J. K. GRIFFITH.

MOLD FOR CASTING CAR WHEELS.

APPLICATION FILED DEC. 31, 1908. RENEWED MAR. 1, 1910.

971,605. **Patented Oct. 4, 1910.**

Fig. 1.

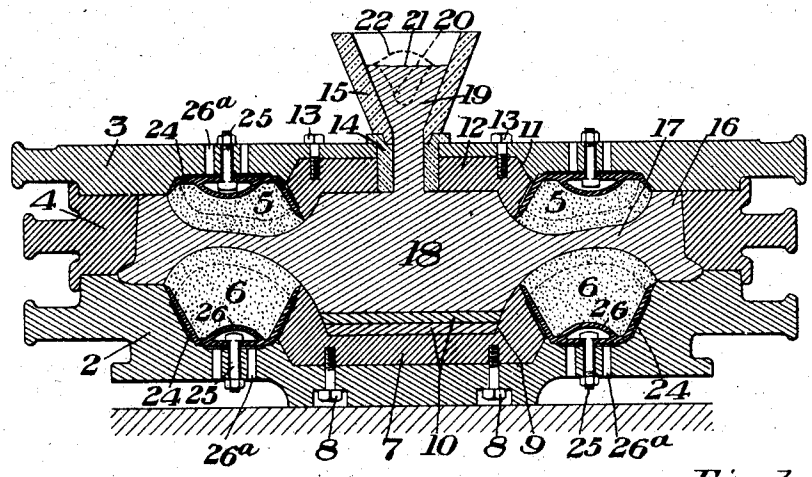


Fig. 3.

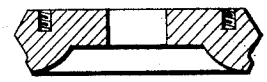
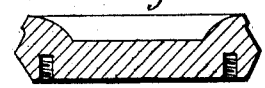
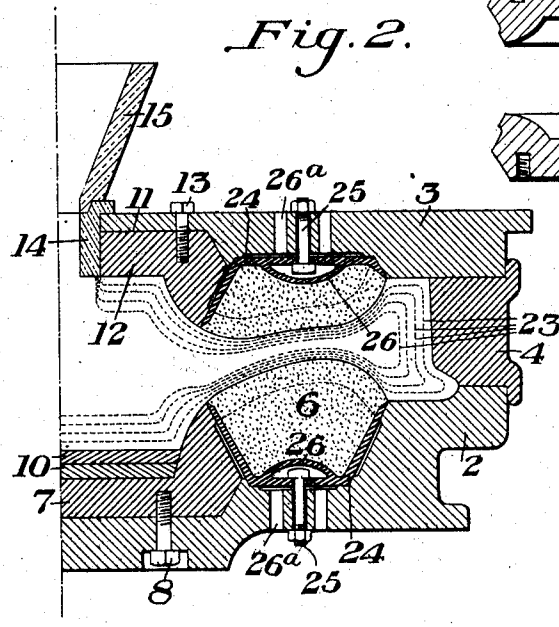


Fig. 2.

Fig. 4.





WITNESSES

R. A. Balderson

G. L. Winters

INVENTOR

J. K. Griffith

by Bakewell Byrnes & Symmes

his attys

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JACOB K. GRIFFITH, OF LATROBE, PENNSYLVANIA.

MOLD FOR CASTING CAR-WHEELS.

971,605. Specification of Letters Patent. Patented Oct. 4, 1910.

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To all whom it may concern:

Be it known that I, JACOB K. GRIFFITH, of Latrobe, in the county of Westmoreland and State of Pennsylvania, have invented a new and useful Improvement in Molds for Casting Car-Wheels, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central vertical section of one form of mold embodying my invention; and Fig. 2 is a sectional view of a portion of the mold on a larger scale. Figs. 3 and 4 are detail views showing different forms of hub chills which may be used interchangeably with those shown in Figs. 1 and 2.

My invention relates to molds for the manufacture of car wheels and the like, having a rim, hub and intermediate web or spokes, and is designed to provide means whereby wheels having hubs of different lengths and shapes can be cast in the same chill, thereby reducing the required number of chills; also to provide means whereby those portions which are injured to the greatest extent by the hot metal can be readily renewed, thereby greatly prolonging the life of a mold, and therefore, reducing the cost of manufacture.

Another object of my invention is to pour the hot metal through a refractory runner in the cope which will perform the function of a runner and a sink-head; also to provide a runner through which the metal will flow more smoothly, and that will not be washed by the flowing hot metal, thereby reducing the number of bad castings caused by sand lodging in the mold.

The precise nature of my invention will be best understood by reference to the accompanying drawings which will now be described, it being premised, however, that changes may be made in the details of construction and arrangement by those skilled in the art, without departing from my invention as shown and described.

In the drawings, the numeral 2 designates the drag, 3 the cope, and 4 the cheek-piece of the mold or flask. 5 designates the upper sand core and 6 the lower sand core between which the web portion of the wheel is formed. These sand cores are supported in suitable carriers 24, in which they are molded and dried, and which are removably seated and secured in the drag and cope. In the particular form which I have illustrated, these carriers each consist of a cup or trough-shaped annular casting. These cup-shaped castings are removably secured to the two correspondingly shaped seats in the drag and cope sections by means of bolts 25, whose headed inner ends are protected by bridges 26. The cope and drag sections are provided with vent openings 26[a] which provide for the free venting of the mold.

The drag 2 is provided with a central circular recess to receive a chill 7, secured therein by means of the bolts 8, and which lies against the inner member of the sand core carrier 24. This removable chill 7 is provided with a central concentric depression 9 of the proper shape and depth to form the inner portion of the longest hubs, and when it is desired to cast a wheel having a shorter hub, a liner or liners, preferably of iron or steel, designated by the numeral 10 are placed in the depression 9 to shorten the length of the hub.

The cope 3 of the mold is provided with a concentric depression 11, in which is suspended a chill 12, by means of the bolts 13, which is similar to the chill 7.

The chill 12 and the cope 3 are each provided with a circular concentric orifice in which it seated a fire brick runner 14, which hangs on an upper flange integral therewith, and is provided with a groove to receive the lower end of a fire-brick runner 15.

In Fig. 1 of the drawings I have shown a wheel in the mold immediately after it is poured and in which 16 is the rim, 17 the web and 18 the hub thereof. 19 is the sink head, and 20 the upper line of the sink head after the hot metal has been fed therefrom to the casting during the cooling and shrinkage thereof. The line indicated at 21 indicates the line of the hot metal immediately after pouring, and the dotted line 22 indicates the rise of the hot metal due to a slight backward compression from the rapid contraction of the rim during further cooling of the wheel, as hereinafter described. These lines 20, 21 and 22 merely indicate the approximate upper line of the sink head during the casting of the wheel.

When it is desired to cast a wheel whose hub is of the length shown in the drawings, the two liners 10 are used as shown in the drawings, or a liner whose thickness is equal to the thickness of the two liners may be employed.

After the mold or flask has been made up, the hot metal is poured into the runner 15 until the same has been filled to the line 21. The cooling and shrinkage of the outer surface of the rim and hub which contacts with the metal portion of the mold, as shown by the lines 23, of Fig. 2, and which will occupy a considerable smaller space than when in the liquid state, forces the hot metal back into the runner 15 to about the line 22, and during the cooling and shrinkage of the central part of the hub, this central part is fed from the runner 15; and when the casting is cold the top line of the runner will be approximately as shown by the line 20.

In Figs. 3 and 4, I have shown slightly modified forms of the hub chills 7^a and 11^a, which can be used interchangeably with the chills 7 and 11 of Figs. 1 and 2 to produce a different shape of hub. It will be understood that various other modified forms of these chills may also be provided. In some cases, the change in the shape of these chills may require slight modifications in the form of the sand cores.

The advantages of my invention will be apparent to those skilled in the art, since not only does it provide a mold in which the portions which are injured to the greatest extent by the hot metal can readily be replaced; but also provides a mold in which wheels having various sized hubs can be cast, either by the insertion of a liner or liners, or by replacing the central chills and sand cores in the drag or cope with others having a different shape, diameter or depth; and by the use of the brick runner projecting through the cope and through its inserted chill, I am enabled to materially reduce the cost of the setting up the flasks and the danger of washing the sand from the runner. I also reduce to a minimum the loss of heat from the sink head by radiation to the runner, thereby keeping the metal in the runner in a fluid state to feed the casting, which will avoid the piping of that portion of the sink head adjacent to the hub of the wheel. This comparatively long runner enables me to use a sufficient depth of metal in the cope to absorb the heat from the hub portion of the wheel until it is frozen, thus reducing the amount of metal necessary in the sink head; while keeping the ingoing metal away from the metal of the flask.

By the use of the removable section in the cope or drag, I can use the mold as originally made until the hub portion thereof is worn or burned away, and I can then turn out this central burned portion of the cope or drag and insert my removable chill, thereby renewing the mold. In this case the cope and drag sections would be originally made to give the desired depth of hub. Moreover, if the hot steel sticks to the removable section of either the drag or cope, I can loosen the bolts and remove the cold chill with the casting. I will then replace this section with a new similar section and bolt it in place either in the cope or in the drag as is necessary. I thus avoid the destruction of the entire mold.

After the casting has been cooled down sufficiently to allow handling it may be removed from the mold and buried in refractory non-heat conducting material to cause the heat in the web to spread to the rim and hub, both of which have been cooled with great rapidity and far in excess of the web portion. This extremely slow cooling induced by burying establishes an equilibrium so far as the heat is concerned, which renders it possible to cool the steel free from strains which otherwise would exist to a very marked degree on account of the great differences in the sections.

I claim:—

1. The combination, in a mold for casting wheels and the like, of a drag section having a seat for a hub chill, and a plurality of hub chills of different forms, with means for detachably securing them in said seat, and adapted to be used interchangeably to form different shapes or sizes of hubs; substantially as described.

2. The combination, in a mold for casting wheels and the like, of a cope section, having a seat therein for a hub chill, and a plurality of hub chills, with means for detachably securing them in said seats, and adapted to be used interchangeably to form different shapes of hubs, substantially as described.

3. A mold for casting wheels and the like, comprising a drag section, a cope section, a removable chill in each section, and a removable liner for the chill in the drag; substantially as described.

4. A mold for casting wheels and the like, comprising cope and drag sections, each of said sections having a seat at its central portion for a removable hub chill, and also a second seat for a sand core, together with hub chills and sand cores and means for removably securing them in said seats; substantially as described.

5. In a mold for casting wheels, and the like, a flask section having integral rim and body portions, the latter having a depression therein to receive a removable hub chill; substantially as described.

6. A mold for casting wheels and the like, comprising a drag section, a cope section, and an intermediate cheek or chill section, said cope and drag sections having a removable chill secured thereto and an annular sand core carrier removably seated within the drag and cope and contacting with the removable chills; substantially as described.

7. A mold for casting wheels and the like, having a metallic cope section of sufficient

thickness at the hub forming portion to properly absorb the heat from the hub until the fluid metal therein is frozen, a refractory runner projecting through this hub forming portion of the cope and protecting it from the ingoing metal, and sand surrounding the hub forming portion and within the cope to form the web of the wheel; substantially as described.

8. A mold for casting wheels and the like, comprising a drag section, a cope section, a removable chill in each section, and a refractory brick runner projecting through the cope and its removable chill; substantially as described.

9. A mold for casting wheels and the like, comprising a drag section, a cope section, a removable chill in each section, and a sectional refractory brick runner projecting through the cope and its removable chill; substantially as described.

10. A mold for casting car wheels and the like, comprising a drag section, a cope section, and a rim chill, the drag and cope sections each having hub chilling portions and a sand cavity surrounding the same, the cope section having a central refractory pouring runner, and the chilling portions of the cope and drag sections being separated from each other sufficiently to afford an opening between them of a sufficient width to maintain the interior of the hub and web of the casting fluid until the rim portion has solidified, the runner acting as a receiver for metal forced outwardly from the mold cavity by the contraction of the rim and web portions of the casting, and as a feeder for the hub portion of the casting; substantially as described.

11. A mold for casting car wheels, comprising a drag section, a cope section having an orifice therethrough, an intermediate cheek or chilled section, and a refractory runner extending through the orifice in the cope to protect the side walls of the opening said runner also acting as a receiver for metal forced outwardly from the mold cavity by the contraction of the rim and web portions of the casting, and as a feeder for the hub portion of the casting; substantially as described.

In testimony whereof, I have hereunto set my hand.

JACOB K. GRIFFITH.

Witnesses:
C. P. BYRNES,
H. M. CORWIN.