

(No Model.) A. H. MEYER.
Apparatus for, and Process of, Separating Gold, Silver,
and Copper from Lead.

No. 234,884.

Patented Nov. 30, 1880.

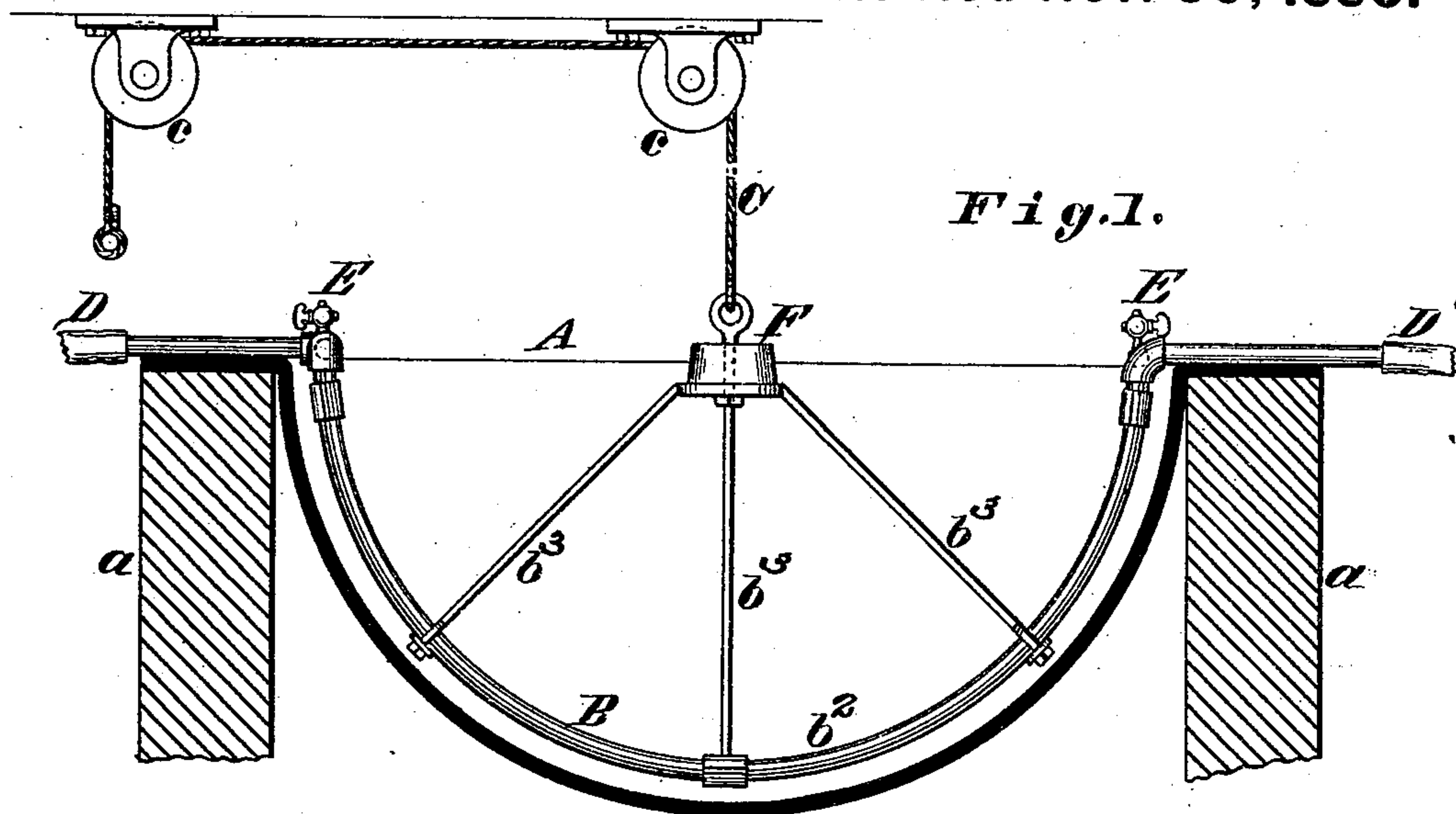
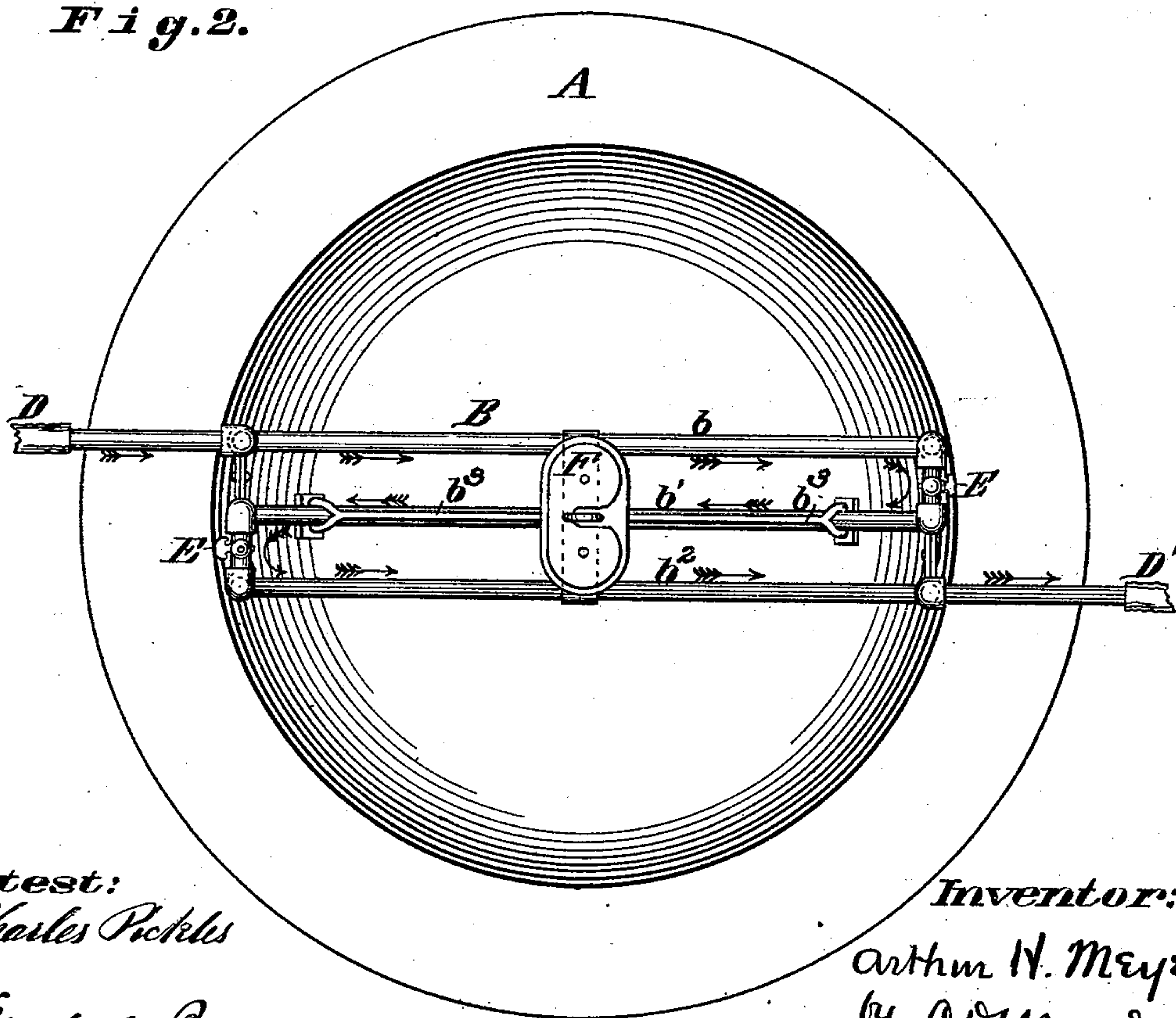


Fig. 2.



Attest:

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UNITED STATES PATENT OFFICE.

ARTHUR H. MEYER, OF ST. LOUIS, MISSOURI.

APPARATUS FOR AND PROCESS OF SEPARATING GOLD, SILVER, AND COPPER FROM LEAD.

SPECIFICATION forming part of Letters Patent No. 234,884, dated November 30, 1880.

Application filed April 24, 1880. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR H. MEYER, of St. Louis, Missouri, have made a new and useful Improvement in Apparatus for and Process of Separating Silver, Gold, and Copper from Lead, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a vertical section taken through a kettle, and showing, in elevation, the device used in carrying out the improvement; and Fig. 2, a plan of the same, the cord and pulleys not being shown.

The same letters denote the same parts.

In separating gold, silver, and copper from the lead in base bullion the practice is to melt the bullion in a suitable kettle and then add zinc thereto, forming thereby an alloy which is richer in silver than the original bullion, and which is separated therefrom when the contents of the kettle are sufficiently cooled down for the alloy to solidify.

To effect the desired cooling the custom has been to draw the fire from beneath the kettle and allow the latter to gradually cool down to the desired degree. This is a tedious operation, requiring several hours, and in warm weather frequently a day or two.

To provide an improved mode of separating the richer metals in question from the lead in base bullion, and that such separation may be effected more speedily and with the use of a smaller amount of zinc than hitherto has been necessary, is the aim of the present improvement, which consists in chilling the molten bath only, meanwhile maintaining the application of heat to the exterior of the kettle, as follows:

A represents a kettle supported upon the walls *a a* and heated by means of a fire beneath, all in the usual manner. The base bullion is softened and tapped into the kettle and the zinc added thereto. Then to effect the cooling a pipe or system of piping, B, is, by means of the cord C and pulleys *c c*, lowered into the molten bath, bringing the piping preferably very near the bottom of the kettle. Hose-connections D D' are made with the piping and water is sent through it, flowing in at D and out at D', and as indicated by the arrows. Any air in the pipes can be let out by

means of the cocks E E. The flow of water, as described, causes the contents of the kettle to be rapidly chilled, in practice not requiring over fifteen minutes to cool the molten metal to that degree at which the zinc-silver-lead alloy solidifies. This occurs at first in that portion of the bath which is in the immediate vicinity of the piping, the alloy collecting about the piping together with some of the base bullion. The piping is then swung around in the kettle so as to come in contact with all parts of the bath, bringing the piping into a position at right angles to that shown in Fig. 2 and into any desired intermediate positions. As the alloy and base bullion upon the piping come in contact with the hotter base bullion, which occurs as the piping is turned around, the base bullion that has hardened upon the piping melts off and the alloy floats upward to the surface of the bath, where it is collected.

A special advantage derived from curving the pipes and carrying them down to the lower part of the kettle, as shown, is that thereby the molten bath is cooled down evenly. Formerly, when the metal was allowed to cool by radiation, the surface of the metal cooled down in advance of the metal at the bottom of the kettle, and in consequence it required, in practice, a larger amount of zinc to separate the alloy than by the present mode, and a portion of the alloy also adhered to the shell of the kettle. Although the principal portion of the zinc is eventually regained, any increase in the amount used necessarily increases the expense of the operation.

The rods *b³* serve to brace the piping, to connect it with the cord C, and also to support a weight, F, which is used to keep the piping down in the kettle.

The piping B, which might be in the form of a hollow flattened tube, or in any other shape suitable for carrying the water-current through the liquid metal for the purpose described, is preferably in the form of the winding pipe *b b'* *b²*, as shown. It is desirable, however, for the piping to be so constructed as to have an excess of cooling-surface at the lowest part of the kettle, for in the present operation the fire is constantly maintained beneath the kettle, keeping the shell of the kettle warm and preventing the adherence of the alloy thereto, and

hence if the cooling-surface of the piping were evenly distributed throughout the kettle, the molten bath would be overheated at and near the bottom thereof, and this difficulty would
5 be increased by the radiation from the surface of the bath.

I claim—

1. The herein-described mode of separating silver, gold, or copper from lead in base bullion, which consists in softening the bullion in
10 the separating-kettle, adding zinc thereto and chilling the molten bath only, meanwhile maintaining the application of heat to the exterior of the kettle, substantially as and for the pur-
15 poses set forth.

2. The herein-described mode of separating silver, gold, or copper from lead in base bullion, which consists in softening the bullion in

the separating-kettle, adding zinc thereto, and chilling the molten bath evenly, meanwhile
20 maintaining the application of heat to the exterior of the kettle, substantially as described, and for the purposes set forth.

3. The herein-described apparatus for cooling base bullion in the separation of silver,
25 gold, and copper from lead, consisting of the combination of the kettle A, piping B, cord C, pulleys *c c*, flexible connections D D', and weight F, said piping being curved and vertically and radially adjustable in said kettle, sub-
30 stantially as described.

A. H. MEYER.

Witnesses:

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CHAS. D. MOODY.