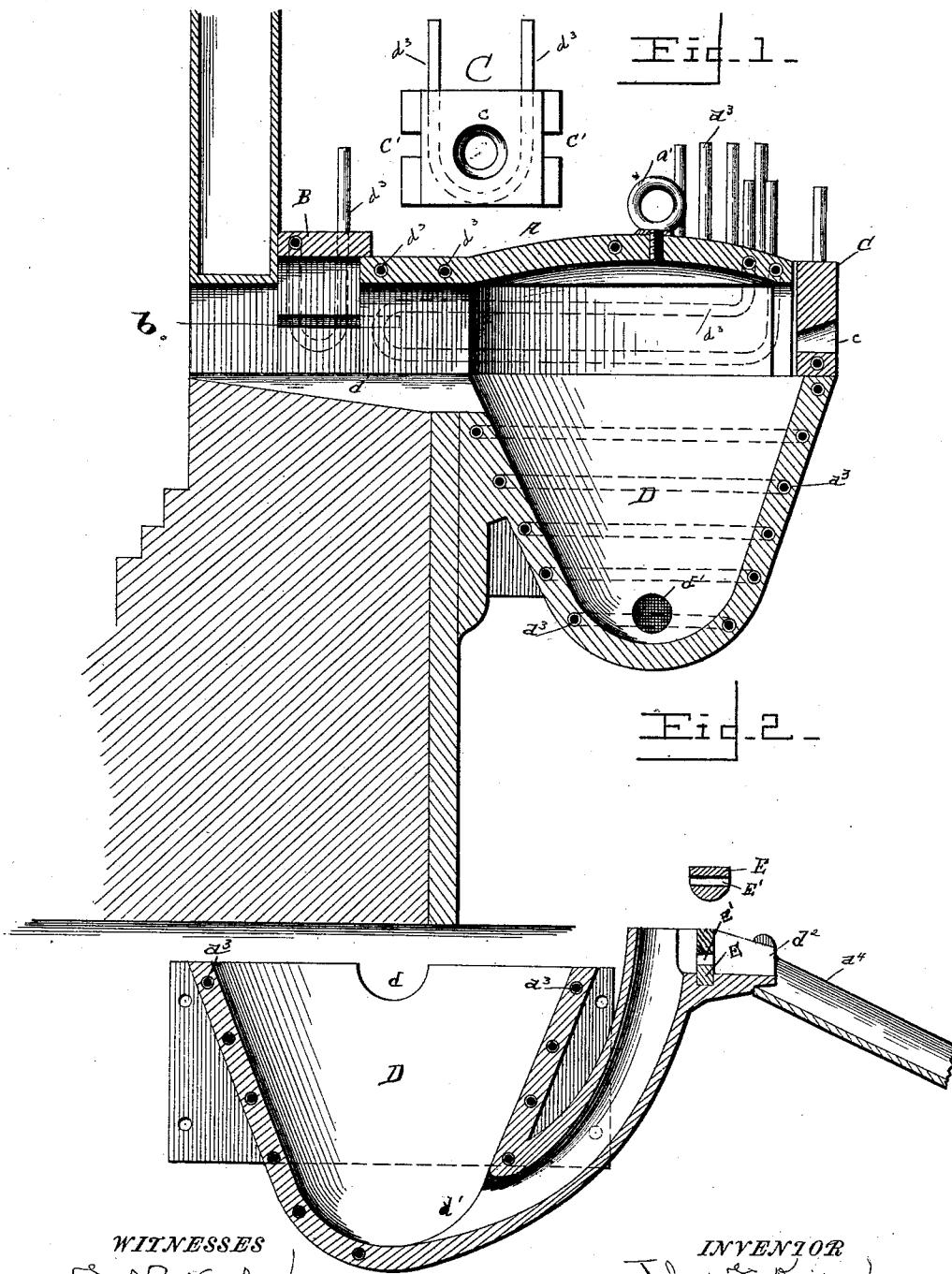


J. F. KEIPER.  
SLAG SEPARATOR.

No. 484,659.

Patented Oct. 18, 1892.



WITNESSES  
J. B. Keiper  
J. A. Wanner

INVENTOR  
John F. Keiper  
by A. S. Wierzbicki,  
his Attorney

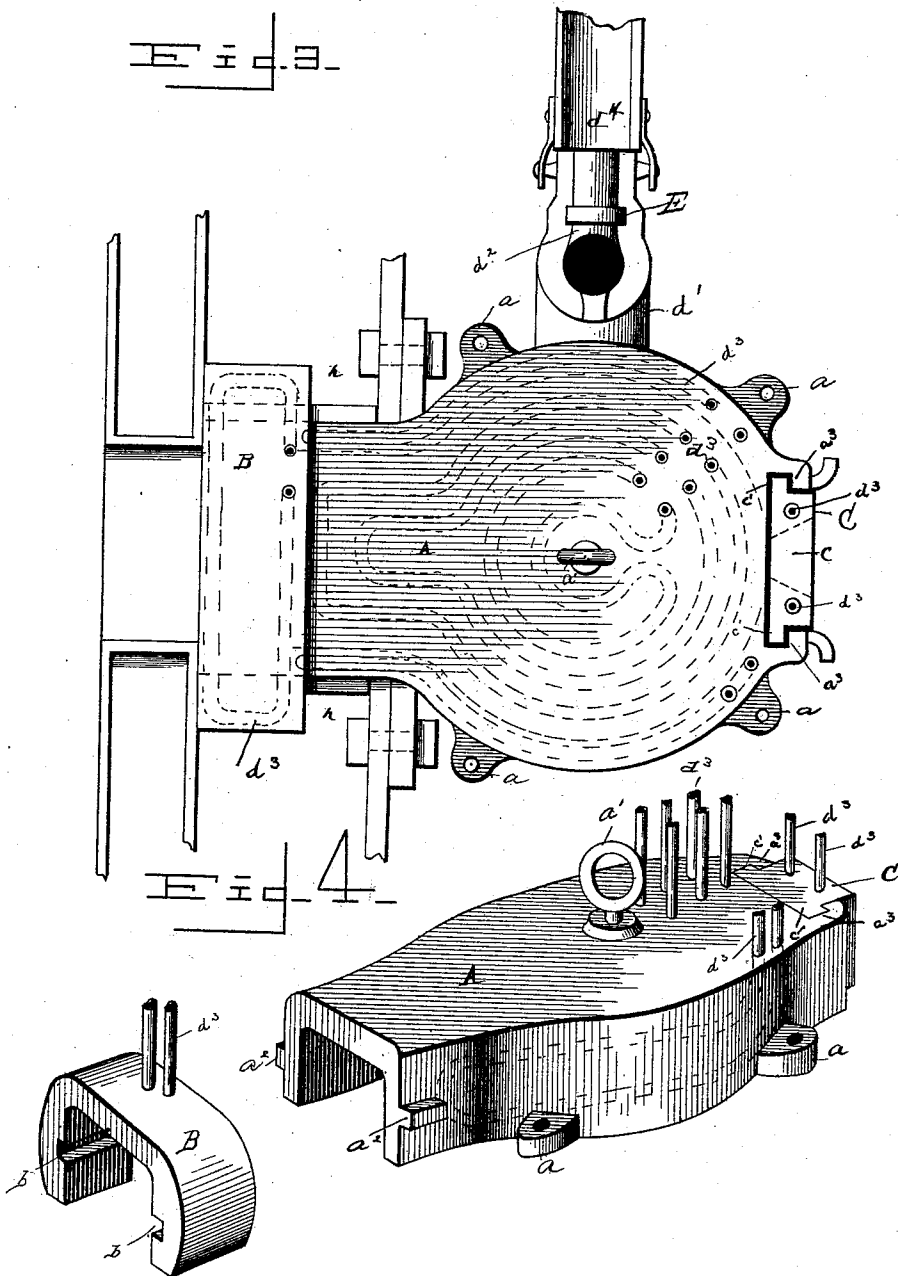
(No Model.)

2 Sheets—Sheet 2.

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WITNESSES

J. B. Keiper,  
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INVENTOR

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# UNITED STATES PATENT OFFICE.

JOHN F. KEIPER, OF DENVER, COLORADO.

## SLAG-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 484,659, dated October 18, 1892.

Application filed July 30, 1889. Serial No. 319,232. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN F. KEIPER, of Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Separators; and I do hereby declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the invention.

This invention relates to separators.

The object of the invention is to produce a device by which the separation of the various minerals contained in lead ore may be achieved in a ready and efficient manner, particularly of lead containing gold, silver, or other precious mineral from slag, matte, or other waste products.

With these objects in view the invention resides, essentially, in a separator provided with two outlet-discharge openings, one for the passage of the lead and the other for the passage or discharge of the waste material.

Furthermore, the invention resides in a separator having adjustable pieces in the lead-discharge, whereby the level of the discharge may be regulated.

Furthermore, the invention resides in a separator having a detachable cover provided with means whereby the same may be extended in order to make connection with the furnace more convenient; and, finally, the invention resides in novel details of construction whereby the operativeness of the device is insured in a ready, convenient, and economical manner.

I have illustrated the invention in the accompanying drawings, in which—

Figure 1 represents a sectional view of a separator made in accordance with my invention, showing it connected to a furnace. Fig. 2 is a view in section taken at right angles to that of Fig. 1. Fig. 3 is a plan view of the separator with the cover in position, and Fig. 4 is a detail view of the extensible cover.

In the drawings, A represents the cover, which is provided with lugs or projections  $a$ , by which it may be connected to the separator D; but any other convenient means of attachment may be used, and I do not wish to be understood as limiting myself in this respect.

$a'$  is a handle secured to the cover, whereby

it may be raised from the separator. The cover is also provided with feathers or projections  $a^2$  on the sides, designed to project into a corresponding groove on the adjustable piece B, whereby the same may not be raised out of position, and with a suitable seat for the reception of the tap-jacket C and grooves  $a^3$  in the seat.

B represents the adjustable piece, designed to be attached to the cover A, and is provided with a groove  $b$  on each side to engage the feathers or projections  $a^2$  on the cover A.

C represents the tap-jacket, which is provided with a tap-hole  $c$ , through which the light slag or matte discharges; and it is also provided with keys  $c'$ , designed to enter the grooves  $a^3$  in the cover A.

D represents the main portion of the separator, into which the mixture of lead and slag is introduced from the furnace through the opening  $d$ . The heavy lead will descend to the bottom of the separator and be forced up through the pipe  $d'$  and out through the spout or opening  $d^2$  into suitable coolers or through a suitable trough  $d^4$  into molds. Cooling-pipes  $d^3$ , through which cold water is circulated for the purposes of preventing the separator and its adjuncts from becoming overheated, may be introduced throughout the separator and its cover.

The outlet-pipe is provided near the spout or opening  $d^2$  with a groove, in which may be inserted piece E for regulating the level of the lead-discharge, said piece having a discharge-opening  $E'$ . The lighter ingredients—such as slag or matte—will remain on top and flow out of the separator by the tap-hole  $c$  in the tap-jacket C.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a separator, the main portion having at its lower end an outlet-spout carrying in its end the adjustable piece for limiting the outflow of the metal, the waste-discharge opening above the level of the said outlet-spout, and the spirally-arranged cooling-pipes in the cover and the separator, substantially as described.

2. In a separator, the main body portion, the removable cover having secured in its end the detachable piece containing the waste-

opening, and the lower outflow-pipe, the end of which is below the level of the waste-opening, substantially as described.

3. In a separator, the main body portion, the removable cover having secured in its end the detachable piece containing the waste-opening, and the lower outflow-pipe, the end of which is below the level of the waste-opening, having secured therein the adjustable piece for limiting the outflow of metal, substantially as described.

4. In a separator, the main body portion, the removable cover having secured in its forward end the detachable piece containing the waste-opening, the lower outflow-pipe, the end of which is below the level of the waste-opening, having secured therein the adjustable piece for limiting the outflow of metal, and the spirally-arranged cooling-pipes in the cover and body portion, substantially as described.

5. In a separator, the cover having a removable piece at its rear end for connecting

it to the furnace and a detachable piece at its forward end having a waste-opening therein, and the body portion having the outflow-pipe connected therewith at its lower end, substantially as described.

6. In a separator, the main body portion, the removable cover having secured in its forward end the detachable piece having a waste-opening therein, the removable piece at its rear end for connecting it with the furnace, the body portion having the outflow-pipe connected therewith at its lower end, in the end of which pipe is secured the adjustable piece for limiting the outflow of metal, and the spirally-arranged cooling-pipes in the cover and body portion of the separator, substantially as described.

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

JOHN F. KEIPER.

Witnesses:

O. T. JACKSON,  
O. E. ADAMS.