Jan. 15, 1935. D. L. SUMMEY 1,988,425

MOLD

Filed July 8, 1931 2 Sheets-Sheet 1

Fig. 2.

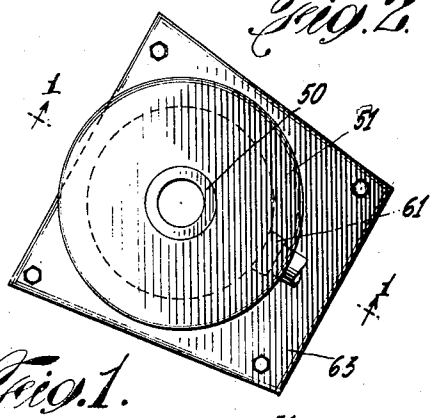


Fig. 3.

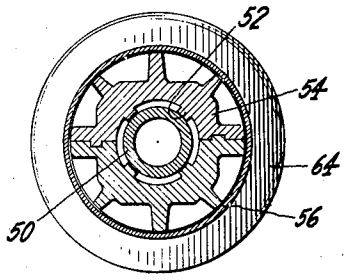


Fig. 1.

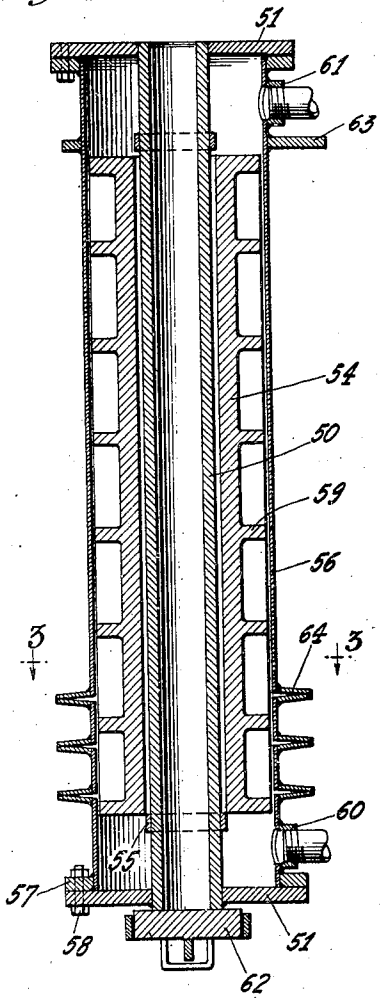


Fig. 4.

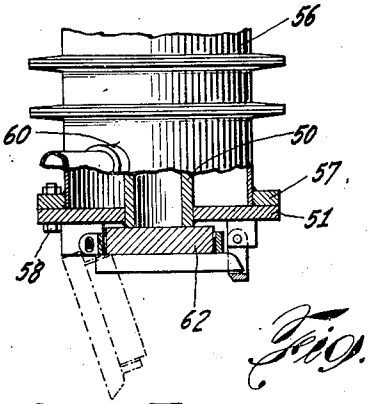
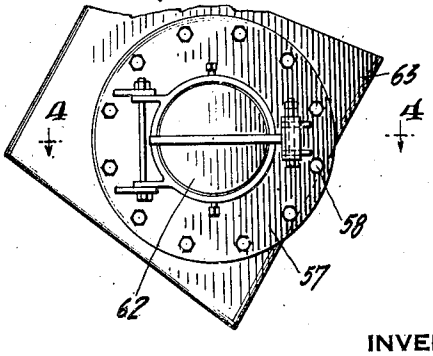


Fig. 5



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Jan. 15, 1935. D. L. SUMMEY 1,988,425

MOLD

Filed July 8, 1931 2 Sheets-Sheet 2

Fig. 7.

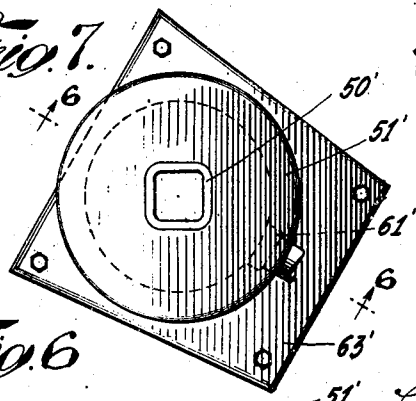


Fig. 8.

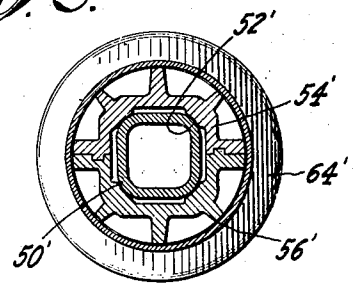


Fig. 6

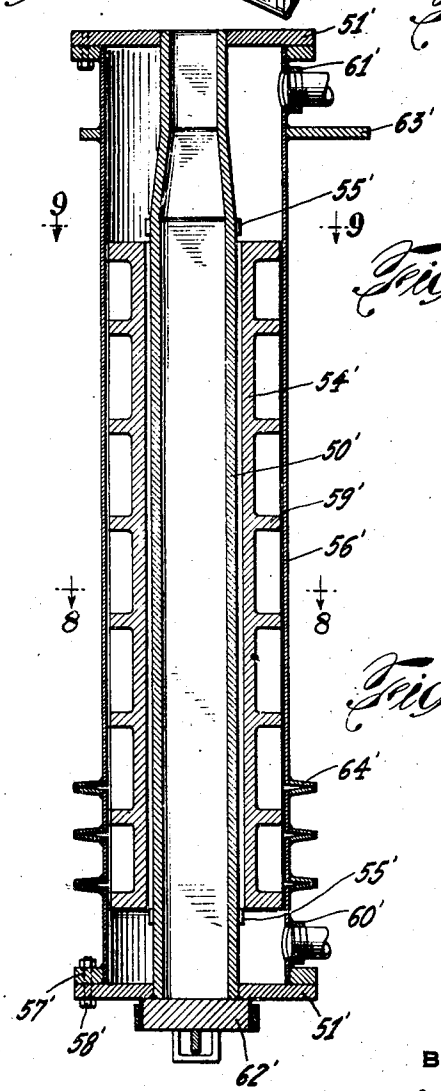


Fig. 9.

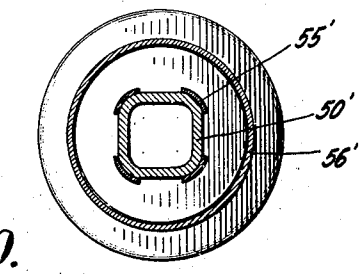


Fig. 10.

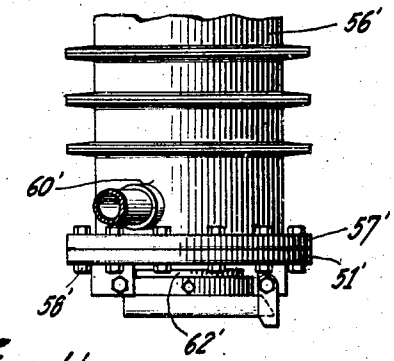
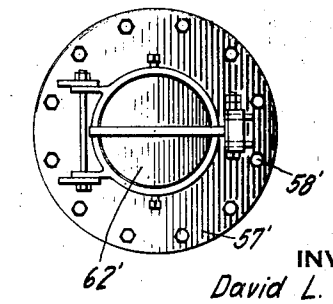


Fig. 11



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Patented Jan. 15, 1935 1,988,425

UNITED STATES PATENT OFFICE

1,988,425

MOLD

David L. Summey, Waterbury, Conn.; The Colonial Trust Company and Richard P. Weeks Summey, executors of said David L. Summey, deceased, assignors to Scovill Manufacturing Company, Waterbury, Conn., a corporation of Connecticut

Application July 8, 1931, Serial No. 549,434

7 Claims. (Cl. 22—177)

The present invention relates to chill molds for casting billets, bars and other workable shapes and has for an object the provision of improvements in this art.

The invention provides an improved lining for a mold. Molds of this class are usually formed of cast metal. The castings frequently have blow-holes or other blemishes on their interior surfaces with which the molten metal contacts and this either renders the molds unsuitable for use in the beginning or causes them to deteriorate so rapidly as soon to become useless. Herein a lining of seamless wrought or worked metal is employed, the same being produced by extruding, drawing or rolling, and this is found to be much smoother and less subject to imperfections than cast metal. Consequently it produces better castings and has a much longer life.

The invention also provides a mold assembly in which the worn-out lining tubes may be readily replaced without replacing the whole mold assembly. This greatly reduces repair and replacement expense.

The invention also provides a mold assembly in which the lining tube is firmly backed up by heavier members to prevent it from bulging or otherwise getting out of shape.

Also there is provided improved means for accommodating the change in length between the lining tube and parts which are less subject to temperature changes.

Other objects and various novel features of the invention will be apparent to those skilled in the art from the following description of a few specific embodiments thereof. In the description reference will be made to the accompanying drawings which form a part of this specification, and in which:

Fig. 1 is a vertical longitudinal section through one form of mold, the view being taken on the line 1—1 of Fig. 2;

Fig. 2 is a top plan view thereof;

Fig. 3 is a transverse section taken on the line 3—3 of Fig. 1;

Fig. 4 is a partial section taken on the line 4—4 of Fig. 5;

Fig. 5 is a bottom plan view;

Fig. 6 is a vertical longitudinal section of a modified form of mold, the view being taken on the line 6—6 of Fig. 7;

Fig. 7 is a top plan view thereof;

Fig. 8 is a transverse section taken on the line 8—8 of Fig. 6;

Fig. 9 is a transverse section taken on the line 9—9 of Fig. 6;

Fig. 10 is a partial elevation of the lower portion of Fig. 6; and

Fig. 11 is a bottom plan view.

Referring to the drawings, and particularly to Figs. 1 to 5, the mold comprises a lining tube 50 formed of worked—as distinguished from cast—metal, which increases in inside dimensions from the top to the bottom in order to discharge the billet. The lining tube is also preferably seamless so as not to have any openings into which molten metal may run. This construction also furnishes more strength than one in which the tube is split.

The lining tube 50 is provided with mounting plates 51 at its ends, which plates are welded thereto, as indicated. The tube is thus readily removable by burning out the welded joint. A reweld can be made at the same place so that the plates and the parts assembled therewith may not have to be replaced until a number of tubes have been used.

The tube 50 may be backed at spaced points as by the ribs 52 of supporting members 54. Thus is provided spaces for the circulation of cooling fluid directly against the outer surface of the lining tube. Thin rings 55 welded to the tube 50 maintain the members 54 in axial position, the passages between the ends of the ribs still being left open for the flow of fluid. The members 54 are notched and are secured together in any suitable manner.

A cooling fluid confining jacket 56 encloses the whole inner assembly and is provided with flanges 57 to which the plates 51 are secured by bolts 58 to support the inner assembly. On their outer surfaces the supporting members 54 are provided with cooling fins 59 which terminate a short distance inside the jacket to permit the circulation of fluid thereby. The jacket is provided with a fluid inlet nipple 60, a fluid outlet opening 61 and a cover 62, the latter being hinged to the lower plate 51. The cover 62 is preferably mounted so as to be adjustable to fit the end of the tube 50. Latch means of any desired type are provided for holding the cover in closed position. A floor support 63 is provided near the top of the assembly for holding it in position.

Means are provided for accommodating relative expansion and contraction between the lining tube and the jacket. This means herein comprises bellows sections 64 welded to the ends of adjoining sections of the jacket 56, the bellows sections each being formed by welding two annular metal discs together at their outer edges. The number of bellows joints, will depend on the

length of the mold, the kind of metal from which it is made and the variations in temperatures to be experienced.

The modification shown in Figs. 6 to 11 is the same as that shown in Figs. 1 to 5 (and the same reference numerals, with a prime (') added, are applied thereto) except that the inner tube is square instead of round; that short lengths of band 55' are used; that the ribs 52' touch only the corners of the inner tube, the radius of the outer corners of the tube being shorter than the inner radius of the ribs; and that the inner tube is elongated and tapered at its upper end to produce a bar with a tapered end.

It is to be understood that the specific embodiments described above are merely representative and that the invention may have various forms within the scope of the subjoined claims.

What I claim is:

1. In a casting mold in combination, a relatively thin inner tube in which the metal is cast, a thick supporting tube provided with longitudinal splines engaging the outer surface of the inner tube, fins formed on the outer surface of said supporting tube, and a cooling fluid jacket surrounding the whole and providing for circulation of fluid therethrough to cool said tubes.

2. In a casting mold, in combination, a relatively thin inner tube in which the metal is cast, a thick supporting tube provided with longitudinal splines engaging the outer surface of the inner tube, rings secured on the outer surface of the inner tube adjacent the ends of the outer tube for retaining the latter upon the former, said rings being radially thinner than said splines so as to permit the flow of cooling fluid between the ends of the splines, and a cooling fluid jacket surrounding the whole and providing for circulation of fluid therethrough to cool said tubes.

3. In a casting mold, in combination, a relatively thin inner tube in which the metal is cast, a thick supporting tube provided with longitudinal splines engaging the outer surface of the inner tube, means for holding the outer tube in position on the inner tube but leaving openings at the ends of said splines for the flow of cooling fluid, longitudinal strengthening splines on the outer side of the outer tube, a cooling fluid jacket surrounding the whole and providing for circulation of fluid therethrough to cool said tubes, and circumferential fins on the outer side of the outer tube extending close to the jacket for directing the flow of cooling fluid principally toward the space between the inner and outer tubes.

4. In a casting mold, in combination, a relatively thin inner tube in which the metal is cast, a thick supporting tube provided with spaced splines engaging the outer surface of the inner tube, interacting elements between the supporting tube and the inner tube near its ends for maintaining the tubes in proper longitudinal relationship but leaving openings for the flow of cooling fluid between said tubes, and a cooling jacket surrounding the whole and providing for circulation of cooling fluid therethrough to cool said tubes, said jacket being constructed to accommodate unequal expansion and contraction of the inner tube and the jacket.

5. Apparatus as set forth in claim 4 in which said jacket is securely attached to the ends of the inner tube and is provided along its length with an expansion section.

6. Apparatus as set forth in claim 4 in which said jacket is securely attached to the ends of the inner tube and is provided along its length with a bellows expansion section comprising pairs of flat annular plates integrally united at their outer edges and united to tubular sections of the jacket at their inner edges.

7. In a metal casting mold, in combination, a relatively thin inner tube in which metal is cast, means bracing said inner tube at intervals on its outer surface but leaving portions of the outer surface exposed for the contact of cooling fluid therewith, said bracing means permitting longitudinal expansion of said tube, a cooling jacket surrounding the whole and providing for the circulation of cooling fluid therethrough to cool said tube, said jacket comprising end plates securely attached to the tube near its ends, cylindrical sections surrounding the tube, and a bellows expansion section rigidly attached to the ends of adjacent cylindrical sections, said bellows section comprising pairs of flat annular plates integrally united to each other at their outer edges and integrally united separately to adjoining cylindrical sections at their inner edges.

DAVID L. SUMMEY.