

(No Model.)

4 Sheets—Sheet 1.

E. R. ROBINSON.

CASTING COMPOSITE OR OTHER CAR WHEELS.

No. 594,286.

Patented Nov. 23, 1897.

Fig. 1.

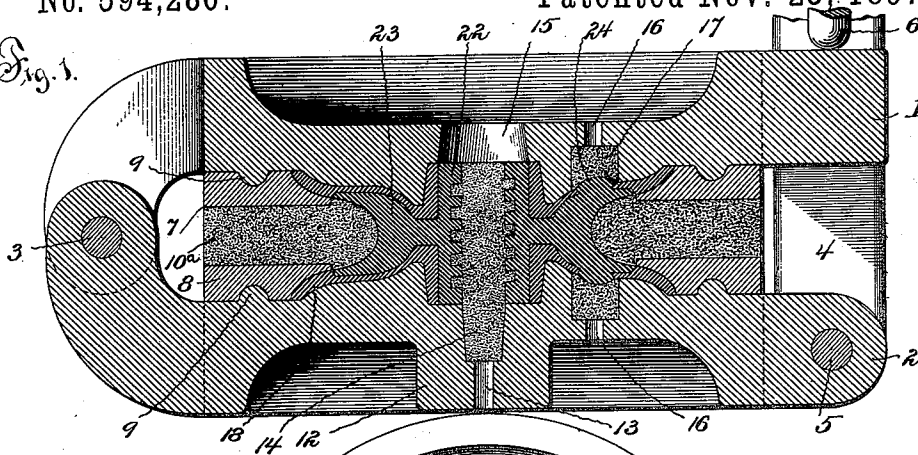


Fig. 2.

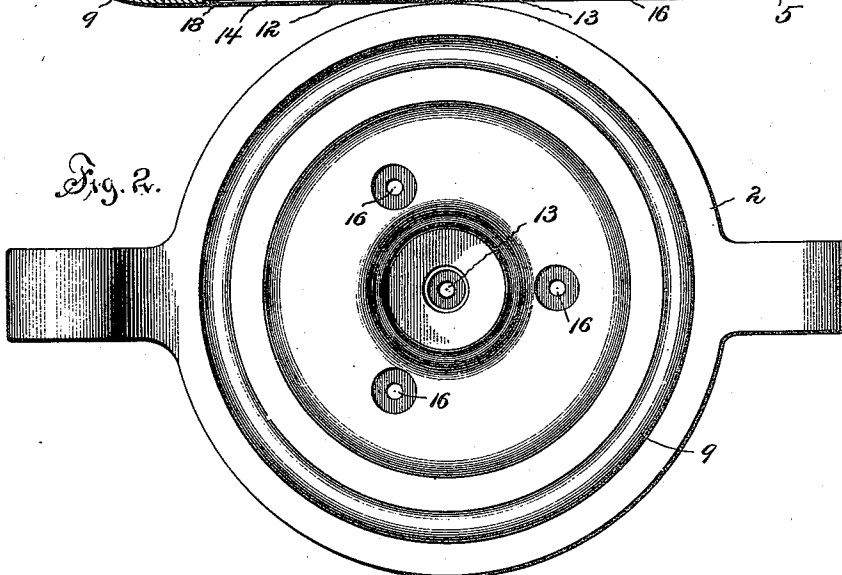
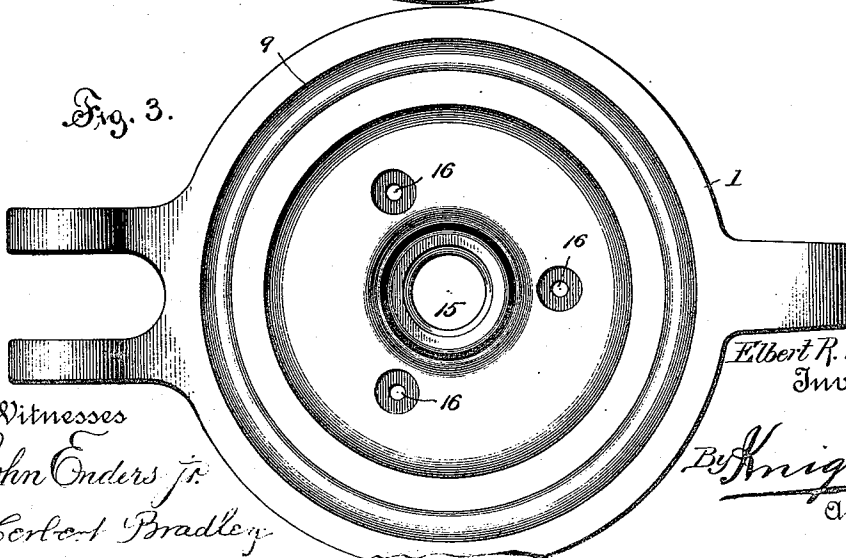


Fig. 3.



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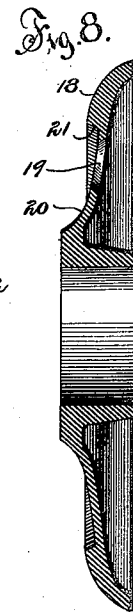
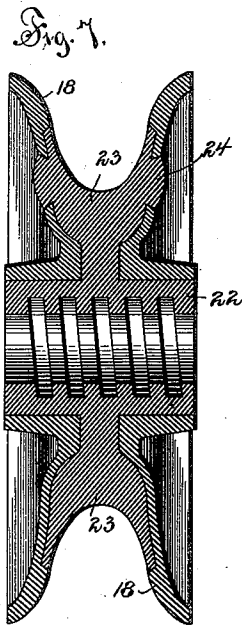
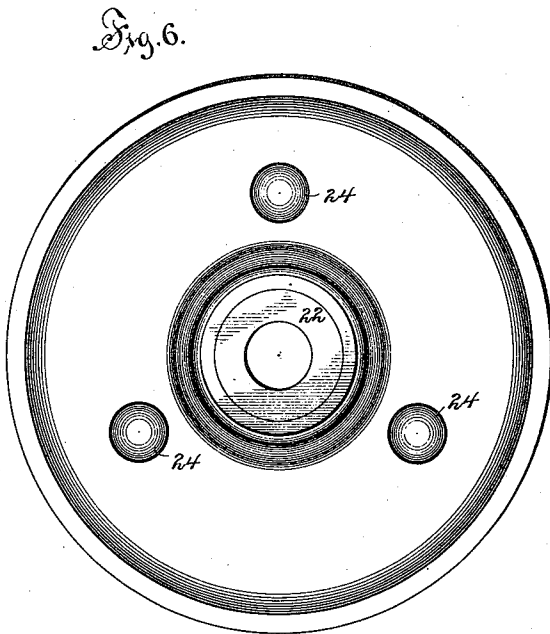
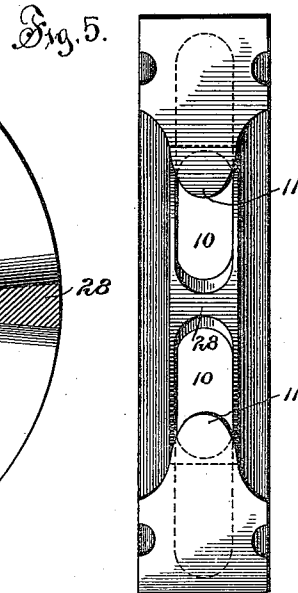
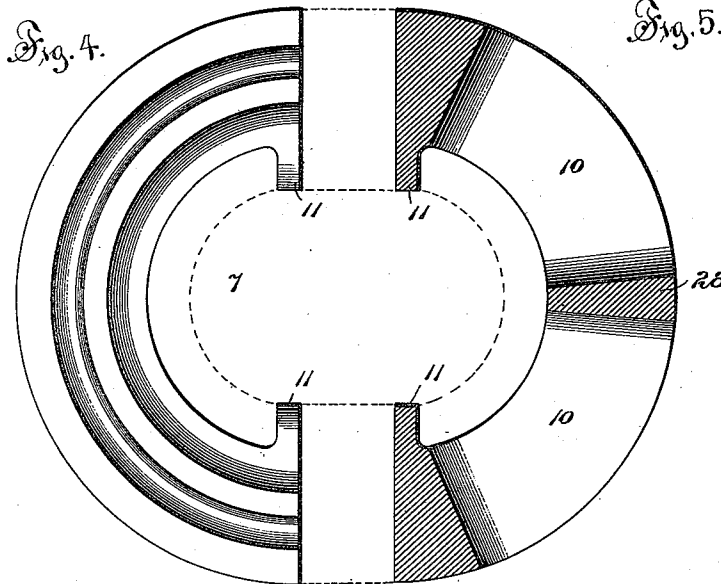
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Fig. 9.

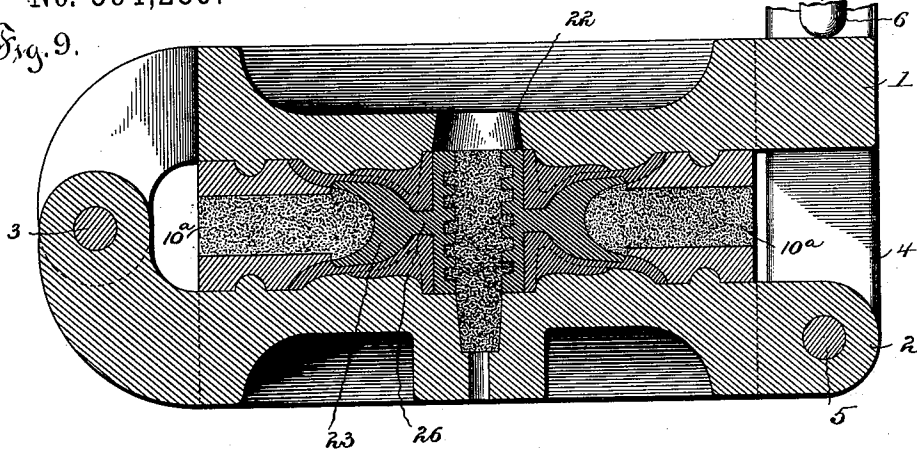


Fig. 10.

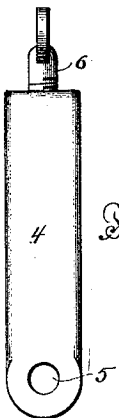
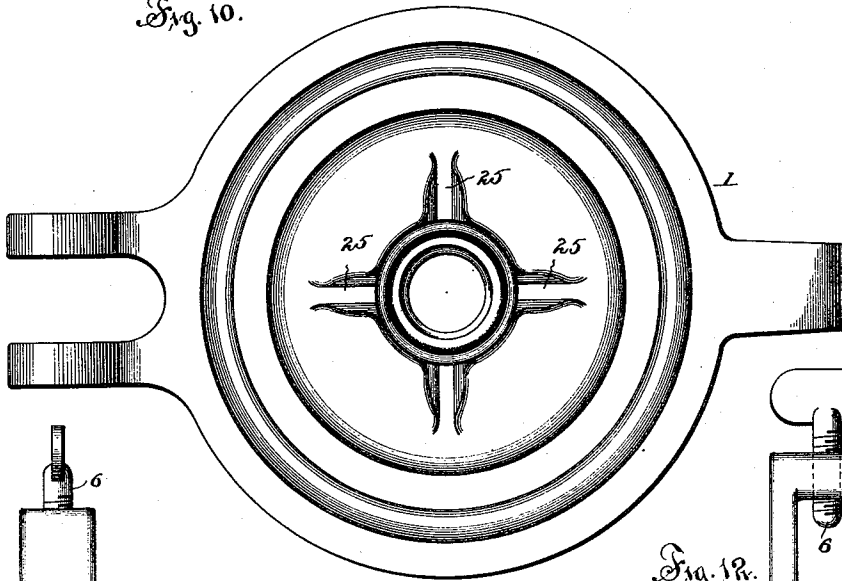
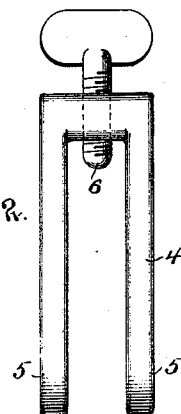


Fig. 11.

Fig. 13.



Fig. 12.



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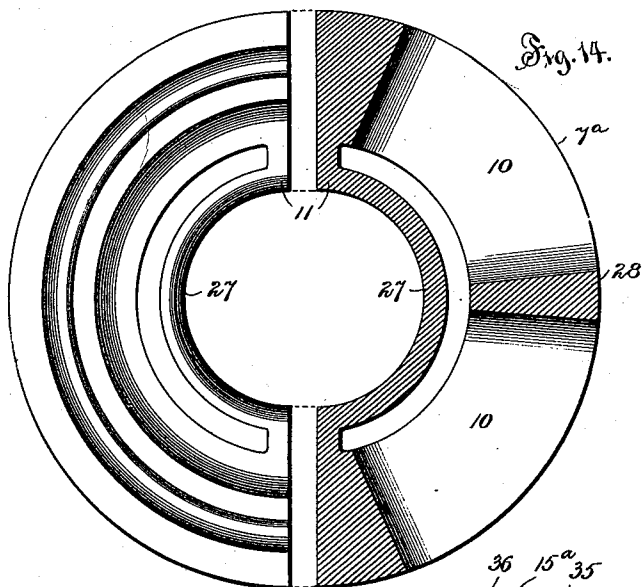


Fig. 14.

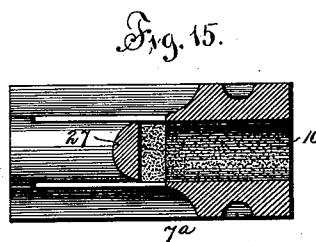


Fig. 15.

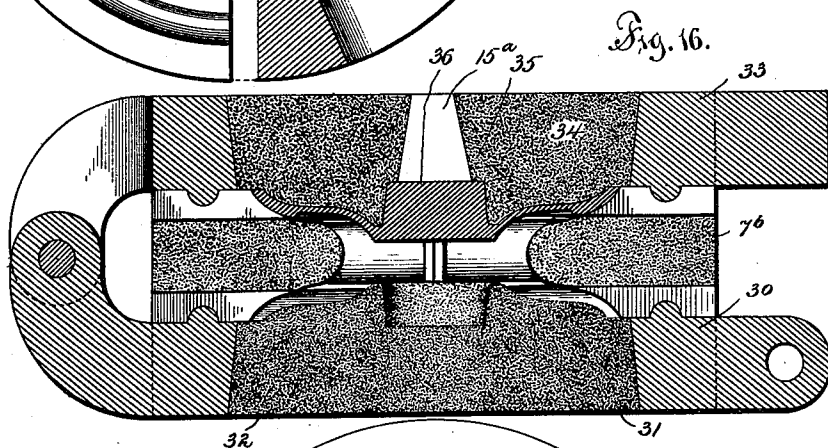


Fig. 16.

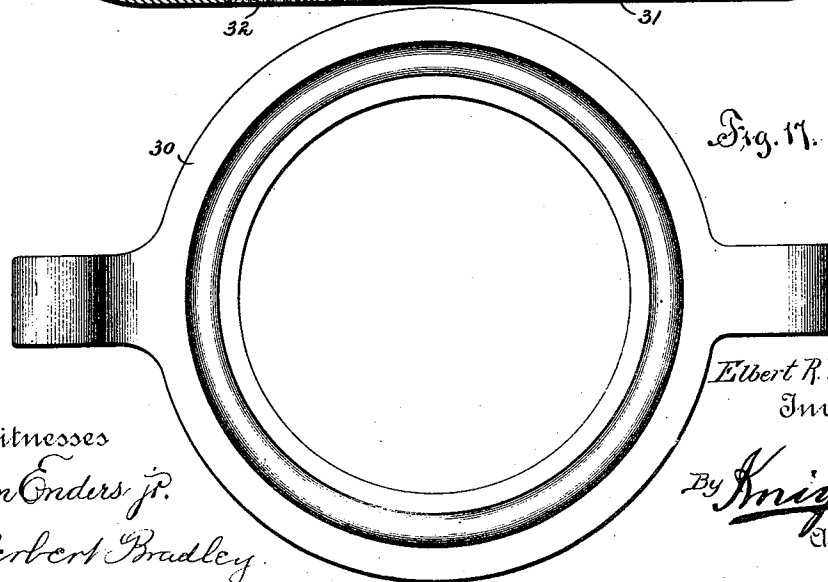


Fig. 17.

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UNITED STATES PATENT OFFICE.

ELBERT R. ROBINSON, OF CHICAGO, ILLINOIS.

CASTING COMPOSITE OR OTHER CAR-WHEELS.

SPECIFICATION forming part of Letters Patent No. 594,286, dated November 23, 1897.

Application filed February 10, 1897. Serial No. 622,818. (No model.)

To all whom it may concern:

Be it known that I, ELBERT R. ROBINSON, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Casting Composite or other Wheels, of which the following is a specification.

My invention has for its objects to provide a method and apparatus whereby wheels of various kinds may be cast in an economical and effective manner, and which method and apparatus are for the most part adapted for making composite wheels wherein the outer portions or sides are of one metal and the interior portions are of another metal cast upon the outer portions or sides, and also to casting a filling of a certain character in grooved wheels.

Heretofore it has been regarded as impracticable to make a hard metal of high conductivity lay to iron in casting wheels or to obtain satisfactory wheels by casting a filling therein.

By my improved method of procedure and with my improved form of mold I am not only able to successfully cast hard metal of high electrical conductivity, such as brass or copper, into the groove of an iron trolley-wheel, but I am enabled to produce, by casting, an entirely new construction of trolley-wheel, which consists in two outer disks or flanges and an intermediate filling or uniting portion, which enters openings or beneath projections on the disks, so as to combine them securely together, and fills in the intermediate space forming the groove and contact portions of the wheel with a web extending to the center and an integral bushing; or I am enabled to cast such a filling or intermediate portion with integral offshoots extending in radial direction to the axis and in axial directions to the ends of the hub in order to produce a wheel of the character described in the copending application, Serial No. 613,843, filed by me on November 28, 1896; or I am enabled by means of substantially the same mold, with sand taking the place of the disks and forming the top and bottom of the mold, to cast a solid wheel. Whether casting a solid wheel or a composite wheel with bushing I employ a sand core with a

spirally-arranged thread, which forms spiral grooves within the bushing, which may be packed with a graphite lubricant or other suitable lubricant.

In carrying out my invention as above outlined I employ certain novel features in the construction of the mold in addition to what has been described.

In the accompanying drawings, Figure 1 is a vertical axial section of a three-part mold illustrating that portion of my invention which relates to the manufacture of composite wheels. Figs. 2 and 3 are plans of the bottom and top of the mold. Figs. 4 and 5 illustrate by a plan, partly in section, and by an edge view the construction of one form of ring which is held between the top and bottom of the mold and which is constructed to receive a sand filling which gives shape to the groove of the wheel. Figs. 6, 7, and 8 represent by side elevation and axial section a finished composite wheel and one of the disks employed in making the same. Figs. 9 and 10 represent, respectively, a vertical axial section of a mold and one of the two similar parts of such a mold employed for casting a wheel with spokes. Figs. 11 and 12 are side and front views of the clamping link and screw employed for holding the parts of the mold together. Fig. 13 is a view of the sand core. Figs. 14 and 15 represent by plan, partly in section, and by transverse section the construction of a modified form of ring which receives a filling of sand and gives shape to the groove of the wheel. Figs. 16 and 17 represent, respectively, the method of preparing a mold for a solid wheel and one of the two similar rings employed for that purpose.

Referring to Figs. 1 to 8, 1 represents the top, and 2 the bottom, of a combined mold and flask, which parts are hinged together at 3 and secured at their free ends by means of a link 4, pivoted to one of them at 5 and carrying a screw which bears upon the other of them and through which they may be forced together with necessary pressure.

7 represents the ring, which comprises a diametrically-divided annular frame 8, recessed to receive the centering-beds 9 on the top and bottom of the mold, and having a cavity 10, in which is applied a filling of sand. As will be seen from Figs. 4 and 5, the halves

of the ring 7 are provided with lugs 11, projecting radially inward at the ends of the parts and conforming to the shape of the groove in the wheel and thereby adapted to give shape to and confine the sand filling 10*, which assumes the shape indicated by the circular dotted lines in Fig. 4.

The bottom 2 of the mold is provided with a boss 12 with a shouldered perforation 13, in which the sand core 14 for forming the axle-bearing of the wheel is inserted. The top of the mold has an opening 15, through which metal may be introduced in the act of casting.

16 represents vent-holes in the top and bottom of the mold, of which there may be any suitable number, (I have shown three—see Figs. 2 and 3,) and these vent-holes are enlarged at their inner ends and provided with fillings 17 of sand.

In setting up the mold the top and bottom are prepared by inserting their fillings 17, and the ring 7 is provided with its filling 10* of sand, as heretofore described. A disk 18, which is to form one part of the shell of the wheel, is then placed upon the bottom of the mold which is formed to receive it. The ring 7 is then put in place, after which the upper disk 18 is placed upon the ring, and the top of the mold is then closed. As will appear from Figs. 6, 7, and 8, as well as from Fig. 1, each disk 18 has a series of holes 19 in its web 20. These holes are countersunk and they serve the double purpose of permitting the escape of gases generated in casting and of admitting a portion of the molten metal within the countersunk opening to securely lock the disks and the central filling which is to be cast. The fillings 17 in the openings 16 are shaped on their inner ends so as to impart a head of suitable shape to the projection of metal which enters the openings 19. After the sand core 14 has been put in place, the mold is poured through the opening 15, and the metal enters the space between the sand core and the hub portions of the disks to form a bushing 22, and also between the two disks to form a filling 23 or central portion of the wheel, and into the openings 19 to form studs 24 to securely lock the disks to the filling 23, and therefore fixing them relatively together. The disks are preferably shouldered, as shown at 21 and as described in my application heretofore referred to.

With a mold constructed as described there is ample room for escape of the gases through the sand fillings, and the mold is practically a ventilated mold. I have found in practice that perfect castings may be obtained by a mold constructed in this way, and such a mold may be repeatedly used and wheels of any kind turned out therefrom which require little or no finishing. Obviously the sand core 14 is replaced for each new casting, but the remaining portions of the mold may be utilized a number of times.

I do not herein claim the construction of a wheel formed by the mold just described, as

the same constitutes a part of the subject-matter of an application filed on even date herewith, Serial No. 622,819.

If it should be desired to construct a wheel which has spokes or which has a web with radial fins or strengthening-flanges, these may be added to the two disks which are to be united by the metal cast between said disks, or if the whole wheel is cast at once these fins or ribs may be formed with the rest, and in either case the top and bottom of the mold is altered, as indicated in Figs. 9 and 10, wherein said top and bottom are provided with spoke-grooves 25. This adapts said top and bottom to receive the disks formed with these projections or to impart this shape to a solid wheel cast in the mold. As illustrated in this mold, the vent-openings through the wheel may be omitted and sufficient ventilation obtained through the sand in the ring and through the core. The form of wheel illustrated as being made in the mold shown in Fig. 9 differs from that illustrated by Fig. 1 in that the two disks are originally joined together, and the connection between the filling 23 and bushing 22 consists in radial offshoots 26, formed at intervals in the circumference of the hub, which feature is described in my application, Serial No. 613,843, before referred to. While I have illustrated one form of spoke or radial strengthening-flange, it will be obvious that the same character of mold with spoke-grooves suitably shaped may be employed for casting wheels with any form of spokes.

Referring to Figs. 14 and 15, 7* represents a modified form of ring wherein a continuous face 27 extends from the lugs 11 and provides the groove-forming surface of the ring, the cavity 10 being left in the ring back of this face to receive the sand and permit the escape of the gases, as heretofore described. In both forms of rings 7 and 7* I prefer to employ bridges 28 to divide the cavity 10 and strengthen the ring.

The manner of casting a solid wheel is illustrated in Figs. 16 and 17, according to which I employ a bottom 30, having an opening 31, in which is placed a filling 32 of sand, and a similar open top 33, having an opening 34, in which is also formed a filling 35 of sand. To get these top and bottom fillings of sand, the open top and bottom of the mold are closed together upon a ring 7*, which may be constructed as shown in Fig. 4 or Fig. 14 and with a sand filling. Upon the upper and lower sides of this ring are placed wooden or other pattern-disks 36. I may employ a disk such as shown in Fig. 8. Upon the outside of each of these disks the sand fillings 32 and 35 are then formed and allowed to harden. The mold is then opened and the disks 36 removed, when the top and bottom will have been given the shape shown by the bottom filling 32 in Fig. 16. The top filling is shown in the course of being made. After the mold is thus prepared the usual sand core 14 is in-

serted and the metal is poured through the opening 15^a in the top filling, as heretofore described with reference to Figs. 2 and 9. When the mold is opened, the casting may be shaken out without necessarily destroying the mold.

With all the forms of my invention it is an easy matter to cast wheels in substantially finished condition and with great rapidity, whether they be solid wheels or composite wheels of the different forms described.

While I have herein shown and described but a single mold, it is obvious that the same principles of construction may be employed in connection with groups of molds of which the tops and bottoms are secured together and in such manner that such molds may be operated simultaneously and a number of wheels cast at once with little or no more expense in time and labor than that which is incident to casting a single wheel.

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

1. The combination of the top and bottom mold-sections for holding the grooved wheel, the grooved wheel, and the metallic ring-sections fitted to the groove of the wheel but leaving a space within said ring-sections to receive a filling to be cast therein, substantially as shown and described.

2. The combination of the upper and lower disks or flanges, top and bottom mold-sections fitted to said disks or flanges for holding them in place, and metallic ring-sections fitted to the groove formed by the inner faces of said disks or flanges but leaving a space within said ring-sections to receive a filling to be cast therein, substantially as shown and described.

3. The combination of the top and bottom mold-sections hinged together and provided with a fastening means at their free ends, centering means provided on the inner faces of said mold-sections, the grooved pulley adapted to be centrally held by said centering means and the ring-sections fitted to the groove of the wheel, substantially as shown and described.

4. The combination of upper and lower disks or flanges, top and bottom mold-sections fitted to said disks or flanges for holding them in place, and metallic ring-sections fitted to the groove formed by the inner faces of said disks or flanges having a sand filling but leaving a space within said ring-sections to receive a filling to be cast therein, substantially as shown and described.

5. The combination of upper and lower disks or flanges, provided with an axial bore, top and bottom mold-sections fitted to said disks or flanges for holding them in place, metallic ring-sections fitted between said disks or flanges and leaving a space within said ring-sections, and a sand core fitted in the axial bore in the disks whereby a bushing is formed integral with the filling cast between the ring-sections and disks or flanges, substantially as shown and described.

6. The combination of upper and lower disks or flanges provided with the shoulders, top and bottom mold-sections fitted to said disks or flanges for holding them in place, and the metallic ring-sections fitting between said disks or flanges and having their inner periphery extending to the shoulders on the disk, and having a sand filling which projects beyond the shoulders but leaving a space between it and the disks to receive a filling to be cast therein, substantially as shown and described.

7. In combination with a mold for casting grooved wheels, a metal ring for forming the grooved periphery of said wheel, and having a radial cavity intermediate its faces to receive a filling of sand, for substantially the purpose set forth.

8. In combination with a mold for casting grooved wheels, a metal ring for forming the grooved periphery of said wheel, provided with a radial cavity intermediate its faces and the retaining-lugs projecting radially at the ends of the said cavity, substantially as herein explained.

9. In a mold for casting composite grooved wheels, the metal ring constructed to fit between the top and bottom of the mold, and disks forming the sides of the wheel, fitted to said ring and spaced apart by the ring to receive the metal filling between them; substantially as herein described.

10. The combination in a mold for casting grooved wheels, of the upper and lower mold-sections, the upper and lower disks for forming the sides of the wheel, and the metallic ring-sections fitted between said disks and having a filling of sand conforming to the shape of the groove of the wheel, but leaving a space within the sections to receive a filling to be cast therein, substantially as shown and described.

ELBERT R. ROBINSON.

Witnesses:

HUGH M. STERLING,
H. S. KNIGHT.

4
It is hereby certified that in Letters Patent No. 594,286, granted November 23, 1897, upon the application of Elbert R. Robinson, of Chicago, Illinois, the title of the invention was erroneously written and printed "Casting Composite or Other Car-Wheels," whereas the said title should have been written and printed *Casting Composite or other Wheels*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 30th day of November, A. D., 1897.

[SEAL.]

WEBSTER DAVIS,
Assistant Secretary of the Interior

Countersigned:

A. P. GREELEY,
Acting Commissioner of Patents.