

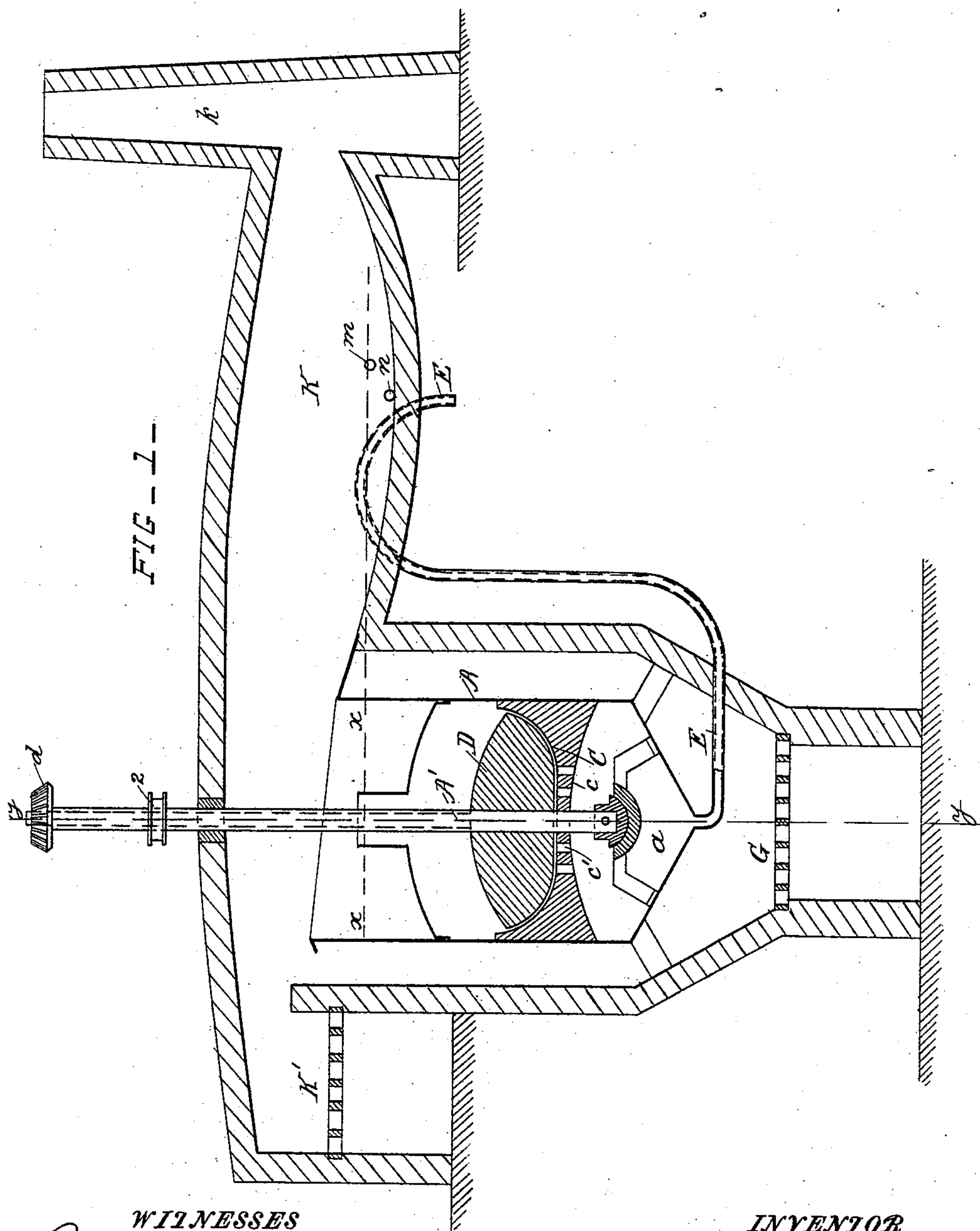
(No Model.)

2 Sheets—Sheet 1.

H. L. SIMMONS.
AMALGAMATOR.

No. 528,815.

Patented Nov. 6, 1894.



WITNESSES
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George H. Bliss.

INVENTOR
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(No Model.)

2 Sheets—Sheet 2.

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FIG. 2.

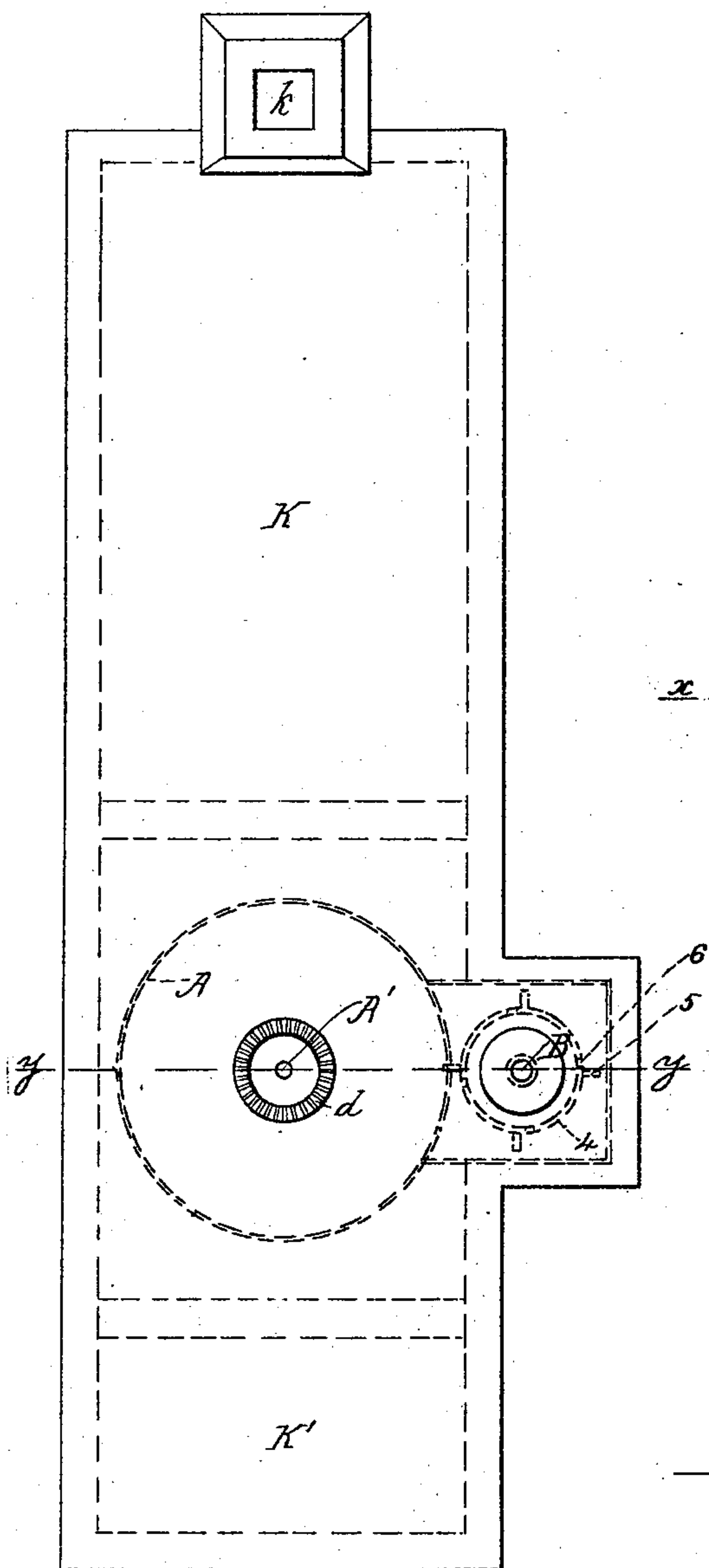
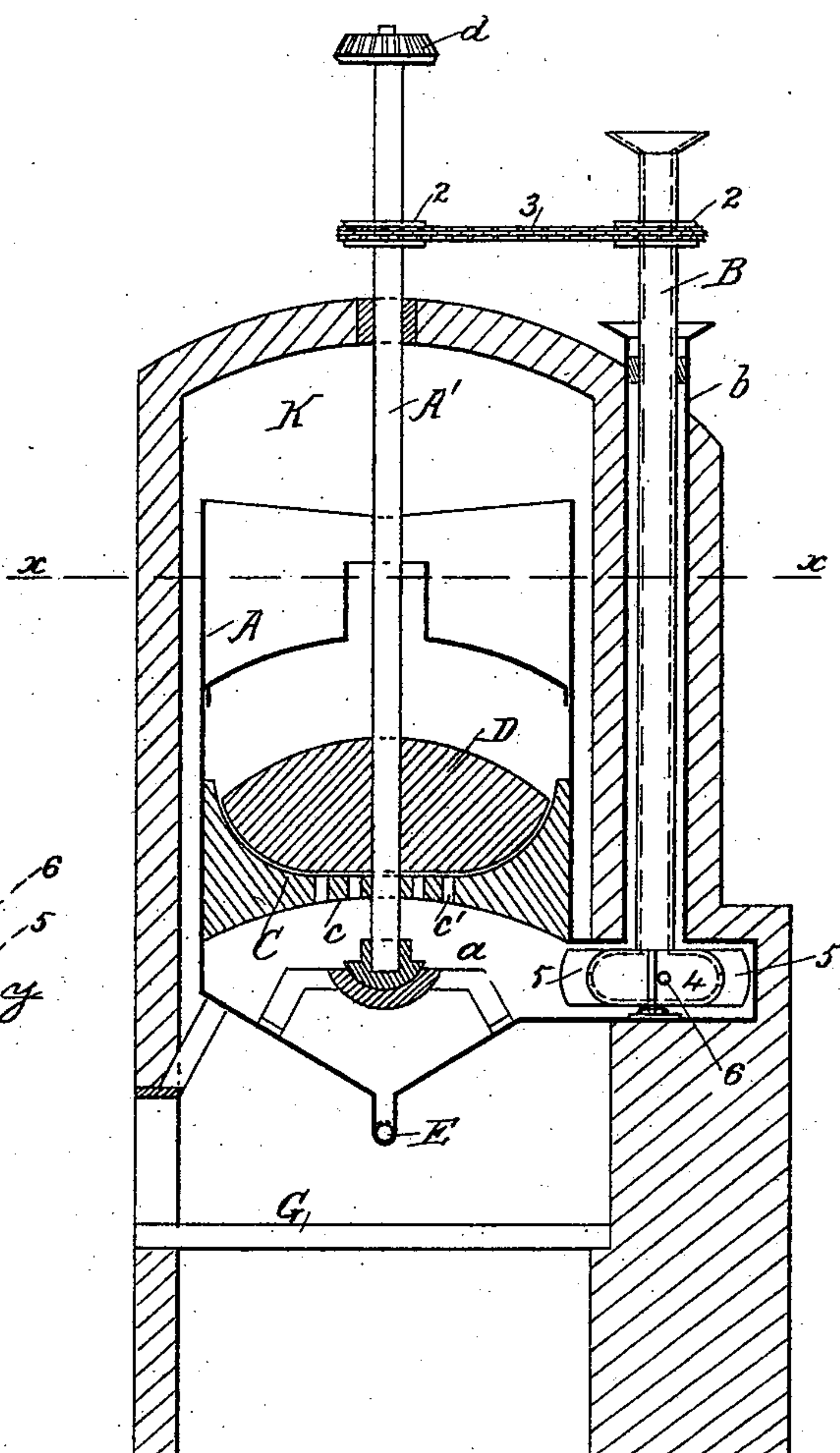


FIG. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

HENRY L. SIMMONS, OF WICKES, MONTANA.

AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 528,815, dated November 6, 1894.

Application filed January 27, 1894. Serial No. 498,218. (No model.)

To all whom it may concern:

Be it known that I, HENRY L. SIMMONS, a citizen of the United States, residing at Wickes, in the county of Jefferson and State of Montana, have invented certain new and useful Improvements in Amalgamators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention consists of a new apparatus for separating a metal, such as gold, &c., from its ores by rubbing the materials containing the metals in a metallic bath.

The metallic bath consists of an easily fusible molten metal, such as lead, bismuth, or an alloy, with which the metal or metals required to be separated will amalgamate.

In the drawings: Figure 1 is a sectional elevation of the novel apparatus used in carrying out this invention. Fig. 2 is a plain view of the same. Fig. 3 is a vertical cross section taken on the line *yy* in Fig. 1.

The separating apparatus consists essentially of a vessel A which contains a bath of molten metal such as lead or bismuth. The lead is kept in a molten condition by any approved form of fire place or furnace.

The material containing the metal to be separated is forced into the lower part *a* of the vessel A. Any approved feeding apparatus may be used for this purpose.

B is a feeding tube which may be used in one form of feeding apparatus. This tube is supported inside another tube *b* extending the full height of the vessel A. The tube B is revolved rapidly from the center shaft A' by the drive wheels 2 and the drive chain 3, or by any other approved means. An enlarged portion 4 is formed at the bottom of the tube B and is provided with wings 5 and holes 6. The material which passes down the tube is thrown out of the holes by centrifugal force and the action of the wings 5.

In the vessel A there are one or more pans C provided with dome shaped under surfaces *c* and holes *c'* near their centers. The shaft A' passes centrally through the pan or pans, and has one or more shoes D secured on it. The shaft A' is driven in any approved manner, as for instance by the toothed wheel *d*.

E is the bullion pipe connected to the bottom of the chamber A.

The material to be operated on is fed by the tube B to the bottom of the vessel A. The material rises through the bath of molten metal, through the holes *c'* in the pans, being guided to them by the dome-shaped form of the under sides of the pans. The material is ground with the metal of the bath in the pans by the revolving shoes, and the heavy amalgam falls to the bottom of the vessel and passes out by the bullion pipe E. The refuse material which has been freed from the precious metal flows over the top of the vessel A.

G is a furnace for keeping the metal of the metallic bath in a molten condition in the vessel A.

The dotted line *xx* in Figs. 1 and 2 indicates the height of the metallic bath when the bullion pipe is used. The bullion pipe is carried up to the level of the line *xx* and is bent around, and discharges into any suitable vessel placed under it.

K is a reducing furnace of approved construction. K' is its heating furnace, and *k* is its chimney.

Instead of the furnace K, a furnace provided with an air blast may be used if desired. The separating apparatus is placed between the heating furnace K' and the body of the furnace K where the reduction of the ore takes place. The furnace K is provided with an ordinary slag hole *m* and a tap hole *n* beneath it.

If desired, the bullion pipes may be dispensed with, or closed up, and the level of the metallic bath is then raised from the line *xx* to the top of the vessel A.

When the bullion pipe is used, the material from which the precious metal has been extracted flows over the top of the vessel A, and is reduced in the furnace. When the bullion pipe is not used, the bullion or amalgam is allowed to overflow the top of the vessel A and is drawn off at the tap hole *n*.

The apparatus may be used to extract precious or other metals from slag or other similar refuse materials, if desired.

The furnace and the separating apparatus can be constructed in various ways to adapt them to various kinds of ores or minerals required to be treated in them.

All portions of the apparatus which are exposed to considerable heat should either be made of fire resisting material, or inclosed in fire resisting casings.

5 What I claim is—

1. The combination, with a separating device consisting of a receptacle adapted to hold molten metal, a furnace for keeping the said metal in a molten condition, and means
10 for subjecting the material to attrition in the said receptacle; of a reducing furnace inclosing the upper portion of the said receptacle and adapted to receive the overtail, substantially as set forth.

15 2. The combination, with a separating device consisting of a receptacle adapted to

hold molten metal, a furnace for keeping the said metal in a molten condition, and means for subjecting the material to attrition in the said receptacle; of a reducing furnace provided with a heating furnace and a chimney, the upper portion of the said receptacle being arranged between the body of the reducing furnace and its said heating furnace, and adapted to discharge its overtail into the said
20 reducing furnace, substantially as set forth. 25

In testimony whereof I affix my signature in presence of two witnesses.

HENRY L. SIMMONS.

Witnesses:

GEORGE F. SHELTON,
CHARLES H. COOPER.