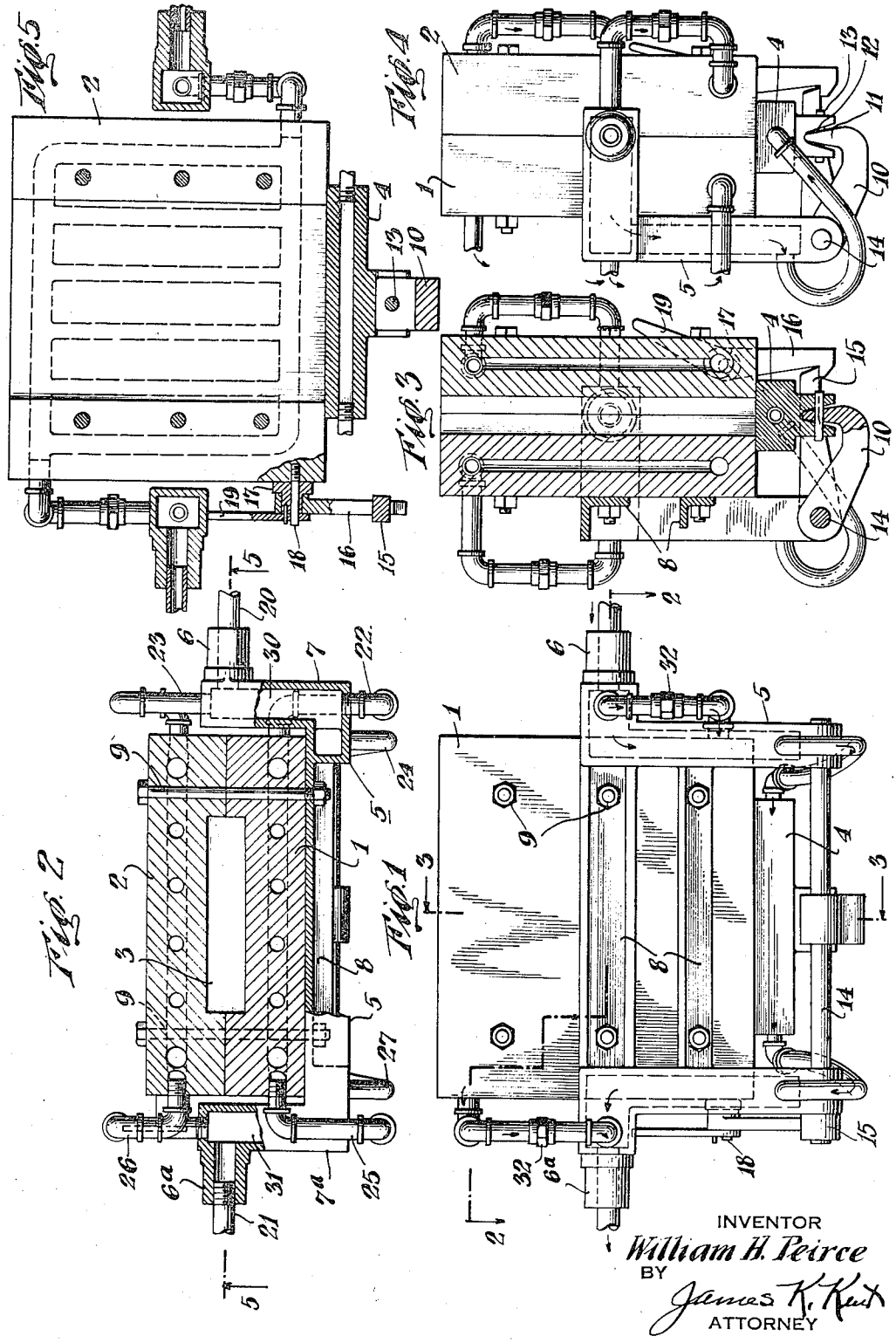
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COPPER MOLD

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COPPER MOLD

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This invention relates to casting apparatus and more particularly to molds for the casting of metals having high heat conductivity.

The invention relates to a mold made in two water cooled sections to form a closed casting space whereby the contour of the mold cavity may be easily machined so as to produce accurate and precise dimensions with a minimum of expense and without sacrificing any of the heat transferring properties of the mold.

The invention also relates to an arrangement for cooling the mold in such a manner as effectively to absorb the heat from the molten metal poured into the mold, and convey it rapidly away from the mold sections thereby preventing any deterioration of the mold sections through contact with the hot molten metal being cast.

A further feature of the invention consists in providing a new and improved cradle or yoke permitting easy manipulation of the mold, whereby it may be readily inverted so that the casting, when sufficiently hardened or solidified, may be removed from the mold through the open top end thereof.

The invention also consists in certain new and original features of construction and combinations of parts hereinafter set forth and claimed.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, and the manner in which it may be carried out, may be better undestood by referring to the following description taken in connection with the accompanying drawing forming a part thereof, in which

Fig. 1 is a side elevation of a mold and the supporting yoke therefor;

Fig. 2 is a top section on the line 2—2 of Fig. 1;

Fig. 3 is an end section on the line 3—3 of Fig. 1;

Fig. 4 is an end view of the mold and yoke; and

Fig. 5 is a side section on the line 5—5 of Fig. 2.

Referring to the drawing, sections 1 and 2 of the mold are preferably made by casting blocks of copper of approximately the desired shape. The inner adjacent faces of the sections are machined to form the casting chamber to the desired degree of accuracy.

Suitable cooling passages are provided in both sections of the mold. These may be formed by casting each section over an assembly of copper pipes fitted together in any desired manner. In the form shown in the drawing, this pipe assembly consists of horizontal inlet and outlet pipes with several vertical connecting pipes, thus forming a number of parallel passages for the cooling fluid, such as water, flowing from the inlet to the outlet in each section. The lower horizontal pipe may be the inlet pipe and the upper one the outlet pipe. Thus, any steam which may be formed during casting will be carried to the outlet.

The complementary recesses forming the casting space 3 may be cut to different depths in the mold sections. For example, five-eighths of the width of the casting space may be comprised in the recess in section 1 and three-eighths of the indentation in the recess of section 2. By this construction the casting space may be divided in any appropriate proportions desired.

The mold may be supported in a suitable yoke or cradle such as the U shaped yoke 5 formed of a single steel casting having hollow ends 7 and 7a and connecting struts 8 between these ends forming the support for the mold. The yoke is provided at its ends with trunnions 6 and 6a which are arranged in alignment with each other and may be journalled in a suitable carriage (not shown).

The two sections of the mold are secured together by bolts 9 passing through both of these sections. The mold is also secured to the supporting yoke by means of these bolts, some of which pass through bridging struts 8 between the ends of the yoke.

Preferably, the bottom gate 4 of the mold is movable and is machined to fit tightly against the bottom of the mold to close the lower end of casting space 3. A gate arm 10 may be keyed or splined to a shaft 14 which extends across the lower park of yoke 5. Gate arm 10 has a wedge-shaped up-turned end 11 which is fitted into a V slot 12 cut in the lower side of the gate piece 4. The wedge-shaped end of arm 10 is held in slot 12 by a pin 13 passing through the sides of the slot and the wedge-shaped tip of the arm. There is thus formed a rocking joint whereby the gate may be tilted slightly one way or the other to enable close alignment with the bottom of the mold.

A lever arm 15 is also keyed to the shaft 14 at the left hand end thereof whereby rotation of the lever arm will rotate the gate arm 10 and open or close the gate. Latching means, such as latch or hook 16, pivoted on the end of the mold section 2 engages the end of lever arm 15 whereby the gate may be locked against the bottom of the mold. The latch 16 is journalled on an eccentric sheave 17 which is mounted to rotate on pin 18

tapped into the edge of mold section 2. A handle 19 is secured to the eccentric sheave 17 whereby it may be rotated to raise the latch slightly and thus tighten the gate against the bottom of the mold.

The fluid circulating system, whereby the cooling fluid, such as water, may be circulated through the parts of the mold, is provided with an intake pipe 20 concentric with the trunnion 6 of the yoke, whereby the fluid may be supplied to the passage 30 in the end 7 of the yoke 5. Fitted pipes 22 and 23 connect the passage 30 to the intake ports for the fluid circulating systems in the ends of sections 1 and 2 of the mold. Flexible means, such as metallic hose 24, connects the same passage 30 in end 7 with the intake opening for the fluid passage in bottom gate 4.

Outlet pipes 25 and 26 connect the outlet ports in the other ends of mold sections 1 and 2 with the passage 31 in end 7a of the yoke. Flexible means, such as metallic hose 27, connects the outlet from the circulating passage in gate member 4 with the passage 31. Outlet pipe 21, concentric with trunnion 6a of the yoke, connects with the passage 31 and serves to lead the used cooling fluid away from the molding apparatus.

The trunnion mounting of the yoke enables the mold to be rotated to any desired orientation and thus allows the cast cake to be dumped from the top of the mold, as desired. Also a very simple mold assembly is provided whereby the mold may be taken apart and machined or cleaned whenever desired. This is done by removing the bolts 9 and disconnecting the couplings, such as 32, in the inlet and outlet pipes between the yoke and the mold sections.

In operation, the mold may be mounted in a suitable casting machine or apparatus (not shown) and cooling water, or other liquid or gas, is circulated through the passages of the yoke and mold. The cooling water will enter the passage 30 in the end 7 of the yoke through intake pipe 20. It is there divided into a plurality of parts, a portion of the water passing through pipe 22 to the intake port of mold section 1 where it follows the several paths provided within the mold section and leaves through outlet pipe 25 leading to the passage 31 in the end 7a of the yoke. Another portion of the cooling water passes through pipe 23 to the intake port of section 2 of the mold and after passing through this section it is carried to the passage 31 by means of pipe 26. A still further portion of the cooling water passes through the flexible coupling pipe 24 to the intake of the cooling passage in the gate member 4. After passing through the cooling passage in the gate, this water is carried to the passage 31 by means of the second flexible coupling 27. The used cooling water which collects in passage 31 passes out through outlet pipe 21 concentric with the trunnion 6a.

Before casting, the bottom gate is swung into place against the bottom of the mold by means of lever 15 and is locked into place by the latch 16 which is tightened by means of handle 19 attached to the eccentric sheave. The lining of casting space 3 is also preferably coated with a mold dressing, such as graphite. The mold is then filled with molten metal in any desired manner well known to the art. After the cake has been sufficiently cooled by the action of the cooling system it is then dumped.

When the cake is dumped from the top of the mold, the supporting yoke is rotated on its trunnions 6 to such a position that the cake will slide out by gravity. If the cake is to be dumped from the bottom of the mold, latch 16 is tripped in any suitable manner thus allowing the gate to swing back on its pivot shaft 14 whereupon the cake drops freely out of the bottom of the mold.

By this construction, a two-piece, parallel-walled, top and bottom-dumping, water-cooled mold having an improved form of yoke which is provided with cooling passages is produced. The mold structure may also be easily assembled and taken apart whereby it may be machined from time to time in order to true up the adjacent surfaces of the recesses forming the casting chamber.

While certain novel features of the invention have been disclosed and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. In metal casting apparatus, a two-piece mold having cooling ducts therein, a detachable supporting yoke therefor comprising two hollow ends and a plurality of struts connecting said ends, and means for conveying water through said ducts via the hollow ends of said yoke.

2. In metal casting apparatus, a two-piece mold comprising a first section and a second section, a gate piece, a U shaped yoke for supporting said mold, cooling fluid passages in said mold sections, said gate piece and the arms of said yoke, and pipes connecting the passages in said mold sections and gate piece to the passages in the arms of said yoke.

3. In a two piece water-cooled copper mold, two complementary side walls forming a casting cavity between them, said walls being parallel whereby the cast copper cakes may be dumped from the top or the bottom of said casting cavity, water circulating passages in said walls having inlets at the bottom and outlets at the top thereof, a bottom gate closing the lower end of said casting cavity, a water passage in said gate, an inlet and an outlet to said passage, a U shaped yoke supporting said mold walls and said gate, water passages in the arms of said yoke, pipes connecting the passage in the first of said arms with said inlets, pipes connecting the passage in the other of said arms with said outlets, and feed and drain pipes connected to said arm passages, respectively.

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