MACHINE FOR BABBITTING SLEEVE BEARINGS

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[Diagram of machine for babbittting sleeve bearings]

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Fig. 8

Fig. 9

Fig. 10

Fig. 11

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My invention relates to machines for babbitting sleeve bearings, relating in particular to the class of machines wherein the molten babbitt is introduced within the sleeve under treatment while the same is being rotated.

Prior to my present invention, so far as I am aware, it has been the custom to employ a handle ladle of the desired capacity into which the molten metal is drawn and then poured into the sleeve to be treated the sleeve being rotated to distribute same therein by centrifugal action. This method is not only slow but permits introduction of dross or scum formed on the top of the metal to enter the bearing with the metal, thus providing a coating both inferior in quality and in density.

Another method heretofore employed is to force the desired quantity of metal up into the bearing, while being rotated, by means of a pump submerged in the molten metal. By this means considerable trouble has been experienced by the pump clogging, etc.

One of the objects of my present invention is, to provide a machine wherein the molten babbitt is fed from an opening in the bottom of an elevated melting pot by the action of gravity to the interior of the sleeve bearing under treatment, thereby obtaining a supply of absolutely clean metal.

Another object of my invention is, to provide means in the machine whereby an accurate measured quantity of babbitt may be gravitated to each like bearing sleeve in their order of treatment.

A further object is, to provide a machine wherein two separate sleeve bearings may be operated on at the same time. That is to say, that while one sleeve is being cooled off another may be charged with its supply of molten babbitt, thus speeding up production.

Still further objects are, to provide a machine of simple construction, of as few parts as possible and reduce to a minimum the possibility of becoming out of order.

Other objects and advantages will be obvious from the description and operation later set forth.

In the accompanying drawings I have illustrated an embodiment of my invention, wherein like detail parts of the machine are indicated by like numerals of reference where they occur in the various views.

In the following:

Figure 1 is a front elevation of the machine partly in section.

Fig. 2 is a side elevation of the same, also partly in section.

Fig. 3 is a side elevation of the upper portion of the machine, enlarged and in section.

Fig. 4 is a front elevation of the upper portion of the machine, enlarged.

Fig. 5 is a side elevation of a part of the machine constituting one of its chuck members and its operating mechanism, partly in section.

Fig. 6 is an end elevation of the midway portion of the machine, partly in section.

Fig. 7 is a plan view of the babbitt conducting element, per se.

Fig. 8 is a plan view of the babbitt pot.

Fig. 9 is a plan view of the pot base.

Fig. 10 is a plan view of the pot supporting brackets, and

Fig. 11 is a plan view of the valve holder.

The machine, which in part includes two like sleeve chucking mechanisms, comprises in its structure supporting means including the base portion 1 adapted to be fixedly attached to a suitable foundation, and the housing 2 secured to the said base portion. The upper surface portion of the housing, at each end thereof, is provided with a key-way 3, and with elongated slots 4 for securing the adjustable portion of each sleeve chucking mechanism thereto, said housing being further provided with the inclined portions 6 located at each side of the central portion 7.

Each adjustable portion of the chucking mechanism includes a stock or bearing 8, ad
justably secured in position upon the housing by bolts 9 extending through the slots 4 formed therein and by key 3 carried by the stock engaging in key-way 3. The stock is provided with sleeve bearings 10 and 10' within which is rotatably mounted a longitudinally adjustable spindle 11 provided at its one end with a grooved head 12 having secured thereto a removable drive chuck plate or member 13 in the face of which is formed a depressed sleeve chucking surface portion 14. A pulley 15 is mounted on each spindle and is secured to one another by a suitable key 16 of the pulley engaging in a key-way 17 of the spindle, thus permitting the spindle to be adjusted longitudinally as well as to rotate with the pulley.

The spindle is actuated in either direction, longitudinally, as required, by an air actuating mechanism, comprising an air chamber 18 secured to the stock by rods 19 extending from lugs 20 on said stock to and connected to a plate 21 fixed to the chamber. The air chamber is provided with an air supply port 22 which extends from the one end thereof to the air hose nipple 23 and another port 24 from the opposite end to the air hose nipple 25. The air piston 26 is operatively connected to the spindle by means of a coupling 26 carried thereby which rotatably engages in the companion coupling part 27 carried by the rod 28 of the piston 26, there being a thrust bearing 29 arranged between the two coupling parts.

For rotatively operating the adjustable spindle and its chuck of each stock an electric motor 30 is employed, being coupled to a shaft 31 engaging at its outer end in a bearing 32 secured to the base plate, said shaft carrying a pulley 33 over which, with the spindle pulley 15, is applied a belt 34. An idler pulley 35 is suspended by a bifurcated member 36, attached to the housing, and engages the belt to keep same taut.

Upon the central portion 7 of the housing are secured the two like supporting members 37–37 which are further secured to the member 38 fixedly supporting the elevated babbit pot 39.

Each of the members 37 carries a driven chuck mechanism as a companion to that of the spindle chuck, and comprises a chuck member 40 rotatively fitted within a shoulder opening in said member 37 and in engagement with a thrust bearing 41 therein. The member 40 has removably secured thereto the chuck plate 42 having a chucking depression 43 in the face thereof and also a tapered central opening 45 which inclines toward and registers with the opening 44 of the chuck plate, the purpose of which will later appear.

Secured upon the portions 46–46 of the members 37 is a bracket 47 having upstanding lugs 48 through which extends a pivotal pin 49 secured to an adjustable babbit conduct ing member 50.

The babbit conducting member comprises integral dual spouts having their inlets 51 spaced apart and terminating in oppositely disposed spout tips 52 and 53 aligning with the openings 44 of the chuck plates 42 and its pivotal pin 49. The conducting member is maintained at a temperature suitable for the flow of molten babbit therethrough by suitable electric heating elements 54 arranged within insulated casings 55 secured in pockets 56. A handle 57 is secured to the conducting member for manually adjusting same upon its pivotal pin.

The babbit pot support 58 is provided with a tapered basin like depression 59 converging toward and terminating in the secondary outlet 59 for directing the flow of molten babbit to the spout. The support is further provided with an insulated electric heating element 60 of annular form, fitted within a recess in the lower surface thereof for the purpose of maintaining the proper temperature, said element being held in place by an annular plate 61. The melting pot 59 has a valve chamber 62 formed therein which communicates with the pot proper by the discharge or supply chamber 63 and has a valve seat 64 at its lower edge and a similar valve seat 65 at the upper edge.

The pot is further provided with the two upright tubular portions 66 through each of which loosely extends a valve stem 67, each connected at its upper ends by a cross member 68 and at their lower ends by a valve holder 69 having ports 70 therein. The holder carries a valve 71 to engage the seat 64 for the normal retention of liquid babbit in the pot.

Secured by its base portion 72 to the top of the pot is a bracket 73 the aforesaid valve rods being slidably fitted through the connecting base portion thereof. The upper portion of the bracket has movably fitted therethrough the vertically disposed tubular valve stem 74 provided with an elongated valve member 75 of sufficient weight for the purpose intended, said valve having a longitudinal opening 76 therein terminating in a chamber 77 at the valve end. The stem is provided at its upper end with a fixed stop collar 78 and adjusting nut 79.

Movably fitted within the hollow stem 74 of the valve 75 is a stem 80 having a piston 81 at its lower end and movably fitted in the aforesaid chamber 77 of the valve. The upper end of the piston rod is threadably fitted into the adjusting nut 79 and is itself provided with a jamb nut 82 to engage the said adjusting nut 79.

Fitted through the upright portion of the bracket 73 is a pivotal shaft 83 having secured thereto a valve lifting bifurcated rock arm 84 which straddles the valve stem 75 and engages beneath the fixed collar 85 thereof. To
each end of the shaft is fixed a crank handle 86 for actuating the shaft in operating the valve 75.

The bracket 73 has also a pivotal pin 87 mounted therein upon which is fixed another bifurcated valve lifting member 88 also straddling the valve stem 55 and engaging the cross member 68 of the other valve 75. The stem 85 of the valve lifter is provided with an adjustable counter weight 90 for maintaining operative contact of the valve lifter with the said valve cross member 68.

The melting pot has disposed therein a pair of spaced electrical heating units 91, which rest upon elevated portions 92 of the pot, the pot being further provided with heating elements 93 surrounding the lower portion thereof. The heating units 91 are submersed in the babbitt metal 93 to bring about and maintain the desired liquefaction temperature of the metal.

The electric heating units of the pot and elsewhere previously described are, as will be readily understood, to be properly connected to a suitable source of electrical energy with proper control devices included in the circuit, none of which are here shown. Also there will be a two way valve employed on the air lines, not shown. The melting pot is provided thereabout by insulating material 93 and 94 to prevent the escape of and confine the heat thereto. The insulating is held in place by sheet metal covering 94.

I have shown a sheet metal guard 95 fixed to the rear of the supports 37 and upon each spindle is mounted an adjustable sector 96 carrying a fixed sheet metal guard 97 and operating handle 98. These guards are merely a precaution against injury to the operator by possibility of splashing of metal.

The machine is shown as having one set of chucking members as spaced farther apart than the other set (see left side Fig. 1) so as to illustrate that two bearing sleeves of different lengths, instead of like lengths, may be treated with babbitt on the one machine.

**Operation**

Assuming that the electric current has been turned on to the heating elements and the babbitt metal is in a molten state of the desired temperature, also that the one chuck spindle 11 is drawn back by the air piston, as shown at the right in Fig. 5, and that the chuck spindles 11 are being rotated by the motor. Such being the case, the operator holds the sleeve bearing to be operated on with one end centered in the depression 43 of the drive chuck plate 42. Air is then turned into the air cylinder 18 causing the piston therein to adjust the spindle 11 and bring the chuck plate 13 thereof into engagement with the other end of the bearing, as shown by dot and dash lines in Fig. 4, causing the bearing and chuck plate 42 to be rotated in unison therewith. The operator then forces the hand crank rearwardly, causing the bifurcated member 84 to permit lowering the valve 75 to its seat 65 in the base of the pot. As the valve is being seated the piston 81, which has previously been adjusted to a definite position, as in this instance a certain distance below the valve, displaces a portion of the metal in the supply chamber 63 leaving a charge of predetermined quantity of metal therein. As the hand crank is forced further to the rear, the bifurcated member 84 comes into engagement with the cross member 68 of the valve holder 69 forcing the same downward sufficient to unseat the valve 71. As this valve is unseated, the charge of metal in said supply chamber passes through the ports 70 in the valve holder into the tapered basin 58 and out through the opening 59. In passing through said opening the metal is directed into the spout 51 and is discharged through the spout tip 53 and chuck plate opening 44 to the interior of the sleeve bearing being rotated.

The babbitt being in a molten state as it enters the bearing, the interior thereof becomes evenly coated with said metal to a measured thickness by centrifugal action. When the bearing is sufficiently coated, requiring but a brief period of time, air is cut off from the rear end of the air chamber and supplied to the forward end thereof, causing the piston to recede and withdraw the chuck plate 13 so that the now babbitted bearing is readily removed.

As will be apparent, when metal is placed in the bearing sleeve it cannot escape therefrom as the one end is entirely closed by the chuck plate 13, and the other end, where the metal enters, is also closed except for the small central opening 43 where the metal enters.

As the machine is constructed to operate upon another bearing at the left end thereof, while the bearing in the right end is being further rotated for cooling, the hand crank 86 at that side is brought forward to cause the valves 71 and 77 and piston 81 to return to normal position and again permit the supply chamber 63 to refill. Another bearing being then chuck ed at that side of the machine the spout member 50 is adjusted upon its pivot to cause the spout 51 to be moved out of registration with the opening 59 and the spout 52 brought into registering position with the said opening 59. The hand crank is then pushed rearward, as heretofore set forth for operating the valves and piston, delivering a charge of like amount to the bearing chuck ed at that side.

In the drawings, the pair of chucks at the left side are illustrated as being farther apart than those at the right, showing the possibility of treating two bearings of different...
dimensions, by adjusting one stock upon the housing, through the medium of the bolts 9. It will, however, be readily apparent that both stocks may be adjusted equidistant when the bearings to be treated are all of one dimension.

It will be noted that the capacity of the outlet chamber of the pot may readily be changed to deliver a charge of any capacity within the limits thereof, by adjusting the piston.

While I have shown and described a specific embodiment of my invention I desire that said embodiment be regarded as illustrative only, and that the appended claims shall be accorded the broadest construction consistent with the prior art.

What I claim is—

1. In a machine of the class set forth, the combination of a support, duplicate pairs of rotatable chucking members thereon for chucking and rotating a sleeve bearing when placed therebetween for internally babbitted, one member of each set being rotatively secured in a fixed position on said support and the other member being longitudinally adjustable toward the other member, a stock secured to said support and carrying the longitudinally adjustable member, means for adjusting said member toward the other member for chucking and unchucking said sleeve bearing therebetween for treatment, an elevated babbitt melting pot having a discharge opening located in the base thereof, a valve for controlling the lower end of the discharge opening of the pot, means for separating a given quantity of the metal from the pot and to supply it to the discharge opening, a dual spout member pivotally mounted on the support the pivot and outlet of each being in axial alignment with one of each pair of chucking members and terminating therein, said dual spout member adapted to be adjusted upon its pivot to cause the inlet of one to come into position to receive and convey a charge to a sleeve babbitted by one of said sets and adjusted in an opposite direction for the other to receive and conduct a charge to a sleeve babbitted in the other set, and means to rotate the chucks and sleeve of each set as a unit.

2. In a machine of the class described, the combination of a support, duplicate pairs of rotatable chucking members thereon for chucking and rotating a sleeve bearing when placed therebetween for internally babbitting, one member of each set being rotative ly secured in a fixed position on said support and the other member being longitudinally adjustable toward the other member, a stock secured to said support and carrying the longitudinally adjustable member, means for adjusting said member toward the other member for chucking and unchucking said sleeve, an elevated babbitt melting pot having a discharge opening located in the base thereof, a valve for controlling the lower end of the discharge opening of the pot, means adjustable to separate a given quantity of the metal from the pot and to supply it to the discharge opening, means for operating said valve and the adjustable separating means, in their respective order of operation, a dual spout member pivotally mounted on the support the pivot and outlets of each being in axial alignment with one of each pair of chucking members and terminating therein, said dual spout member adapted to be adjusted upon its pivot to cause the inlet of one to come into position to receive and convey a charge to a sleeve babbitted by one of said sets and adjusted in an opposite direction for the other to receive and conduct a charge to a sleeve babbitted in the other set, and means to rotate the chucks and sleeve of each set as a unit.

3. In a machine for babbitting sleeve bearings, the combination of a babbitt melting pot having a discharge chamber in the base thereof, a valve for closing the outlet end of said chamber, means for operating said valve, a second valve for closing the upper end of said chamber to separate a definite charge of babbitt therein from that in the pot, and means for operating said second valve.

4. In a machine for babbitting sleeve bearings, the combination of a babbitt melting pot having a discharge chamber in the base thereof, means for melting babbitt in said pot, a valve for controlling the outlet end of the discharge chamber, and a valve for controlling the upper end of said chamber, means for operating the upper valve to separate a given charge of babbitt within said chamber from the main body of said pot, actuated by the upper valve means for opening the outlet valve after closure of said upper valve.

5. In a machine for babbitting sleeve bearings, the combination of a babbitt melting pot having a discharge chamber in the base thereof, a valve for closing the outlet end of said chamber, a second valve for closing the inlet end of said chamber to separate a definite charge therein from the main body of metal, actuating means for said valves, said means adapted to close the inlet valve and when further actuated open the outlet valve, adjustable means for reducing or increasing the charge capacity of said chamber, and means for heating the babbitt in the pot.

6. In a machine for babbitting sleeve bearings, a babbitt melting pot having a discharge chamber in the base thereof, heating means for the pot, a valve for closing the outlet end of the chamber, a valve for controlling the inlet end thereof, means for actuating said valves, a support for said pot provided with a secondary discharge opening, and heating
means for maintaining said support at the desired temperature.

7. In a machine for babbitting sleeve bearings, a babbit melting pot having a discharge chamber in the base thereof, heating means for the pot, a valve for closing the outlet end of the chamber, a valve for controlling the inlet end thereof, means for actuating said valves, a support for said pot and provided with a secondary discharge opening, heating means for maintaining said support at the desired temperature, and a dual conductor spout member pivotally supported beneath said support and adapted to be adjusted to conduct a discharge of metal through either of the spouts.

8. In a machine for the purpose set forth, the combination of an elevated babbit melting pot having a direct outlet chamber in the bottom thereof, a valve for closing the lower end of said chamber, a member adapted to enter the upper end of said chamber at a predetermined distance to cut off a charge of metal from that in the pot, an operating member, and means for operating said valve and chamber entering-member by actuating said operating member.

9. In a machine for the purpose set forth, the combination of an elevated babbit melting pot having a direct outlet chamber in the bottom thereof, a valve for closing the lower end thereof, a valve for closing the upper end thereof, a member associated with the upper valve and adapted to enter said chamber a predetermined distance in advance of the associated valve and provide a charge therein, a manually operated member, and means actuated by said manually operated member to operate said valve and associated member and said lower valve in their respective order.

10. In a machine for the purpose set forth, the combination of an elevated babbit melting pot having a direct outlet chamber in the bottom thereof, a valve for closing the lower end of said chamber, a piston adapted to enter the upper end of said chamber a predetermined distance to provide a charge in said chamber of a given quantity of metal, means to adjust said piston to increase or decrease the capacity of the chamber, a valve associated with said piston and adapted to seat upon the upper end of the chamber about the piston, an operating member mechanism for operating said valves and piston in their respective order by actuating said operating member, and a secondary discharge chamber disposed beneath the lower valve.

11. In a sleeve babbitting machine, a babbit discharge spout member, a support upon which said member is pivoted at its discharge end, said member including dual spouts the outlet ends of which extend in opposite directions and in axial alignment with the pivotal center and the inlet ends spaced apart from the pivotal axis, means for operating said member to receive a charge in either spout, and means carried by said member for heating each spout.

12. In a sleeve babbitting machine, a babbit heating pot provided at its bottom with a measuring chamber communicating therewith, a valve for closing the lower end of said chamber, a valve for closing the upper end, a piston carried by and movable with said upper valve and adapted to enter the measuring chamber a predetermined distance for a measured charge of metal, means to adjust said piston to cause same to enter a greater or less distance within the chamber for greater or less charges, a manually operated member, and mechanism cooperating with the valves and said member and adapted to operate the valves in their respective orders by actuating said manual member.

13. In a machine for the purpose set forth, an oscillatable babbit conducting member comprising an upstanding body adapted to be pivoted at its lower end and provided with two spouts the outlet ends of which project in opposite directions from the sides of the body and in line with the pivotal axis, the inlet ends being spaced apart and disposed transversely to that of the outlet spouts, the spout openings being radially disposed in the direction of operation with respect to the pivotal axis, said member being oscillatable to bring the upper intake end of either spout into conducting position.

14. In a machine such as set forth, the combination with an elevated babbit melting pot having a discharge chamber communicating therewith at the bottom, of a valve for closing and opening the lower end of said chamber and having vertically disposed actuating means, a valve for closing the upper end of said chamber and having vertically disposed actuating means, a chamber capacity piston operated with the upper valve and adapted to be adjusted to enter the chamber to such distance as will give the desired capacity, and a manually operated mechanism operating in one direction to lower the upper valve and piston to their closed positions and open the lower valve for discharging the contents of the chamber, and close the lower valve and elevate the upper valve and piston when operated in the opposite direction.

15. In a machine such as set forth, the combination with an elevated babbit melting pot having a discharge chamber communicating therewith at the bottom, of a valve for closing and opening the lower end of said chamber and having vertically disposed actuating means, a gravity balanced valve for closing the upper end of said chamber and having vertically disposed actuating means, a chamber capacity piston operated with the upper valve and adapted to be adjusted to enter the chamber to such distance as will give the de-
sired capacity, and a manually operated mechanism operating in one direction from either side of the pot to lower the upper valve and piston to their closed positions and open the lower valve for discharging the contents of the chamber, and close the lower valve and elevate the upper valve and piston when operated in the opposite direction.

In testimony whereof I affix my signature.

CARL H. LEIS.