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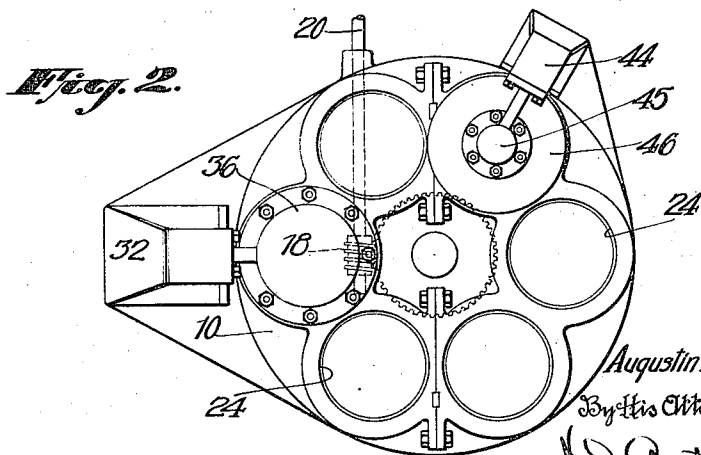
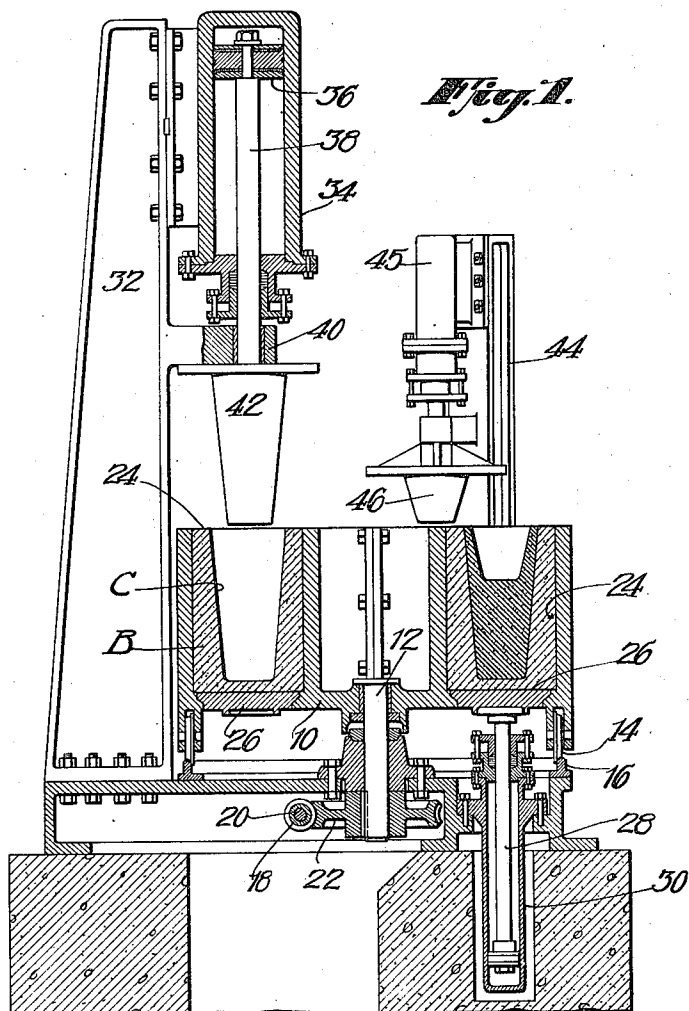
1,609,427

A. L. J. QUENEAU

METHOD OF MAKING RETORTS

Filed April 19, 1926

2 Sheets-Sheet 1



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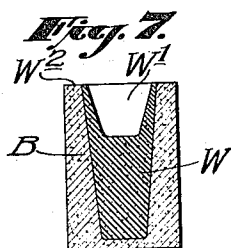
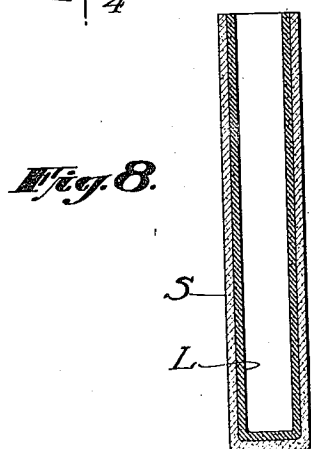
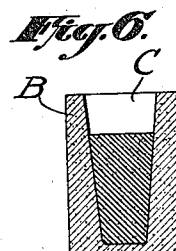
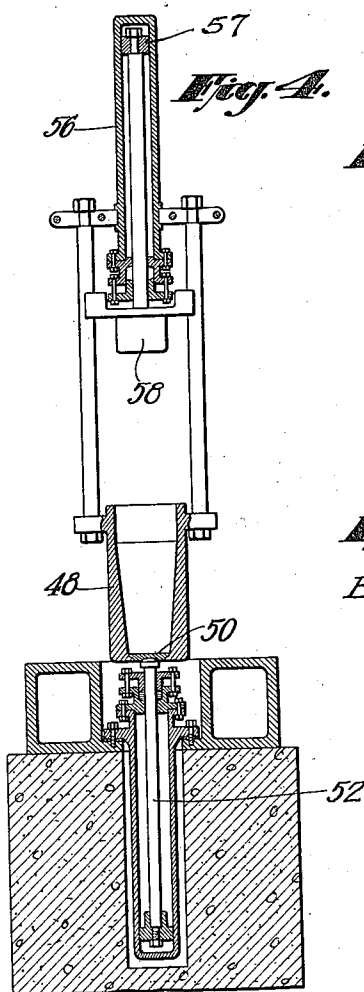
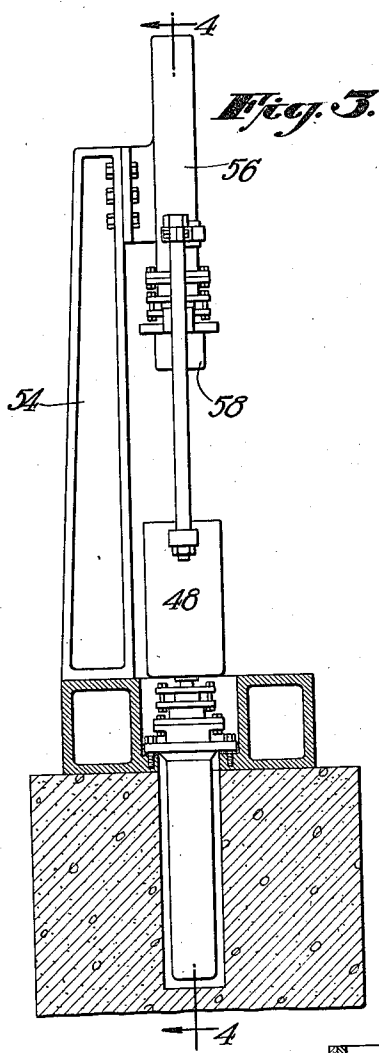
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METHOD OF MAKING RETORTS

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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE.

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## METHOD OF MAKING RETORTS.

Application filed April 19, 1926. Serial No. 103,028.

The present invention relates to an improved method of making retorts and similar metallurgical vessels.

While not limited thereto the herein-described method is particularly well adapted for use in the production of retorts used in the treatment of zinciferous ores. Those skilled in the art are aware that one of the problems confronting those in the zinc industry is to provide for the rapid and inexpensive replacement of retorts which are constantly being cracked or broken.

In the metallurgy of zinc, it is advantageous to utilize retorts whose inner surfaces are composed of a basic material so as to resist the action of the slag, the vapors and the molten charge in the retort. My invention provides an improved method whereby such retorts with resistant linings may be expeditiously and cheaply produced.

The invention will be apparent from the following specification when read in connection with the accompanying drawings in which—

Fig. 1 shows in longitudinal vertical section a press mold for carrying out certain steps in the method;

Fig. 2 is a plan view of the apparatus of Fig. 1;

Fig. 3 is an elevation of a similar piece of apparatus for carrying out another step in the method;

Fig. 4 is a section on line 4—4 of Fig. 3;

Fig. 5 is a sectional view of a wad of pugged material which has been compressed in the apparatus of Fig. 4;

Fig. 6 is a sectional view illustrating an intermediate step in my method;

Fig. 7 is a similar view illustrating a further step;

Fig. 8 is a sectional view through a retort made according to my invention.

Referring to the drawings, in making retorts according to my improved method, I provide a press mold such as that illustrated in Figs. 1 and 2 having a turret 10 secured to a shaft 12 and supported at its periphery by suitable rollers 14 which roll on a circular track 16. The turret is turned by means of a worm 18 secured to a shaft 20 and meshing with a worm wheel 22 which is keyed to the lower end of the shaft 12. The turret is provided with a plurality of cylindrically mold chambers 24. These chambers have loose bottoms 26. At one

station an hydraulic plunger 28 operating in a cylinder 30 is provided for the purpose of exerting an upward pressure on the loose bottom 26 in alignment herewith.

Secured to a suitable pedestal 32 is a hydraulic cylinder 34 having a piston 36 therein arranged to reciprocate a piston rod 38 operating through the suitable guide 40 and having a forming plunger 42 secured to the lower end thereof. At another station a pedestal 44 supports a similar hydraulic cylinder 45 which is arranged to reciprocate a forming plunger 46.

In carrying out my improved method, I also utilize a press mold of the character shown in Figs. 3 and 4 in which the mold section 48 is provided with a loose bottom 50 which is adapted to be lifted by an hydraulic plunger 52. This mold has a pedestal 54 which supports an overhead cylinder 56 having a piston 57 therein which is arranged to reciprocate a ram 58 adapted to compress the material which is introduced into the mold 48.

In carrying out my improved method, I first introduce into one of the mold chambers 24 a pugged mixture of burned and plastic clay. I then operate suitable valves not shown which cause the plunger 42 to descend so as to form a chamber C in the body B of the clay mixture in addition to forming the chamber. The plunger also causes any excess material to be extruded at the top of the mold. If desired, any excess material may be cut off by use of a wire or suitable tool. It is thus clear that the bodies B may be quickly formed. Further, all bodies so formed will be of substantially the same uniform size, weight and density. During the formation of the body B or before or after the formation of such body, wads W made up with a mixture of silicon carbide or other suitable basic material and plastic clay are formed by introducing a suitable quantity of such material in the mold 48 of Fig. 4 and then causing the hydraulically operated plunger 58 to descend so as to compress this material to the desired shape and size and also to extrude any excess material. The compressed wad W of silicon carbide and clay is then inserted in the cavity C of the clay body B and the turret 10 is turned so as to bring the same below the plunger 46, whereupon, the hydraulic pressure is turned on so as to cause

the plunger to descend. This action will forcibly press the material of the wad W and the material of the body B so as to effect an intimate bond between the granular particles of the two materials. At the same time, a cavity  $W^1$  will be formed in the wad W. The operation just described will produce a compressed composite ballot such as shown in section in Fig. 7. This ballot is ejected from the mold chamber 24 of the turret by manipulating a suitable valve causing the plunger 28 to exert an upward pressure on the removable bottom 26.

The remaining step in the production of the retort is carried out in any suitable hydraulic retort press of known construction. For example, the so-called "Dorr machine" may be used. This machine is provided with a cylinder into which the ballot of Fig. 7 is introduced. The machine is equipped with a hollow plunger which engages the annular edge  $W^2$  of the ballot and with a central plunger the end of which enters the cavity  $W^1$  of the ballot. As the two plungers travel upwardly, they force or extrude the material of the ballot through a suitable die so as to produce an elongated substantially cylindrical retort such as illustrated in Fig. 8 which retort is provided with an interior wall or lining L of silicon carbide or similar basic material and clay and an outer shell S of fire-resistant clay, the two materials being intimately bonded to one another.

My improved method enables a rapid and inexpensive production of composite retorts of uniform quality and it is thought to mark an important advance over the haphazard or unmethodical methods of production heretofore in general use.

Various modifications may be made without departing from the invention as defined in the appended claims.

#### What I claim:—

1. In the making of lined retorts, the method which consists in forming a chambered body, forming a wad of lining material to a size and shape to fit in said chambered body, subjecting the wad to pressure to form a composite ballot in which said body and wad are intimately bonded, and inserting the composite ballot thus formed in a press wherein it is pressed to the required size and shape.

2. In the making of lined retorts, the method which consists in forming a chambered body of a mixture of burned and plastic clay, forming a wad of a mixture of silicon carbide and plastic clay to approximately fit said chambered body, subjecting the wad to pressure to form a composite ballot in which said body and wad are intimately bonded, and inserting the composite ballot thus formed in a press wherein it is pressed to the required size and shape.

3. In the making of lined retorts, the method which consists in introducing a mixture of burned and plastic clay in a mold, inserting a plunger into the mixture to form a body with a chamber therein, compressing a mass of silicon carbide and plastic clay in another mold to form a wad to fit said chamber, inserting said wad in said chambered body and forcing a plunger into the mold to bond the material of the wad with that of said body to form a composite ballot, and subjecting said ballot to the action of the plunger of a forming press so as to produce a composite retort of the required size and shape having an inner lining of silicon carbide and an outer body of said clay mixture.

In witness whereof, I have hereunto signed my name.

AUGUSTIN LEON JEAN QUENEAU.