

UNITED STATES PATENT OFFICE

2,135,245

CASTING MACHINE

Alvy C. Yerkey, Maywood, Ill.

Application April 30, 1937, Serial No. 140,012

9 Claims. (Cl. 22-77)

This invention relates to a casting machine, and more particularly to a machine in which individual moulds are poured automatically. The machine is especially useful in casting grids for storage batteries, but may be used for other purposes.

An object of the invention is to provide improved mechanism for pouring molten metal into moulds as they are delivered on a carrier. A further object is to provide mechanism for pouring the molten metal in which a predetermined amount of molten metal is automatically discharged into each of the moulds presented by the machine, and in which the amount of metal discharged may be changed. A more specific object is to provide cam means by which the movement of the carrier is utilized for timing the discharge of molten metal into the moulds. Other specific objects will become apparent as the specification proceeds.

An embodiment of the invention is illustrated in the accompanying drawing, in which—

Figure 1 is a broken view in elevation showing the parts of the casting machine with which my invention is concerned; Fig. 2, a broken plan view showing an edge portion of the rotary carrier; and Fig. 3, a detail view showing the pouring bucket, as seen from line 3 of Fig. 1.

As illustrated, A designates a frame carrying the pouring bucket; B, the means for supplying the bucket with molten metal; C, the rotary carrier and moulds carried thereon; and D, bucket-actuating mechanism controlling the discharge of metal from the pouring bucket.

The frame A may be of any suitable construction. As here shown, it comprises a base 10 to which is secured a standard 11 having attached the laterally extending frame piece 12. At its extreme outer end piece 12 is equipped with jaws 13 between which is mounted the pouring bucket 14. Bucket 14 is here shown as rectangular in shape having its top side open and its bottom equipped with a transverse slot 14^a, through which the molten metal may be poured. A pivot pin 15 is attached transversely to the bottom of bucket 14 and has its ends received in jaws 13.

The frame piece 12 carries also the pivotally mounted member 16 which is a part of the bucket actuating mechanism D. This member has a rearwardly extending arm 17 which is urged downwardly by a spring 18 attached at its one end to the extreme end of the arm and at its other end to frame piece 12. Spring 18 normally maintains arm 17 in extreme downward position in which its end rests on frame piece 12. Member

16 has the forward arm 19 which has the spaced apertures 20 near its end. A link 21 extends through one of apertures 20 and is pivotally attached to the forward end of bucket 14. This link may be connected in either of apertures 20, and it will be observed that when the link engages an aperture nearer the end of arm 19, movement of member 16 about its pivot will cause the bucket to be moved through greater amplitude since the aperture nearer the end is farther distant from the pivot point of the member. With member 16 in normal position, i. e., with arm 17 held in extreme downward position by spring 18, the bucket 14 is held in an inclined position and will hold a quantity of molten metal in its rearward end.

The means B for supplying molten metal includes a pipe 21 having at its end a faucet or nozzle 22 directly over bucket 14. The other end of pipe 21 connects with a pump 22 driven by shaft 23 and adapted to draw molten metal from pot 24 and force it through pipe 21 to the bucket 14. A sufficient amount of metal is pumped through pipe 21 to fill the bucket between pourings and also to guard against cooling of the metal before it is poured. When the bucket becomes full, the additional metal delivered into it will spill over the rear end of the bucket into a spill-chamber 25 provided by frame piece 12 and from there will be conducted by pipe 26 back to pot 24.

The rotary carrier C is generally of very well known construction and will not be described in detail. Only a portion of one side of this carrier has been shown in the drawing but this is sufficient to illustrate its application in this invention. Such rotary carriers have radial arms 27 each of which may carry an individual mould 28, each of moulds 28 being equidistant from the center of rotation of the carrier. When rotated, this carrier brings the moulds 28, one by one, under the bucket 14 to be filled with molten metal.

In the carrier shown, each of arms 27 has at its extreme end an upwardly extending front piece 29 which is equipped with a top flange 30. To each of these flanges is secured a cam piece 31 as shown more clearly in Fig. 2. Cam pieces 31 are generally triangular in form with a rounded high point 34 and are provided with slots 32 in their bases. Screws 33 extending within slots 32 and into flanges 30 secure the cams to the mould carrier. The high points 34 should be aligned approximately with the center of the sprue openings 35 in the moulds.

As more clearly illustrated in Fig. 1, the piv-

oted member 16 has also a downwardly extending arm 36 which is equipped with collar 37 which is adjustably secured by means of a set screw 38. Collar 37 is adapted to engage cams 31 as the mould carrier is rotated, so that the action of cams 31 is to push arm 36 rearwardly and thereby tip the bucket into pouring position. The drawing shows the relative positions of the parts after a cam has operated to move arm 36 rearwardly.

In the operation of my improved casting machine, the bucket 14 is filled with molten metal from pipe 21, the bucket being held in normal inclined position for receiving the metal through the action of the spring pressed pivoted member 16. When the bucket becomes full it will overflow over the rear end wall and will be carried by pipe 26 back to the source in pot 24. The power operated pump 22 operates to force the metal through this circuit.

At the same time, mould carrier C is rotating as indicated by arrow 39 in Fig. 2 to bring the empty moulds under the bucket one at a time. When the carrier has so rotated as to bring one of the moulds into position so that the sprue opening 35 is directly under the outlet slot 14^a in bucket 14, the cam 31 engages collar 37 of arm 36, and further movement of the carrier causes this arm to be moved rearwardly and member 16 to be moved about its pivot against the tension in spring 18 to bring arm 19 downwardly. This operates to tilt bucket 14 about its pivoted support and allow the molten metal to flow out through slot 14^a into the sprue opening of the mould. When the high point 34 of the cam has passed collar 37, spring 18 operates to return pivoted member 16 and bucket 14 to their original or normal position ready to be filled again. When the next arm 27 of the carrier is brought forward and the next mould is brought under the bucket, another of cams 31 operates to effect tilting of the bucket as before explained. After each of the moulds has been filled by this method and has passed to the opposite side of the carrier, the moulds are pulled apart, the castings ejected and the moulds again prepared to be filled with molten metal. The methods and means for ejecting the castings and preparing the moulds are well known and will not be specifically described here. A part of the mechanism for manipulating the moulds is designated by the numeral 40.

The embodiment herein described is designed particularly for use in casting the grids used in storage batteries, and in such use the metal used is lead, and this may be heated to a molten state in any suitable way. However, other castings of different kinds of metals may be made in the same way and by using the same type of apparatus.

It will be seen that if the cams are uniformly attached the amount of metal delivered to each of the moulds will be the same. But if it is desired to deliver a greater amount of metal to the moulds on one or more of the carrier arms, this may be accomplished by adjusting the position of the cams so that the cams will extend farther out on the arms to which more metal is to be delivered. By loosening screws 32 on one of the arms and moving this cam 31 outward radially of the carrier, the screws moving within slots 32, more metal will be delivered to the mould on this arm.

If more metal is required to be discharged into all of the moulds, this adjustment may be made

by attaching link 21 at one of apertures 20 nearer the end of arm 19. This will cause the bucket to be tipped farther when moved to pouring position and more of the metal contained in the bucket will be discharged.

While I have described the cams 31 as being attached to flanges 30 of the carrier, it will be obvious that other means may be provided for attaching the cams to the mould carrier. Also, it is apparent that the carrier may be at a higher or lower position with respect to the frame and bucket, it being required only that the mould be moved directly under the pouring bucket.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

I claim:

1. A casting machine of the character set forth comprising: a frame, a pouring bucket pivotally mounted on said frame, pipe means for delivering molten metal into said bucket, a spillway for catching overflow metal from said bucket and delivering it back to its source, a rotary mould carrier having at least one mould thereon and arranged to carry said mould under said bucket, and means for moving said bucket about its pivot to pour molten metal into the mould as the mould is brought under the bucket.

2. A casting machine of the character set forth comprising: a frame, a pouring bucket pivotally mounted on said frame and normally held in position to contain molten metal, a source of molten metal, means for delivering molten metal from said source into said bucket, a spillway for catching overflow metal from said bucket and delivering it back to said source, a rotary mould carrier having a plurality of moulds located at equal distances from its center of rotation, said carrier being adapted to move said moulds under said bucket, and cam means actuated by said carrier for moving said bucket about its pivot to pour molten metal into each of said moulds as it is passed under the bucket.

3. A casting machine of the character set forth comprising: a frame, a pouring bucket pivotally mounted on said frame, pipe means for supplying said bucket with molten metal, a spillway for catching overflow of metal from said bucket and delivering it back to its source, a rotary mould carrier carrying a plurality of moulds thereon, said moulds being supported by said carrier at equal distances from its center of rotation, said carrier being arranged to move said moulds under said bucket as it rotates, means pivotally mounted on said frame for moving said bucket to pouring position, a plurality of cams equal in number to the number of moulds, said cams being carried by said carrier and each of said cams being adapted to actuate said means when the corresponding mould is brought under said bucket.

4. A casting machine of the character set forth comprising: a frame, a pouring bucket pivotally mounted on said frame, pipe means for supplying said bucket with molten metal, a spillway for catching overflow metal from said bucket and delivering it back to its source, a mould carrier carrying a plurality of moulds thereon, said carrier being arranged to pass said moulds under said bucket, a pivoted member mounted on said frame having an arm connected with said bucket and movable to bring said bucket into pouring position, and individual cam means cooperating

with each of said moulds adapted to move said member to bring said bucket into pouring position as said carrier passes each of said moulds under said bucket.

5 5. Apparatus as set forth in claim 4 in which said pivoted member is connected to said bucket by means of a link, said link being attachable to said member at points of unequal distance to its point of pivot.

10 6. Apparatus as set forth in claim 4 and including a spring holding said pivoted member normally in position to allow filling of said bucket with molten metal, but permitting said member to move into position for pouring from said bucket

15 when engaged by said cams.

7. Apparatus as set forth in claim 4 and in which the position of at least one of said cams is adjustable so that said cam is effective for moving said member in different amplitudes.

20 8. A casting machine of the character set forth comprising: a frame, a pouring bucket pivotally mounted on said frame, a source of molten metal, means for delivering molten metal from said source into said bucket, a spillway for catching

25 overflow metal from said bucket and delivering it back to said source, a rotary mould carrier carrying a plurality of moulds at equal distances from its center of rotation, said carrier being adapted to move said moulds under said bucket,

a pivoted member mounted on said frame and having one arm connected to said bucket by a link, said member having another arm extending downwardly, a spring for holding said member normally in such position that said bucket 5 will contain molten metal, and cams carried by said mould carrier, said cams being adapted to engage said downwardly extending arm to move said member into such position that said bucket will pour out molten metal, said cams 10 being so positioned as to effect said movement when each of said moulds is brought under said bucket.

9. A casting machine of the character set forth comprising: a frame; a pouring bucket pivotally 15 mounted on said frame; pipe means adapted to deliver molten metal substantially continuously to said bucket, whereby said metal may overflow the bucket; a spillway for catching overflow of metal from said bucket and returning said over- 20 flow metal to its source; a mould carrier having mounted thereon a plurality of moulds, said carrier being adapted to move said moulds successively under said bucket; and means actuated by said carrier adapted to bring said bucket into 25 pouring position as each of said moulds is carried under the bucket.

ALVY C. YERKEY.