

Nov. 18, 1924.

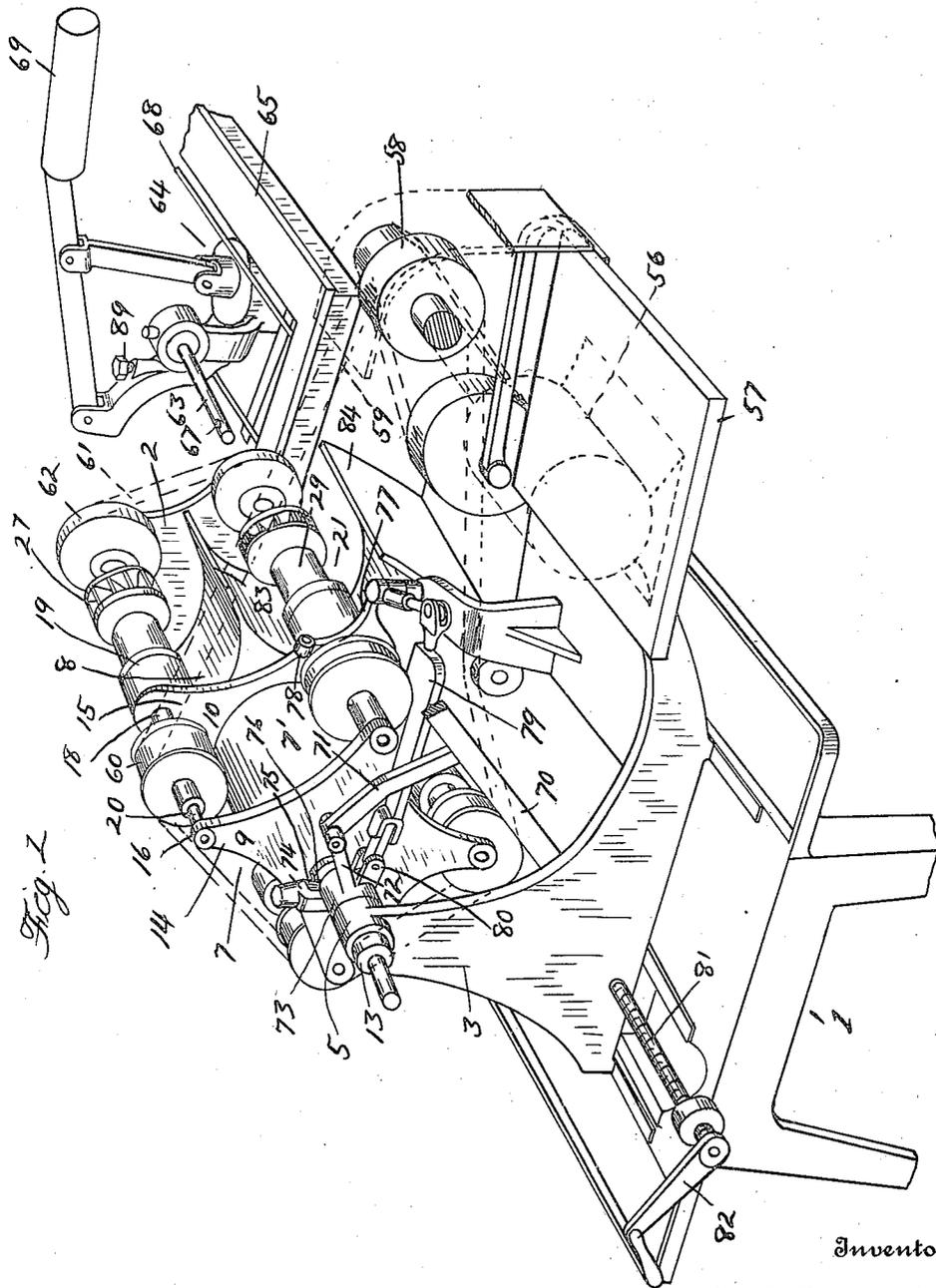
C. W. EGGENWEILER

1,516,089

BABBITTING MACHINE

Filed March 5 1920

5 Sheets-Sheet 1



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5 Sheets-Sheet 2

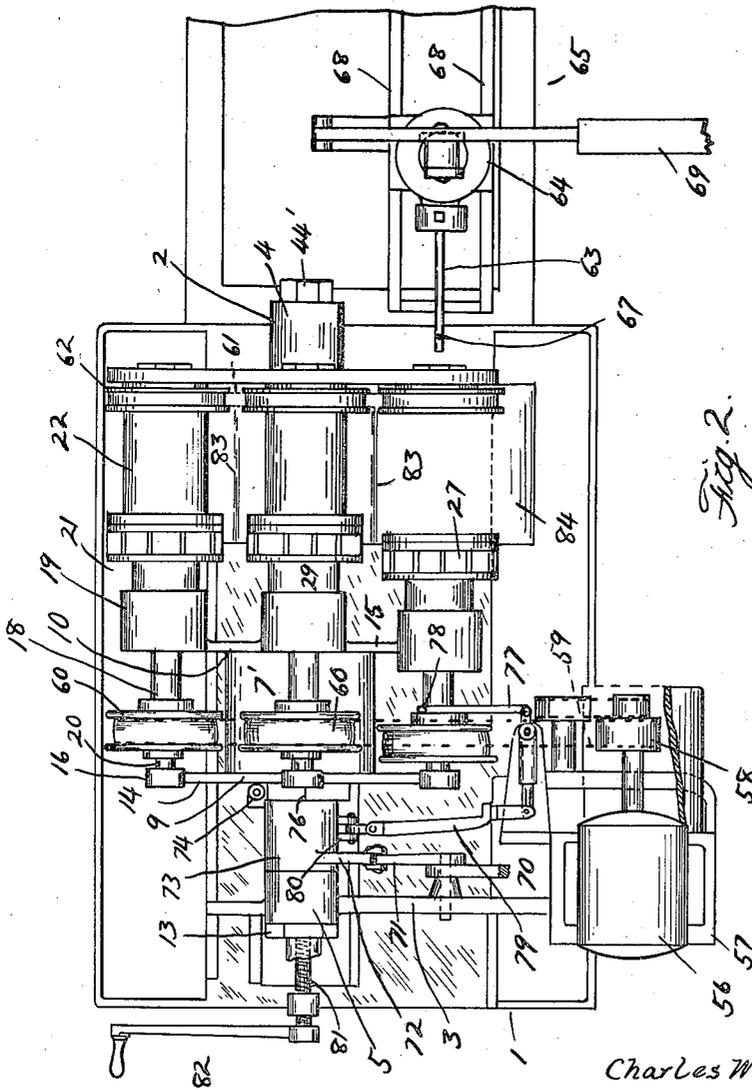


Fig. 2.

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5 Sheets—Sheet 3

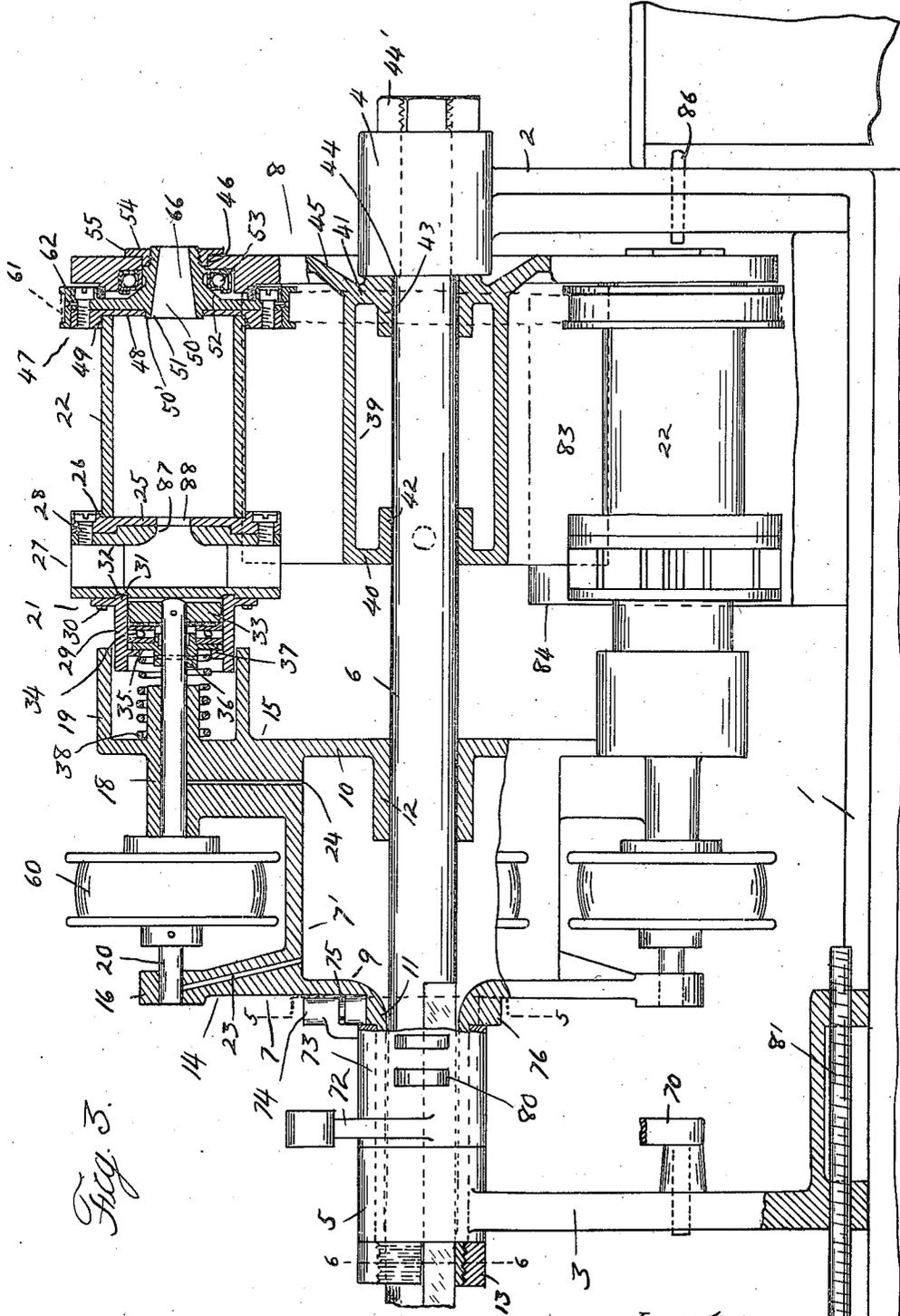


Fig. 3.

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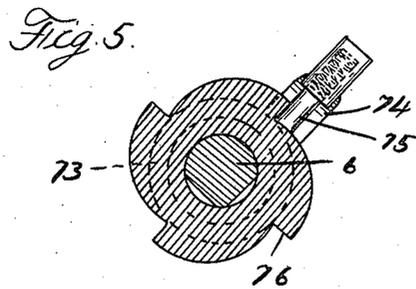
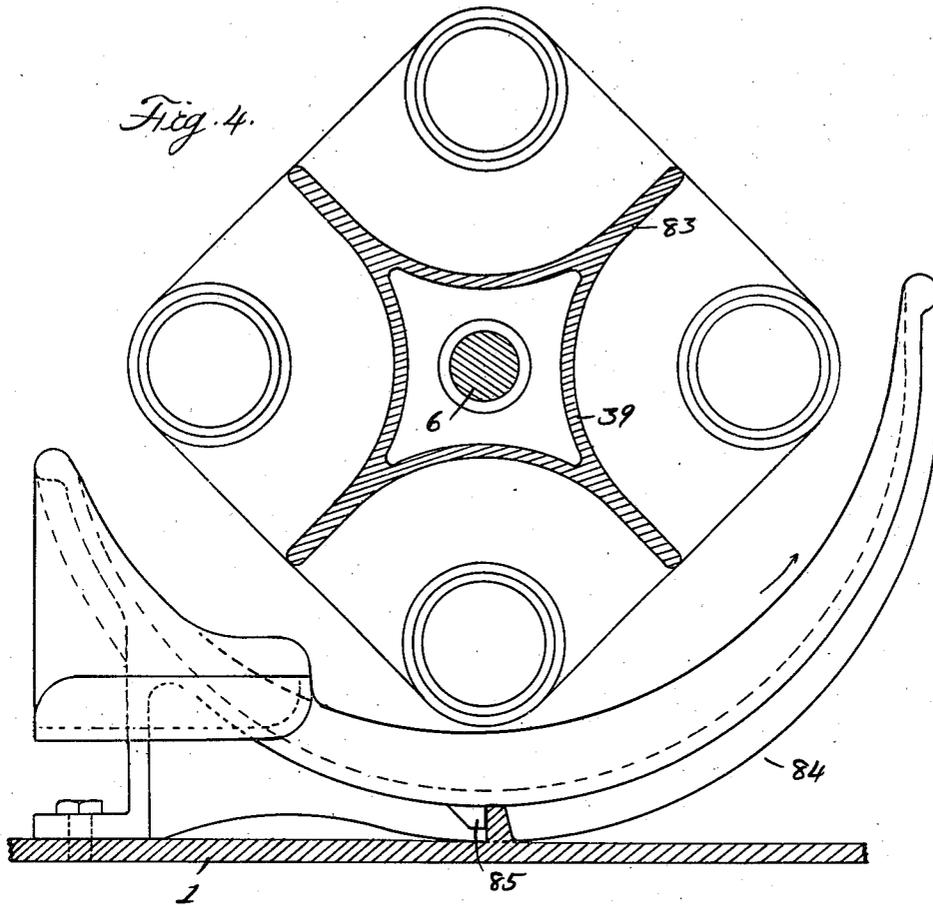
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5 Sheets-Sheet 4



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5 Sheets—Sheet 5

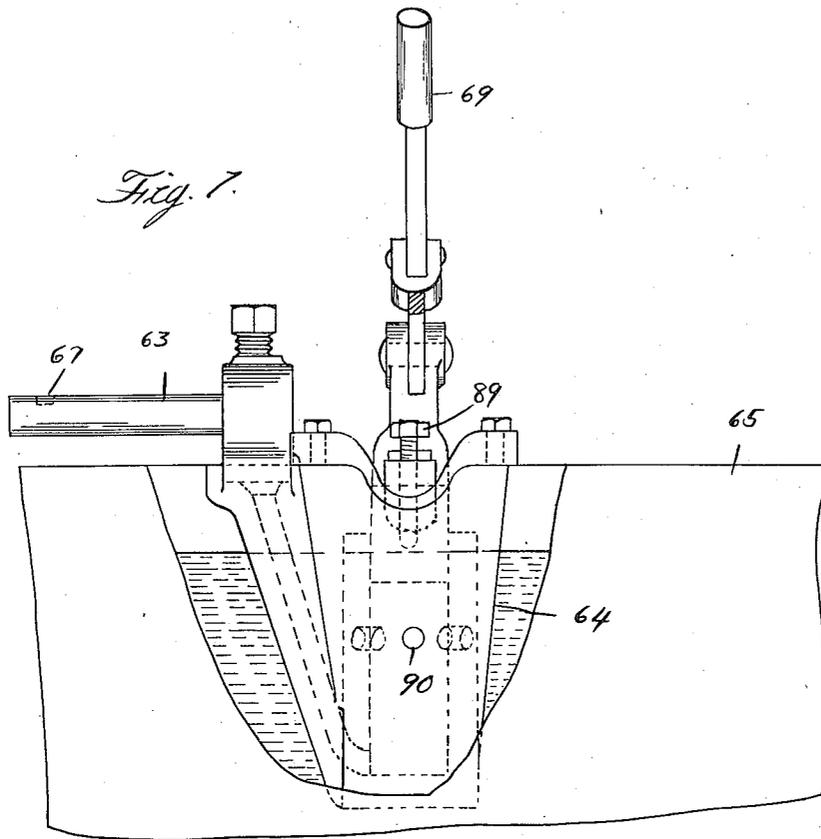
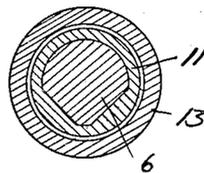


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES W. EGGENWEILER, OF DETROIT, MICHIGAN, ASSIGNOR TO GENERAL ALUMINUM & BRASS MANUFACTURING COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

BABBITTING MACHINE.

Application filed March 5, 1920. Serial No. 363,447.

To all whom it may concern:

Be it known that I, CHARLES W. EGGENWEILER, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Babbitting Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to babbitting machines adapted for use particularly in babbitting hollow backs of bearings. One object of the invention is to provide means for revolving the hollow bearing back while the molten babbitt is being fed thereinto. Another object is to provide means for forcibly feeding the molten babbitt into the hollow bearing back. A further object is the provision of means for suddenly cooling the babbitt after the same has been fed into the bearing back to prevent separation of the elements comprising the babbitt whereby the density thereof remains uniform throughout and furthermore the rate of production is greatly increased.

The invention has among other objects: The provision of a carrier having a plurality of holders for the bearing backs; the provision of means for rotating this carrier by a step-by-step motion; the provision of means for permitting of the ready removal and replacement of the bearing backs; and also the provision of means for permitting of babbitting bearing backs of different lengths and diameters. Still other objects of the invention reside in the novel arrangements and combinations of parts as more fully hereinafter set forth.

In the drawings:

Figure 1 is a perspective view of a machine embodying my invention;

Figure 2 is a top plan view thereof;

Figure 3 is a vertical central section, partly in elevation;

Figure 4 is a sectional elevation, showing the guards;

Figure 5 is a cross section on the line 5—5 of Figure 3;

Figure 6 is a cross section on the line 6—6 of Figure 3; Figure 7 is a side elevation of the retort and pump with part of the retort broken away.

1 is the base, and 2 and 3 are upright supports thereon, having the bosses 4 and 5 respectively. 6 is a shaft rotatably mounted in the bosses 4 and 5, and 7 and 8 are carriers non-rotatably mounted upon this shaft.

The carrier 7 has the hollow hub portion 7' and the end flanges 9 and 10 which terminate in the cylindrical flanges 11 and 12, respectively, engaging the shaft. The cylindrical flange 11 extends through the boss 5 and is threadedly engaged at its outer end by the nut 13. 14 and 15 are arms in continuation of the end flanges 9 and 10, respectively, the arms 14 having bosses 16 at their outer ends, and the arms 15 having bosses 18 and cup-shaped enlargements 19 at their outer ends. 20 are shafts rotatably engaging in the bosses 16 and 18 and carrying holders 21 for the hollow bearing backs 22. For the purpose of lubricating the shafts 20 passages 23 and 24 are provided extending from the hollow hub 7' to the bearings for the shafts through the reinforcing webs for the arms 14 and 15, respectively.

The bearing back holders 21 each comprises the head 25 having the annular outwardly extending shoulder 26 for engaging the end of the bearing back. This head is removably secured to the rotary fan 27 by means of the screws 28. The rotary fan is in turn secured to the cylinder 29 by the bolts 30 and concentrically located thereon by means of the shoulders 31 engaging in the annular groove 32 in the fan. 33 is a key rockable longitudinally within the cylinder 29 but non-rotatable, relative thereto. This key is pinned to the shaft 20. 34 is a suitable anti-friction bearing between the inner side of the key 33 and the flange 35 which is upon the member 36 and limits the outward movement of the cylinder relative to the shaft. The cylinder 29 is longitudinally movable within the cup-shaped member 19. For yieldably holding the head 25 in its outward position the coil spring 38 is provided abutting against the cup-shaped member 19 and against the flange 35 of the member 36. The arrangement is such that the head 25 can be rocked to engage the end of the bearing back 22 throughout its entire extent, thereby sealing the same.

The carrier 8 has the hollow hub 39

which has the end flanges 40 and 41 terminating in the cylindrical flanges 42 and 43, respectively. The cylindrical flange 42 is fixedly secured to the shaft 6 as by a set screw, this shaft being in turn prevented from longitudinal movement relative to the support 2 as by the shoulder 44 and nut 44' engaging opposite ends of the hub 4. 45 is an outwardly extending annular flange in continuation of the end flange 41, this flange being provided with the apertures 46 in axial alignment with the shafts 20. 47 are holders for the bearing backs 22 cooperating with the holders each comprises the head 48 located concentrically with respect to the axis of the aperture and having the annular shoulders 49 for engaging the end of the bearing back, and also comprises the member 50 carrying the head 49 and having the hub portion 51 extending through the aperture. This hub has an inwardly extending flange 50' which is surrounded by the head 48. This hub also has the conical surface 52 which is engaged by a suitable anti-friction bearing 53 mounted in the flange 45 whereby the member 50 may be rocked through an angle, so that its head 48 will engage the end of the bearing back 22 throughout its entire extent and seal the same. 54 is a bushing threadedly engaging the outer end of the hub 51 and having the flange 55 for engaging the outer face of the flange 45 thereby securing the holder 47 to the flange 45.

For the purpose of rotating the heads the motor 56 is provided mounted upon the lateral extension 57 of the support 3, this motor having the driving pulley 58 mounted upon its shaft, which pulley is engaged by the belt 59 passing over the pulleys 60 non-rotatably secured to the shafts 20, the pulleys all being normally in alignment. When the bearing backs 22 are in position between the cooperating heads 25 and 48 sufficient friction is produced to rotate the heads 48. In order to rotate all of this series of heads 48, regardless of their position relative to the support 2, the belt 61 is provided extending around the annular channel members 62 secured upon the holders 47. It will be noted that the belt 59 does not engage the pulley 60 nearest to the motor.

63 is a nozzle adapted to conduct molten babbitt into the bearing backs and 64 is a suitable pump for forcing the molten babbitt from the retort 65 through the nozzle 63. This nozzle is located in substantial axial alignment with the shaft 20 when the latter is located between the shaft 6 and the motor 56 and has its axis in the same horizontal plane as the axis of the shaft 6. When the shaft 20 is in this position its pulley 60 is out of driving engagement with the belt 59. The hub 51 of each of the members 50 carrying the heads 48 has an inward-

ly tapering aperture 66 axially there-through, for permitting of the passage of the molten babbitt into the bearing back.

In order to direct the molten babbitt against the inner wall of the bearing back the nozzle 63 has its end closed and has an aperture 67 in its lower surface for the discharge of the molten babbitt. Furthermore, the nozzle is longitudinally movable through the aperture 66 of the head 47 and into the bearing back, this being accomplished in the present instance by having the pump 64 and the nozzle 66 slidably mounted as a unit upon the guides 68 across the top of the retort 65. The handle 69 for the pump is employed to slide the pump and nozzle.

For the purpose of rotating the carriers 7 and 8, the hand lever 70 is provided pivotally mounted upon the support 3 and connected by the link 71 to the radial arm 72 upon the hub member 73, which latter is rotatably mounted upon the cylindrical flange 11 of the carrier 7 and between the support 3 and the end flange 9 of the carrier. 74 is a lug upon the hub member 73 and carrying a suitable spring pressed detent member 75, which detent is engageable with teeth 76 upon the carrier 7 to rotate the latter in one direction. In the present instance there are four teeth so that for each complete operation of the hand lever 70 the carrier will be rotated one-fourth revolution. This carrier having a non-rotatable engagement with the shaft 6, as shown in Figure 6 particularly, the shaft and consequently the other carrier 8 will be correspondingly rotated, the arrangement being such that the cooperating heads for one of the bearing backs will always be axially aligned with the nozzle for conducting the molten babbitt.

To permit of readily removing and replacing a bearing back, the rock arm 77 is provided having a roller 78 engageable with the inner face of the pulley 60 which is in horizontal relation to the shaft 6 and between the shaft and motor. This rock arm is connected to the link 79 having a universal engagement with the radial lugs 80 upon the hub member 73, the arrangement being such that at the end of the quarter rotation of the carriers, the pulley 60 with its shaft 20 and head 25 will be moved longitudinally away from the cooperating head 48. When this occurs the babbitted bearing back can be removed and an unbabbitted bearing back inserted after which by releasing the downward pull upon the hand lever 70 the head 25 and other parts will resume their normal position and the heads will adjust themselves to the opposite ends of the bearing back and close the joints therebetween. Due to the fact that the head 48 is revolving the bearing back and head 25 will also be rotated in this position when

the molten babbitt is forcibly fed into the bearing back.

The heads 25 and 48 may be readily removed and replaced to take care of bearing backs of different diameters. The series of heads 25 may also be moved toward or away from the series of heads 48 as a unit to take care of bearing backs of different lengths. As shown 81 is a threaded rod mounted on the base 1 and engaging the support 3, which latter is longitudinally slidably mounted thereon. 82 is a crank for rotating the rod 81 and adjusting the support upon the base. The shaft 6 is of sufficient length to permit of this adjustment.

For the purpose of protecting the operator of the machine, the carrier 8 has the arms or guards 83 extending radially outward from the hub 39 and between the heads 25 and 48 and the bearing backs, the arrangement being such that they are partially embraced by the arms or guards. A pan 84 is also provided removably resting upon the base 1 and having a stop 85 for limiting its inward movement, this pan being concave to embrace approximately the lower half of the carrier 8 with the heads 25 and 48 and the bearing backs.

In order to suddenly cool the babbitt after it has been fed into the bearing backs the conduit 86 is provided below the shaft 6 and adapted to register with the apertures in the holders 47 when rotated in the direction indicated by the arrow in Figure 4 to this position. With this arrangement one-quarter of a complete revolution of the carriers takes place in moving each holder 47 from the position where it registers with the nozzle 63 to the position where it registers with the conduit 86. This conduit conveys water, the flow of which can be suitably controlled as by a valve (not shown). When the water comes in contact with the molten babbitt vapor or steam is formed which is withdrawn by means of the rotary fans 27 which communicate with the interior of the bearing backs through the axial apertures 87 and 88 respectively in the fans and heads 25.

The purpose of conducting the water into the bearing back containing the molten metal is to solidify the latter before the elements comprising the same separate and those of greater specific gravity become arranged near the outer surface of the babbitt due to the centrifugal force caused by the rotation of the bearing back. This rotation uniformly distributes the molten babbitt about the bearing back. Another important consideration is that the rate of production is greatly increased due to the fact that the molten babbitt is solidified so quickly relative to the usual practice heretofore.

The general operation of the machine is as follows: the operator raises the hand lever

70 to move the head 25 away from its cooperating head 48 the heads being at the front of the machine or between the shaft 6 and motor 56 and their axes in the horizontal plane of the axis of the shaft. An unbabbitted bearing back is inserted between the heads and the hand lever released, when the bearing back will revolve, the other heads clamping bearing backs. The nozzle 63 is inserted into the bearing back and then a predetermined amount of molten babbitt is pumped through the nozzle against the interior wall of the bearing back. The carriers are rotated a quarter revolution when the bearing back containing the molten babbitt registers with the water conduit and the molten babbitt is subjected to water. The fan 27 withdraws the vapor or steam created in the bearing back. Meanwhile another unbabbitted bearing back is being operated upon in the first position and in the same manner. These operations are continued for each partial revolution of the carriers.

For the purpose of controlling the amount of molten babbitt to be forced into the bearing back the stop 89 is provided for limiting the downward movement of the pump handle 69 and consequently the plunger actuated by the handle. This stop is adjustable to vary the amount of babbitt dependent upon the size of the bearing back being handled by the machine. Another important consideration is the arrangement of inlet openings into the pump cylinder, whereby the impurities and slag in the molten metal in the retort will not enter the cylinder and thus be forced into a bearing back. Specifically 90 are inlet openings in the periphery of the pump cylinder and intermediate its ends, these openings being a substantial distance below the surface of the molten metal, so that when the pump plunger is raised, pure molten metal will enter the cylinder.

While I have used the term "babbitt" in the specification it is to be understood that bearing-metal alloys other than Babbitt metal itself are included.

What I claim as my invention is:

1. In a babbiting machine, the combination with rotatable means for holding a plurality of hollow bearing backs, of means for forcibly feeding molten babbitt successively into the bearing backs.

2. In a babbiting machine, the combination with a rotatable carrier, of a plurality of holders for hollow bearing backs mounted on said carrier, means for rotating said carrier, and a nozzle for conducting molten babbitt under pressure successively into the bearing backs.

3. In a babbiting machine, the combination with a rotatable carrier, of a plurality of holders for hollow bearing backs mounted

on said carrier, means for intermittently rotating said carrier, and a nozzle adapted to register with the bearing backs in one position of rotation for conducting molten babbitt under pressure successively thereinto.

4. In a babbitting machine, the combination with a rotatable carrier, of a plurality of holders for hollow bearing backs concentrically mounted on said carrier, means for rotating said carrier about its axis, means for rotating said holders about their respective axes, and a nozzle adapted to conduct molten babbitt under pressure successively into the bearing backs.

5. In a babbitting machine, the combination with a rotatable carrier, of a plurality of holders for hollow bearing backs mounted on said carrier, means for rotating said carrier, a nozzle adapted to be in substantial axial alignment with and movable longitudinally within the bearing backs in one position of rotation, and means for forcing molten babbitt through said nozzle.

6. In a babbitting machine, the combination with means for revolving a hollow bearing back, of means for feeding molten babbitt into the bearing back while revolving, means for subsequently feeding moisture into the bearing back while revolving and means for withdrawing a portion of the moisture from the bearing back while the moisture is being fed thereto.

7. In a babbitting machine, the combination with a rotatable carrier, of a plurality of holders for hollow bearing backs concentrically mounted on said carrier, means for rotating said carrier about its axis, means for rotating said holders about their respective axes, a nozzle adapted to conduct molten babbitt under pressure successively into the bearing backs, and a conduit adapted to subsequently conduct water successively into the bearing backs.

8. In a babbitting machine, the combination with a support, of cooperating aligned heads for holding a bearing back, one of said heads having a universal mounting upon said support, means for revolving said head, and means for feeding molten babbitt into the bearing back while the latter is revolving.

9. In a babbitting machine, the combination with aligned rotatable carriers, of a plurality of aligned cooperating heads upon said carriers for holding hollow bearing backs therebetween, means for rotating said carriers, means for rotating the heads upon one of said carriers when in certain positions, means for rotating all the heads upon said other carrier in all positions, and a pump for forcing molten babbitt successively into the bearing backs in one position of rotation of said carriers.

10. In a babbitting machine, the combination with aligned rotatable carriers, of a plu-

rality of aligned cooperating heads upon said carriers for holding hollow bearing backs therebetween, means for rotating said carriers, means for rotating the heads upon one of said carriers when in certain positions, means for rotating all the heads upon said other carrier in all positions, a pump for forcing molten babbitt successively into the bearing backs in one position of rotation of said carriers, and a conduit for subsequently conducting water successively into the bearing backs.

11. In a babbitting machine, the combination with cooperating aligned heads for holding a hollow bearing back therebetween, one of said heads being axially apertured, means for feeding molten babbitt through the aperture in said head and into the bearing back, a conduit for subsequently feeding water through the aperture in said head into the bearing back and a fan upon the other of said heads for withdrawing the vapor in the bearing back.

12. In a babbitting machine, the combination with rotatable carriers, of aligned rotatable heads for holding hollow bearing backs therebetween, said heads being universally mounted concentrically on said carriers, means for rotating said carriers about their axes, means for rotating said heads about their respective axes, a nozzle adapted to conduct molten babbitt successively into the bearing backs in one position of rotation of said carriers, a conduit adapted to subsequently conduct water successively into the bearing backs in another position of rotation of said carriers, and means for yieldingly moving one of said cooperating heads away from the other in said first-mentioned position of rotation of said carriers.

13. In a babbitting machine, the combination with a base, of a support upon said base, a second support slidably mounted upon said base toward or away from said first-mentioned support, aligned carriers mounted upon said supports, cooperating series of aligned heads for holding hollow bearing backs therebetween, concentrically mounted upon said carriers, means for feeding molten babbitt into the bearing backs, and means for adjusting said movable support to move one series of cooperating heads as a unit toward or away from the other series of cooperating heads.

14. In a babbitting machine, the combination with a rotatable carrier, of a plurality of heads for hollow bearing backs concentrically mounted on said carrier, means for rotating said carrier about its axis, means for rotating said holders about their respective axes, a nozzle adapted to conduct molten babbitt through said heads into the bearing backs and a guard concentrically mounted with respect to said heads and having outwardly extending portions

for partially enclosing said heads and bearing backs.

15. In a babbitting machine, the combination with a support, a rotatable carrier mounted upon said support, rotatable shafts concentrically mounted upon said carrier, heads for holding hollow bearing backs mounted upon said shafts, means for rotating said carrier by a step-by-step motion, and means actuated by said rotating means for longitudinally moving one of said heads.

16. In a babbitting machine, the combination with a support, of a rotatable carrier mounted upon said support, rotatable shafts concentrically mounted upon said carrier, heads for holding hollow bearing backs, universal driving connections between said heads and shafts, means for rotating said carrier intermittently, means actuated by said rotating means for moving one of said shafts longitudinally with respect to said carrier, and means for yieldably returning said shaft to its normal position.

17. In a babbitting machine, the combination with a pair of spaced rotatable carriers, of a series of cooperating heads between said carriers for holding bearing backs, and means for adjusting one of said carriers toward or away from the other of said carriers.

18. In a babbitting machine, the combination with cooperating heads for holding a hollow bearing back, one of said heads having an aperture therethrough registering with the interior of the bearing back, of a fan connected to said last mentioned head and rotatable to pass air through said central aperture.

19. In a babbitting machine, the combination with cooperating heads for holding a hollow bearing back therebetween, one of said heads having a central aperture therethrough for the passage of molten babbitt into the bearing back, and the other of said heads having a central aperture therethrough for the passage of air, of a fan connected to said last-mentioned head and having an inlet opening registering with the

central opening in said last-mentioned head, said fan being arranged to draw air through the bearing back.

20. In a babbitting machine, the combination with a pair of spaced rotatable carriers, of a plurality of holders for hollow bearing backs mounted between said carriers, means for rotating said carriers, a nozzle movable longitudinally within said bearing backs in one position of said rotatable carrier, and means for forcing molten babbitt through said nozzle.

21. In a babbitting machine, the combination with a pair of spaced rotatable carriers, of a plurality of holders for hollow bearing backs mounted between said carriers, means for rotating said carriers, a nozzle movable longitudinally within said bearing backs in one position of said rotatable carrier, means for forcing molten babbitt through said nozzle, and a conduit adapted to register with the bearing backs in another position of said carrier to convey a cooling fluid thereto.

22. In a babbitting machine, the combination with a pair of spaced rotatable carriers, of a plurality of holders for hollow bearing backs mounted between said carriers, means for rotating said carriers, a nozzle movable longitudinally within said bearing backs in one position of said rotatable carrier, means for forcing molten babbitt through said nozzle, a conduit adapted to register with the bearing backs in another position of said carrier to convey a cooling fluid thereto, and means for removing the vapor formed by contact of the cooling liquid within the molten babbitt.

23. In a babbitting machine, the combination with a rotatable carrier, of a plurality of holders for hollow bearing backs rotatable about the horizontal axis of said carrier, means for rotating said carrier, means for rotating said holders, and a nozzle adapted to conduct molten babbitt successively into the bearing backs.

In testimony whereof I affix my signature.

CHARLES W. EGGENWEILER.