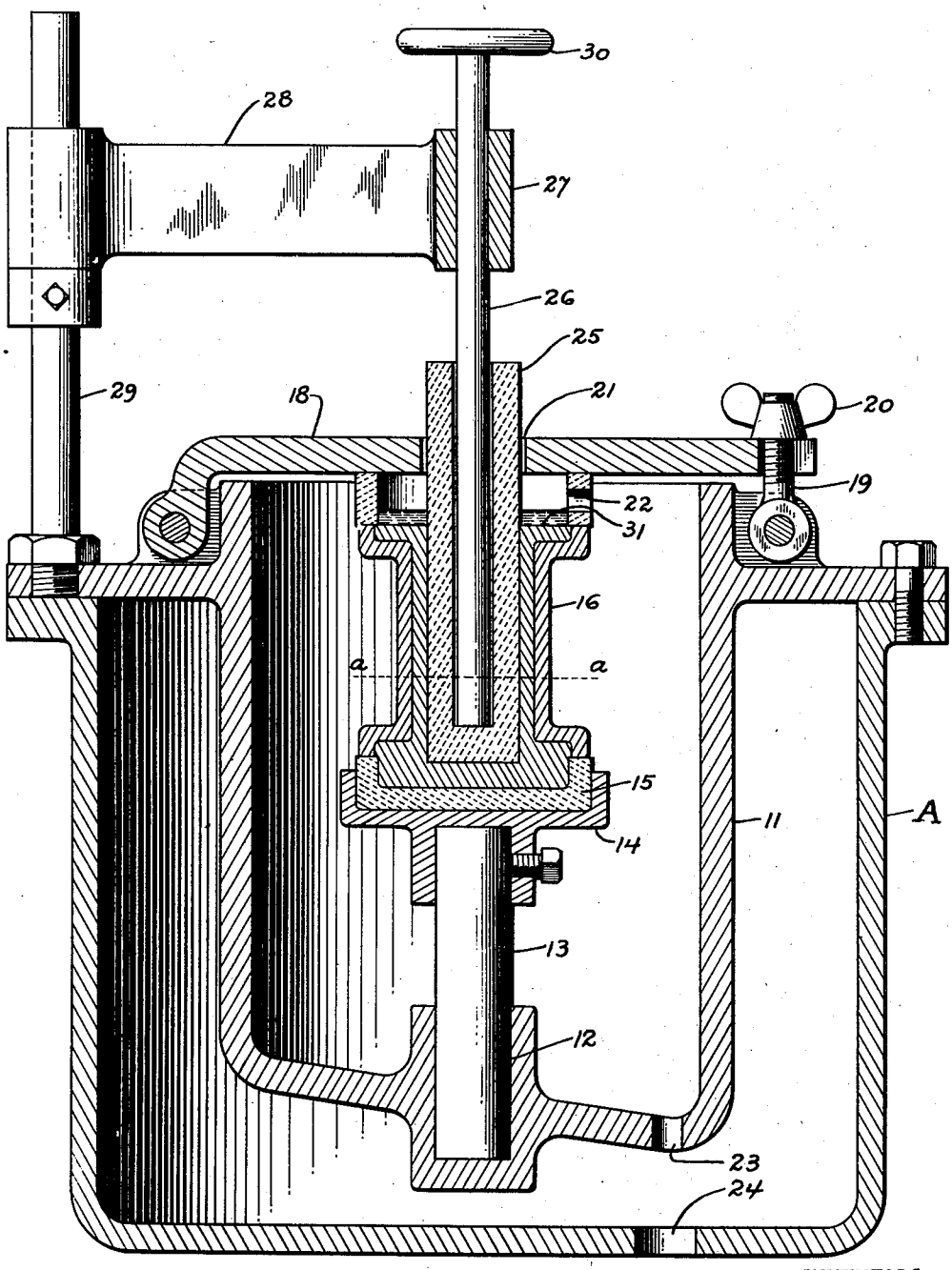
Aug. 9, 1932. R. D. PIKE ET AL 1,870,867

METHOD OF CASTING DUAL METAL BEARINGS

Filed June 17, 1930



INVENTORS.
Robert D. Pike,
Ellsworth W. Carroll.

BY
Townsend, Loftus & Offett
ATTORNEYS.

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UNITED STATES PATENT OFFICE

ROBERT D. PIKE, OF DIABLO, AND ELLSWORTH W. CARROLL, OF SAN FRANCISCO, CALIFORNIA, ASSIGNORS TO KALIF CORPORATION, OF EMERYVILLE, CALIFORNIA, A CORPORATION OF DELAWARE

METHOD OF CASTING DUAL METAL BEARINGS

Application filed June 17, 1930. Serial No. 461,708.

Our present invention relates to an improved method for casting bearings and bushings of the type disclosed in concurrently filed applications by Robert D. Pike and Joseph Krill, method of welding Serial Number 461,709, and by Robert D. Pike, "bushing" Serial Number 461,707, and in the copending application by Robert D. Pike, "compound article and method of making the same," Serial No. 554,785, filed August 3, 1931, and relates particularly to an improved method for making steel reinforced bearings in which the bearing face is an alloy of copper-lead with or without minor amounts of other metals. However, it is to be understood that our invention is not limited to the particular nature of either the supporting structure or the bearing metal, but is a broad new method for obtaining uniform dual metal castings in which a molten metal becomes integrally attached to a solid metal.

Our invention will be made apparent by reference to the drawing in which the figure shows a vertical cross-section of a bearing back just after a casting has been completed. For the sake of simplicity, but not for limitation, the description which follows will pertain to a steel backed bearing of the main engine type with a copper-lead bearing liner on the inside and over the flanges, the copper-lead being integrally attached to the steel.

A represents a trough-like furnace of suitable material heated by suitable means not shown and maintained at a temperature of 600° to 800° C. 11 is a pot-like receptacle, made preferably of cast iron, which is suspended within the furnace. A bottom well 12 is provided which supports and centers the steel post 13, which terminates in a rigidly attached adapter 14. In the latter is placed a bottom closure 15, preferably made of some ceramic material.

In operating our process the first step is to place the closure 15, which has previously been heated red hot (about 1000° C.) in a separately fired furnace (not shown) in place in the adapter 14. The steel back 16 is then put into place. This back has preferably previously been heated to 500° to 600° C. in a separate furnace (not shown) although it may be placed as shown cold and then heated to about 600° C. The top ring, preferably made of some ceramic material and provided with an opening 22, is then placed thereon, and the top clamp 18 is then swung into place and secured down tightly by means of swing bolt 19 and wing nut 20. We then promptly pour in through hole 21 very hot molten flux so as to entirely cover the inside face of the back. This flux is preferably of borax glass at a temperature of 1400° to 1500° C.

The next step is to pour in a few seconds after pourng the flux, a measured amount of the molten copper-lead alloy at a temperature of about 1250° C. This will come to some such position as indicated by the dotted line *a—a*, and the borax which has been displaced flows out through hole 22 and thence through holes 23 and 24 into some suitable receptacle, (not shown). In the meantime the hollow core 25, which is preferably made of some ceramic material, has been brought to a temperature of 1000° to 1200° C. in a separate furnace, (not shown) and is seized with a pair of tongs and thrust into the hole 21, its lower end floating in the pool of molten borax. The steel rod 26 is held in an elevated position in bearing 27 which swings at the end of arm 28 around post 29 so that it may be brought directly over the center of the bearing. When the rod is thus centrally positioned the operator seizes the handle and thrusts downwardly, thus pressing the core 25 down through the borax and through the molten pool of copper-lead. Thus the core 25 is made to act as a plunger pump which forces the copper-lead into its final cast position as indicated by the level 31 and spills substantially all of the borax through the hole 22. Solidification of the copper-lead is very rapid and at the same time the weld is perfect.

One of the great advantages of our process is that it permits all of the flux to come to the top in an orderly fashion and none is trapped in the copper-lead. In large castings we sometimes employ as a core a light bucket made out of sheet steel and provide pneumatic or hydraulc means for operating the rod 26.

A further advantage of our invention is that whether the core 25 be made of ceramic material or sheet steel or other material, it is not locked in by gating channels and is therefore very easy to remove. In carrying out our process when copper-lead is being cast we find it preferable to remove the casting as soon as it has solidified and quench it in water.

By means of our process it is possible to make steel backed or reinforced copper-lead bearings of more uniform excellence and more cheaply than by any process hitherto known, and our process may be applied to the making of integrally welded dual metal bushings of a wide range of materials. In our description we have specified the use of a molten flux to keep the surface of the supporting structure bright and weldable and this method is preferred by us, but our invention is intended to cover the use of any other suitable means for keeping the surfaces bright and weldable as, for example, the use of an atmosphere of reducing gas which may be employed instead of the molten flux.

Having thus described our invention, what we claim and desire to secure by Letters Patent is—

1. A process for making dual metal bushings in which a molten metal is poured into integral contact with a pre-formed solid metal which consists in pouring into contact with the lower part of the solid metal, while maintaining all surfaces to be integrally attached in a metallic condition, the requisite amount of molten metal to complete the casting and then plunging into this molten metal a pulp-like core which forces the molten metal into its final position integrally attached to the solid metal.

2. A process for making a duel metal bushing in which a molten metal is poured into integral contact with a pre-formed solid metal which consists in pouring into contact with the pre-formed metal so as to cover all surfaces to be integrally attached, a molten flux, then following this by pouring into contact with the lower part of the pre-formed metal, an amount of molten metal substantially requisite for completing the casting and then plunging through the molten flux and into the molten metal a pump-like core which forces the molten metal into its final position integrally attached to the solid metal.

3. The process of cast-welding a layer of metal consisting principally of copper and lead onto a solid iron or steel member, which comprises pouring into contact with the lower part of the solid member, while maintaining all surfaces to be integrally attached in a metallic condition, sufficient molten metal to complete the casting, and then moving into said molten metal a pump-like core which forces said molten metal into its final position integrally attached to said solid metal after cooling.

4. The process of cast-welding a layer of metal consisting principally of copper and lead onto a solid iron or steel member, which comprises pouring into contact with said member so as to cover all surfaces to be integrally attached, a molten flux, then pouring into contact with the lower part of said member sufficient molten metal for completing the casting, and then moving through said molten flux and into said molten metal a pump-like core which forces said molten metal into its final position integrally attached to said solid metal after cooling.

ROBERT D. PIKE.
ELLSWORTH W. CARROLL.

CERTIFICATE OF CORRECTION.

Patent No. 1,870,867. August 9, 1932.

ROBERT D. PIKE, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 38, claim 1, for "pulp-like" read "pump-like"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of February, A. D. 1933.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.