I. A. BRADDOCK.

METAL CONCRETE CONTAINER.

APPLICATION FILED AUG. 19, 1910.

1,016,912.

Patented Feb. 6, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

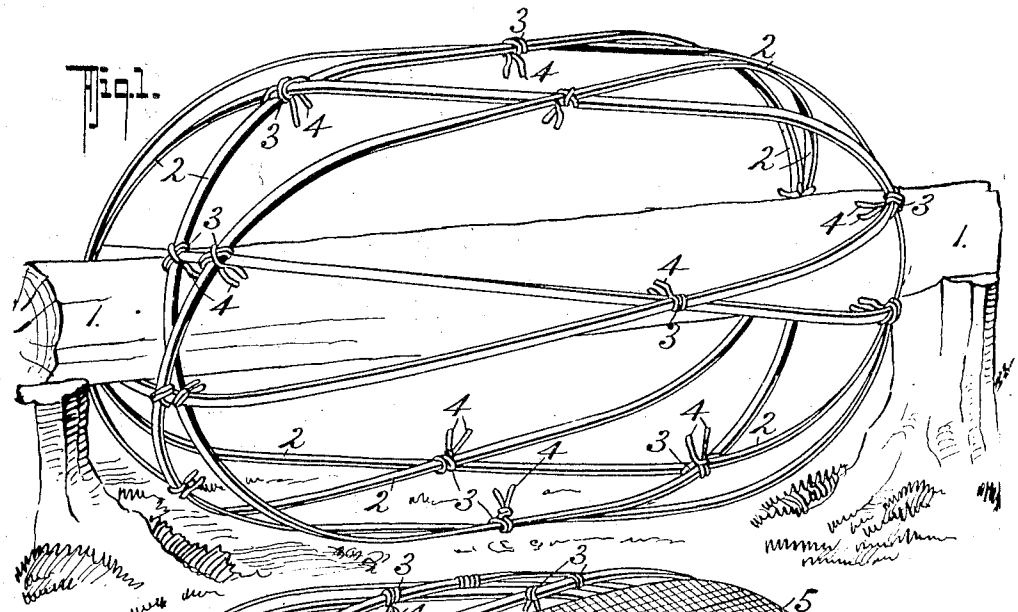


Fig. 2.

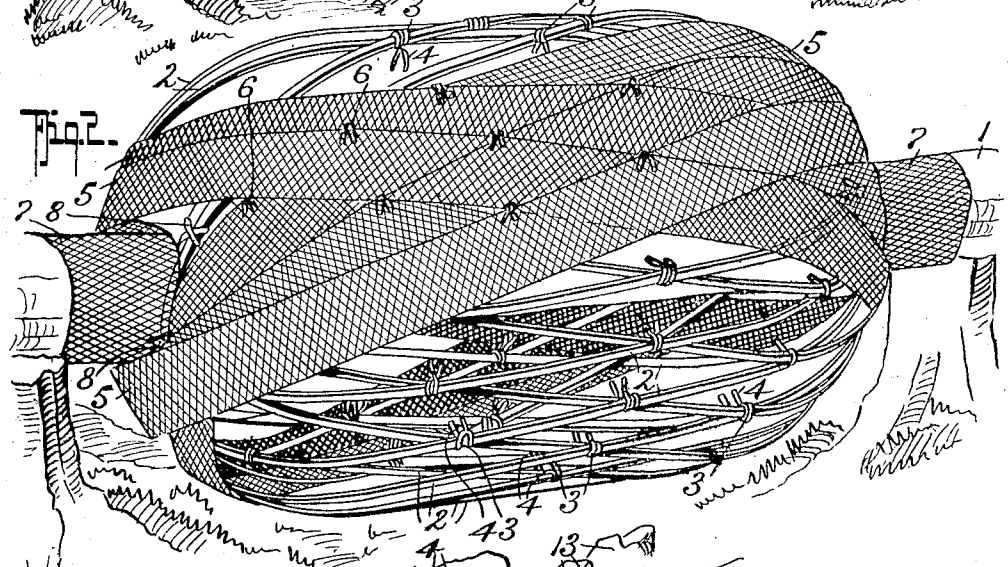
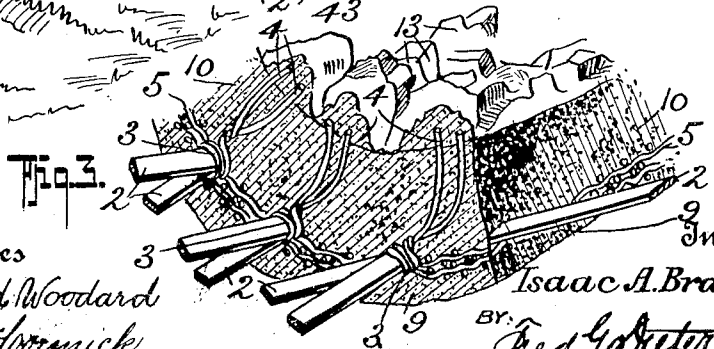


Fig. 3.



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2 SHEETS—SHEET 2.

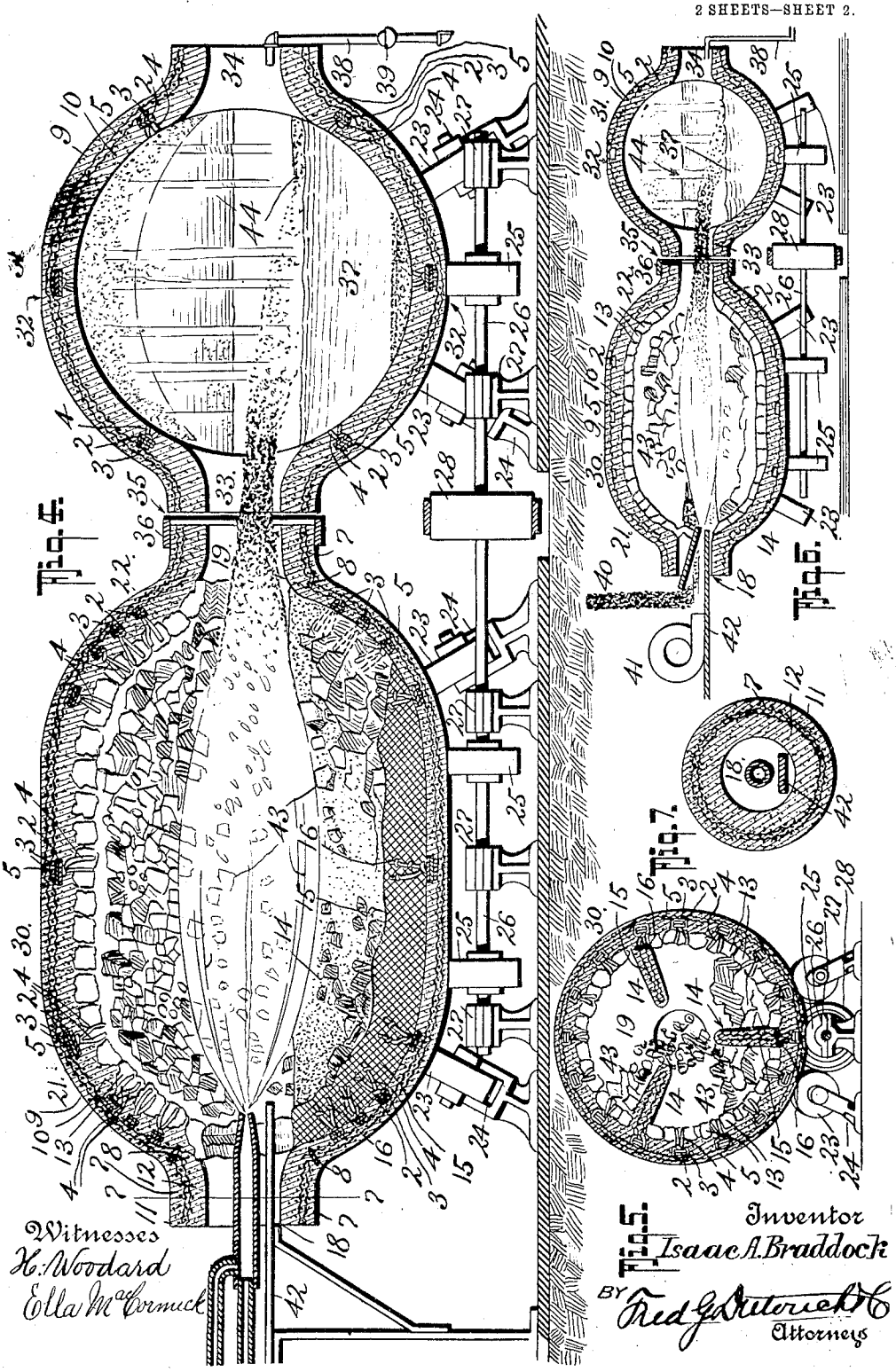

Fig. 5.

Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE.

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METAL-CONCRETE CONTAINER.

1,016,912. Specification of Letters Patent. Patented Feb. 6, 1912.

Original application filed June 18, 1910, Serial No. 567,572. Divided and this application filed August 19, 1910. Serial No. 577,992.

To all whom it may concern:

Be it known that I, ISAAC A. BRADDOCK, residing at Haddonfield, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Metal-Concrete Containers, of which the following is a specification.

The invention of the present application is a metal concrete structure of more or less general application, and in its generic nature, the invention resides in providing a metal reinforce container that may be used in a variety of ways, the invention as illustrated, however, being particularly designed for use as a mill for crushing and pulverizing ores. It may be used as a cement burning kiln, as a metallurgical furnace, and in any other way for which it may be found adapted.

It is one of the objects of my invention to provide a container that may be economically constructed at the place where it is to be used from material available at such place, or that may be readily conveyed to the locality by burros, or other pack animals.

Generically my invention resides in providing a container constructed of metal hoops, bands or strips which support a covering of bands of woven wire netting, the same being protected on the outside and inside by a wall of cement, concrete or other like substance, and being further provided, when desired, on its inside with a lining of rocks. The lining of rocks is set by concrete, plaster, cement, or the equivalent, into the inner lining of the apparatus.

Again, my invention resides in providing a protected built up metal construction, whereby the several parts are so tied, connected and interlocked, as to form a strong and efficient device for whatever use to which it may be put.

For purpose of illustration, I have disclosed my invention as particularly applied and adapted for use as a metallurgical apparatus for use in crushing, pulverizing and treating ores, although I desire it understood that I do not limit myself to this use.

This application is a divisional part of my copending application filed June 18, 1910, Serial No. 567,572.

The invention also includes those novel details of construction, combination and arrangement of parts, all of which will be first fully described, then be specifically pointed out in the appended claims and illustrated in the accompanying drawings, in which:

Figures 1 and 2 are perspective views, illustrating the method of construction of the shell or casing of the container or mill. Fig. 3, is a detail sectional perspective view of a part of the completed structure. Fig. 4, is a central vertical longitudinal section of my complete apparatus designed for use in connection with liquid fuel. Fig. 5, is a cross section on the line 5—5 of Fig. 4. Fig. 6, is a central vertical longitudinal section on a reduced scale showing the arrangement of parts when brush wood, or other similar fuel is used. Fig. 7, is a cross section on the line 7—7 of Fig. 4.

In constructing my apparatus, I take a suitable mandrel (when my invention is to be constructed at the mines the mandrel may be the trunk of a tree, or any other suitable thing that comes handy) and provide a set of hoops, rods, wires or bands 2, bent into the required shape and place them on the mandrel, as indicated in Fig. 1 of the drawings, tying the same together by tie wires 3, wherever the hoops, etc., cross, with the ends 4 of the tie wires projecting inwardly. A sufficient number of hoops, etc., 2 (hereinafter termed the "frames") are used to afford the desired strength and support, upon which the frame cover 5 is wound. The cover 5 consists preferably of a band or strap of woven wire wound onto the frame, as shown in Fig. 2, of the drawings, in a manner similar to the way in which a ball of cord is wound around a stick. The cover 5 is tied together where desired, by tie wires 6 whose ends may also project inwardly.

The mouths of the container are formed

of a double thickness of woven wire 7 wound around the mandrel 1 and tied to the body portion by the wires 8.

After the frames 2 have been set up and tied, and after the covering 5 has been wound on and after the mouth tubes 7 have been wired in place, the mandrel 1 is removed in any desired way. When the mandrel is the trunk of a tree, and it cannot be pulled out endwise, it may be burned out, if desired.

An outer covering 9 of cement, or a mixture of cement and asbestos, or the like, is placed on the frame covering 5 to a suitable thickness and a lining 10 is placed within the container, which lining 10 is preferably thicker than the covering 9. The covering 9 and lining 10 form an outer and an inner wall of the container and are united as an integral mass by the cement which passes through the interstices of the frame 2, and the frame covering 5, thus forming an integral structure of the frames 2, cover 5 and walls 9 and 10. The wire 7 is also covered and lined at 11 and 12 by a cover and lining of the same material as used for the cover 9 and lining 10 of the container proper.

An inner lining 13 of rocks of any hard material such as flint, etc. (or when such material is not available, rocks of the ore to be treated may be used) is provided, by cementing the rocks 13 to the inner wall 10 of the container, the ends 4 of the tie wires serving as final binding elements to assist in holding the rocks in place. These rocks form the crushers or crushing surface against which the ore is dropped or pounded to effect its pulverization in a manner more clearly set forth hereinafter.

Suitable longitudinal partitions 14 are provided within the container and these may be formed of frames 15 of woven wire suitably tied at 16, to the frame 2, and covered with a coating of cement or the like. The partitions 14 terminate short of the central axis of the apparatus to leave a central free or uninterrupted passage 18 from the inlet 18 to the outlet 19 of the container (see Fig. 4).

It will be observed that the entrant and exit ends 21 and 22 of the container are of hemispherical form or shape for a purpose hereinafter elucidated.

The container is mounted on a suitable cradle or other convenient means, formed by rollers 23 suitably supported at 24, and the container may be turned in any desired manner, as for example, by rollers 25 on a shaft 26 that is mounted in bearings 27 and is driven by a pulley 28 from any convenient source of power (not shown).

In the use of my apparatus as an ore recovering plant two containers 30 and 31 are provided, one of which 30, forms the crushing, drying and desulfurizing and heating container, and the other 31, serving as the solution container. In the solution container the crusher lining 13 of ore is preferably omitted. The construction of both containers 30 and 31 is the same, excepting that I prefer to make the crushing container 30 of an elongated structure, while the solution container has no apparent elongation but is substantially spherical in shape.

When a substantially true globular or spherical container 31 is used it is preferably provided with a flattened zone 32 at right angles to its axis so that it may be rolled along the ground and still maintain its axis, which runs from the center of the inlet 33 to the center of the outlet 34, horizontal.

In practice, the outlet 19 of the first container 30 and the inlet 33 of the second container 31 are held in close juxtaposition, they being spaced slightly apart, however, to leave an air inlet passage 33 between the two containers, the volume of which may be regulated by the slidable collar 36.

The solution 37 may be introduced into the container 31 in any desired manner, preferably by a pipe 38 which is jointed at 39 to be swung out of the way when the container 31 is to be rolled away from the container 30.

When the invention is to be used with powdered fuel, coal, coke or wood and brush, I arrange the apparatus somewhat as indicated in Fig. 6 of the drawings, by reference to which it will be observed that the fuel 40 is introduced into the container and a blower 41 of any approved type is provided to create the necessary draft.

A suitable frame or support 42 is provided which may be used either as a convenient means on which the ore may be introduced into the container, or it may be used as a grate for cord wood, when such is used for fuel.

In operation when it is desired that my invention be used in the treatment of ores bearing precious metals, the ore is introduced into the container 30 and the fuel ignited to raise the temperature within the container 30 to about 500°. I prefer, when possible, to use a liquid fuel burner or a burner that will produce a flame somewhat of the type indicated in the drawings, whereby the central passage from the inlet to the outlet will be the heat zone. After the fuel has been ignited to produce the heat zone, the container 30 is set in motion to turn it on its horizontal axis, thus causing the partitions 14 to lift the ore 43 and drop it through the hot blast flame whereby the temperature of the ore will be raised to a high degree, namely,—about 500° F. and

thus cause its water of crystallization to be driven off and also cause those volatile products contained in the ore to be separated therefrom. Any sulfur in the ore is removed in this way. The removal of the volatile products in the ore, while passing through the heat zone causes decrepitation to take place, and the ore becomes porous and soft so that when it contacts the bottom of the container it will be broken and crumbled, the breaking and crumbling action is also assisted by the rolling and tumbling of the ore within the container during its movements, the heavier and lesser heated ores serving to assist in crushing the softer particles until the ore is reduced to a fine powder or dust. The force of the heated blast serves to cause the crushed particles of ore to gradually work toward the outlet 19 of the container, and as soon as the ores have been crushed fine enough the heated blast will carry the ore particles through the outlet 19 of the second container 31 where the hot ore particles are deposited into the solvent. The container 31 being provided with partitions 44 will serve to agitate the solution within the container 31, and as the hot ore particles are directly deposited in such solution the temperature within the container 31 will be maintained at the desired degree. The air opening between the containers 30 and 31 is so regulated that the temperature within the container 31 will be about 200 or 212° F. so as to prevent the boiling of the solvent and yet allow sufficient heat to assist the chemical re-action. As soon as a sufficient quantity of ore is deposited in the solution in the container 31 the same is rolled away and another container rolled into place in lieu of the one rolled away. The container containing the ore in solution that has been rolled away is taken to a suitable place and subjected to enforced percolation by steam or vacuum, if desirable, as its formation permits of either. After exhaustion of its values the contents thereof dumped out, the container will be ready to be used again, as soon as desired.

While my apparatus as a whole has been particularly designed for use in the treatment of ores bearing precious metals and the like, it may with slight modifications, that will be obvious to those skilled in the art, be used in the manufacture of cement, or for other purposes than those described, and I do not wish it understood that it is intended that my apparatus be merely used for the specific purposes herein described, but its use is not limited, and it may be used wherever convenient, and for whatever purpose to which it may be adapted.

By making the containers 30 and 31 of hemispherical form at the ends the re-bound of the dropped ore or liquids will be toward the center of the containers, and hence the contents of the same will not jump out.

The speed at which the containers are turned on their axis will depend upon the conditions met with in practice, a slow turning, however, being sufficient to effect the results desired under ordinary conditions.

From the foregoing taken in connection with the accompanying drawings, it is believed the complete construction, operation and numerous advantages of the invention will be readily apparent to those skilled in the art to which the invention appertains, and I desire it understood that I do not limit myself to the precise details of construction described and disclosed in the drawings and slight changes and modifications may be made to adapt the invention to the various uses without departing from the spirit of the invention or the scope of the appended claims.

What I claim is:—

1. A metal-cement container composed of a body of globular form having an inlet and an outlet, said body consisting of a metallic frame embedded in a cement-like substance, and longitudinal metallic partitions within said body also embedded in a cement-like substance and connected with said body together with an internal lining of rocks for said body.

2. In an apparatus of the class described, a frame composed of hoop-like members tied together, a metallic strip wound on said hoop-like members to form a covering therefor, a cement-like body embedding said frame and covering, tie wires for tying said frame and covering together, said tie wires having their ends projected inwardly, and a rock lining within said cement-like body, said tie-wire ends interlocking with said rock lining.

3. In an apparatus of the class described, a frame composed of hoop-like members tied together, a metallic strip wound on said hoop-like members to form a covering therefor, a cement-like body embedding said frame and covering, tie wires for tying said frame and covering together, said tie wires having their ends projected inwardly, and a rock lining within said cement-like body, said tie-wire ends interlocking with said rock lining, and means for turning the aforesaid structure.

4. A container including a frame composed of hoop-like members tied together, a metallic strip wound on said hoop-like members to form a covering therefor, a cement-like body embedding said frame and covering, tie wires for tying said frame together, and having their ends projected into said container, a rock lining within said cement-like body into which said tie wire ends project.

5. A container including a frame composed of hoop-like members tied together, a metallic strip wound on said hoop-like members to form a covering therefor, a cement-like body embedding said frame and covering, tie wires for tying said frame together, and having their ends projected into said container, a rock lining within said cement-like body into which said tie wire ends project, and partitions within said container.

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