No. 843,679. PATENTED FEB. 12, 1907.

C. JOHNS.

MOLD FOR MANUFACTURING ROLLS.

APPLICATION FILED OCT. 26, 1906.

FIG. 2

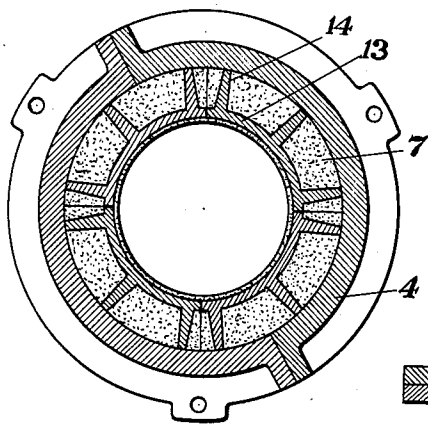


FIG. 3

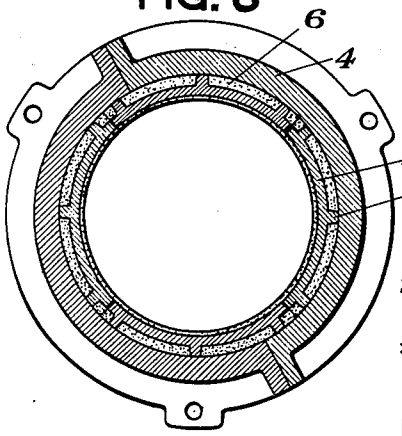


FIG. 4

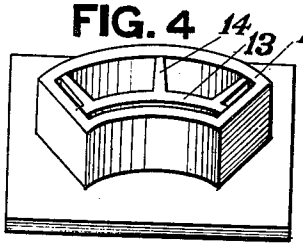


FIG. 1

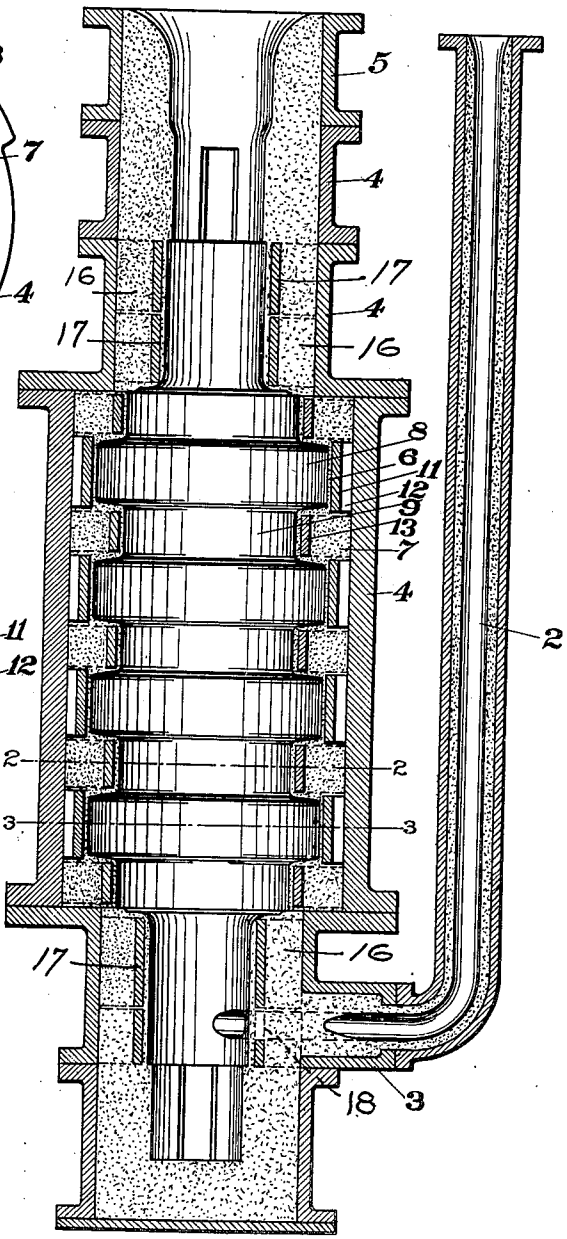
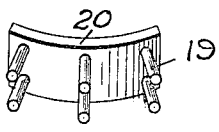


FIG. 5



WITNESSES.

J. R. Keller

Robert C. Totten

INVENTOR.

Charles Johns

By Kay Totten & Winter

attorneys

UNITED STATES PATENT OFFICE.

CHARLES JOHNS, OF PITTSBURG, PENNSYLVANIA.

MOLD FOR MANUFACTURING ROLLS.

No. 843,679. Specification of Letters Patent. Patented Feb. 12, 1907.

Application filed October 26, 1906. Serial No. 340,654.

To all whom it may concern:

Be it known that I, CHARLES JOHNS, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Molds for Manufacturing Rolls; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to mold for casting rolls and other articles of varying diameters, such as the ordinary grooved rolls used in the rolling of rods, angles, I-beams, channels, rails, &c.

The object of my invention is to provide a mold which facilitates the cooling of the mold, so that the metal solidifies more rapidly, and at the same time to obtain a finer grain of metal and a more finished and smoother surface on the casting.

To these ends my invention comprises, generally stated, an outer flask in which are placed one upon the other a series of rings of varying diameter to correspond to the grooves to be formed in the roll, said rings comprising a metal core enveloped with sand, so that when the mold has been built up in this manner I have a sand-lined mold with metal cores which have a cooling effect upon the molten metal after it is poured into the mold, and so hastens the solidifying of the metal, while at the same time I obtain a finer grain of metal, as well as a smoother casting.

Referring to the accompanying drawings, Figure 1 is a central vertical longitudinal section through a mold embodying my improvements. Fig. 2 is a cross-section on the line 2 2, Fig. 1. Fig. 3 is a view of the core-box with the pattern of one part of the roll in place therein. Fig. 4 is a perspective view of one of the core-sections, and Fig. 5 is a modified form of metal core.

Like numerals indicate like parts in each of the figures.

In the drawings I have illustrated my invention as applied to the casting of a grooved roll, such as employed in rolling-mills for rolling bars, angles, or other shapes, although it is apparent that my invention may be applicable to the casting of other articles of varying diameter.

The numeral 2 designates the gate through which the molten metal is introduced, the metal being introduced from below into the drag 3. Supported upon the drag 3 is the cylindrical metal flask 4, which may be of any length desired, it being preferable to form the said flask in two sections where a long roll is to be cast. Supported upon the flask 4 is the sink 5. Gate 2, drag 3, and sink 5 are lined in the usual manner with sand or other suitable refractory material, and I prefer to employ the ordinary swirl in introducing the metal to the mold, which is very common in casting rolls of this character.

Within the flask 3 are arranged the ring-like sections 6 and 7, the section 6 corresponding to the collars 8 of the roll and the section 7 to the grooves 9 thereof. These sections are made up in the following manner: I employ a suitable core-box 10, and in making the rings 7 I place within said core-box the metal core 13, which is preferably formed of cast-iron and has formed integral therewith the lugs or supports 14. After the metal core 13 has been placed in the core-box I introduce sand and pack it around the metal until the same is completely enveloped with sand. The section of the ring formed in this way is then removed from the core-box, and the same is permitted to dry, so as to prevent it from spawling. I prefer to make up the rings 7 of sections made in the manner just described, so as to form a complete circle when arranged within the flask. In the same manner I form the rings 6, which are composed of the metal cores 11, with the lugs 13, formed integral therewith. When the sections of the rings have been formed in this manner, the sections are lowered into the flask to form complete rings and rest upon each other. If upon inserting the separate segments of a ring it is found that there is any space between the ends of the contiguous segments, this space may be filled up with a wedge or other suitable device to take up the space. When the rings are in position, the lugs 6 and 14 will bear against the inner walls of the flask 4, and so support the rings against the outward pressure of the molten metal when poured into the mold. As the rings are built one upon the other, any seam or joint between them is luted up with sand, so as to make a smooth even surface on the mold. The same construction may be followed in forming the mold for the necks of the rolls. The rings 16 have the metal cores 17 inclosed in sand, and the lowermost ring of the lower neck is cut away, as at 18, to allow for the swirl or inlet.

After the mold has been built up in the

manner illustrated and described the metal is poured into the gate 2 and rises within the mold and up into the sink 5. The effect of the metal cores 11 and 13 when enveloped in the sand as indicated will be to cause the molten metal to cool more rapidly and at the same time in cooling to present a more even surface, as well as give a finer grain to the metal.

In the casting of such rolls in the ordinary manner, in which a mold composed entirely of sand is employed, the solidification of the metal takes place very gradually, and the longer the metal remains in a molten condition the more draft there will be upon the metal in the sink, and as a consequence a greater supply of metal must be employed. It sometimes happens that the drain on the sink is so great that there is not even sufficient metal to form a complete neck on the roll. By my invention, owing to the fact that the metal solidifies more rapidly, there is not the necessity for drawing so much metal from the sink, and as a consequence a less amount of metal is required. After the metal is cooled sufficiently to form a solid casting, the flask 3 may be slipped from the mold and the rings 6 and 7 broken off, leaving the surfaces of the collars and grooves of the roll smooth and even and the metal of a finer grain.

By supporting the rings by means of the lugs 12 and 14, which bear directly against the inner wall of the flask, I provide against the pressure of the molten metal and prevent the collapsing of the mold as the metal expands.

In Fig. 5 I have illustrated another manner of supporting the rings against the inner wall of the flask. In this case I employ pins 19, which may be screwed into openings in the core 20.

What I claim as my invention is—

1. A mold having in combination a cylindrical flask, a series of sand rings forming the collars and grooves respectively resting one upon the other, said rings having cores composed of a cooling material, whereby the molten metal coming in contact with said rings is cooled more rapidly.

2. A mold having in combination a cylindrical flask, a series of sand rings forming the collars and grooves respectively of the roll, resting one upon the other, and metal-cooling cores embedded within said rings, whereby the molten metal coming in contact with said rings is cooled more rapidly.

3. A mold having in combination a cylindrical flask, a series of sand rings forming the collars and grooves respectively resting one upon the other, metal-cooling cores embedded in said rings, and supports on said cores engaging the inner walls of said flask, whereby the molten metal coming in contact with said rings is cooled more rapidly.

4. A mold having in combination a cylindrical flask, a series of sand rings forming the collars and grooves respectively of the roll resting one upon the other, said rings being formed in sections, and metal-cooling cores in said sections, whereby the molten metal coming in contact with said rings is cooled more rapidly.

In testimony whereof I, the said CHARLES JOHNS, have hereunto set my hand.

CHARLES JOHNS.

Witnesses:
JAMES I. KAY,
ROBERT C. TOTTEN.