

# UNITED STATES PATENT OFFICE

2,278,135

## PRESS

William H. Osborn, New York, N. Y., assignor to  
Phelps Dodge Corporation, New York, N. Y., a  
corporation of New York

Application August 2, 1940, Serial No. 349,971

17 Claims. (Cl. 266—37)

This invention relates to an improvement in presses and particularly to a press suitable for use as a dross press.

In the refining of relatively low melting point metals such as tin or lead or lead-tin compositions known as solder, the practice of fire refining causes various drosses to rise to the surface of the kettle in which the metals are being refined. These drosses carry with them much entrained molten metal which can be partly removed by pressing or squeezing the dross.

The removing of antimony from tin or solder metals with aluminum or sodium may be cited as an example of the production of such a dross. To a pot or kettle of tin or solder containing antimony, metallic aluminum or sodium may be added and stirred into the charge. An inter-metallic compound of aluminum or sodium and antimony is formed which has a high melting point and which rises to the surface of the kettle in the form of a mushy dross in which solid crystals of aluminum-antimony or sodium-antimony compound are found with large amounts of molten tin or solder metal entrained among them. Such a dross will contain in the neighborhood of 8% antimony and 2 to 3% aluminum, or sodium, the balance of the dross being tin or solder metal.

Relatively low pressures, such as may be exerted by the action of air on a hydraulic press cylinder against a mold into which this dross is charged, will squeeze out much of the entrained metal. For example, pressures of the order of magnitude of 160 to 200 pounds per square inch will squeeze out sufficient tin from an 8% antimony dross to bring the antimony up to approximately 20%. The use of higher unit pressures on such a dross at temperatures above the melting point of the mother metal and below the freezing point of the compounds of the dross itself will squeeze out further amounts of the mother metal. For example, an antimony-aluminum dross which has already been pressed at pressures of 160 to 200 pounds per square inch so that it contains approximately 20% antimony, may be introduced into a high pressure hydraulic press and mold where pressures of the order of magnitude of 25,000 to 30,000 pounds per square inch may be applied to squeeze out further tin or solder metal and leave a final cake containing as much as 50% antimony and 15 to 20% aluminum, the remaining 30 to 35% being tin or solder metal. The cake may be further refined for the separation of antimony, for example, by selective oxidation, as described in my copending application

Serial No. 347,641, filed July 26, 1940, entitled "Recovery of antimony."

It is an object of this invention to provide an improved press, and method of operating the same, particularly adapted for the pressing or squeezing of drosses. A further object of the invention is to provide an improved press and method of operating the same to produce a multiplicity of cakes of squeezed dross, which cakes are in a shape and form which make it easy to introduce them into the container of a high pressure hydraulic press for further squeezing. Another object is to provide a press having means for moving the mold head by the press head, whereby close contact may be maintained during the pressing, said mold head being also movable separately from the press head whereby the ejection of the press cakes may be facilitated. It is also an object to provide a press with means for dropping the press head into the bath under the dross and to then lower the molding head through the dross and onto the press head so as to partially or completely fill the mold with dross. Other objects will become apparent.

The attached drawings illustrate a form of press embodying the invention. Figure 1 is a vertical cross sectional view at the diameter of the press cylinder, the pistons and piston rods being shown in elevation, and portions being broken away to indicate greater length.

Figure 2 is a similar view of the lower portion of the press with the press opened for removal of the press cake.

Figure 3 is a horizontal sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a horizontal sectional view taken on the line 4—4 of Figure 1.

In the drawings, 1 is an air cylinder (about 20 inches in diameter) equipped with a double acting piston 2, to which there is attached a piston rod 3. The piston may be provided with any suitable packing such, for example, as the cup leathers 2a. The upper end of the cylinder is welded or otherwise fastened to a flange ring 4, to which the top cover plate 5 is bolted or otherwise fastened, suitable sealing means being provided as indicated at 6. This cover plate 5 is provided with suitable packing means, such as the packing gland 7, pressing against the packing material 7a, through which the piston rod 3 passes. It is also provided with an aperture 8 communicating with a valved pipe for supplying and withdrawing air or other fluid pressure medium used for actuating the press.

The lower end of the cylinder 1 is welded or