L. G. WOODS.

METHOD OF CASTING STEEL BOXES.

APPLICATION FILED DEC. 19, 1910.

991,258. **Patented May 2, 1911.**

2 SHEETS—SHEET 1.

FIG. 1

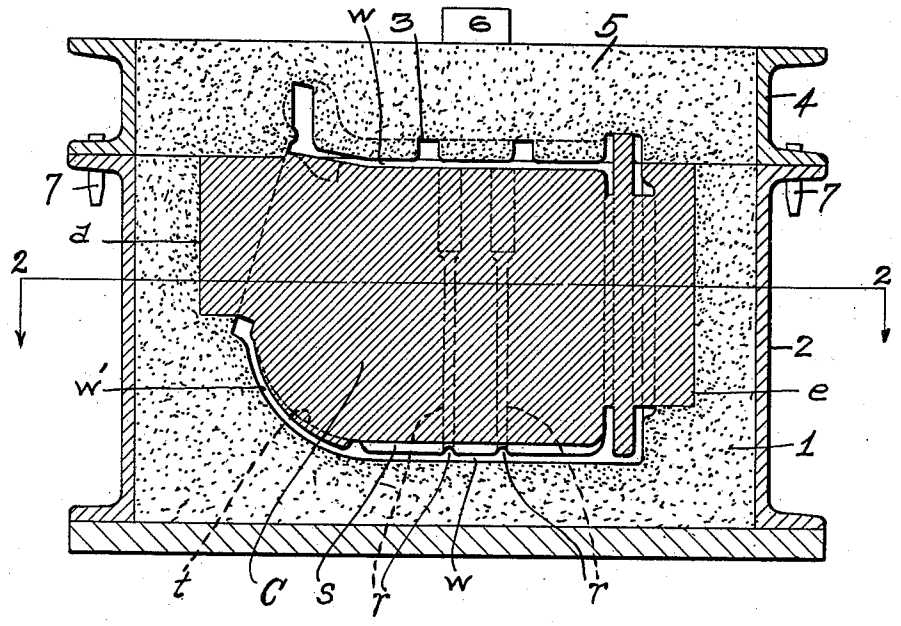
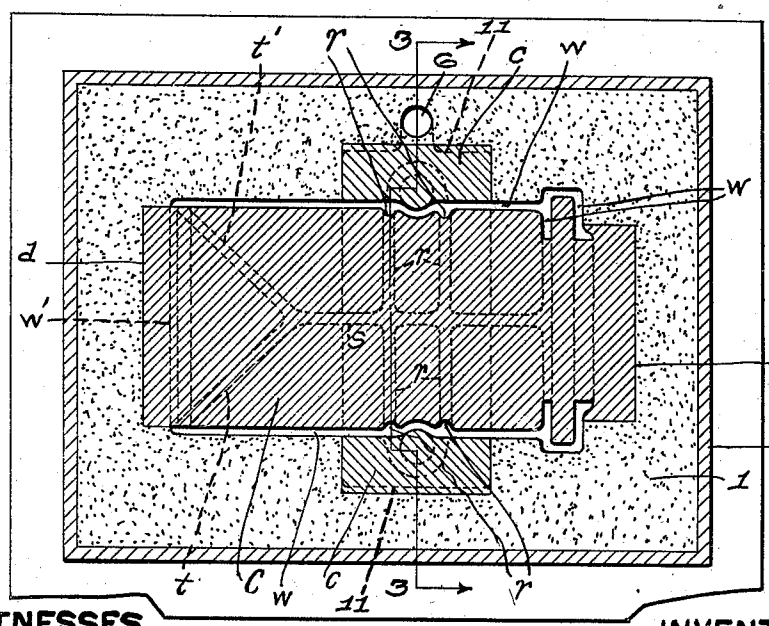


FIG. 2



WITNESSES.

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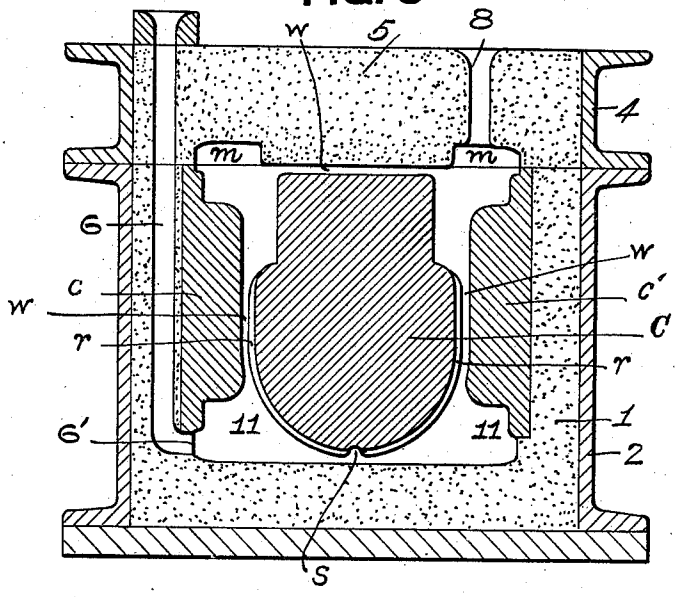
2 SHEETS—SHEET 2.

FIG. 3



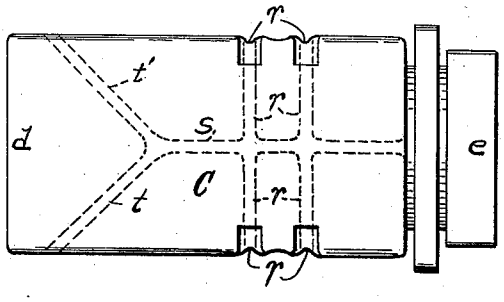


FIG. 4

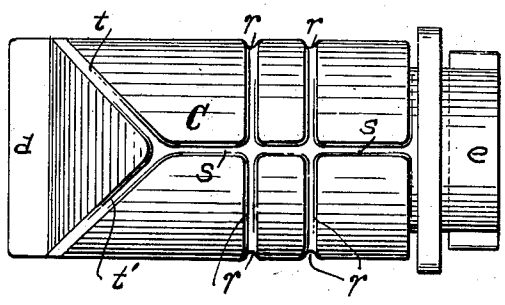


FIG. 5

WITNESSES.

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METHOD OF CASTING STEEL BOXES.

991,258. Specification of Letters Patent. Patented May 2, 1911.

Application filed December 19, 1910. Serial No. 597,972.

To all whom it may concern:

Be it known that I, LEONARD G. WOODS, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Methods of Casting Steel Boxes; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the art of casting steel, and more particularly to that of casting hollow steel articles such as boxes with very thin walls. Its object is to provide an improved process whereby boxes of this nature may be cast of steel with such very thin wall portions that in casting in the ordinary way the steel would be chilled before filling the mold, and a defective cast would result.

It is well known to all persons versed in foundry practice that it is much more difficult to cast an article having thin walls of steel than of iron, as the molten steel must be maintained at a very high temperature in order to flow at all, and where it is necessary to fill up thin cavities or pockets in the molds, the contact of the steel with such a large area of cold mold in proportion to the amount of steel flowing through the cavity frequently results in causing the steel to chill and thereby obstruct the complete filling of the mold by the molten and unchilled metal. This is especially true where the thinner pockets or cavities are necessarily located at a distance from the pouring gate or opening, or especially where it is necessary for the molten steel in its course from the gate to pass through thin cavities before filling the rest of the mold. It will be understood that in this specification by the term "steel" I mean a ferrous metal commonly known to the trade under that name, and I do not include malleable iron or gray iron, steel having the characteristics of greater strength and toughness and less fluidity.

To these ends my invention contemplates, generally stated, the method of casting hollow steel articles or boxes with thin walls, such, for instance, as railroad journal boxes, consisting in forming a mold with very thin wall cavities provided with thickened runner portions extending preferably in the direction of flow of the steel from the pouring gate, and pouring the molten steel so as to flow through said cavities to fill the more remote portions of the box.

In the drawings, I have illustrated a mold adapted to form a cast steel railroad journal box. It will be understood, however, that the drawings illustrate merely one form of apparatus suitable for the practice of my invention, and one type of product which it is adapted to produce, and that the method of my invention is capable of various applications in producing steel boxes with thin walls, and provided with stiffening ribs or beads.

In the said drawings Figure 1 is a vertical section through a flask or mold formed to produce a cast steel box of the type specified. Fig. 2 is a horizontal section of the same on the line 2—2, Fig. 1. Fig. 3 is a vertical transverse section on the line 3—3 Fig. 2. Fig. 4 is a detail top plan view of the main core illustrated in Figs. 1 to 3. And Fig. 5 is a like bottom plan view of the core.

In forming the mold illustrated, the pattern conforming to the outside of the box, in this case a railroad journal box is inserted in the molding material 1 in the flask or drag 2 in the usual manner. In like manner the mold of the top portion 3 of the journal box is formed in the molding material 5 in the cope 4. After the pattern has been withdrawn from the lower flask or drag 2, the outside mold therein is completed by inserting the small or auxiliary cores c, c', which are necessary on account of the peculiar shape of the particular article or casting illustrated. The main core C is then inserted within the molded sand so as to be positioned accurately by its supporting or projecting portions d, e as illustrated clearly in Fig. 1. The core C is so positioned as to leave very thin wall cavities or pockets w between the same, and the main portion 1 and small cores c, c', respectively of the mold. The cavity w in the mold illustrated comprises in fact a continuous wall cavity or pocket including a curved lower wall portion and forming in effect the side and lower walls of the journal box when cast.

In order to produce a perfect casting with the extremely thin wall cavity or pocket w, I provide the runners or runner portions r, extending continuously around the said cavity w, as illustrated. I also preferably provide the longitudinally extending runner s intersecting with the runner r; and the runners t, t', extending preferably along the intersections of the front wall pocket w' and side or bottom wall pocket w.

In casting the article illustrated, namely,

a journal box provided with the bottom lugs cast in the cavity *l* and the thickened top portion formed in the cavity *m*, the cope 4 is first attached to the main flask 2 in any suitable manner, as by the pins 7 illustrated. The molten steel is then introduced through a suitable pouring opening, such as the pouring gate 6, and passes first into the lower lug portions 11 and then rises, passing upwardly through the runners *r* to fill the thickened upper pockets *m* to form the box top as well as the very thin wall pockets *w* to form the wall portions of the box. The molten steel is also aided in completing a perfect mold by the longitudinally arranged runners *s*, which permits of its easy flow into the forward and rear portions of the mold cavity, and its junction with the intersecting runners *t* insures the filling of the forward wall pocket *w'* which forms a cast wall of very thin metal. When the molten steel appears through the rising gate 8, the pouring is stopped, and the molder knows that all the thin wall pockets have been satisfactorily filled and that a perfect casting will result.

While I prefer to arrange the pouring opening 6 in the manner illustrated so as to enter the mold proper at the point 6', it is apparent that other locations of pouring gate may be employed or more than one, if found desirable. It is preferable, however, to arrange the pouring opening in connection with the thickened portions of the casting and the runner portions of the thin wall pockets so that the steel in flowing will naturally pass longitudinally of said runner portions to thereby insure its passage to the remote portions of the cast before it has had an opportunity to chill in the thin wall pockets, as illustrated at *w*.

I have found that in the practice of my improved method of steel casting that in casting a box of the journal box type illustrated, which must have sufficient strength and stiffness to resist the heavy jars and tremendous strains incident to modern railway practice with cars of great capacity, that the thin wall portions *w*, *w'*, can be cast as thin as 5/16 of an inch or even 1/4 of an inch thick without danger of chilling in the mold. The runner portions *r*, *s*, *t*, of the casting cavity form in the cast article ribs or beads integral with the wall portions which serve to greatly stiffen the same and brace the box in the regions of greatest strain. My invention therefore provides an improved method of casting which not only insures a perfect cast of a steel article with very thin walls, but also provides for bracing and stiffening the article when cast.

What I claim is:

1. The method of casting hollow steel articles with thin walls consisting in forming a mold with thin wall cavities provided with thicker runner portions arranged to provide for free running of the steel, and then pouring the molten steel so as to flow along said runner portions to fill the mold before chilling.

2. The method of casting steel boxes with thin walls consisting in forming a mold with very thin wall cavities provided with a plurality of thicker runner portions extending across said wall cavities and arranged to provide for free running of the steel, and then pouring the steel so as to flow in its course through said runner portions of said wall cavities to fill the more remote portions of the mold without chilling.

3. The method of casting steel boxes with thin walls consisting in forming the mold with thin wall pockets provided with a plurality of intersecting thickened runner portions, each wall portion having a runner portion contiguous therewith, and pouring the molten steel so as to enter the mold at a point adapted to provide for its free flow in said runner portions to insure the filling of the thin wall pockets.

4. The method of casting hollow steel boxes of the character specified consisting in forming the mold with very thin wall cavities to produce the thin bottom and side walls of the box and with thicker cavities to produce the thickened top portion thereof and with runner portions in said thin wall cavities extending across the same and connecting with said thicker top portion, and pouring the steel so as to flow freely through said thin wall cavities by means of said runner portions to fill the thickened top portion of the box.

In testimony whereof, I the said LEONARD G. WOODS have hereunto set my hand.

LEONARD G. WOODS.

Witnesses:
ROBERT C. TOTTEN,
JOHN F. WILL.