B. L. SMITH.

APPARATUS FOR CASTING HOLLOW ONE PIECE SPOKE WHEELS.

APPLICATION FILED MAY 15, 1917.

1,328,852.

Patented Jan. 27, 1920.

2 SHEETS—SHEET 1.

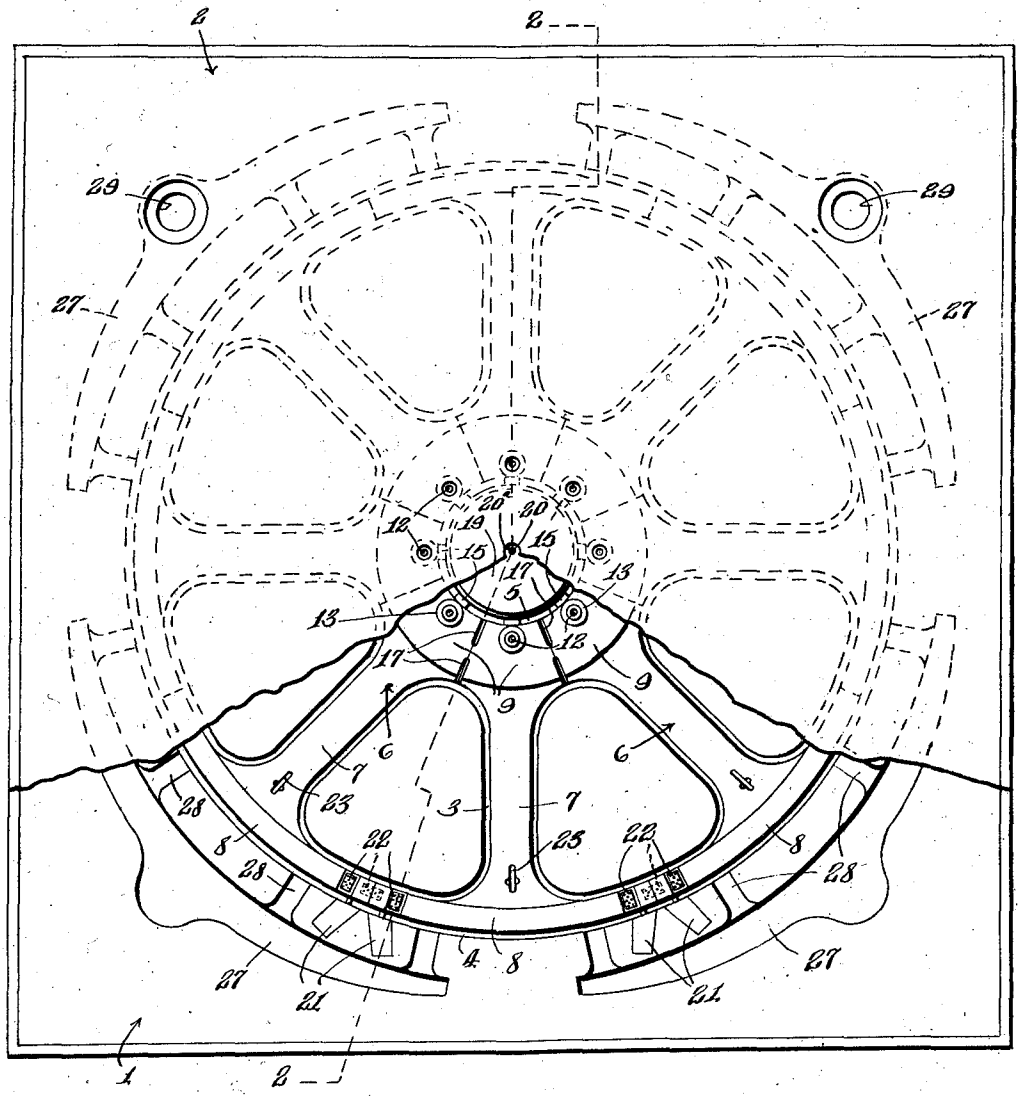

Fig. 1.

INVENTOR

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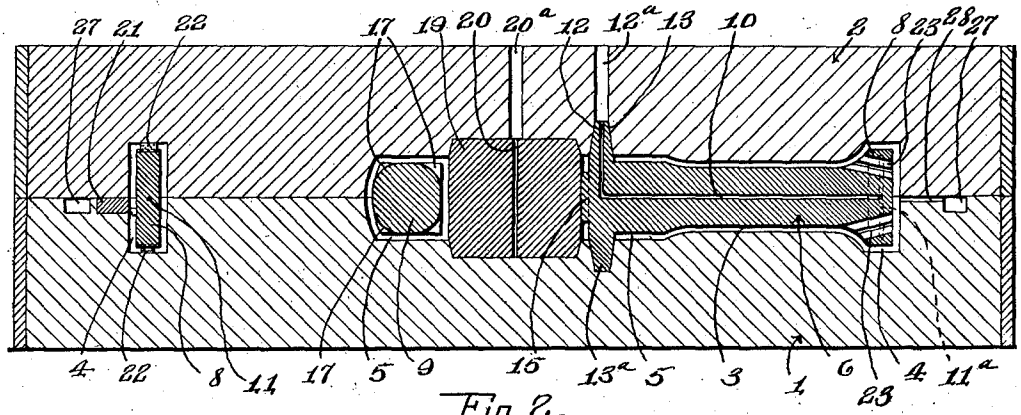

Fig-2-

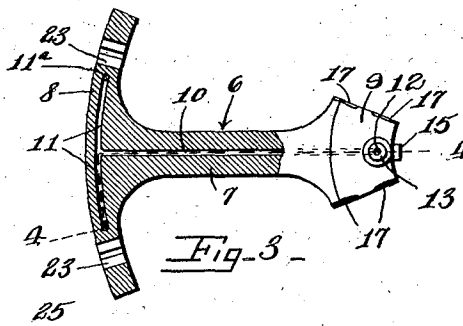

Fig-3-

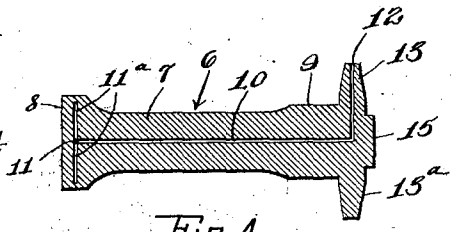

Fig-4-

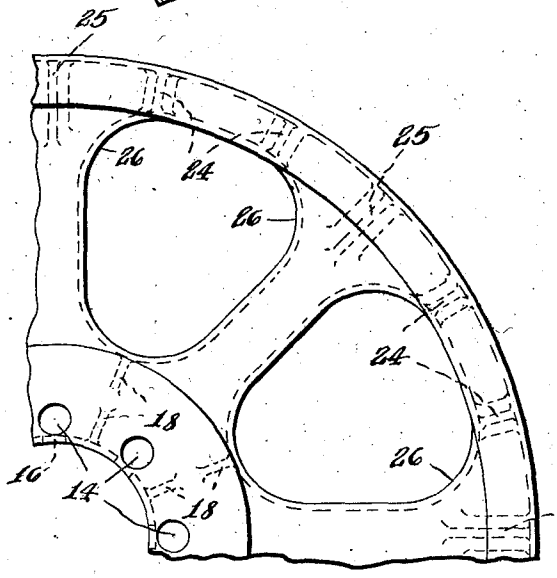

Fig-5-

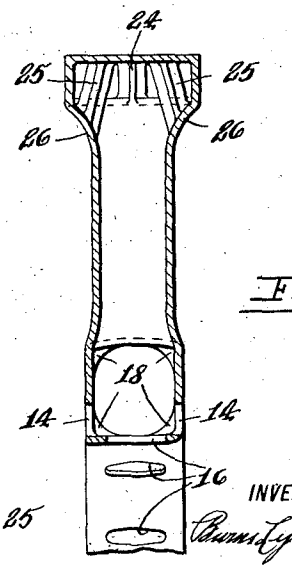

Fig-6-

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UNITED STATES PATENT OFFICE.

BURNS LYMAN SMITH, OF SYRACUSE, NEW YORK.

APPARATUS FOR CASTING HOLLOW ONE-PIECE SPOKE-WHEELS.

1,328,852. Specification of Letters Patent. Patented Jan. 27, 1920.

Application filed May 15, 1917. Serial No. 168,673.

To all whom it may concern:

Be it known that I, BURNS LYMAN SMITH, a citizen of the United States, and a resident of Syracuse, in the county of Onondaga and State of New York, have invented a certain new and useful Apparatus for Casting Hollow One-Piece Spoke-Wheels, of which the following is a specification.

This invention has for its object an apparatus for casting hollow one piece spoke wheels, in which apparatus the cores are readily placed in position and accurately supported, and from which the gases generated during the pouring are taken off in a particularly simple and efficient manner. Other objects will appear throughout the specification. The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a plan view, partly broken away, of a mold embodying my invention.

Fig. 2 is a transverse sectional view on line 2—2, Fig. 1.

Fig. 3 is a plan view partly in section, of one of the cores.

Fig. 4 is a sectional view on line 4—4, Fig. 3.

Figs. 5 and 6 are respectively, a fragmentary elevation, and a radial sectional view of the wheel.

This process of molding hollow, one piece, spoke wheels comprises pouring the metal into the mold at a plurality of points around the periphery of the mold cavity, so that the metal flows from the periphery toward the axis, and permitting the escape of gas near the center.

1 and 2 represent the lower and upper sections of the mold or the drag and the cope. The mold cavity in each section includes radial portions, a circumferential portion, and a hub portion. Each core consists of a spoke member, a rim section, and a hub section located respectively in the radial, circumferential and hub portions of the mold cavity and held spaced apart from the walls of the mold cavity in order to provide the space for receiving the molten metal.

3 designates the radial portions, 4 the circumferential portion, and 5, the hub portion of the mold cavity.

6 are the cores, each of which consists of a spoke member 7 arranged in a complemental radial portion 3 of the mold cavity.

8 is the rim section, and 9 is the hub section arranged in the circumferential portion 4, and the hub portion 5 of the mold cavity.

Each core 6 is formed with a main passage 10 extending lengthwise of its spoke member 7, branch passage 11 extending lengthwise of the rim section and intersecting the main passage, branches 11^a at the ends of the passage 11, and with an outlet vent 12 which extends through an upwardly extending lateral projection 13 at the inner end of the hub section. Said projection 13 extends into a complemental cavity in the cope 2 and the vent 12 thereof is alined with a passage 12^a which opens through the top of the cope 2 so that the gas vents 12 communicate at their outer ends with the outer air.

Each hub section is also formed with a similar projection 13^a on the lower side thereof which is unprovided with a gas vent and which extends into a complemental opening or socket in the drag. The projections 13, 13^a position the core 6 and hold it, especially its inner end, in position in the mold cavity. The projections 13, 13^a form openings 14 in the end walls of the hub of the wheel.

The hub sections 9 are also formed with radial projections 15 on their inner ends for forming holes 16 in the inner annular wall of the hub of the wheel.

The side faces of the hub sections 9 are arranged in planes radial with the end faces of the rim sections 8 and are formed with marginal depressions 17 which form radially extending internal webs 18 in the hub of the wheel between the holes 14 and 16.

19 is a central core for forming the axial opening of the hub of the wheel, the periphery of the core 19 engaging the ends of said projections 15, and being spaced apart from the inner end surfaces of the hub sections 5 around the projections 15. The core 19 is held centered by said projections 15. Said core 19 is also formed with central or axial gas passage 20 which communicates with a passage 20^a through the cope 2. The end portions of the central core 19 are beveled

and fit complemental recesses in the drag and cope.

The cores 6 are held accurately in position by the projections 15 shouldering against the core 19, by the projections 13, 13ª and by additional supports 21 embedded in the sand of the lower mold section or drag 1, on the outside of the circumferential cavity portion 4, said supports having means extending into the rim section of the cores 6 near the ends of said sections. The cores 6 at the rim sections thereof are held spaced from the bottom and top of the mold cavity by supports or perforated chaplets 22 which are fused by the molten metal. The rim sections of the cores 6 also have transverse or radial openings 23 for the metal for forming webs 24 between the spokes of the finished wheel and also webs 25 extending into the widening ends 26 of the hollow spokes of the finished wheel.

The mold and usually the drag 1 is formed with a runner or runners 27 extending circumferentially around the mold cavity and separated therefrom by a wall, and connected thereto at intervals by inwardly or radially extending ducts or gates 28 leading from the runner or runners and opening at intervals into the circumferential portion of the mold cavity which forms the peripheral wall of the hollow rim of the wheel, and also with the intake ports or sprue holes 29 at intervals as at the four corners of the mold, through which the molten metal is poured, these ports 29 communicating with the runners 27. As here shown, there are four runners 27 each of which is practically a quadrant. Said runners 27 are usually provided only in the drag and are deeper than the ducts 28.

In operation, when the metal is poured it flows into the mold cavity from a plurality of points around the outside of the cavity and flows toward the center of the mold around the cores 6. The gas generated in the cores 6 passes through the branch passages 11ª, 11, main passage 10, from the outer end of the cores 6 toward the inner ends of the cores, that is, toward the center of the wheel, as the metal is flowing from the outer or circumferential portion of the mold cavity toward the center along the spoke passages, the gas escaping through the vents 12, 12ª, and also through the central hole 20 of the core 19 and passage 20ª in the cope. During the pouring operation, the cores 6 are accurately held by the core 19 abutting against the projections 15, by the projections 13, 13ª, and by the supports 21.

By my process and apparatus, a one piece cast wheel is produced in which the periphery of the hollow rim is imperforate as the gas is taken off at the center of the mold, and no gas vents on or near the periphery are required, and the location of the gas vents at the center of the mold does not weaken the wheel structure.

Furthermore, loss due to defective castings and castings in which the walls are uneven due to shifting of the cores, is reduced to a minimum.

What I claim is:

1. A casting apparatus for casting hollow one piece spoke wheels, comprising complemental sections inclosing a mold cavity, cores supported in the cavity, each core comprising a spoke member, a hub section and rim section, each core having an internal passage extending lengthwise of the spoke member and into the hub section, and also a closed passage extending lengthwise of the rim section, and intersecting the former passage, and an outlet vent communicating at its inner end with the first mentioned passage and at its outer end with the outer air, substantially as and for the purpose described.

2. A casting apparatus for casting hollow one piece spoke wheels, comprising complemental sections inclosing a mold cavity, cores supported in the cavity, each core comprising a spoke member, a hub section and a rim section, the hub section being formed with a lateral projection extending in the wall of one of the complemental sections, and each core having an internal passage extending lengthwise of the spoke member and into the hub section, a passage extending lengthwise of the rim section and intersecting the former passage, and an outlet vent extending lengthwise of said projection and opening through the end thereof and communicating at its inner end with the first mentioned passage, and at its outer ends with the outer air, substantially as and for the purpose specified.

3. A casting apparatus for casting hollow one piece wheels, comprising opposing sections inclosing a mold cavity, and cores supported in the cavity, each core comprising a spoke member and a hub section, each hub section having a lateral projection engaging the opposing wall of the mold cavity, substantially as and for the purpose set forth.

4. A casting apparatus for hollow one piece spoke wheels comprising complemental sections inclosing a mold cavity, cores supported in the cavity and including a plurality of sections, each including a spoke member and a hub section, the hub section being provided with a radial projection at its inner end, and a core for the axial opening located in the central cavity inclosed by the inner ends of the hub sections, the periphery of the latter core abutting against said projections, and being spaced apart from the inner faces of the hub sections around the projections, substantially as and for the purpose set forth.

5. A casting apparatus for hollow one

piece spoke wheels, comprising opposing complemental sections inclosing a mold cavity, cores supported in the cavity and including a plurality of sections, each including a spoke member, a sectional rim member and a sectional hub member, the hub members being provided with radial projections at their inner ends, a core for the axial opening located in the central cavity inclosed by the inner ends of the hub sections, the periphery of said core abutting against said projections, and being spaced apart from the inner faces of the hub sections of the first mentioned cores around the projections, and means coacting with the rim sections of the first mentioned cores for supporting the same in the mold cavity, substantially as and for the purpose described.

6. A casting apparatus for hollow one piece spoke wheels comprising opposing complemental sections inclosing a mold cavity, cores supported in the cavity, each core including a spoke member, a sectional rim member and a sectional hub member, and means in the mold cavity coacting with each core at the ends thereof for supporting the same in the mold cavity spaced apart from the top and bottom of the mold cavity, substantially as and for the purpose specified.

7. A casting apparatus for casting one piece hollow wheels comprising opposing sections inclosing the mold cavity, cores supported in the cavity and including a plurality of sections, each including a spoke member and a sectional hub member, each hub member being formed with a radial projection at its inner end and with a lateral projection engaging at its end one of the opposing sections and a central core located in the central cavity inclosed by the inner ends of the hub sections, the periphery of the central core abutting against said radial projections, substantially as and for the purpose set forth.

8. A casting apparatus for one piece hollow wheels comprising opposing sections inclosing a mold cavity, cores supported in the cavity and including a plurality of sections, each including a spoke member, and a sectional hub member, the hub member being formed with a radial projection at its inner end and with lateral projections extending in opposite directions therefrom and engaging said opposing sections, and a central core located in the central cavity inclosed by the inner ends of the hub members, the periphery of the central core abutting against said radial projections, substantially as and for the purpose described.

9. A casting apparatus for casting one piece hollow wheels comprising opposing sections inclosing a mold cavity, cores supported in the cavity and including a plurality of sections, each including a spoke member, a sectional rim member and a sectional hub member, the hub member being formed with a radial projection at its inner end and with lateral projections on opposite sides thereof coacting with the opposing mold sections to support the core, a central core located in the central cavity inclosed by the inner ends of the hub members, the periphery of the central core abutting against said radial projections, and means for supporting each of the first-mentioned cores at the rim section thereof, substantially as and for the purpose specified.

10. A mold for casting one piece hollow spoke wheels comprising upper and lower sections inclosing a mold cavity, cores located in the mold cavity, each including a spoke member, a rim section and a hub section, the mold being formed with runners separated from the mold cavity by a wall, ducts leading from said runners at intervals into the annular space of the mold cavity, and a plurality of feed openings communicating at intervals with said runners, substantially as and for the purpose set forth.

In testimony whereof I have hereunto signed my name, at Syracuse, in the county of Onondaga and State of New York, this 3rd day of May, 1917.

BURNS LYMAN SMITH.