

No. 616,835.

Patented Dec. 27, 1898.

F. GORMAN.

METHOD OF AND APPARATUS FOR MAKING CHILLED ROLLS.

(Application filed Mar. 5, 1897.)

(No Model.)

Fig. 1.

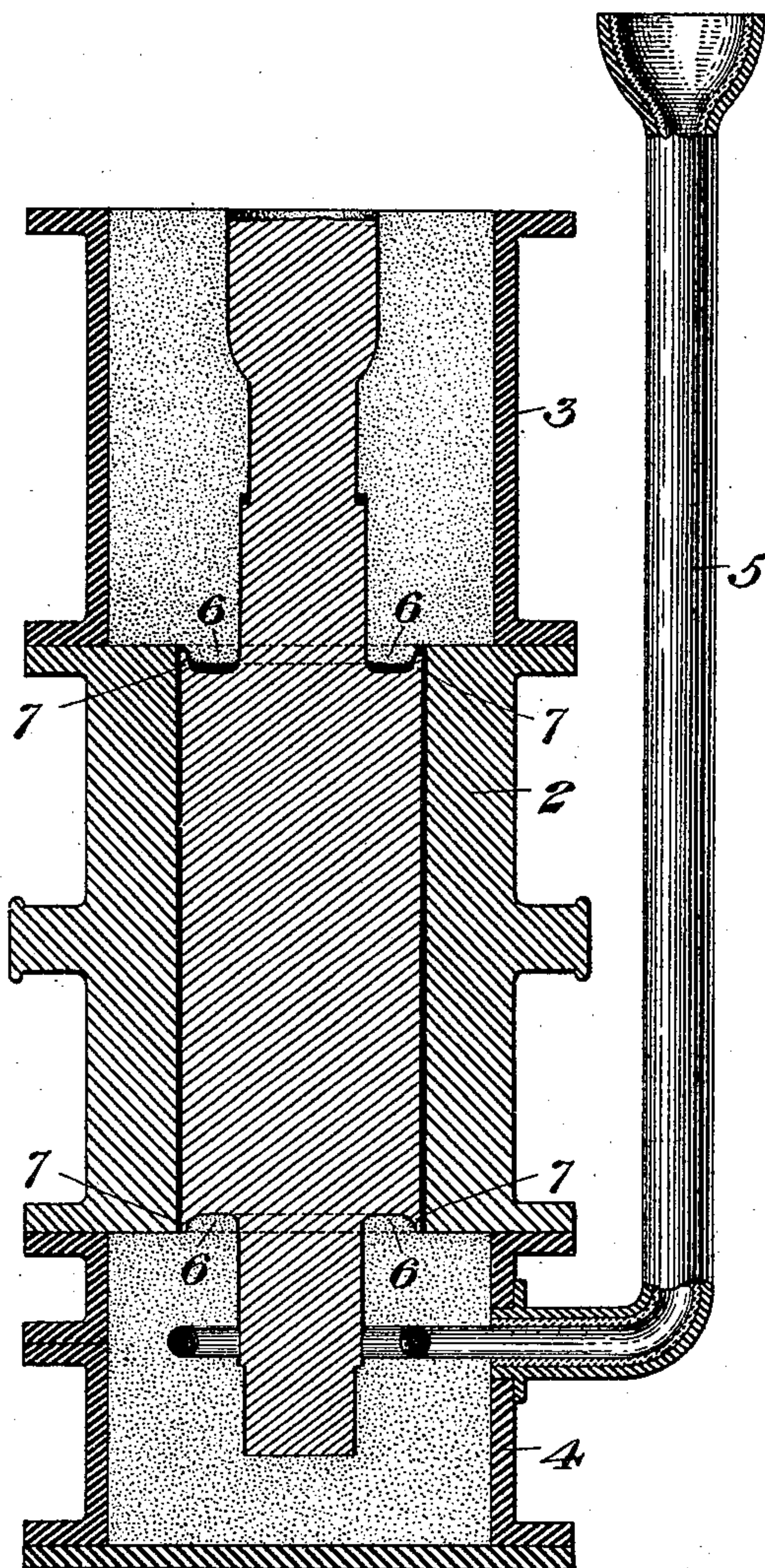


Fig. 4.

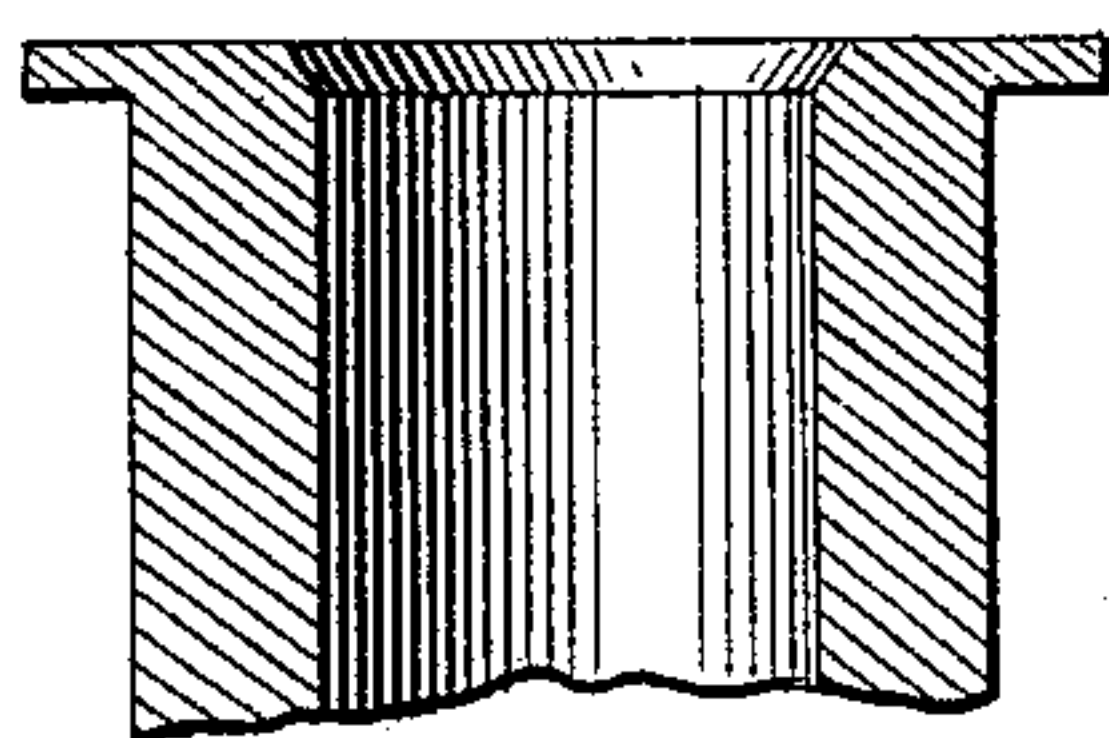
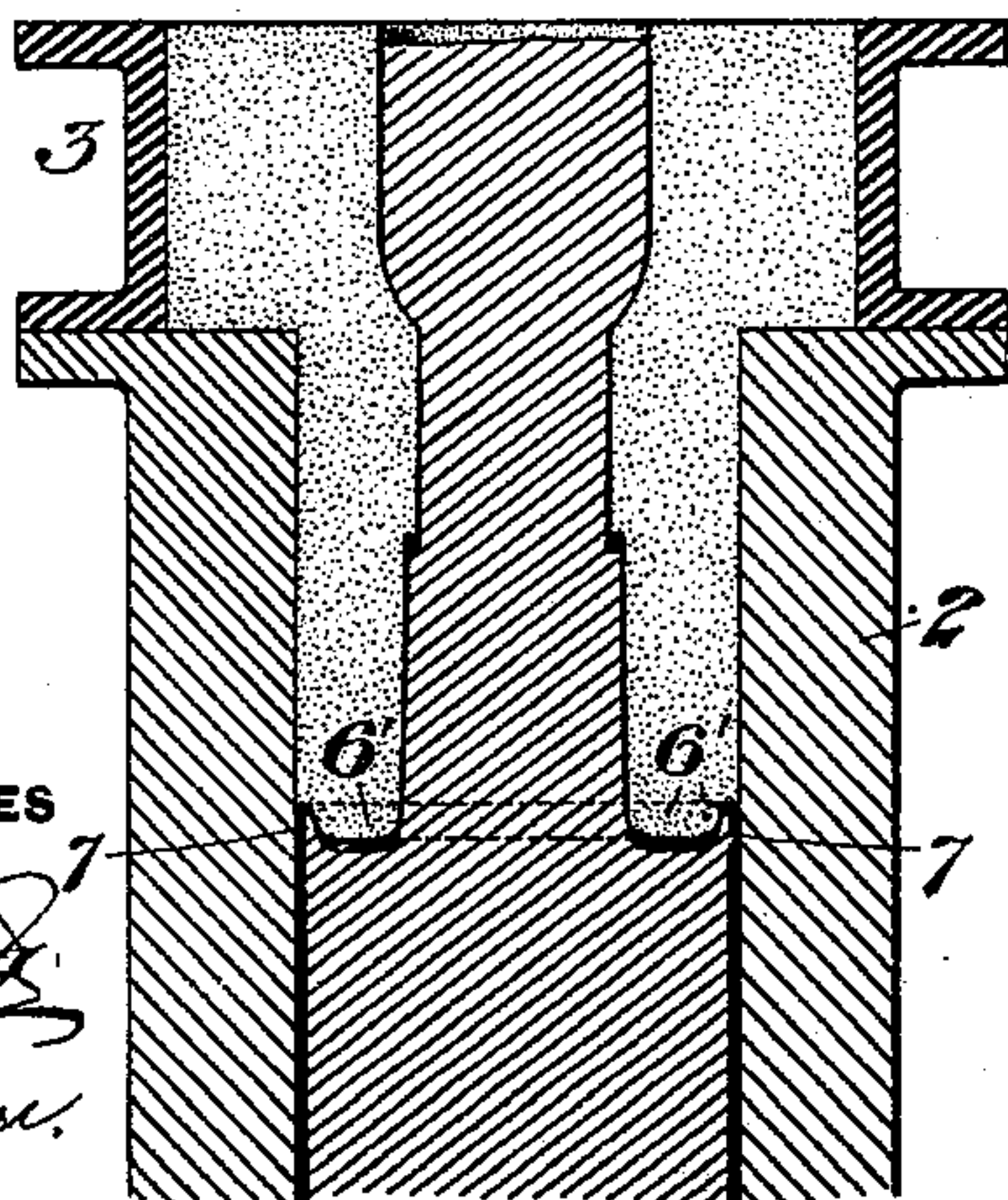


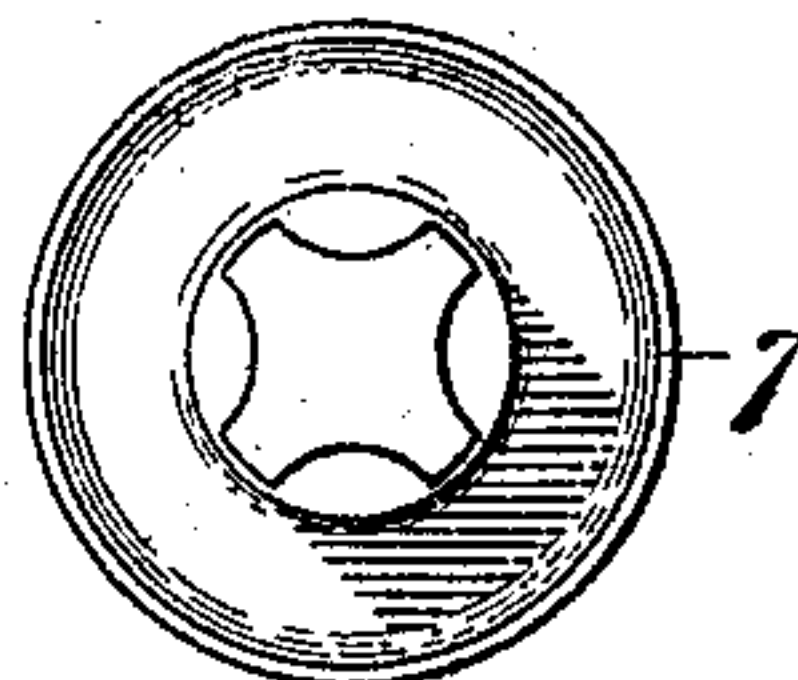
Fig. 2.



WITNESSES

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Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## METHOD OF AND APPARATUS FOR MAKING CHILLED ROLLS.

SPECIFICATION forming part of Letters Patent No. 616,835, dated December 27, 1898.

Application filed March 5, 1897. Serial No. 625,941. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK GORMAN, of Mount Oliver, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Methods of and Apparatus for Making Chilled Rolls, 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 my improved mold for casting rolls, the casting being shown in place. Fig. 2 is a partial vertical section illustrating the casting of a shorter roll. Fig. 3 is an end elevation of the casting as it comes from the mold, and Fig. 4 is a partial sectional view of a modified form of the chill-mold.

My invention relates to the casting of plain chilled rolls in a metal mold and is designed to provide an improved means for and method of casting such rolls, whereby a uniform depth of chill upon the surface of the roll-body and a truly cylindrical shape are obtained.

The invention is based upon the fact that to produce a uniform depth of chill and a true cylindrical form the roll must be maintained centrally within the chill-mold during its cooling and solidification, so that at all points it will be held equidistant from the chilling-surface of the mold. To that end it consists in the method of and means for casting the roll with a relatively thin circumferential ring or projection or chime at one or both of its ends. I have found that where such thinner ring-shaped end portion is formed integrally with the roll it will cool much more quickly than the body of the roll on account of its relative thinness and while doing so will retain its cylindrical form and will thus serve as a guide for the roll during its solidification and cooling and hold the same centrally within the chill-mold, sliding downwardly over its inner surface as the roll shortens in cooling.

Referring to the accompanying drawings, in which I show my preferred form of apparatus, 2 represents the cylindrical chill-mold, 3 the cope, and 4 the drag of a mold for casting chilled rolls.

5 is the usual fountain or runner for pouring, this runner leading into the matrix-cavity within the dried loam sand of the drag.

The above parts are those ordinarily employed in the casting of chilled rolls, and as usual the journals and coupling ends of the rolls are formed in the dried loam-sand portions. In the forming of the sand portions of the mold, however, the sand instead of being molded with a flat plane-faced end portion as formerly, which would produce a square end on the roll-body, is provided with an inner projecting annulus 6, which when the parts are in position protrudes into the mold-cavity within the chill-mold. I preferably form both the cope and drag with this projecting portion of sand, as shown, and it is apparent that when the metal is poured a comparatively thin ring or chime 7 will be formed between the sand annulus and the inner surface of the chill at each end of the roll, which is an addition to the length of the roll-body proper. This band or extension of the roll-body while contracting to a degree by immediate contact with the chill-mold will still have shrunk diametrically only a portion of its entire contraction at the time when the chilling action is occurring upon the roll-body, which chilling action is completed long before the entire contraction of the band has taken place. During the brief period in which the roll is chilling, therefore, the rigid band will slide downwardly over the inner surface of the chill-mold and hold the roll-body centrally therein, its function ending with the completing of the chilling action of said body, after which the further contraction continues until atmospheric temperature is reached.

It is evident that the invention may be employed not only where rolls are cast the entire length of the chill-mold, but also where a shorter roll is cast, as shown in Fig. 2, wherein the dried loam sand of the cope is shown as extending some distance into the chill-mold, the sand being provided with the projecting annulus or ring portion 6' as before. When the casting is removed from the mold, these rings are cut away during the turning operation, and by their removal the roll-body is reduced to the length desired.



The advantages of my invention will be apparent to those skilled in the art, since the ordinary chill-mold may be employed as before without any alteration in its form, the only change necessary being in the molding of the sand portions, while all danger of unequal chilling due to uneven settling of the metal is obviated, the thin end rings or chimes centralizing and supporting the roll-body, as well as giving it a truly cylindrical form. The end of the chill-section may be beveled off on its inner surface, if desired, as shown in Fig. 4, so that the ring will be of slightly larger diameter than the roll-body, and the shape and thickness of the circumferential end ring may be varied widely in other ways without departure from my invention, as may also the means for forming it.

I claim—

1. A mold for casting chilled rolls, having a matrix-cavity inclosed by a chill-mold, said mold having at the end of the matrix-cavity proper a narrow annular recess arranged to form upon the end of the roll-body a relatively thin annular flange which constitutes a temporary addition to the length of said body; substantially as described.

2. A mold for casting chilled rolls, having a matrix-cavity inclosed by a chill-mold and a neck-forming cavity inclosed by a sand mold, such mold having at the end of the

matrix-cavity proper a narrow annular recess, said recess being inclosed exteriorly by the chill-mold and interiorly by the sand portion, and being arranged to form upon the end of the roll-body a relatively thin annular flange which constitutes a temporary addition to the length of said body; substantially as described.

3. A mold for casting plain chilled rolls having a matrix-cavity inclosed by a chill-mold, said mold having at each end of the matrix-cavity proper a narrow annular recess partially inclosed by the chill-mold, said recesses being arranged to form at the ends of the roll-body relatively thin projecting annular flanges which constitute temporary additions to the length of said body; substantially as described.

4. The method of preventing distortion in cast-metal cylindrical roll-bodies during a solidifying after pouring, which consists in cooling and solidifying an annular flange or ring on and integral with the roll-body in advance of the solidification of the metal in the roll-body itself, substantially as set forth.

In testimony whereof I have hereunto set my hand.

FRANK GORMAN.

Witnesses:

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G. I. HOLDSHIP.