No. 868,904. PATENTED OCT. 22, 1907.

J. O. BARDILL.

BOMB FOR USE IN METALLURGICAL OPERATIONS.

APPLICATION FILED JUNE 22, 1907.

FIG. I.

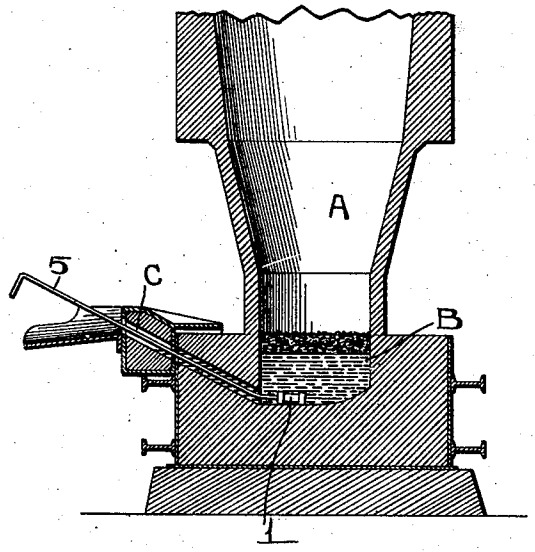


FIG. II.

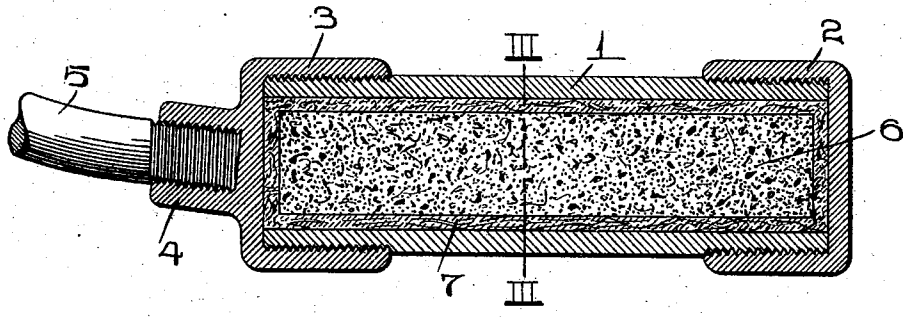
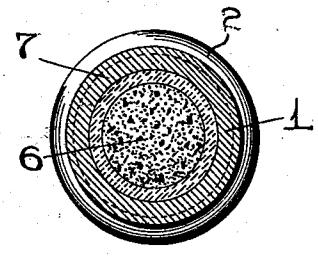


FIG. III.



ATTEST.

L. J. Fletcher.

Lily Rost

INVENTOR.

J. O. BARDILL.

BY Geo. B. Knight

ATT'Y

UNITED STATES PATENT OFFICE.

JOHN O. BARDILL, OF HERCULANEUM, MISSOURI.

BOMB FOR USE IN METALLURGICAL OPERATIONS.

No. 868,904. Specification of Letters Patent. Patented Oct. 22, 1907.

Application filed June 22, 1907. Serial No. 380,249.

To all whom it may concern:

Be it known that I, JOHN O. BARDILL, a citizen of the United States of America, residing at Herculaneum, in the county of Jefferson and State of Missouri, have invented certain new and useful Improvements in Bombs for Use in Metallurgical Operations, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a bomb designed for use in the crucibles of smelting furnaces and through the medium of which the accretion of substances, such as sulfids and metallic iron, may be dislodged from the crucible basin, from time to time, thereby avoiding a condition under which the crucible basin or well becomes choked or filled to the detriment of the metallurgical operation, due to the impairment of the crucible or the well.

Heretofore the crucibles and wells of smelting furnaces have become rapidly filled by accretions in the manner stated, and owing to there being no known means, so far as I am aware for the effective dislodgment of the accretions after they have become present in the crucible basin and well, and the crucible has been continued in service until such time as it was unfit for use, due to the amount of accretions, and it has then been necessary to stop the operation of the furnace, and by a vast amount of labor, to blast the accretions from the crucible basin to render it fit for service. By the use of my bomb, I am enabled to thoroughly dislodge the accretions during the period of operation of a smelting furnace and without any detriment to either the furnace or the crucible.

Figure I is a vertical section taken through the crucible of a smelting furnace and with one of my bombs shown in position therein ready to be exploded for the disintegration of the accretions in the crucible basin. Fig. II is an enlarged longitudinal section taken through the bomb with the inner end of the handle of the bomb shown in elevation. Fig. III is a cross section taken through the bomb on line III–III, Fig. II.

A designates the crucible of a smelting furnace which contains the basin B from which extends the outlet well C through which the molten metal that has been smelted escapes from the crucible.

The bomb which forms the subject matter of my present invention is adapted to be introduced into the crucible basin B through the outlet well C and this bomb is constructed as follows: The shell of the bomb comprises a cylinder 1 and a pair of end caps 2 and 3 secured to said cylinder which serve to close the ends of the cylinder in a manner to provide an air-tight chamber within the shell. The end cap 3 is provided with a neck 4 that receives a long rigid hand rod 5 which is of a suitable length to permit of the bomb to which the rod is attached being pushed through the outlet well C of the crucible into the basin of said crucible to occupy the position illustrated in Fig. I of the drawings. Within the shell of the bomb, I place any suitable explosive agent 6, such as dynamite or gun-powder, which is preferably incased within a lining 7 of asbestos or other substance that is a slow conductor of heat and will therefore act to retard the passage of heat from the shell of the bomb to the explosive agent within said shell.

In the practical use of my bomb the workman introduces the bomb through the outlet well of the crucible by pressing it through the molten metal therein and into the molten metal in the crucible basin, this act being readily accomplished due to the hand rod 5 being made sufficiently rigid to permit of the bomb being forced through the metal. The metal into which the bomb is introduced being at the time of the introduction of the bomb at a high temperature, heat passes rapidly through the shell of the bomb and acts to cause explosion of the explosive agent within the bomb with the result of bursting the bomb in the crucible basin. The force of the explosion and bursting of the bomb is sufficient to break or disintegrate the accretions that have become present in the basin, after which these accretions may be readily withdrawn or flow from the crucible through the tap hole or well of the crucible. The slow conductor lining 7 being present in the shell of the bomb and around the explosive agent therein, there is, in the use of the bomb, a delay in the explosion thereof, after it is inserted into the crucible basin, sufficient to permit of the workman who has introduced the bomb, moving to a safe distance away from the discharge end of the well C through which the bomb is inserted, in order that he may not be injured by any metal that might be forced outwardly through the well as a result of the bursting of the bomb.

Claims:

1. A bomb of the character described, comprising a cylindrical shell, an explosive agent in said shell, and a lining intermediate of said explosive agent and said shell, and a long rigid hand rod whereby the bomb is introduced lengthwise through the outlet well into the basin of a crucible furnace; said lining being a slow conductor of heat, substantially as set forth.

2. A bomb comprising a cylindrical shell, having externally screw-threaded ends, an internally screw-threaded cap at the inner end of the shell, an internally screw-threaded cap at the outer end of the shell, having an internally screw-threaded neck, a lining within the shell, an explosive agent within the lining and a long rigid hand rod secured in the neck, whereby the bomb is introduced lengthwise through the outlet well into the basin of a crucible furnace.

JOHN O. BARDILL.

In the presence of—
LILY ROST,
H. G. FLETCHER.