May 15, 1945. J. L. MORRIS 2,375,939

BABBITTING APPLIANCE

Filed Jan. 3, 1944 2 Sheets-Sheet 1

Fig. 1.

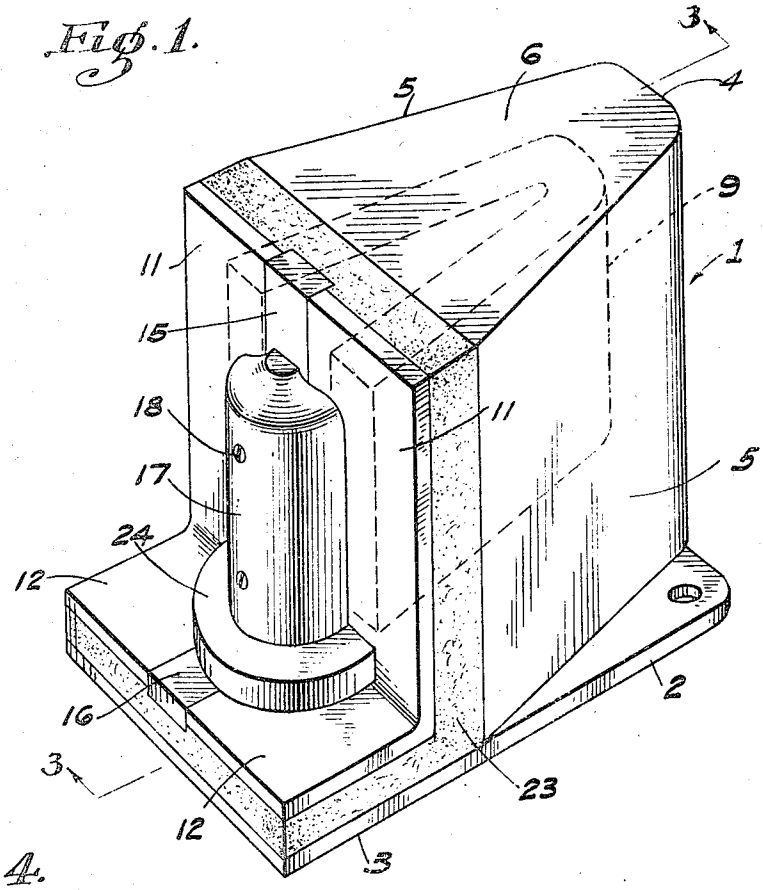


Fig. 4.

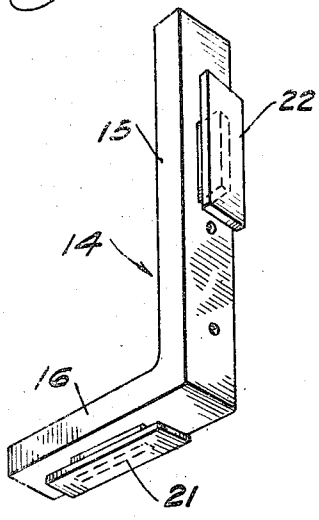


Fig. 5.

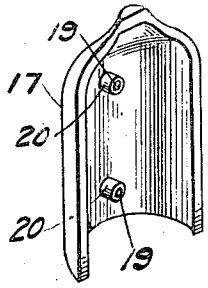
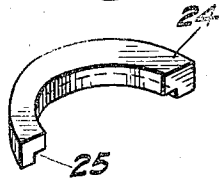


Fig. 6.



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Filed Jan. 3, 1944 2 Sheets-Sheet 2

Fig. 2.

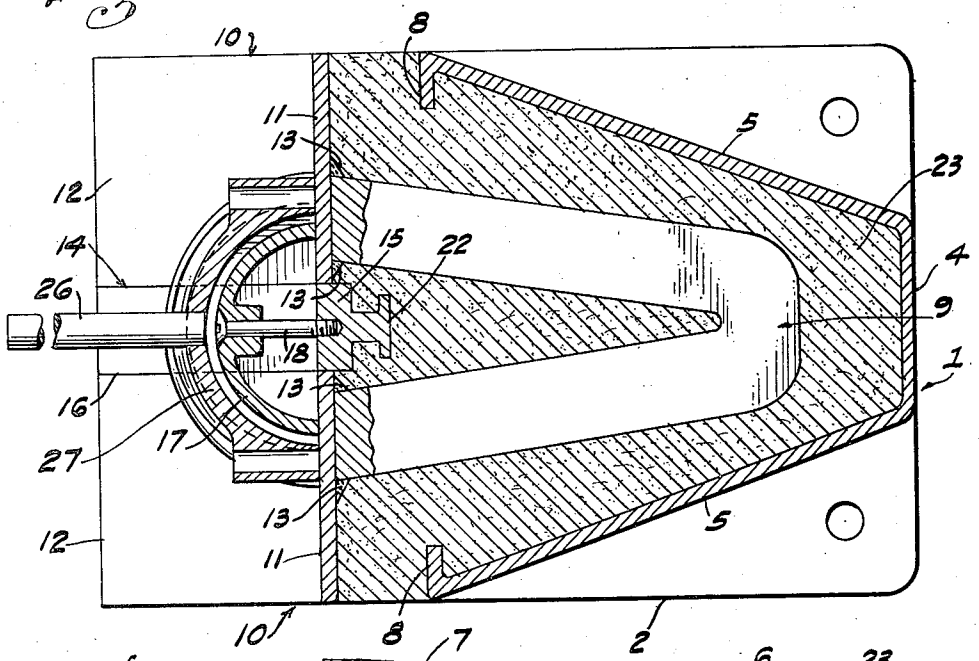
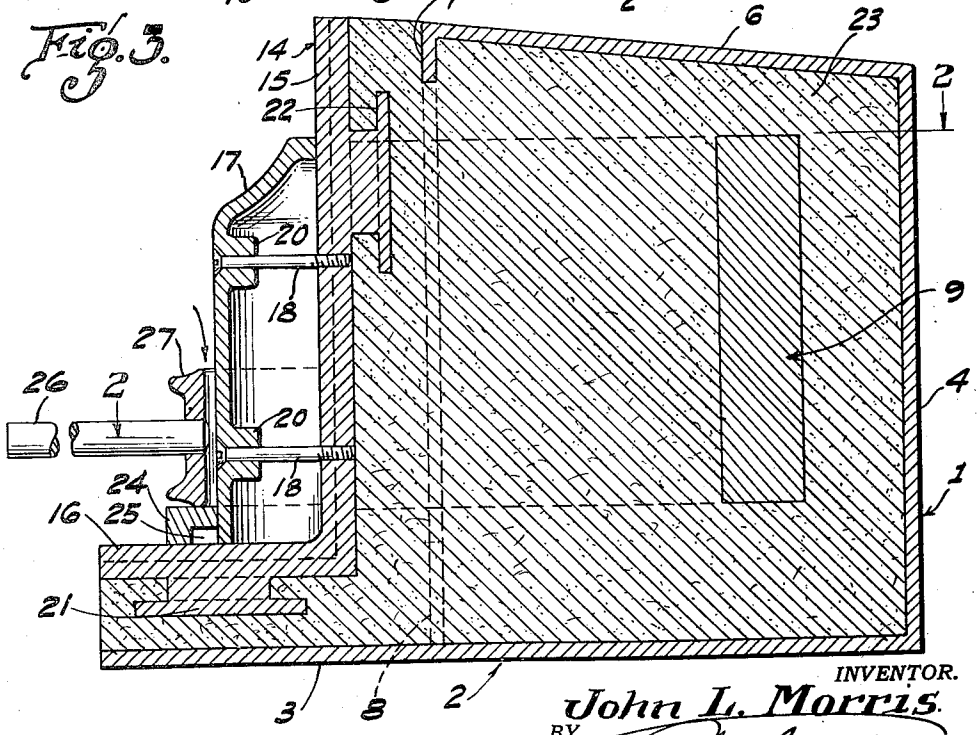


Fig. 3.



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BABBITTING APPLIANCE

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4 Claims. (Cl. 22—123)

This invention relates to improvements in babbitting appliances.

The general object of the invention is to provide magnetic means to temporarily hold a part to be coated with molten metal (for example babbitt), in a slightly spaced relation to a mandrel of non-magnetic material, thus affording, between said part and the mandrel a narrow space into which the molten metal is poured which, after cooling, forms the desired coating or lining.

More specific objects of the invention are: to avoid, in performing the coating operation, the use of exposed threaded surfaces or of opening or closing mold parts, holding devices, clamping mechanisms or cams apt to clog with babbitt and thereby to retard the lining operation, and produce rust; to provide for more quickly and firmly placing the part to be coated into a proper operative relation to the mandrel and for as quickly removing the work after it has been coated; to provide for pouring more quickly the metal of which the lining is made thereby preventing cooling of the tinned surface before molten metal has time to "set"; to avoid the necessity of using batteries, generators and wiring, as has heretofore been required with the use of conventional magnetic chucks; to greatly speed up the lining or coating operation; and to greatly reduce the manufacturing cost of a device of the kind to which the invention pertains.

The aforementioned advantage of preventing cooling of the tinned surface during the babbitting operation arises from the fact that the present type of casting fixtures require a much slower positioning of the part to be babbitted because mechanical means (cams, wheels, centering screws, etc.) are employed instead of the magnetic angle plates, which instantly position properly the part to be babbitted.

Other objects, advantages and features of invention will hereinafter appear.

Referring to the accompanying drawings, which illustrate what is at present deemed to be a preferred embodiment of the invention, in which embodiment it is now being marketed,

Fig. 1 is a perspective view of the complete device.

Fig. 2 is a transverse section thereof on line 2—2 of Fig. 3, except that the greater part of the magnet is shown in plan.

Fig. 3 is a vertical section on line 3—3 of Fig. 1.

Fig. 4 is a detail perspective view of the non-magnetic angular separator which also serves as an anchor.

Fig. 5 is a perspective detail of the non-magnetic arbor or mandrel per se.

Fig. 6 is a perspective view of the keeper or armature which conserves the magnetism of the device.

Referring in detail to the drawings, the cast iron metal housing 1 comprises a rectangular base plate having a floor portion 2, and front portion 3 which forms a horizontal apron. From the midwidth part of the back edge of said floor portion 2 upstands the vertical back wall 4 of the housing, this wall preferably extending across only about one-third the width of the floor 2. The twin side walls 5 of the housing extend forward and divergingly from the outer edges of said back wall, as shown, their front portions being shown substantially flush with the side edges of the floor 2, from which points the apron portion 3 of the floor forwardly projects. The top wall 6 of the housing may be horizontal but is shown slightly inclined downwardly from front to rear. From the front edge of this wall depends a flange 7 and continuous with each end portion of this flange are the inwardly directed side flanges 8, 8 of the side walls 5. Said flanges 8 extend down to the floor 2 which, so far as the housing proper is concerned, is otherwise unobstructed. The aforesaid apron portion 3 of the floor 2 of the housing projects a considerable distance forwardly of the upstanding wall portion of the latter in order to support and provide room for parts presently to be described.

A magnetic member 9 of the V or horseshoe shape type is provided. To said magnetic member are secured the magnetizable L-shaped pole pieces 10 each of which has a vertical leg 11 and a horizontal, forwardly projecting foot portion 12. Said vertical legs 11 are secured to the front faces of the limbs of the magnet member by means of the welds 13.

A non-magnetic L-shaped separator 14 having a vertical leg 15 and a horizontal leg 16 bridges the space between the vertical and horizontal portions of each of said pole pieces so that the entire combination of the aforesaid L-shaped parts provides a smooth face portion and floor portion for the front part of the device.

The vertical leg 15 of the separator is provided with a plurality of threaded holes which are utilized to attach to said leg an arcuate, non-magnetic arbor or mandrel 17 by means of screw bolts 18, whereby said mandrel is attached with its

concave side directed toward the upstanding front faces of the magnetic pole pieces, and its basal portion resting upon the horizontal leg portions of the pole pieces and of the intermediate separator **16**.

A set of aluminum arbors differing in size is provided only one of which is shown and separately detailed in Fig. 5, and being shown detachably secured in its operative position in Figs. 2 and 3. This arbor is shaped as a segment of an inverted cylindrical cup and has a plurality of apertures **19** passing through its midwidth portion to receive screw bolts **18** which are tapped into the threaded sockets provided for them in the vertical limb **15** of the separator **14**. Where the apertures **19** pass through the arbor the material thereof is shown reinforced by internal lugs **20**.

Said separator **14** is provided with a bonding anchor **21** in its horizontal leg, and its vertical leg is likewise furnished with a bonding anchor **22**, said anchors being utilized to sustain the unit comprising the magnet member, its pole pieces and its separator in a spaced insulated relation to the floor and wall portions of the housing by grouting said bonding elements within a cementitious material **23**.

Said cementitious material is preferably a composition consisting of three parts of Portland cement, one part of plaster of Paris and enough water to make the composition pasty.

In order properly to mount the magnetic unit in the aforementioned position the parts thereof when assembled are properly supported in an appropriate mold into which the pasty material is injected and then allowed to remain for a period of approximately twelve hours to "set." Thereupon the completed device may be removed from the mold.

A set of different sized keepers **24** is provided to conserve the magnetism of the device, and for another reason which will hereinafter appear, one of these keepers being separately shown in Fig. 6. In Figs. 1, 2 and 3 an arcuate keeper **24** is shown fitted around the arbor **17** in a position to perform its function of conserving the magnetic flux. This keeper forms one of a set of keepers in which set individual keepers of the proper size and contour cooperate properly with whatever arbor of a corresponding set of arbors happens to be in use at any particular time. These keepers, when in use, need no attaching means but are safely held in place by reason of the magnetism of the magnetic member and the magnetized areas contacted thereby.

As illustrated in Fig. 6 each of the arcuate keepers **24** has cut into one of its side faces along its inner periphery a rightangular groove **25**. Ordinarily, when said keeper is in use the grooved side thereof will be directed downwardly and its flat face will be uppermost, as shown in Fig. 1. At times, however, the keeper will be used with its grooved face uppermost in order to produce an arcuate downward extension of the metallic lining which is applied to whatever bearing member is operated upon.

In Figs. 2 and 3 a fragment of a rod **26** is shown in its operative relation to a connecting rod bearing member **27** with which it cooperates, said rod closing an opening in said bearing member through which the molten metal would otherwise escape and at the same time providing means for the operator to properly adjust the member being operated upon in relation to the arbor about which it is fitted in a spaced relation.

The arcuate keeper is held in place not only by the action of the magnetic flux upon its extremities but also by magnetic current from the forwardly projecting foot portions of the two L-shaped pole pieces which pulls downwardly upon said keeper and likewise the work being operated upon thereby greatly increasing the force by which each is held in their operative positions.

From the foregoing it is believed to be obvious how the babbitting appliance as a whole is constructed. However, some question may arise as to the employment of a cementitious material instead of the well known insulative rubber. This is due to the fact that the heat from the molten babbitt causes rubber insulation to become heated thereby giving off obnoxious fumes which is offensive to the operators performing the babbitting operation.

A description of the operation relative to the babbitting or rebabbitting of one of several items will now be given, that of babbitting connecting rods and their caps being the ones chosen for illustration.

When necessary, the old babbitt is melted from the parts by first submerging them in molten babbitt, after which they are removed from the bath and the bearing surfaces brushed by a wire brush to clean away the surplus babbitt.

The cleaned rods and caps are next heated by submerging them in molten tin or solder. Then by using a brush, any good soldering flux is applied to the bearing surfaces, whereupon the parts are returned to the solder or tin bath.

The parts are next removed from the molten solder bath and quickly placed in contact with the magnetic angle plate, the cap end of the connecting rod being shown applied in Figs. 2 and 3, and the babbitt is poured into the space between the cap (or shank end of the rod) and mandrel as indicated by the arrow in Fig. 3. The affinity of the molten babbitt for the tinned or soldered surface of the cap (or rod) creates an instant bond between the steel and babbitt. After the latter operation the rod and cap are bolted together and machined to the desired diameter and width.

Due to the escape of some of the molten metal between the contacting faces of the cap and keeper, the keeper is constructed so as to allow its outer perpendicular peripheral face to cause the babbitt to flow by gravity down therealong rather than to collect on the top surface where it could adhere to the tinned surface of the cap and cause the subsequent operation of having to chip it off. Thus the second important function of the keeper.

By properly positioning the rod **26** against the face of the arbor **17** the operator can easily adjust the cap relative to the mandrel to obtain a uniform spaced relation of the two elements as shown in Fig. 2. The temporary magnetic holding bond of the end portions of the cap to the vertical magnetizable pole portions **11** is augmented by the magnetic bond of the contacting areas of the cap element with the horizontal magnetizable pole portions **12** through the medium of the keeper **24**, thus positioning securely any part against movement during the babbitting operation.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the subject matter claimed.

What is claimed is:

1. In a babbitting appliance, a housing having an open front side and a floor having a substantially horizontal apron portion which projects outwardly beyond said front side, a filling of insulation material within said housing and having a portion which projects from its front side and also a portion which overlies said apron portion of the housing floor, a permanent magnet partly embedded within said filling and by it insulated from said housing, said magnet being of the V or horseshoe type and having the outer end portions of its limbs occupying the aforesaid projecting portion of said filling and having front end faces in an exposed relation to said filling, a pole piece carried by each of said limb ends, said pole pieces consisting of L-shaped plates having spaced apart inner edges and each of said pole pieces having the inner face portion of its vertical limb abutting against and secured to one of the aforesaid exposed end faces of said magnet and also abutting against the surface of the aforesaid projecting portion of said filling, a non-magnetic separator anchored to said filling and bridging the space between said inner edges of said pole pieces, a segmentally cylindrical non-magnetic arbor centrally secured to said separator in an upstanding position with its convex side directed forwardly, and an arcuate keeper of magnetizable material contoured to fit detachably around the otherwise exposed basal portion of said arbor with its ends in a contacting relation to said pole pieces.

2. In a babbitting device for lining the segments of the heads of connecting rods, a magnet of the V or horseshoe shape type, and having pole pieces, a support for said magnet, a segmentally cylindrical member of non-magnetic material mounted upon said support in an upstanding position with its convex side directed away from said magnet and its opposite side in substantially an abutting relation to its said pole pieces, and an invertible magnetizable arcuate keeper mounted on said support with its concave side in substantial contact with the convex surface of the lower part of said segmentally cylindrical member, and its extremities in a conducting relation to said pole pieces, the space superjacent to said keeper being unobstructed to receive the connecting rod segments while they are seated upon said arcuate member in position for babbitting, said arcuate keeper having horizontal upper and lower side faces and along the inner arc of one of said faces a groove which deepens the metallic lining being applied to said heads of connecting rods when said groove is directed upwardly.

3. In a babbitting appliance, the combination, with a housing having an open front side and a floor with an apron portion which projects forwardly of said front side; a magnet of the V or horseshoe type having two poles, an L-shaped pole piece attached to each of said poles and having a basal limb projecting outwardly from the magnet, said pole pieces being spaced apart from each other, a cementitious filling of insulating material within said housing and carpeting the apron portion thereof, said filling supporting said magnet together with its said pole pieces in an insulated relation to said housing, and L-shaped separator of non-magnetic material occupying the space between said pole pieces and intercepting the flow of magnetism from one to the other of said pole pieces, the basal limbs of said pole pieces and separator resting upon the portion of said filling which carpets said apron, an arcuate non-magnetizable arbor secured to said separator, and a magnetizable keeper arcuated to the form of said arbor and fittable thereagainst in a position to form a shelf on which to support bearing members and the like while being babbitted by injecting fused metal between them and said arbor, and said arcuate keeper having angular corners as viewed in cross section and having a groove along one inner corner of its concave side, said keeper being reversible between two positions in one of which said groove thereof is directed upwardly and provides room for an extension of the babbitting and in the other of which said groove is directed downwardly in an inoperative position.

4. In a magnetic babbitting appliance, in combination, a magnet member having spaced apart L-shaped pole pieces consisting of plates which have upstanding body portions and substantially horizontal forwardly directed foot portions, a partly cylindrical member of non-magnetic material supported in an upstanding position wherein it rests upon said foot portions of said pole pieces with its convex side directed forwardly, and an arcuate magnetizable keeper positionable in a detached manner upon the foot portions of said pole pieces to be magnetically held in such position during a babbitting operation, said keeper having a substantially horizontal arcuate upper surface to underlie parts supportable thereon while the latter are magnetically held in place for being babbitted.

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