Sept. 4, 1923.

1,466,826

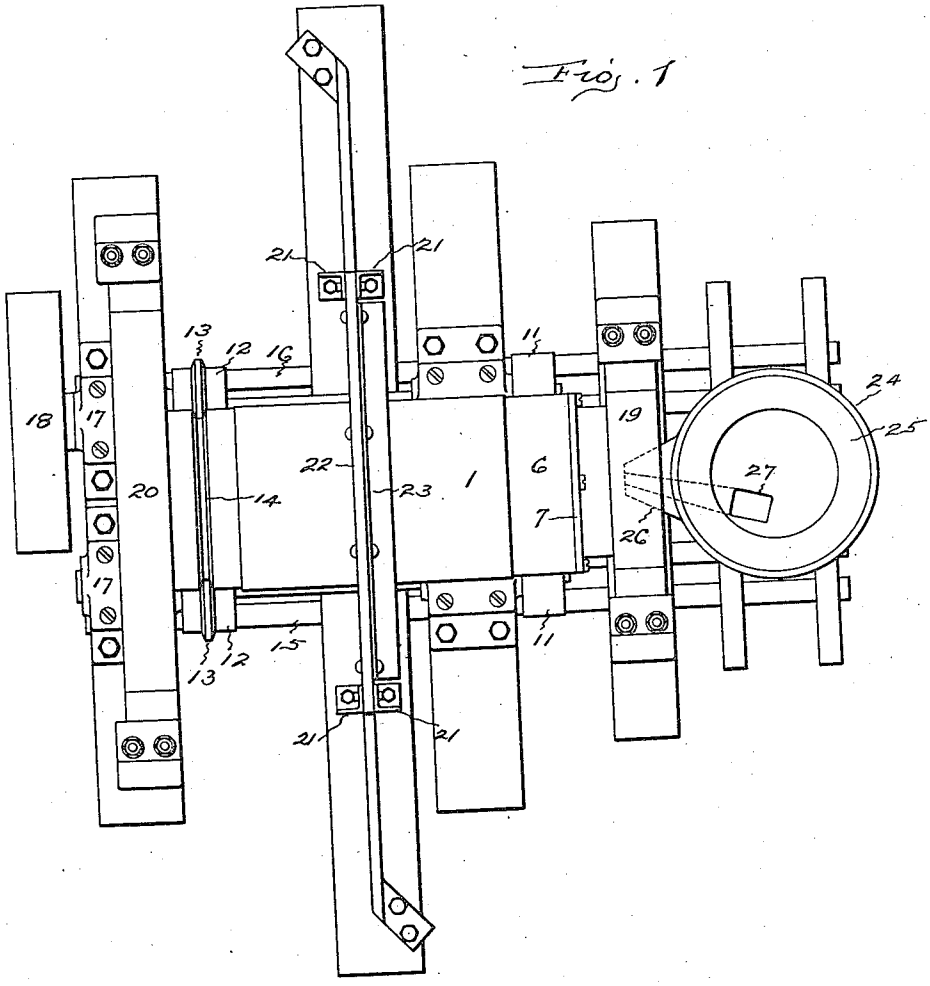
W. A. GORDON

CENTRIFUGAL MOLD

Filed Aug. 31, 1922

2 Sheets-Sheet 1

Fig. 1



INVENTOR

William A. Gordon by

Harry R. Williams

Atty.

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Fig. 2

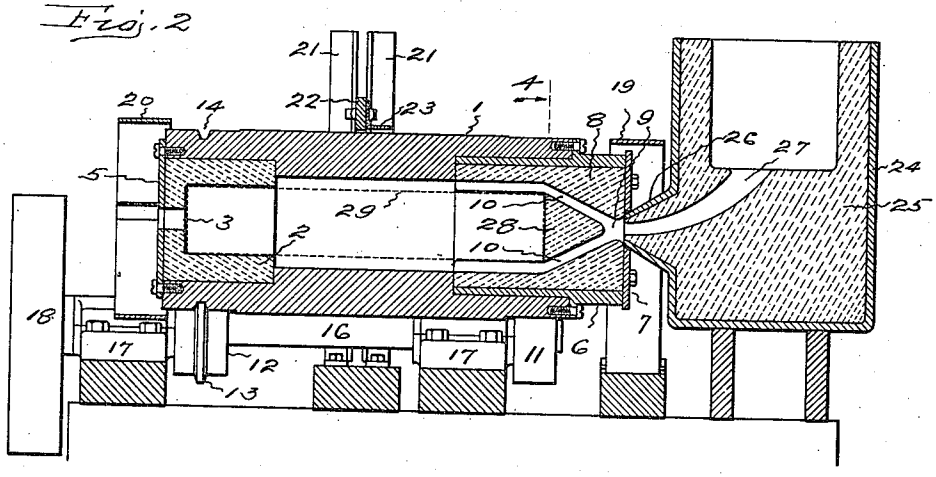


Fig. 3

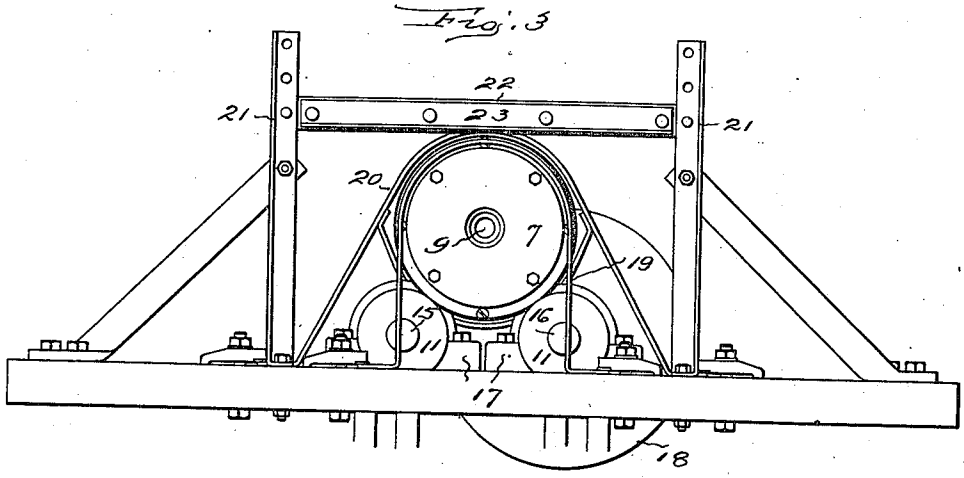


Fig. 4

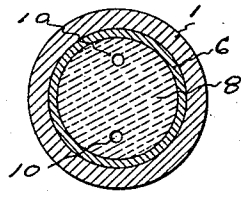
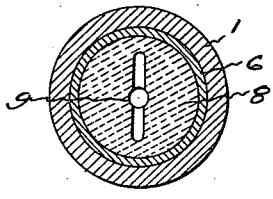


Fig. 5



INVENTOR

William A. Gordon by

Harry P. Williams

Atty.

Patented Sept. 4, 1923. 1,466,826

UNITED STATES PATENT OFFICE.

WILLIAM A. GORDON, OF SHELTON, CONNECTICUT, ASSIGNOR TO BIRMINGHAM IRON FOUNDRY, OF DERBY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

CENTRIFUGAL MOLD.

Application filed August 31, 1922. Serial No. 585,393.

To all whom it may concern:

Be it known that I, WILLIAM A. GORDON, a citizen of the United States, residing at Shelton, in the county of Fairfield and State of Connecticut, have invented a new and useful Improvement in Centrifugal Molds, of which the following is a specification.

This invention relates to those apparatus for casting metal having molds which are capable of being rapidly rotated when the molten metal is poured and while it is cooling in order to ensure homogeneity and density of the metal and freedom from gas holes, surface cracks and unequal internal shrinkage stresses.

The object of the invention is to provide a simple apparatus having a construction that can be readily adapted to cast solid or hollow bodies of different sizes and shapes and which will operate with a minimum amount of power and will compact the metal into a desired condition.

This object is attained by providing a frame with rotating means arranged in such a manner that molds or flasks of various sizes may be substituted one for the other on the rotating means; in so constructing the molds that different plugs of refractory material having chambers of different sizes and shapes may be inserted into the chilling and supporting body, and in so designing the mold intake that the metal on entering is directed toward the chilling wall of the mold chamber and when it reaches there it is whirling with the rotating mold.

Figure 1 of the accompanying drawings shows a plan of an apparatus which embodies the invention. Fig. 2 shows a vertical longitudinal section of the same. Fig. 3 is a view looking toward the intake end with the feed kettle or trough removed. Fig. 4 shows a transverse section of the mold taken on the plane indicated by the dotted line 4 on Fig. 2. Fig. 5 is a similar section with a mold gate or intake plug of modified form.

The mold or flask has a substantial metal hollow cylinder 1, preferably cast iron. This cylinder forms the body of the rotating part of the apparatus and also acts to conduct heat rapidly from the molten metal, that is, to chill the metal cast therein. The ends of the cylinder are counterbored to enlarge the chamber therein. In the counterbore at one end is a chambered plug 2 of sand, fire clay or other suitable refractory material, with an axial gas vent 3. This plug is held in place by a plate 5 that is detachably fastened to the end of the cylinder. In the counterbore at the other end is a metallic shell 6 that is detachably fastened to the end of the cylinder. In this shell and held by a detachable plate 7 is a chambered plug 8 of sand, fire clay or other suitable refractory material. This plug has an axial inlet or gate opening 9 and leading inward and branching outward from which to the inner wall of the chamber in the cylinder are passages 10, these passages and the mouth forming a Y-shaped intake.

The body is mounted near the intake end on a pair of rolls 11 that are spaced some distance apart, and near the other end on a pair of spaced rolls 12, the latter rolls preferably having annular ribs 13 that fit into an annular groove 14 in the periphery of the cylinder. The rolls on one side are mounted on a common shaft 15 and the rolls on the other side are mounted on a common shaft 16. These shafts are held in ordinary bearings 17 mounted on any suitable frame or bed. One of the shafts is extended and provided with a pulley 18 which may be driven from any convenient source of power. When the pulley is rotated the mold is given a rotation by the rolls which support it, and the ribs on the rolls at one end prevent endwise movement of the mold. Mounted on the frame and extending about the intake end of the mold is a guard 19 and mounted on the frame and extending about the other end is a guard 20.

On each side of the mold near the middle are a pair of upright posts 21 and extending across the cylinder and held by these posts is a beam 22, on one side of which is an angle iron 23. This beam or the angle iron is designed to prevent the mold from jumping out of place when it is rotated. The elevation of this beam may be altered, to permit molds of different diameters to be placed on the rolls.

The feed kettle or trough arranged adjacent to the intake end of the mold has a metallic casing 24 in which is placed a lining 25 of sand, fire clay or other refractory material. This casing has a nose 26 that is fitted into an opening in the center of the

plate 7 about the intake opening through the plug 8. A throat 27 leads through the refractory lining from the opening in this kettle to the intake opening in the plug.

Molten metal poured into the kettle flows through the throat and is thrown outward through the Y-shaped gate opening in the entrance plug so that it is whirling at about the same speed that the mold is rotated when it reaches the chamber in the mold cylinder. Plugs having different shaped openings may be substituted for those shown.

Instead of having the gate opening for admitting metal to the mold Y-shaped, the preferred form, a triangular gate opening which accomplishes practically the same result, may be made by simply removing the refractory material 28 between the branches of the Y. This would leave the intake passage in the form illustrated in Fig. 5 rather than in the form shown in Fig. 4.

The mold described is comparatively inexpensive to build, simple to operate, and it runs with a minimum expenditure of power. Various sizes and forms of molds can be readily substituted one for the other on the rolls. If a tube is to be cast a core 29 of refractory material may be placed in the mold with its ends fitted into the chambers in the plugs. If a practically solid ingot that is, an ingot with heavy walls and only a relatively slight axial opening, as a roller with trunnions is to be cast no core need be used. When the apparatus is in operation the metal is thrown to the exterior of the chamber in the metal cylinder and is compacted solidly as it is chilled, by the centrifugal action which predominates over gravity and which is facilitated by the form of the intake opening that directs the metal to the outside of the chamber and whirls it rapidly before it reaches the chamber. This ensures a dense homogeneous casting without surface cracks, blow holes, and irregular shrinkage stresses.

The invention claimed is:

1. A centrifugal casting apparatus comprising a rotatable but longitudinally fixed cylindrical mold, means for rotating the mold, and means for feeding molten metal to the axis of the mold, said mold having a rotatable intake that extends obliquely outward in opposite directions from the axis to the inner wall of the molding chamber, whereby the molten metal is caused to whirl by being carried in said oblique intake at the same rate of speed as the rotating inner wall of the mold when it reaches the mold chamber.

2. A centrifugal casting apparatus having a rotatable mold, means for rotating the mold, and means for feeding molten metal to the axis of the mold, said mold having a Y-shaped intake opening that extends obliquely from the axis of the mold.

3. A centrifugal casting apparatus having a rotatable mold, means for rotating the mold, and means for feeding molten metal to the axis of the mold, said mold comprising a cast metal cylinder with counterbored ends and refractory plugs inserted into said counterbored ends, one of said plugs having a Y-shaped intake opening.

WILLIAM A. GORDON.