May 14, 1935. F. M. POE 2,001,583

CASTING MOLD

Original Filed March 7, 1931

Fig. 1.

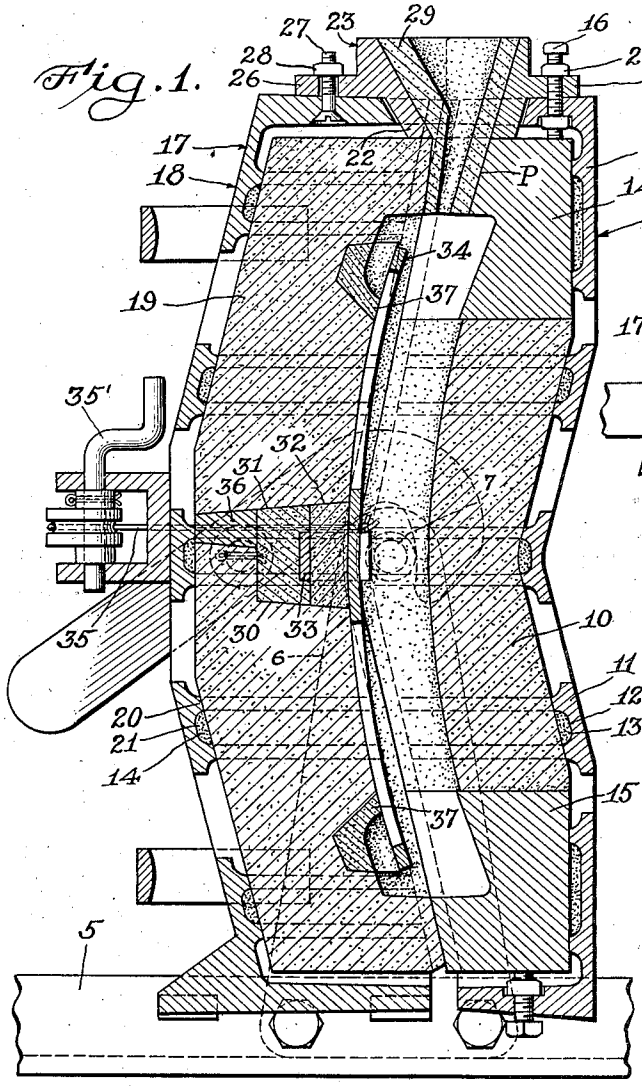


Fig. 2.

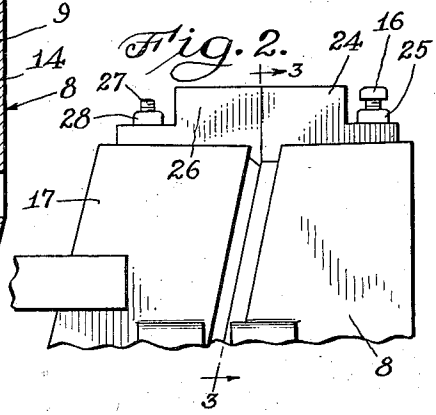


Fig. 3.

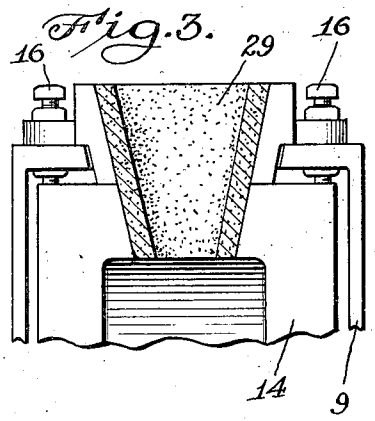
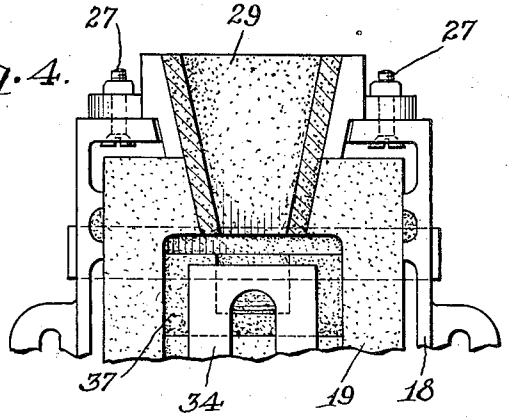


Fig. 4.



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2,001,583

CASTING MOLD

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Original application March 7, 1931, Serial No. 520,782. Divided and this application August 16, 1933, Serial No. 685,333

1 Claim. (Cl. 22—125)

This application is a division of my application Serial No. 520,782, filed March 7, 1931.

The invention relates to casting molds of that class commonly referred to as repetition or permanent molds and which are intended for use in the manufacture of railway brake shoes and other castings which are produced in large quantities.

The pouring gate of a repetition mold tapers inwardly and it is the practice to leave this pouring gate partly filled with molten metal at the conclusion of the pouring operation. This molten metal in the pouring gate cools and forms a tapered sprue which is connected with the casting in the mold cavity. The cast brake shoe in cooling shrinks toward its middle and when the pouring gate is located at an end of the mold cavity the sprue will anchor in the pouring gate and will prevent the natural shrinkage of the shoe and cause the shoe to shrink toward the pouring gate end and set up stresses and strains in the mold which will cause the shoe to bind in an all-metal mold and to damage any wall of a mold cavity which may be made of refractory material.

The object of the invention is to relieve the anchorage of the sprue in the pouring gate and to permit the natural shrinkage of the cast shoe toward its middle and to avoid damage to refractory walls of the mold cavity by providing the pouring gate with a frangible core which will break down under the pulling strains of the shrinking shoe upon the sprue and permit the sprue to move inwardly into the mold cavity.

In the selected embodiment of my invention illustrated in the accompanying drawing,

Fig. 1 is a longitudinal sectional view of my improved mold.

Fig. 2 is a side elevational view of the end portion of the mold wherein the pouring gate is located.

Fig. 3 is a plan view of the end portion of the drag taken on the parting as indicated by the line 3—3 on Fig. 2, the pouring gate core being shown in section.

Fig. 4 is a plan view of an end portion of the cope taken on the parting and showing the pouring gate core in section.

In the accompanying drawing, a suitable base 5 is provided with a pair of upright brackets 6 having bearings 7 in which trunnions on the drag 8 are journaled so that the mold may be pivoted in the bearings to be turned either into vertical position or into horizontal position. The drag comprises a metal shell 9 having a block 10 of refractory material secured in position therein by means of the ribs 11 and a suitable material 13, such as lead, Babbitt metal or other soft metal, or carborundum, Portland cement or other plastic substance, in grooves 12 in said ribs. Metal chill blocks 14 and 15 are clamped against the opposite ends of the block 10 by adjusting bolts 16 mounted in the end walls of the shell. The cope 17 comprises a metal shell 18 having a refractory block 19 secured in position therein by ribs 20 having grooves 21 with a suitable material 14 such as that used in the grooves 12.

The mold cavity is formed in the refractory blocks 10 and 19 and the chill blocks 14 and 15 with a passage P connecting with one end of the mold cavity. The end walls of the shells 9 and 18 are cut away to receive the neck 22 of the sectional pouring gate 23. The section 24 of the gate is secured to the shell 9 by nuts 25 on the bolts 15 and the section 26 is secured to the shell 18 by bolts 27 and nuts 28. The parting of the mold extends along the opposing faces of the sections 24 and 26 of the pouring gate and along opposing faces of the cope and drag. A core or liner 29, preferably unitary, is arranged in the pouring gate and the passage P and extends to the adjacent end of the mold cavity. This core conforms to the inner walls of the pouring gate 23 and the passage P and it has a tapered opening therein to receive the molten metal. The core is frangible so that it may break down when the casting is cooling and shrinking to prevent damage to the refractory material 10 and 19, and it is also preferably porous to permit the escape of gases during the pouring operation. The core may be made of sand like or substantially like sand cores customarily made in foundry practice. The molten metal is poured through the core of the pouring gate into the mold cavity and more or less metal remains in the pouring gate according to custom. As the casting cools in the mold and the molten metal cools in the pouring gate to form the sprue the shrinkage of the casting which is normally toward the middle of the shoe and the shrinkage of the sprue will be opposed and if it were not for the frangible core in the pouring gate this shrinkage would produce stresses and strains of the shoe on the walls of the mold cavity to such an extent that the refractory walls are very likely to be damaged; and damage to the refractory walls may make the mold unserviceable until the walls have been replaced or repaired and comparatively slight damage ordinarily involves considerable labor and time to repair. But the frangible core 29 crushes under the shrinking strains of the shoe and sprue and

permits the shoe to shrink naturally and also permits the sprue to shrink naturally and move into the mold cavity to compensate for the shrinkage of the shoe to which it is integrally connected. The mold selected for illustration is designed for casting a brake shoe in upright position (Fig. 1) and the refractory material 19 in the cope has a centrally located recess 30 to receive the cores 31 and 32 and the lug strap 33 for forming the attaching lug on the back of the shoe at the middle thereof. These lug cores and straps are assembled as a unit with the reenforce insert 34 which is arranged in the mold cavity for embedment in the cast shoe at the back thereof. This unit is held in place in the mold by any suitable means such as the looped wire 35 and a spacer 36 may be provided between the recess 30 and the shell 18 to protect the refractory material against the crushing action which would occur when too much tension is put upon the wire 35 by the tensioning means 35'.

Brake shoes are customarily provided with end lugs on the back thereof and if the cavities for these lugs were formed in the refractory material the lugs would be liable to damage the refractory when the cast shoe shrinks in cooling. Therefore I provide frangible cores 37 in the refractory 19 of the cope, which cores are suitably shaped to form the end lugs on the back of the shoe and are frangible to crush under the shrinking strains of the shoe. When a brake shoe cast in the mold shown in Fig. 1 of the drawing cools the casting will shrink toward the middle and pull the sprue slightly into the mold cavity, thereby crushing the frangible liner 29. At the same time the cores 37 will be crushed by the end lugs on the back of the shoe. It will not be necessary to provide the end cores 37 unless the shoe is to have end lugs corresponding with the cavities therein. Thus the shrinkage of the shoe is permitted to proceed in its normal and natural way toward the center of the shoe without resistance by the sprue and without damage to the refractory blocks 10 and 19. The frangible core 29 in the pouring gate breaks down under the pressure of the sprue in shrinking and under the pulling strain of the shoe in shrinking and if cores 37 are provided they also will break down under the pressure of the end lugs of the shoe and the shrinkage of the shoe. The core 29, and also the core 37 if used, can be readily replaced for each casting operation, but the blocks 10 and 19 which constitute the greater part of the walls of the mold cavity will remain intact without becoming damaged by shrinkage of the shoe in cooling.

After the casting has cooled sufficiently the cope and drag may be separated, the casting removed and the cope and drag prepared for a repetition casting, and these operations may be repeated as often and as frequently as required.

I have illustrated the invention in a selected embodiment for casting a brake shoe, but I do not limit the invention to this particular use, nor to the particular construction and arrangement of parts herein shown and described, but I reserve the right to make any changes and modifications which may be necessary or desirable for different castings or for other purposes and within the scope of the following claim.

I claim:

A repetition mold for casting brake shoes and the like and having an elongated mold cavity, a tapered pouring gate extending through one end of the mold in the direction of the length of the mold cavity and communicating with the adjacent end of the mold cavity, a tapered frangible core in said pouring gate, a wall of the mold cavity being made of refractory material and having recesses therein to form projections on the casting adjacent the ends thereof, and frangible cores in said recesses at the opposed ends thereof, the core in the pouring gate adapted to be crushed by the movement of the sprue as the sprue shrinks and the cores in the recesses adapted to be crushed by the movement of the projections therein as the casting shrinks towards its middle, and thereby permitting the casting to shrink in its normal way from its ends towards its middle without damage to the refractory part of the cavity wall.

FRED M. POE.