CHILL PLATE FOR USE IN MOLDING TAPPET HEADS

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This invention relates to foundry molds and pertains particularly to chill plates. The inventive novelty is found in the construction of a chill plate, wherein the objects of my invention are attained.

The prime object is to so construct the face of the chill plate that it will act to prevent eddying or swirling of the molten metal upon the face of the plate when pouring a tappet head casting or other similar thin piece of work that requires to be chilled evenly throughout its area both as regards its internal metal structure and the uniformity of depth to which the chilling and hardening effect extends into the body of the metal.

Cast iron tappets formed with chilled glass-hard faces are in common use. They are usually cast in multiple mold flasks and the chill is produced by making one face of the flask out of a plate of heavy metal that serves as a chill plate common to all of the individual molds of the flask.

Various means have heretofore been provided, with the object of producing uniform depth of chill in a casting such as a tappet head that has a flattened mushroom face combined with a central hub or boss. Such chill plates give commercially good results except under certain conditions of moisture, mold temperature, etc., when a serious practical difficulty develops, namely, swirling of the molten metal when it strikes the chill plate, resulting in an imperfect surface on the working face of the chilled casting. This imperfection takes the form of creases or stream lines of various shapes, but usually spiral, that extend over the entire area of the working face of the tappet head, or over only part of it. These stream lines produce uneven depth of chill, and since they must be ground away until they entirely disappear they increase the work of grinding, and what is more important, they require so great depth of grinding over the entire face of the tappet head that in some places the chilled iron is practically ground away, or at least seriously weakened.

My invention, as above stated, has for its prime object the eliminating of the eddying movement of the molten metal, the securing of uniform depth of chill and the production of a working face on the tappet casting that can be ground away to an even depth, leaving an even thickness of chilled metal to act as the working surface of the tappet head.

With the foregoing and certain other objects in view, which will appear later in the specification, my invention comprises the devices described and claimed and the equivalents thereof.

In the drawings Fig. 1 is a part sectional perspective view of a chill plate embodying my improvement, the grooves greatly enlarged for purposes of description. Fig. 2 is an end view of a tappet head molded in the manner shown in Fig. 1. Fig. 3 is a diagrammatic face view of a multiple mold chill plate indicating various arrangements of grooves. Fig. 4 is a sectional detail showing grooves of various suitable cross sectional shapes. Figs. 5 and 6 are face views of tappet head castings with modified arrangements of grooves therein. Fig. 7 is a sectional view of a tappet head finished. Fig. 8 is a face view of a tappet head casting before being machined.

As is clearly shown in the drawings the sand mold and chill plate are employed in their usual relationship, the tappet casting being poured in the ordinary manner as indicated in Fig. 1.

I form the working face of the chill plate with grooves, which may be of any desired cross sectional shape, as indicated in Fig. 4. These grooves may extend in rows lengthwise the chilled plate, as shown in Fig. 3, where a single row of grooves is illustrated. I have indicated only two rows of tappet mold locations in Fig. 3, for purpose of illustration, but it will be understood that four such rows are intended to be used in the particular chill plate illustrated, giving room for thirty-two castings at each pouring.

I have shown a number of different general schemes or arrangements of grooves, all of which are satisfactory in practice. In Figs. 1 and 2 and 8 the grooves are parallel and extend straight across the diameter of the cast-
ing face. In Fig. 5 they are part circular, being formed by facing off the chill plate and turning its grooves in a lathe. In Fig. 6 the grooves are arranged to radiate from the center of the tappet head 2 to the edges.

In each case, however, the grooves extend across the diameter of the tappet head and beyond, so that when the metal is poured it fills the grooves 1, which instantly check any tendency of the hot metal to swirl or rotate, thereby preventing eddies or creases in the faces of the finished casting.

Moreover the grooves, where they project beyond the edge of the casting, are closed by the sand of which the mold is made, and this rammed sand forms a filter-like gas vent, through which the gases formed in molding seep along the grooves and have their pressure relieved. The completed casting has a uniform depth of chill and no surface irregularities caused by swirling action of the molten metal. When the face of the casting is ground off, as in Fig. 7, there is left a chilled working face of extreme density and hardness and of uniform depth and thickness.

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

In a mold for the production of cast metal articles having chilled faces, a chill plate provided with means for preventing swirling of molten metal when poured into said mold, while attaining in the finished article a normal predetermined depth of surface chill, said means comprising a chill plate whose working face is formed with finely divided grooves, the depth of said grooves being sufficient to prevent eddying of the molten metal, and less than the predetermined depth of the chilled area.

In testimony whereof, I affix my signature.

ALLEN B. SCHALL.