

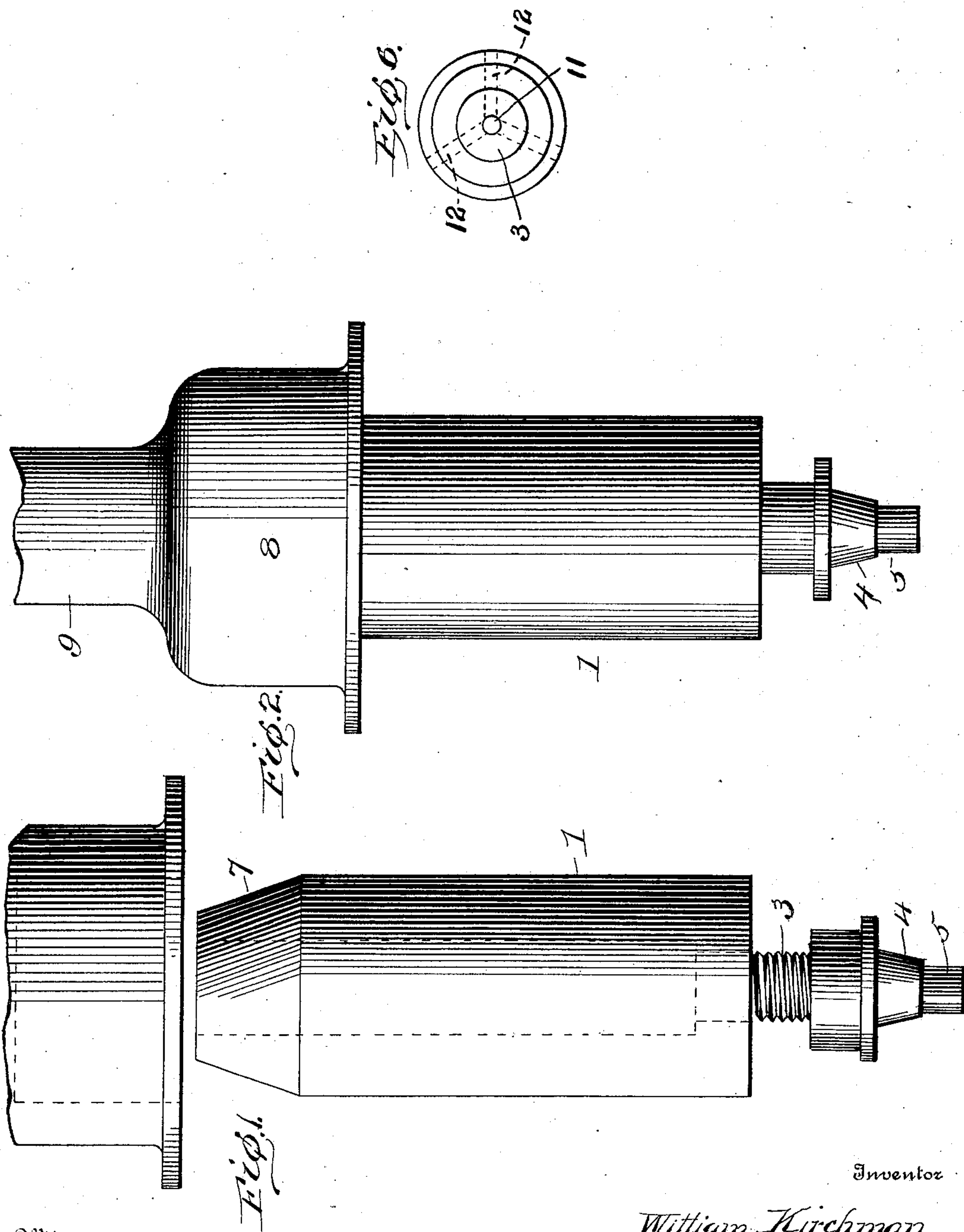
No. 755,013.

PATENTED MAR. 22, 1904.

W. KIRCHMAN.  
WHEEL CONSTRUCTION.  
APPLICATION FILED SEPT. 16, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



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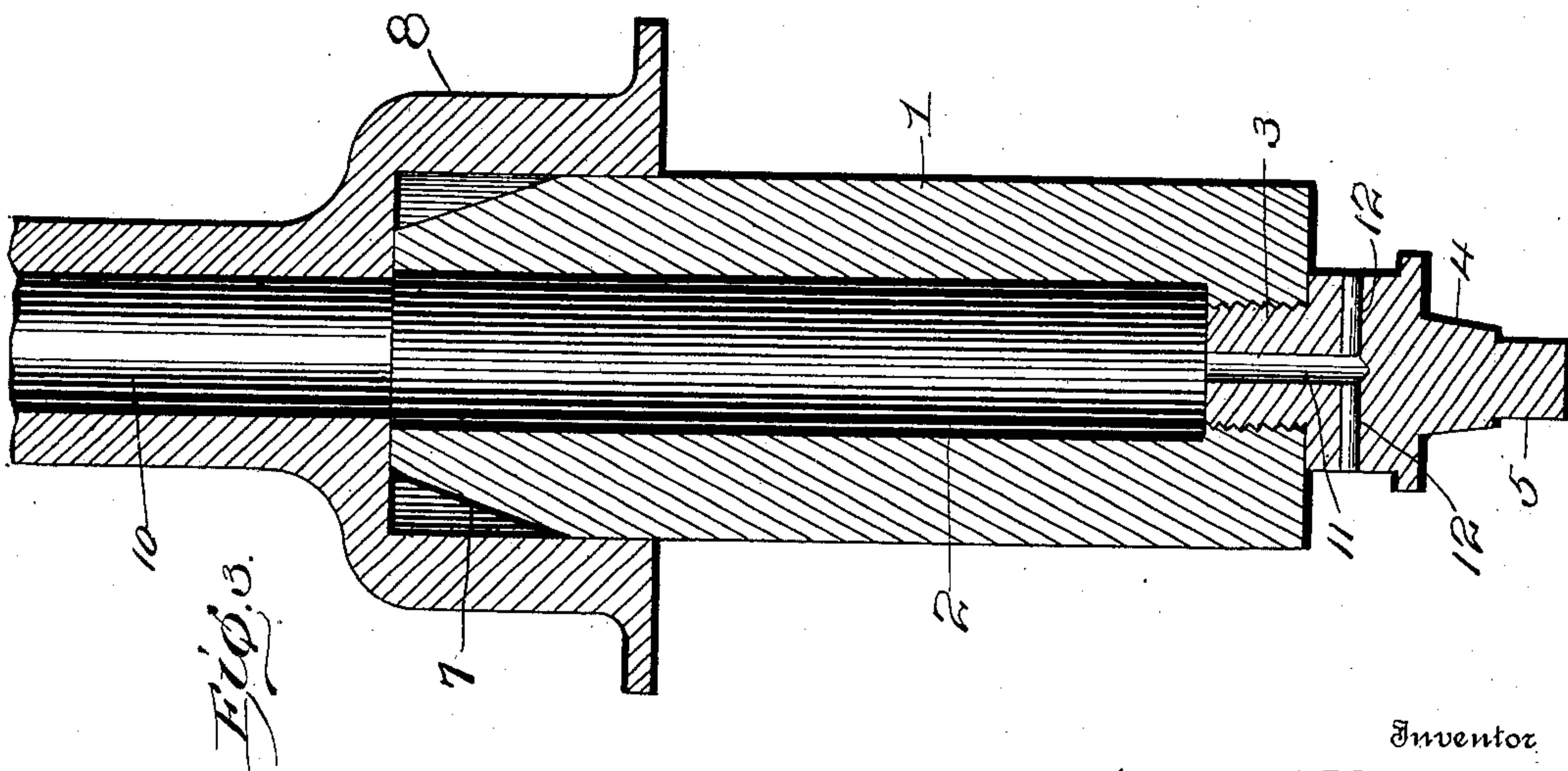
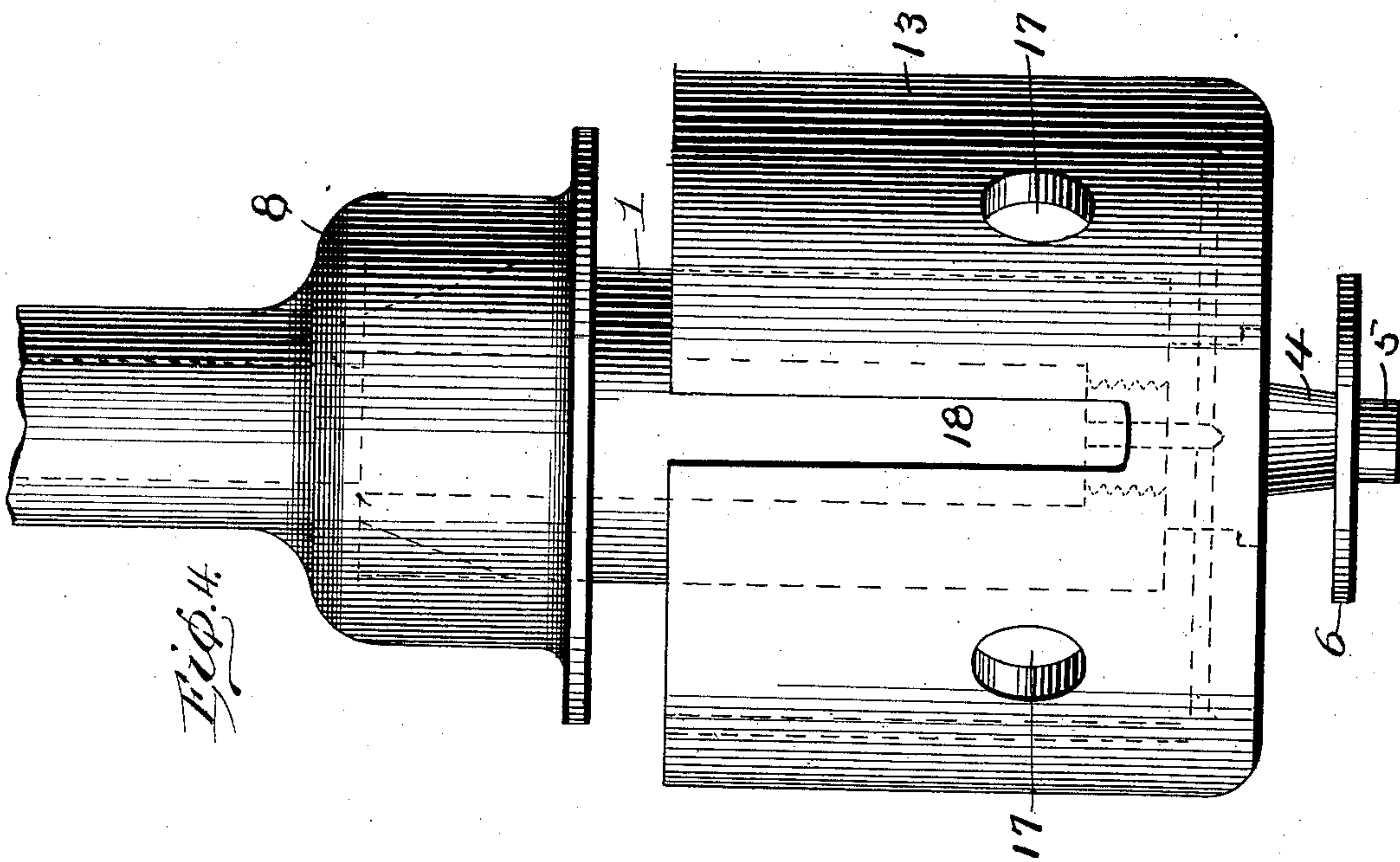
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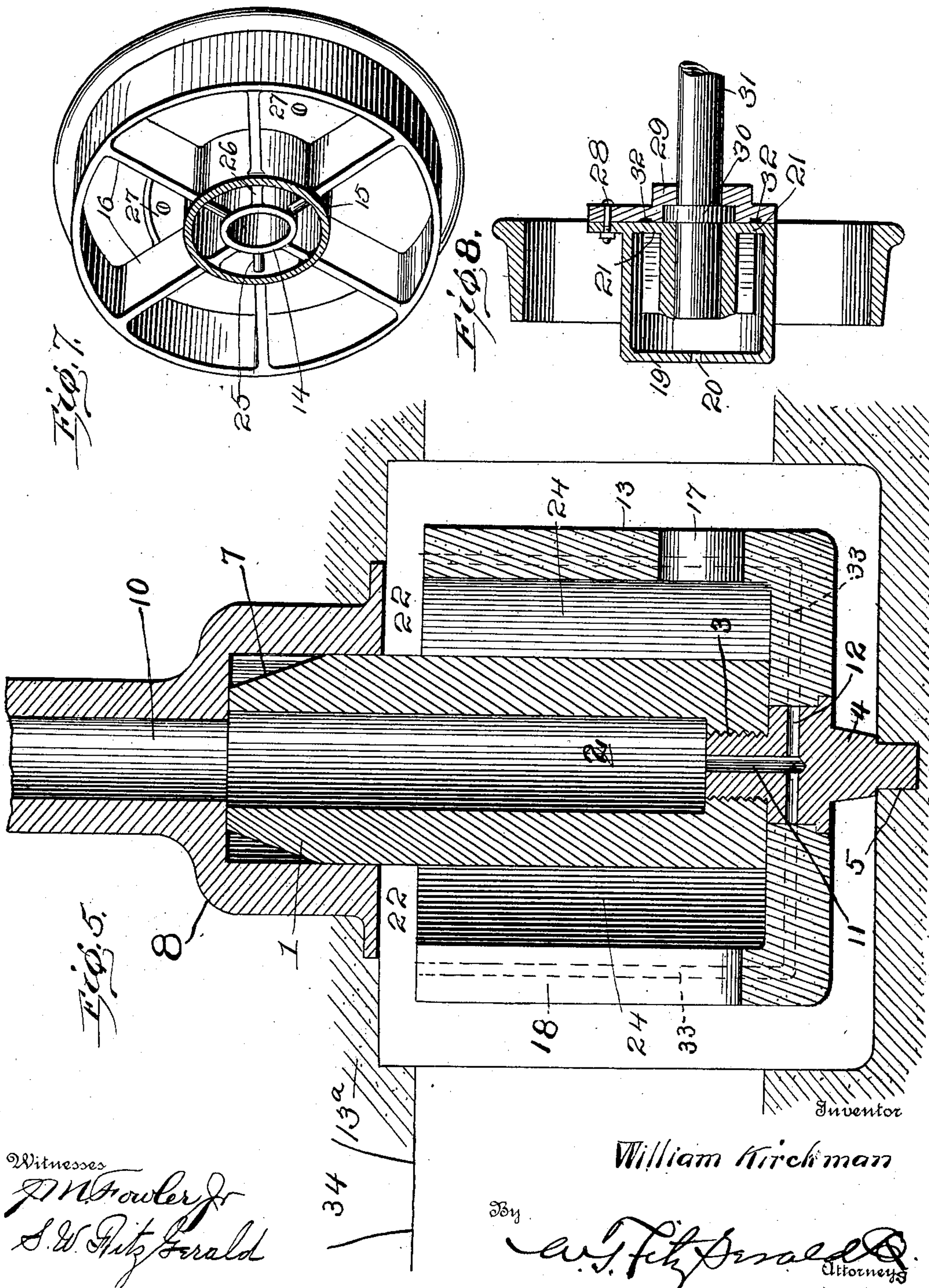
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# UNITED STATES PATENT OFFICE.

WILLIAM KIRCHMAN, OF CENTERVILLE, IOWA.

## WHEEL CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 755,013, dated March 22, 1904.

Application filed September 16, 1903. Serial No. 173,436. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM KIRCHMAN, a citizen of the United States, residing at Centerville, in the county of Appanoose and State of Iowa, have invented certain new and useful Improvements in Wheel Construction; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the construction of wheels for railway uses and other purposes and the preferred form whereof will be hereinafter fully set forth, and pointed out in the claims.

The object of my invention is to provide means for constructing a hardened-steel bearing-center for the wheel and an oil-chamber disposed around said center and comprising means to supply the bearing parts with the requisite quantity of lubrication.

A further object of my invention is to provide means for casting the entire wheel and its center or hub and its accompanying oil-chamber at one operation.

Other objects and advantages will be hereinafter made clearly apparent, reference being had to the accompanying drawings, which are made a part of this application, and in which—

Figure 1 is an elevation showing the middle portion of my core-box ready for use. Fig. 2 is a similar view of the parts shown in Fig. 1 disposed in an assembled position. Fig. 3 is a longitudinal central section of the parts shown in Fig. 2. Fig. 4 is an elevation thereof with a part of the sand core in position relative thereto. Fig. 5 is a longitudinal central section showing a complete core for forming the oil-chamber of the wheel and a section of the spokes and ribs which connect the oil-chamber with the next contiguous hub-section of the wheel. Fig. 6 is an end view of the anchoring-plug removed from the core-box. Fig. 7 is a perspective view of the wheel in its completed state, showing a portion of the oil-chamber cut away, while Fig. 8 is a central vertical section of the wheel mounted upon its axle and showing means to retain the wheel thereon.

The elements of my invention and coöperating accessories will for convenience be designated by numerals, the same numeral applying to a similar part throughout the several views.

Referring to the numerals on the drawings, 1 designates the central part or member employed by me in my improved core, and said member 1 is of proper diameter to form a suitable bore in the hub of the wheel adapted to receive the end of the axle and rotate thereon. The member 1 is provided with a bore 2, which is concentrically formed relative to the periphery. One end of the bore 2 is provided with a threaded seat adapted to receive the threaded end 3 of the anchoring-plug 4, the said plug being provided with the terminal 5 of reduced size and designed to serve as a centering-point in order that said terminal may enter an aperture in the plate 6, and thereby insure that the core member 1 will be properly located in the sand-box. The upper or opposite end of the member 1 is preferably slightly tapered, as more clearly indicated by the numeral 7 in Fig. 1, in order that said end may be guided into the open end of the guiding member 8, which is bell-shaped at its lower end and provided with the upwardly-extending tubular stem 9, communicating concentrically with the interior of the bell-shaped member 8, and it therefore follows that when the tapered upper end of the member 1 is received by the bell-like member 8 the bore 2 of said core member will communicate or register with the bore 10 of the tubular extension 9 for a purpose hereinafter clearly set forth.

By reference to Fig. 3 it will be observed that the closure-plug 4 is provided with a centrally-disposed longitudinal duct 11 and with radiating bores or ducts 12, which intersect or communicate with the lower end of the main duct 11, the office subserved by said ducts being to provide a vent for escaping gases created within the sand core 13, which surrounds the member 1 and direct the same upward through the registering bores 2 and 10 and incidentally heat the core member 1 to a proper degree to result in compressing or concentrating the molecules of wheel metal



immediately surrounding the core member 1 (which latter, it may be stated in this connection, is made of iron) and at the same time not cool the bearing-surface of the wheel-hub with sufficient rapidity as to cause a positive chill or hardness on such bearing-surface. The escaping gases therefore are in this manner effectively utilized to raise the temperature of the interior of the core member 1 to the proper point that will insure only the requisite hardness for the bearing-surface of the wheel-hub, as will be productive of the best results.

The mold-box is provided, as hereinbefore stated, with the plate 6, and the closure-plug 4 is disposed in position in the mold-box by entering the anchoring-terminal 5 in the aperture in said plate. The member 4 is first disposed or made in sharp core-sand and properly rammed in the core-box at the same time the sand member or oil-chamber core 13 is made. After this part of the core has been thoroughly dried or baked the central core member 1 is screwed onto the projecting threaded part 3, already anchored and secured in the dry sand core. The bell-like member 8 is then entered over the tapered end of the core member 1, this position of said parts being fully illustrated in Fig. 5 of the drawings. This arrangement, as shown in said view, forms a complete oil-chamber and hub-core within the wheel adapted to receive the end of the axle, inasmuch as hereinbefore stated the core member 1 is of the same size as the bearing end of the axle. In forming the oil-chamber sand core 13 it will be understood that the thickness of the part thereof surrounding the core member 1 will be determined by the amount of space which is desired shall exist between the outer periphery of the oil-chamber or central hub proper, 14, as shown in Fig. 7, and the reinforcing or auxiliary hub-section 15 and that proper provision shall also be made for a continuation of the spokes 16, and with this purpose in view I provide a plurality of apertures 17 and a series of continuous openings or slots 18, said apertures and slots being alternately disposed in the oil-chamber sand core and so located that they will provide what is practically a continuation of the wheel-spokes 16, and thereby properly distribute the load upon the wheel and bearings thereof.

I deem it unnecessary for the purpose of this application to illustrate in the drawings or specifically describe in the specification the method of forming the auxiliary hub-section 15, it being understood that the thickness of this auxiliary hub or collar may be readily effected by a proper formation of the core within which the same is cast, the outer surface of the oil-chamber and the inner surface of the auxiliary hub or collar 15 being produced by the sand core 13<sup>a</sup>, as shown in Fig. 5.

In Fig. 8 I have illustrated a section of a complete wheel with its oil-chamber and the

relative position of the end of the axle, and it will be observed that the walls of the oil-chamber are extended outward sufficiently to produce the hub-like extension 19, which is pierced centrally with an aperture of suitable size to permit the introduction of the oil, said aperture being indicated by the numeral 20.

The inner end of the oil-chamber is wholly closed, as indicated by the numeral 21, said closure being effected by leaving a sufficient space, as indicated by the numeral 22, which extends annularly around the central core member 1 between the end of the oil-box sand core 13 and adjacent parts of the sand core 13<sup>a</sup> and member 8. In order to enable the gases to reach the core member 1 and properly heat the same before the molten metal comes in contact therewith, I place the sprue-gate 34 at some distance from the chamber 24, and in this instance, as shown in Fig. 5, said sprue intersects one of the channels made to form the spokes 16, so that when the metal is poured therein it passes first into the chamber adapted to form the auxiliary hub 15, thence through the openings 17 and 18 into the chamber 24. Thus it will be seen that while the metal is passing into and filling the lower end of the auxiliary hub-chamber the gases will have time to pass into the member 1 and heat the same to the proper degree before the molten metal comes in contact therewith. While I have shown the sprue-gate 34 as tapping a spoke-cavity, I desire it to be understood that it may be placed at any desired point outside of the chamber 24 and the same results attained.

In Fig. 7 I have indicated the position of the continuation of the spokes formed by the openings 17 by the numeral 25, while the continuation of the spokes formed by the slotted openings 18 is indicated by the numeral 26. I also properly form the sand mold upon at least three opposite sides of the oil-box with a suitable extension or lip 27, which when provided with an aperture will receive a bolt 28, passing through an aperture in the flange of the wheel-retaining member 29, which, as will be seen by reference to Fig. 8, is provided with an opening of proper size to fit around the axle, the said plate being so shaped as to conform to or receive the collar 30, preferably integrally formed upon this part of the axle 31.

It will thus be seen that I have provided reliable and efficient means for retaining the wheel in place upon the end of the axle and at the same time wholly inclose the bearing part or end of the axle, and thus house and protect it against dust or loss of oil.

In some instances an annular groove or seat may be formed in the outer face of the wheel-retaining plate 29, within which may be located a suitable packing to prevent the escape of oil, the position of said groove and packing being indicated by the numeral 32.



If desired, a suitable closure-plug may also be located in the oil-receiving aperture 20 for obvious purposes. I also prefer to channel or otherwise suitably form the oil-box sand core 13 with suitable bores or openings 33, adapted to communicate with the radial bores or vents 12, thus enabling the gases to immediately and freely pass into said vents, though ordinarily said sand core will be sufficiently porous to readily communicate the gases to the only point of escape—namely, the cooperating bores or vents 11 and 12—allowing the heated gases to escape through the bores 2 and 10 and incidentally, as hereinbefore stated, raise the temperature of the central core member 1 to the proper point.

Believing that the advantages of my invention have thus been made fully apparent, further description is deemed unnecessary.

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

1. The herein-described means for constructing wheels, comprising the central tubular core member 1, a centering and anchoring closure 4 therefor, threaded into the inner end of the member 1 and having the terminal 5, a member 8 having a tubular extension 10 adapted to receive and hold the upper end of said central core member, and an oil-box-forming sand core having vents communicating with the vents in the anchoring-closure 4, whereby the escaping gases through said vents will raise the temperature of the central core member to a proper degree and thereby temper the bearing-face of the axle-receiving wheel-hub, said sand core also being provided with means to form the walls of the oil-box with the requisite thickness and also form the next adjacent or auxiliary hub-section and wheel-spokes, all combined substantially as specified and for the purpose set forth.

2. In wheel-casting a tubular core member 1,

having a closure 4 fitting the inner end of said core member, said closure having a centering and anchoring terminal 5, and vent ducts or bores 11 and 12, a hollow guiding and centering member 8 for the opposite end of the core member, whereby when said parts are assembled the said ducts or bores will lead the escaping gases from the sand surrounding said parts into the bore of the core member 1 and raise the temperature thereof, as and for the purpose set forth.

3. In casting, a metal core member 1 tubular throughout and open at each end, a centering member 4 fitting the inner end thereof, said centering member having intersecting bores or vent-ducts and a centering-terminal 5, a hollow centering member 8 to receive the outer end of said core member whereby the gases created, incident to casting, will pass through said ducts into the core member and raise the temperature thereof, as and for the purpose set forth.

4. A tubular core member to form the axle-bore of a car-wheel or the like and means to convey the gases created in the sand incident to the casting process and deliver the same into the bore of said core member, said gas-conveying means consisting of the combined closure and centering member 4 having a threaded end fitting the inner end of the core member and also having a plurality of intersecting bores providing communication between the surrounding sand and the bore of the core member and also having a centering-terminal 5, and means to center the outer end of the core member and convey the gases therefrom as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM KIRCHMAN.

Witnesses:

ADAM J. LEISHMAN,  
DANIEL CLARKE.