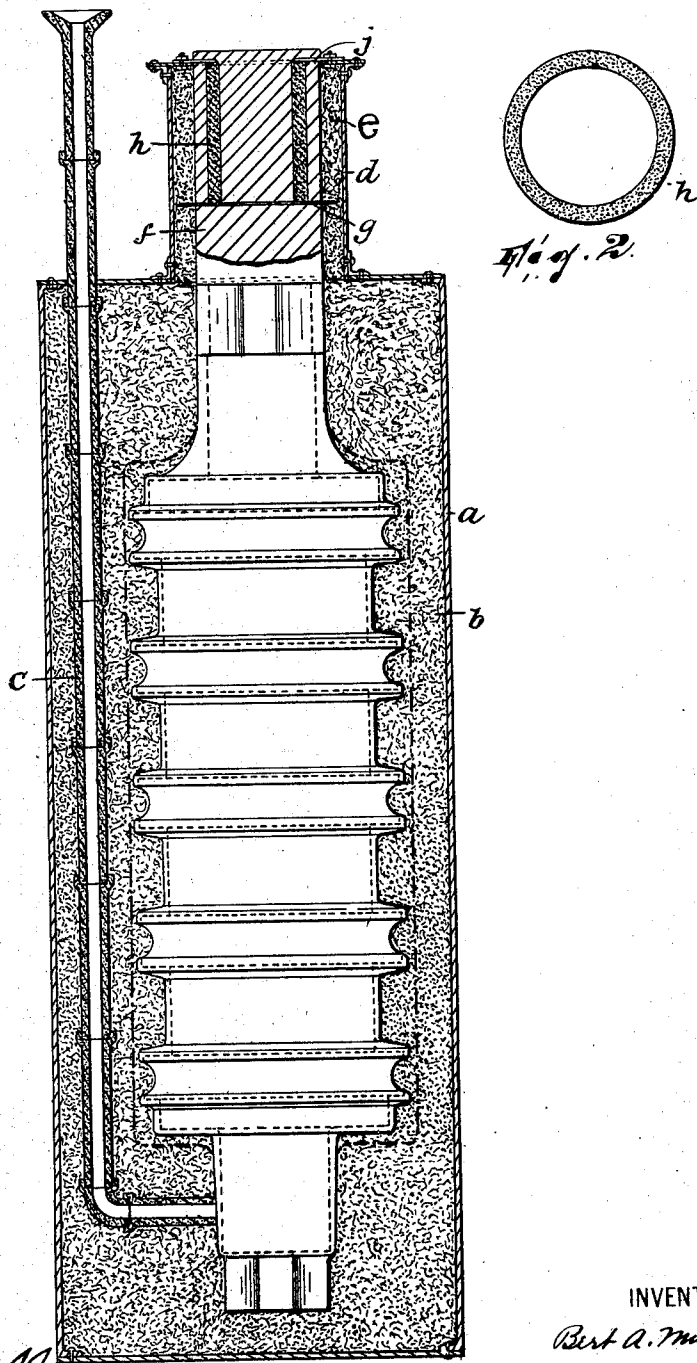


No. 736,419.

PATENTED AUG. 18, 1903.

B. A. MICK.
CASTING SOLID METALLIC BODIES.
APPLICATION FILED JUNE 17, 1903.

NO MODEL.



WITNESSES:

Wm. D. Bell.
Jan. B. Newton.

INVENTOR,

Bert A. Mick.

BY

Garner & Howard.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

BERT A. MICK, OF PATERSON, NEW JERSEY.

CASTING SOLID METALLIC BODIES.

SPECIFICATION forming part of Letters Patent No. 736,419, dated August 18, 1903.

Application filed June 17, 1903. Serial No. 161,772. (No model.)

To all whom it may concern:

Be it known that I, BERT A. MICK, a citizen of the United States, residing in Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Casting Solid Metallic Bodies; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

In casting certain solid metallic bodies, and especially steel bodies, of a more or less elongated shape, and which it is necessary to cast in a vertical position, it is well known that, owing to the fact that the superficial portion of the metal sets comparatively precipitously, and so resists that settling which tends to take place throughout the whole body of metal so long as it is in the molten state, a depression of conical shape is formed which in many instances extends to a very material and undesirable depth down into the metal. It thus becomes necessary to anticipate the undesirable and often fatal result thus produced by either casting the object as to its upper portion longer than it needs to be for use in order that sufficient may be available for cutting away, and thus eliminating, more or less, the depression from the finished object, or thicker in order that weakness caused by the depression may be compensated for, or both. Moreover, because the settling of the metal cannot proceed more uniformly honeycombing and other irregularities result not only as to the portion of the casting where said depression forms, but even down farther in the body of the casting.

The objections above pointed out can perhaps be best illustrated upon reference to steel rolls. In casting a steel roll it is at present found necessary to turn it out with an extension, very materially superfluous as to its longitudinal dimension, formed on the end which is uppermost in the mold. This, in effect, elevates the conical depression formed, so that its weakening the roll, particularly where the wabblor or coupling comes, is somewhat reduced. Lengthening the casting in

this respect, however, does not of itself produce the desired result. In fact, it is the practice to also materially thicken up that portion of the roll which forms the wabblor, and even then the turning out of a casting fit for use is not insured. Moreover, in order to eliminate irregularities in the outer portion of the roll it is necessary to cast the roll considerably larger in diameter than the finished roll will be and afterward dress it down to the desired shape. This involves a considerable expense of time and labor, especially where the roll is to be of the type having annular grooved acting faces. My invention contemplates avoiding all these objections by, in effect, maintaining the tendency to settle uniform throughout all parts of the metal. This I accomplish by placing in the mold a body preferably formed of some refractory material so disposed that it tends to cool the interior of the metal the same as the walls of the mold cool its outer portion. The effect then is for the cooling and consequent settling of the metal to take place practically no sooner in its superficial portion than in its interior. Hence when the settling comes all parts of the metal drop together, and the undesired depression referred to is reduced to an immaterial depth if it is not wholly removed. The body referred to is preferably in the form of a cylinder and is arranged concentrically in the upper portion of the mold.

Referring to the accompanying drawings, Figure 1 is a vertical sectional view of a mold provided with my improvement, a completed casting being shown in position in the mold; and Fig. 2 is a top plan view of the body which constitutes my improvement.

In said drawings, *a* is a metallic casing, termed in the present instance a "roll-box."

b is the body of sand or the like which is swept out to form the mold.

c is the runner leading into the opening in the mold at the base thereof.

d is a top extension on the casing *a*, forming what is known as the "sink-head box," and *e* is a swept-out body of sand or the like in which the sink-head portion *f* of the metal is formed.

In preparing the mold a horizontal bar *g* is placed in the sink-head, its position being maintained by said bar having its ends pro-

jecting into the sand of the sink-head. On this bar is made to be supported a body *h* of annular, preferably cylinder, shape, and this is steadied by other shorter bars *j*, which are bolted to the top of the sink-head box. Bars *j* also subserve the function of resisting upward displacement of body *h* when the metal enters the mold. The metal as it enters the mold through the runner in the initial filling is allowed to fill up to approximately the top of the body *h*. Upon its being allowed to cool and settle it will be found that the effect of the cylindrical body *h* is to cause the settling to take place uniformly throughout the whole mass of metal, and particularly in that portion thereof which forms the upper portion of the casting. Upon the second filling, which takes place through the top of the mold, the same effect will accrue. Upon removing the casting the portion of the metal which constitutes the sink-head when in the mold is cut away, as is also the shell or superficial portion of the roll, (indicated by the dotted outline in Fig. 1,) so as to give the roll its ultimate or finished shape.

By using the body *h* referred to it is possible to use the minimum of superfluous material at the top of the casting, because the depression formed is materially reduced over what it is in casting the roll according to the present methods. Besides this the diameter of the portion just referred to can be cast much smaller than is ordinarily done, to say nothing of the fact that even the whole roll can be cast smaller in diameter. The material of the roll when finished, moreover, will be found to be more homogeneous and compact than can be accomplished by ordinary methods, all honeycombing and like irregularities being eliminated. It is found in casting by the ordinary method that on the first filling a crust forms so rapidly and so thick at the top that it is required to constantly break the same in order that there will be an opening for introducing the metal at the second filling. This also is avoided in the practice of my invention, because only a compara-

tively thin crust, which can be easily broken, can form.

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

1. A mold for casting rolls in combination with an annular refractory body located in said mold in spaced relation to the side walls thereof, substantially as described.

2. A mold for casting rolls in combination with an annular refractory body located in said mold in spaced relation to the side walls thereof and concentrically therein, substantially as described.

3. A mold for casting rolls in combination with a refractory body located in said mold in spaced relation to the side walls thereof, and in the upper portion of said mold, substantially as described.

4. In combination, a mold for casting, end-on, metallic bodies having a relatively long longitudinal axis, and a refractory body located in the upper portion of the mold in spaced relation to the walls thereof, substantially as described.

5. In combination, a mold for casting, end-on, metallic bodies having a relatively long longitudinal axis, and an annular refractory body located in the upper portion of the mold and, concentrically, in spaced relation to the walls thereof, substantially as described.

6. In combination, a mold for casting, end-on, metallic bodies having a relatively long longitudinal axis, and a refractory body located in the upper portion of the mold in spaced relation to the walls thereof and having a relatively large portion thereof projecting above the line marking the upper end of the article when finished, ready for use, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 13th day of June, 1903.

BERT A. MICK.

Witnesses:

JOHN W. STEWARD,

WM. D. BELL.