

R. TAYLOR & L. A. MILEY.
CASTING MACHINE.
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1,156,446.

Patented Oct. 12, 1915.
4 SHEETS—SHEET 1.

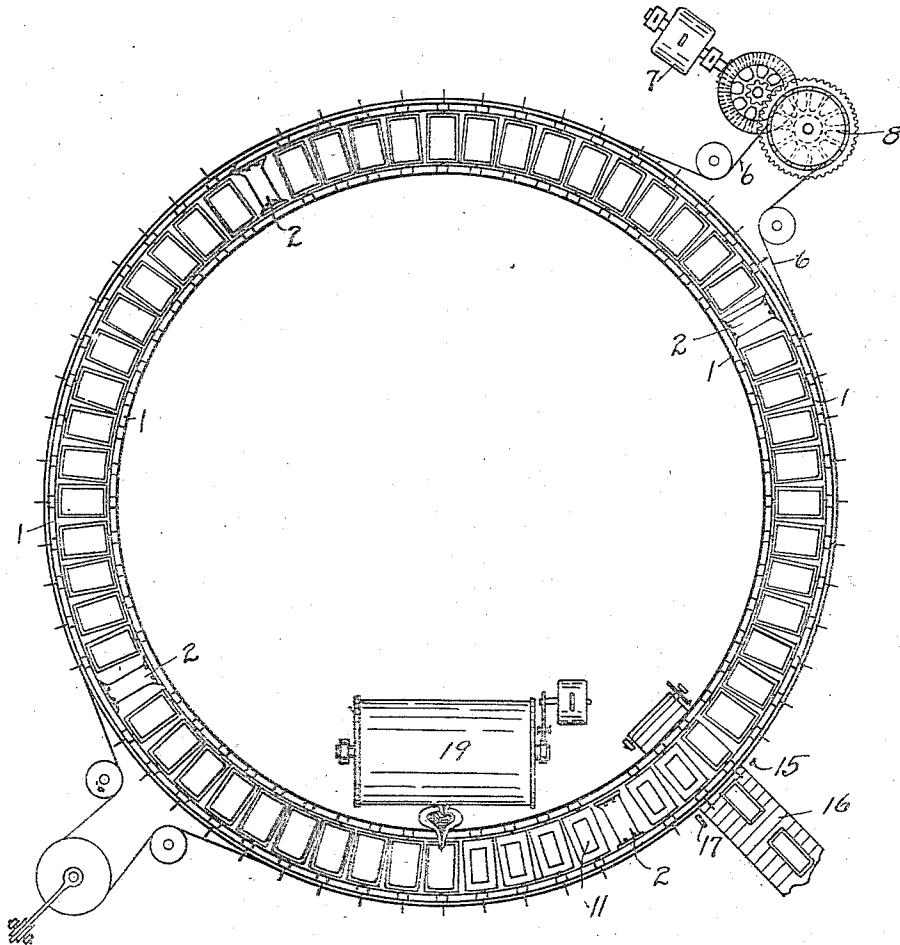


Fig. 1

Witnesses.

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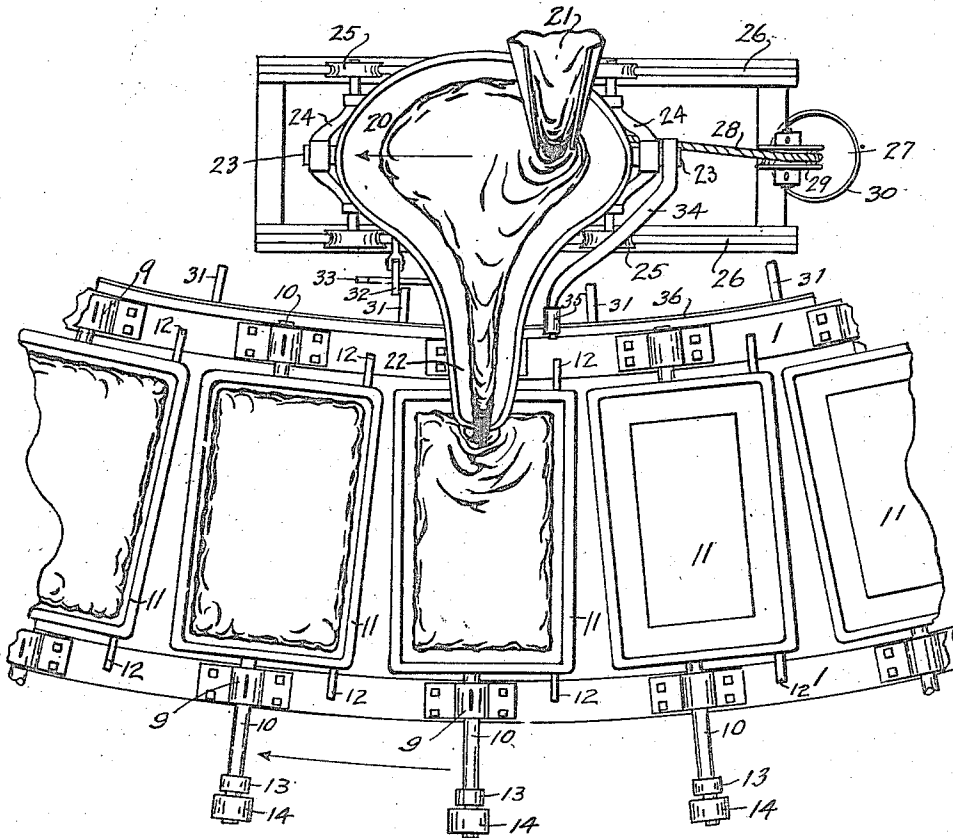


Fig. 2.

Witnesses

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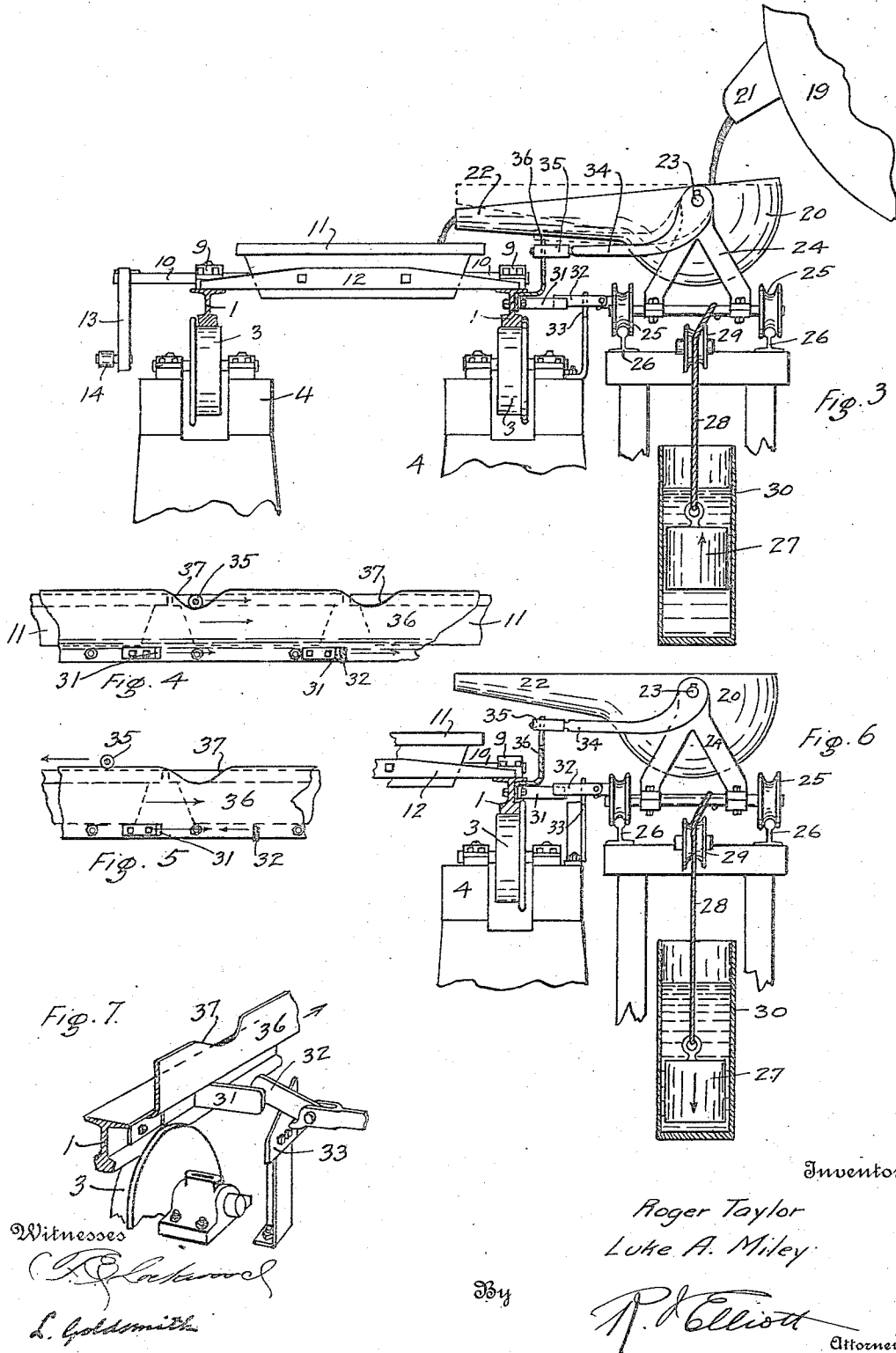
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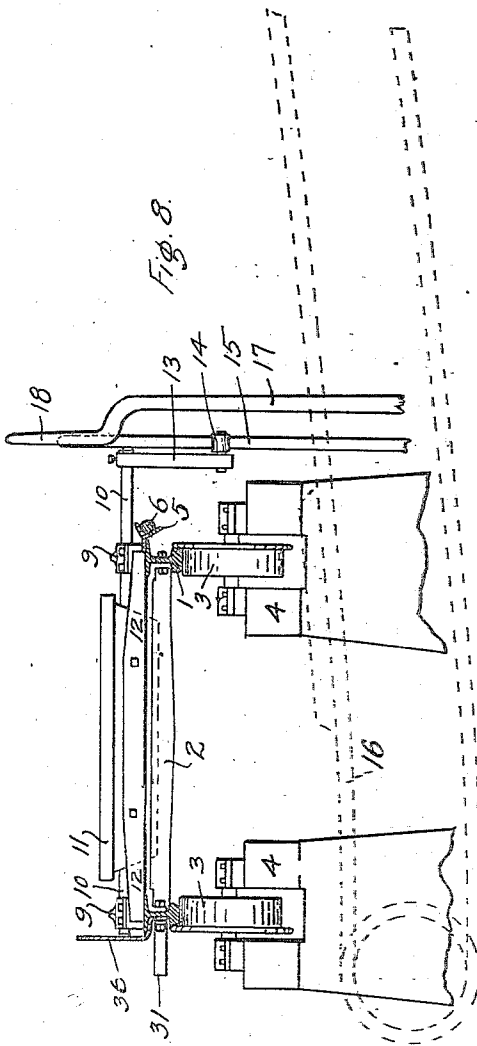
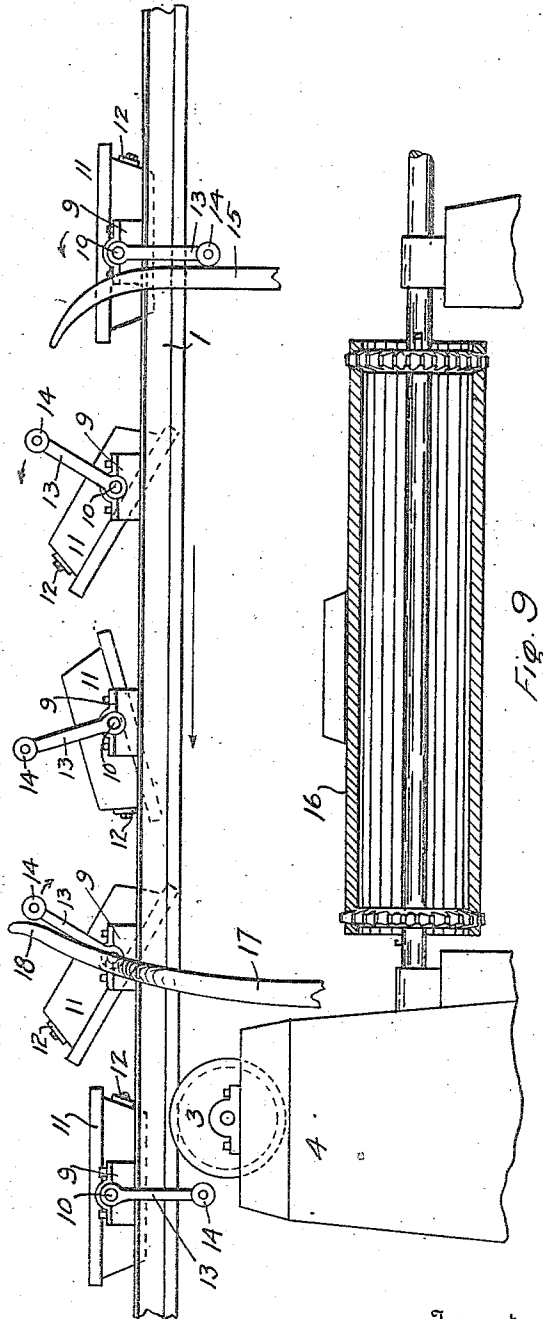
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

ROGER TAYLOR AND LUKE A. MILEY, OF SELBY, CALIFORNIA.

CASTING-MACHINE.

1,156,446.

Specification of Letters Patent.

Patented Oct. 12, 1915.

Application filed February 11, 1914. Serial No. 817,963.

To all whom it may concern:

Be it known that we, ROGER TAYLOR and LUKE A. MILEY, citizens of the United States, residing at Selby, in the county of Contra Costa, State of California, have invented a new and useful Casting-Machine, of which the following is a specification.

Our invention relates to improvements in the mechanism for casting metal, slag or matte ingots whereby the molten substance is poured into suitable molds, which follow each other successively, and cools therein and is dumped therefrom when sufficiently cooled.

The objects of our invention are to provide means for filling the molds, when they arrive at a predetermined place, with the molten substance without stopping their motion; to reduce the waste of metal from spilling; for dumping the ingots from the molds at a predetermined place; for imparting a reciprocating motion to the pouring spoon; and for tipping the pouring spoon to control the flow of the molten substance therefrom in accordance with the direction of its motion. We attain these and other objects by the devices, mechanisms and arrangements illustrated in the accompanying drawings, in which—

Figure 1 is a general plan of the machine; Fig. 2 is a plan of that portion thereof which receives and pours the molten substance; Fig. 3 is a side elevation of said part showing the molten substance being poured; Fig. 4 is a side elevation of a portion of the cam ring extending around the machine, showing the position of the roller when the pouring spoon is tipped to pour the molten substance therefrom; Fig. 5 is a similar view thereof showing the position of the roller when the pouring spoon is tipped up so that it cannot pour the molten substance; Fig. 6 is a view similar to Fig. 3 showing the pouring spoon tipped up; Fig. 7 is a perspective view of the part of the mechanism controlling the motion of the pouring spoon, the parts being in the positions occupied thereby when the spoon has almost reached the end of its longitudinal motion; Fig. 8 is a transverse section of the portion of the machine showing especially the mechanism for dumping the ingot onto a conveyer; and Fig. 9 is a front view

thereof, showing the conveyer partly in section.

Similar numerals of reference refer to similar parts throughout the several views.

This machine consists of a large ring-shaped frame, carrying a suitable number of similar ingot molds, which is slowly rotated past the point from which the molten substance is received. This ring-shaped frame is made of two inverted rails 1, suitably bent into two concentric circles, said rails lying in a horizontal plane and being fastened together by means of a plurality of spreaders 2, thus forming a rigid revoluble body. This frame is supported at suitable intervals on wheels 3, having axes arranged radially from the center of the frame, said wheels being mounted on foundation piers 4, so that the said frame may be easily rotated.

A Y-shaped ring 5 is secured entirely around the outer rail ring 1 of the frame and extends outward therefrom and is adapted to receive the driving cable 6 whereby the ring is rotated. This cable 6 is driven preferably by an electric motor, indicated at 7, which drives a suitable drum 8 on which the cable is wound. The cable 6 is endless and extends from around the drum engaging the Y-ring 5 and passing entirely around the machine, and also passing over a suitable tightening mechanism as indicated in Fig. 1, whereby the tension in said cable is regulated and kept constant.

At suitable intervals along the frame formed by the circular rails 1 are mounted pairs of bearing blocks 9, arranged radially and adapted to receive the trunnions 10 of the ingot molds 11. The molds, into which the molten copper, or other substance, is poured, are of any desired size and shape and are provided with a pair of trunnions, whose axis is slightly forward of the central axis of the mold. Lugs 12 are also secured to the rear of said molds 11, so that said molds will be supported partly by the trunnions 10 and partly by the lugs 12, which rest on the rails 1 of the circular frame. The outer trunnion 10 of each of the molds extends a short distance out from the outer rail 1 and has a depending lever 13 mounted thereon as shown in Figs. 3, 8 and 9. This lever 13 has a roller 14

mounted on one side of its free end, the roller being adapted to be engaged by the trip bars whereby the mold is turned on its bearings to dump the ingot and is returned to its normal position again.

The first trip bar 15 is positioned in line with the roller 14 on the lever 13 and extends upward on a curved line to a point slightly below the position of the roller 14 when the mold 11 is overturned. As each mold approaches the said trip bar 15 the roller thereof is at its lowermost position, but as soon as the roller 14 engages the trip bar 15, the forward motion of the mold retards the roller and forces it upward on the trip bar, turning the lever 13 and the trunnion 10 and tipping the mold in the frame, and this action continues until the mold is turned so that its center of gravity is forward of the trunnions, and then the weight of the mold and of the ingot therein will continue the turning motion so that the mold is turned completely over. The lugs 12, secured to the mold will violently engage the rails 1, and the shock incident to the sudden stopping of this rotary motion will dislodge the ingot from the mold and cause it to fall onto any suitable receiving or conveying device, such as is indicated at 16 in Figs. 8 and 9.

The second trip bar is positioned a short distance beyond the said first trip bar 15 and is of a slightly different form, having its main shank or standard 17 mounted outside of the line of the rollers 14, but having its upper part 18 off-set therefrom into said line so that this portion is adapted to engage the roller 14, when the mold is upside down and the roller is in its highest position, and the forward motion of the mold retards the roller 14 and causes it to travel downward on the off-set portion 18 of the trip bar, until the mold is turned far enough to assume its normal position under the action of gravity, the roller 14 then passes beside the shank 17 of the trip bar without engaging it as shown in Fig. 8; thus the mold is restored to position to receive a new charge of molten substance. The trip bar 15 is positioned a suitable distance from the pouring station to allow the substance to cool the desired amount and the trip bar 18 is positioned between the trip bar 15 and the pouring station in the direction of motion of the molds. Each mold, as it passes the first trip bar 15, is overturned and dumps its ingot and each mold is then restored to its normal position again.

In view of the fact that the circular frame supporting the molds 11, is continuously rotating, it is evident that, in order to fill the molds without unnecessary waste of metal, it is necessary to provide a movable device which will travel with a mold while it is filling it and which will not pour out

any of the molten substance in the space between two molds no matter how close or far apart they may be positioned. But in view of the fact that the molten substance is poured from a stationary receptacle 19, such as a converter for instance, it is evident that this pouring device must move within a very limited area. In order to accomplish this we provide a reciprocating pouring spoon which is of such transverse dimensions at its bowl or receiving end 20 that, whatever position it may be in, the said bowl remains vertically below the spout 21 of the receptacle 19; and whose pouring lip 22 is sufficiently contracted in width that the molten substance will not be wastefully spilled in passing to a mold. This pouring spoon is mounted on trunnions 23 whereby its pouring lip 22 may be raised and lowered to cause the molten metal to flow therefrom or to be held therein. The mechanism whereby this is accomplished will be described later. The trunnions 23 are positioned to the rear of the center of gravity thereof so that the spoon constantly tends to dip its lip 22 down. The trunnions are mounted in bearings which form part of the small car 24 having four suitable double-flanged wheels 25; the said car being mounted on a short section of track formed by two parallel rails 26. The car is free to move on the track 26, except that its forward motion is resisted by the weight 27 secured by a cable 28 to the car 24. This weight hangs over a fixed pulley 29 and is preferably submerged in a liquid which is contained in a vessel 30, slightly larger than the weight 27, so that as the car 24 is moved forward, the weight is raised and the liquid which was above it passes around it to a position in the bottom of the vessel, and as the car is released from its forward propelling mechanism the weight then acts thereon and draws it back to its starting position; but since the weight nearly fits the vessel 30, its action is retarded and the return motion is substantially constant and there will be practically no shock either at the beginning or the end of the motion.

A number of lugs 31 are fastened to the inner rail 1 of the frame, one said lug being provided in suitable position adjacent to each of said molds 11 mounted in the frame. A vertically movable latch 32 is mounted on the car 24, which supports the pouring spoon, in such position as to be engaged by any of the said lugs 31. A cam plate 33 is fixedly secured to the stationary frame at a suitable point, and is positioned so as to be engaged by the latch 32 and is inclined so as to raise the latch when it is thus engaged, and when said latch is thus raised it becomes disengaged from the lug 31 on the rotating frame. It is evident then that, if the car 24 is at the beginning of its travel, the latch

32 will be engaged by one of the lugs 31 as it passes the pouring station and will be dragged thereby, drawing with it the car 24 the weight 27 and the pouring spoon, so that the pouring spoon will travel with the mold and, if it is tipped down, will pour the liquid therein, but that when the latch 32 engages the cam plate 33 it is raised from out of the path of said lug 31 and released therefrom and the car 24 is freed from the rotating frame and is returned under the action of the weight 27 to its starting point where it again becomes engaged by the next lug 31 on the frame and the next mold 11 is therefore filled.

One of the trunnions 23 of the pouring spoon is provided with a lever 34 extending toward the rotating frame and having a roller 35 mounted on its end. A cam ring 36 is secured to the inner rail 1 of the rotating frame and is provided, in a suitable position adjacent to each of the molds 11, with a slight depression or notch 37 having suitably inclined sides. The roller 35 on the end of the lever 34 engages the cam ring 36 and the said parts are arranged in such a way that when the pouring spoon is moving forward with the mold the roller 35, on the lever 34 which controls the dip of the pouring spoon, is in one of the notches 37 in the cam ring 36 so that the lip 22 of the pouring spoon is depressed and the molten substance allowed to pour therefrom into the said mold. And, since the spoon travels with the mold, the roller 35 will remain stationary in the notch 37 until the car 24 has been released from the rotating frame as described, when the roller 35 will move backward relatively to the rotating frame and will leave the notch 37 and ride on the elevated part of the cam ring 36 and, as soon as it leaves the notch, it raises the end of the lever and turns the trunnions 23 of the pouring spoon thus raising the lip 22 thereof and preventing the molten substance from being poured therefrom when the car 24 and the spoon are returned into position to pour into the next mold.

The position of the lug 31 relatively to the notch 37 will correspond with the position of the latch 32 relatively to the roller 35, so that when the lug and latch engage the roller and notch will also be in engagement. The positions of each lug 31 and notch 32 relatively to the corresponding mold 11 must be substantially constant throughout the machine. The distance between centers of adjacent molds and the speed of rotation of the frame should be at least such as to give time for the filling of one mold and the return of the pouring spoon to the starting point. The size of the mold, the speed of rotation of the frame, and the length of travel of the pouring spoon should be such as to allow the mold to

be filled with the liquid. The size of the frame and the speed of rotation thereof should be such as to give time for the molten substance to solidify sufficiently between the pouring station and the dumping station.

Having described our invention, what we claim is:—

1. In a casting machine, the combination with a moving frame; of a mold mounted thereon; a lug extending from the frame and moving therewith; a pouring spoon movably mounted on tracks substantially parallel with the direction of motion of the mold therepast; means acting on the pouring spoon to actuate it in the opposite direction to the motion of the mold therepast; a latch connected to the pouring spoon and normally lying in the path of motion of said lug, whereby when the latch is engaged by the lug the pouring spoon is moved with the mold; and means for releasing the latch from engagement with the lug.

2. In a casting machine, the combination with a moving frame; of a mold mounted thereon; a lug extending from the frame and moving therewith; a cam piece connected to said mold and moving therewith, said cam having a depression in its operative surface; a pouring spoon movably mounted on tracks substantially parallel with the direction of motion of the mold therepast; a lever mounted on the pouring spoon whereby it may be tipped, said lever engaging said cam piece whereby when the lever is in engagement with the depressed portion thereof the pouring spoon is tipped down to pour and when it is in engagement with any other portion thereof it is tipped up to hold the molten substance therein; means acting on the pouring spoon to actuate it in the opposite direction to the motion of the mold therepast; a latch connected to the pouring spoon and normally lying in the path of said lug, whereby when the latch is engaged by the lug the pouring spoon is moved with the mold, said latch being so positioned as to be engaged by the lug when the lever is in engagement with the cam depression; and means for releasing the latch from engagement with the lug.

3. In a casting machine, the combination with a rotating ring-shaped frame; a mold mounted thereon; a lug extending from the frame adjacent to the mold; a ring-shaped cam plate secured to the frame and having a depression in its operative surface adjacent to the mold; a pouring spoon mounted adjacent the frame and adapted to be moved and tipped; a latch connected to the pouring spoon and adapted to be engaged by the lug whereby the pouring spoon is moved with the frame when said parts are in engagement; means for returning the pouring spoon when said parts are not in engagement; and means secured to the pour-

ing spoon and engaging said cam plate and so positioned as to engage the depression therein only when the lug is in engagement with said latch whereby the pouring spoon
5 is tipped down to pour when the lug is in engagement with the latch and is tipped up to hold the molten substance when said parts are not in engagement.

4. In a casting machine, the combination
10 with a moving frame; of a mold mounted thereon on horizontal pivots; a lever secured to said mold and adapted to turn it on its pivots; and a pair of stationary trip bars, positioned successively in the path of
15 motion of said lever, the first trip bar being adapted to engage the lever as it moves therepast and thereby to cause said mold to be overturned, and the second trip bar being adapted to engage the lever when in its
20 reversed position as it moves therepast and

thereby to cause said mold to be returned to its normal position.

5. In a casting machine, the combination with a supporting frame; of a mold reversibly mounted thereon on horizontal pivots, 25 the axis of said pivots being positioned to one side of the center of gravity of said mold; and lugs secured to said mold, and positioned thereon on the opposite side of the center of gravity from said pivots, and 30 resting on said frame, whereby the rotary motion of the mold on its pivots is limited and the mold is held in either of its positions.

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