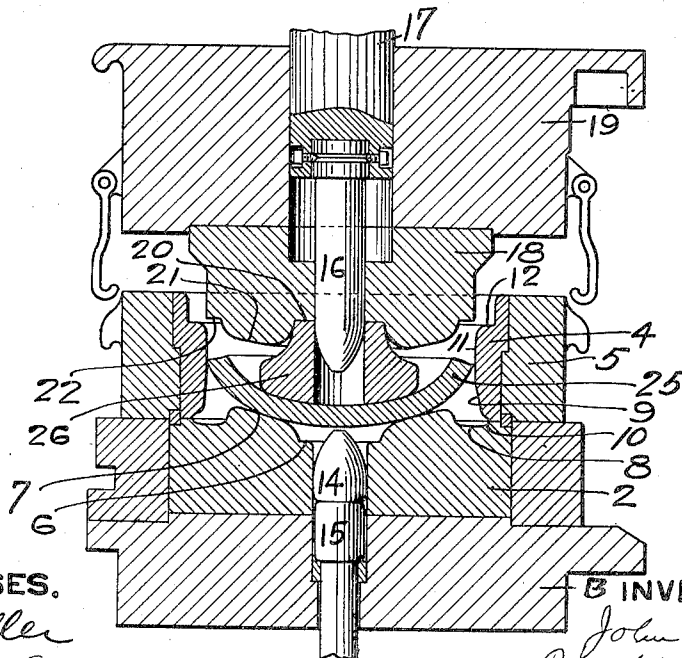


FIG. 2



WITNESSES.

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2 SHEETS—SHEET 2.

FIG. 3

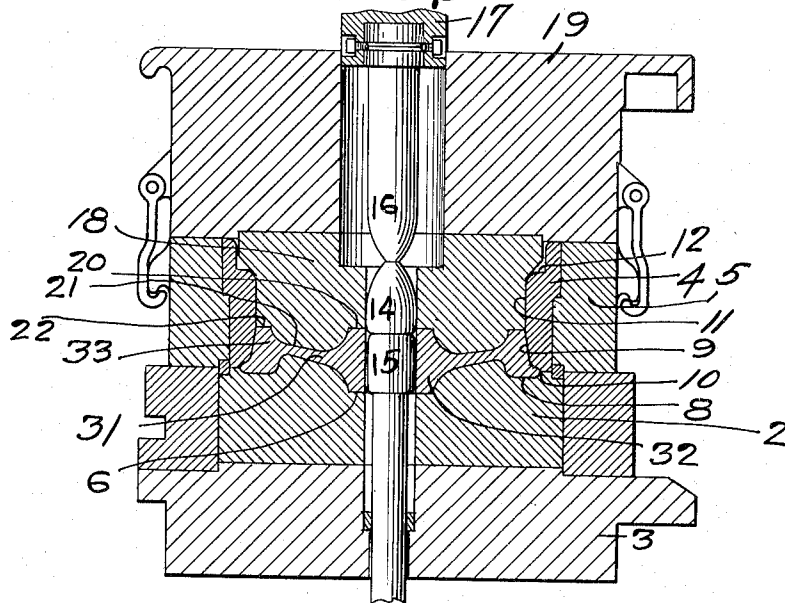
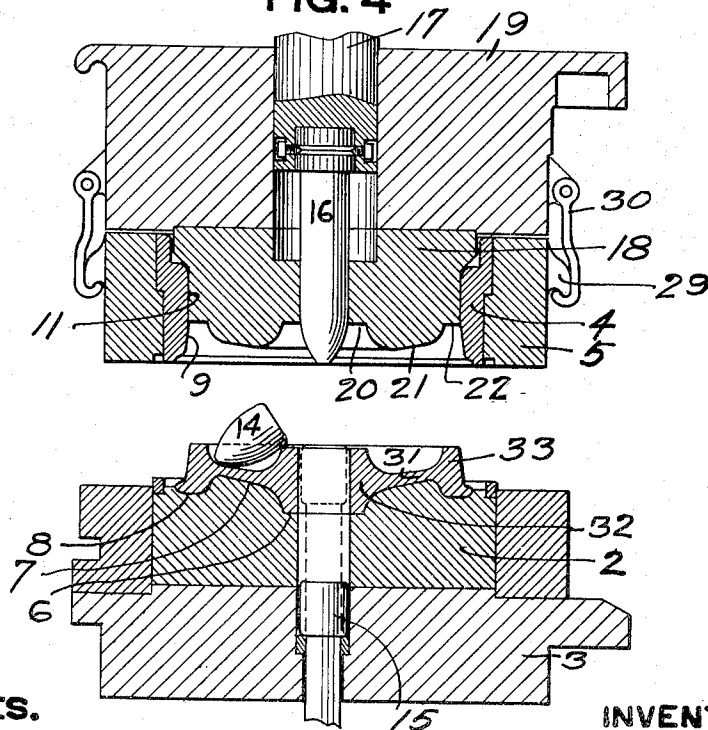


FIG. 4



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.

1,007,943.

Specification of Letters Patent.

Patented Nov. 7, 1911.

Application filed November 11, 1909. Serial No. 527,483.

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
5 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 apparatus for the
10 manufacture of forged steel car and like wheels, its object being to provide means to produce the same at a single heat from a suitable blank, and a simple form of dies requiring only the use of a central mandrel,
15 and a single reciprocating die surrounding the same, so simplifying the mechanism while making it possible to produce car and like wheels in what is practically a single operation of the mechanism.

20 It consists, generally stated, in the combination of the matrix die having a bottom face conforming to the shape of one face of the finished wheel, and a confining die face to form the tread of the wheel, and a reciprocating top die conforming in shape to the
25 opposite face of the finished wheel, together with means for preliminarily forcing the blank into the matrix die in position to be operated upon by the die faces to produce
30 the finished wheel.

In the accompanying drawings Figure 1 illustrates a preferred form of dies embodying the invention showing the position of the parts prior to the bending of the blank;
35 Fig. 2 illustrates the bending operation; Fig. 3 shows the completion of the forging stroke and Fig. 4 shows the dies opened for the removal of the finished wheel.

In the use of the invention, I employ a
40 suitable forging press giving the necessary forging strokes of the different die members which I do not consider it necessary to illustrate at the present time. These necessary dies are supported on the anvil and connected to the moving parts as hereafter described. The press has a matrix 1 which, in the form illustrated, is formed of the bottom
50 die 2 resting on the anvil 3 and the removable ring die 4 held within the annular die holder 5 which as shown rests upon the bottom die 2. The bottom die 2 has the hub forming cavity 6 and beyond the same the web forming face 7 and the rim forming face 8, while the lower portion of the ring
55 die 4 provides the tread forming face 9

which is shown as formed of an incline, the dies 2 and 4 meeting and having the flange forming recess 10. The upper portion of the ring die 4 is formed with vertical walls 11 to confine the blank during the forging
60 operation. The ring die 4 has also the seat 12 for receiving and supporting the blank 13 in position to be operated on by the dies. Centrally of the bottom die 2 and the hub cavity 6 is the piercing mandrel 14 operated by the plunger 15. The press has the central reciprocating mandrel 16 operated by the mandrel carrier 17 and around the same the annular die 18 operated by the die
70 carrier 19. The annular die 18 has the hub forming cavity 20 and beyond the same the web forming face 21 and the rim forming shoulder 22. The dies 2 and 18 thus provide opposing die faces corresponding in shape to the finished wheel, and adapted to the
75 forging of the opposite faces thereof while the metal is confined within the ring die 4. As, however, difficulty might be encountered in bending the blank within the matrix and bringing the outer edge 25 thereof into position to be operated upon by the outer portion of the annular die 18, particularly the
80 shoulder 22 thereof, I provide the removable bending block 26, the upper portion 27 of which fits within the hub cavity 20 of the upper die 18, the removable bending block having a central opening or recess 28 within which the mandrel 16 enters to center the bending block upon the blank, as shown in
85 Fig. 1. The lower face of the bending block preferably is curved so as to correspond to the curve of the bowl shaped blank to be formed as illustrated in Fig. 2, and made of sufficient width to provide for a symmetrical bending of the blank within the matrix.
90 The annular die holder 5 is shown as having the hooks or lugs 29 to be engaged by the swinging hooks 30 by which said annular die holder and its ring die may be lifted to withdraw the blank.

In the use of the above apparatus, as set forth in application Serial No. 527,485, a heated blank suitable for forming the wheel is seated in the seat in the matrix, and it is preliminarily bent into bowl shape within
105 the matrix, such as by a preliminary lowering of the reciprocating parts of the press or of the center mandrel thereof. To bring the blank to the most desirable shape, I prefer to employ the bending block 26 as de- 110

scribed, that block being placed upon the heated blank supported in the seat 12, and the mandrel 16 and die 18 being lowered so as to center the bending block as illustrated in Fig. 1 and then the press being carried down sufficiently to bend the blank as illustrated in Fig. 2, in this way the edge portion 25 of the blank being brought within the vertical walls 11 of the matrix die. The press is then opened and the removable bending block 25 removed and then the mandrel 16 and the annular die 18 are forced down with great power, the result of which is that a part of the metal in the portion of the heated blank forming the web of the wheel is forced inwardly to develop the hub of the blank, being thinned between the opposing faces 7 and 21 of the top and bottom dies, a small portion at the outer edges of said faces being forced outwardly, while the edge 25 of the blank is forced downwardly within the seat 8, face 9 and flange forming cavity 10, so forming the rim 33 of the wheel, the metal being thus forged between two opposing die faces to shape and finish the entire wheel body and properly confine the same for the piercing of the hub portion by the mandrel 14 which is forced upwardly by the plunger 15; the completed wheel with its web portion 31, hub portion 32 and tread portion 33 being thus produced at a single heat and by a single manipulation of the dies. As the dies descend to their lowest position the hooks engage with the annular die holder 5 and as the dies ascend, lift such die holder with the ring die 4, so exposing the blank and permitting its withdrawal from the press. The ring die can then be lowered again into position upon the bottom die and the hooks 30 disengaged and the press opened ready for another operation. While I have described the preferred use of the removable bending block to preliminarily bend the heated blank, other means for accomplishing this may be provided, such for example as the use of the central mandrel 16 which may be projected a sufficient distance below the annular die 18 to carry the blank down into the matrix die into position to be operated upon by the forging faces of the die 18 and especially by the annular rim forming shoulder 22.

The apparatus thus provides means for quickly forging car and like wheels by a very simple and rapid operation, and the use of a simple form of dies having no complicated movement, by first bringing the blank into position to be operated upon by the opposing working faces of the main dies while confined within the matrix. The ap-

paratus, therefore, simply requires the formation of dies corresponding in shape to the finished wheel to be produced and it reduces the number of movable die parts.

What I claim is:

1. The combination with a matrix having a bottom die conforming in shape to one face of the finished wheel and a ring die conforming in shape to the rim thereof, of a reciprocating top die conforming in shape to the opposite face of the finished wheel, and means for preliminarily bending the blank within the matrix prior to the operation of said dies.

2. The combination with a matrix having a bottom die conforming in shape to one face of the finished wheel and a ring die conforming in shape to the wheel rim, of a reciprocating top die conforming in shape to the opposite face of the wheel, and a centrally located movable member projecting beyond the top die and adapted to force the blank into the matrix prior to the operation of said dies thereon.

3. The combination with a matrix having a bottom die conforming in shape to the finished wheel and a ring die conforming in shape to the rim of the wheel, of a reciprocating top die conforming to the opposite face of the finished wheel, and a removable bending block adapted to be forced downwardly to bend the blank within the matrix.

4. The combination with a matrix having a bottom die conforming in shape to the finished wheel and a ring die conforming in shape to the rim thereof, of a reciprocating top die conforming in shape to the opposite face of a wheel, a centrally located top mandrel and a removable bending block having a central opening and engaging with said mandrel, and adapted to be forced downwardly within the blank to bend the blank within the matrix die.

5. The combination with a matrix having a bottom die conforming with one face of the finished wheel and a ring die face conforming to the rim thereof, of a reciprocating top die conforming in shape to the opposite face of the finished wheel and having a central hub forming cavity, and a removable bending block adapted to be centered within said hub cavity of the top die and forced downwardly by the top die to bend the blank within the matrix.

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

JOHN M. HANSEN.

Witnesses:

ROBERT C. TOTTEN,
J. F. WILL.