

(No Model.)

J. O. BOSWORTH.

APPARATUS FOR GRANULATING LEAD.

No. 373,766.

Patented Nov. 22, 1887.

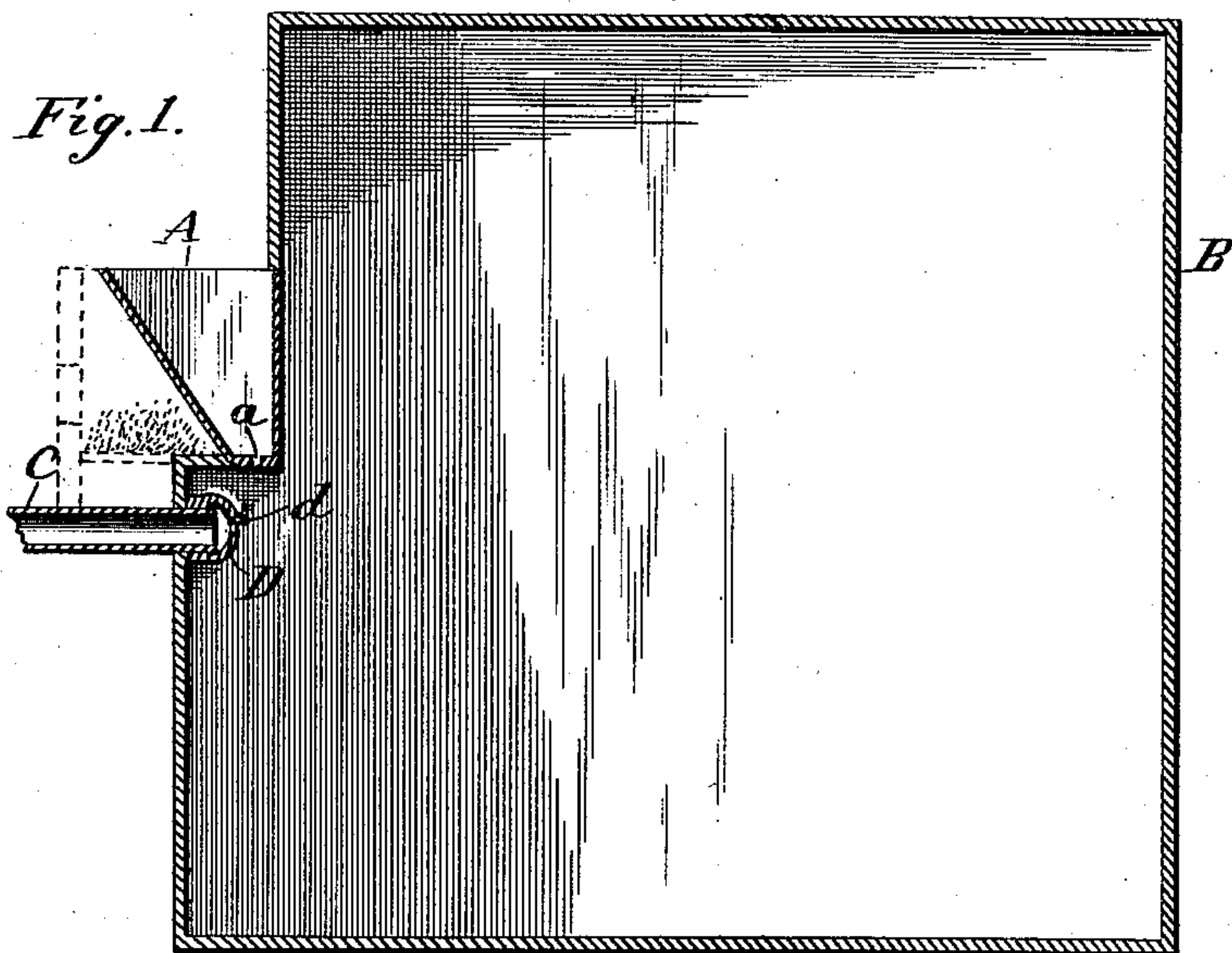


Fig. 2.

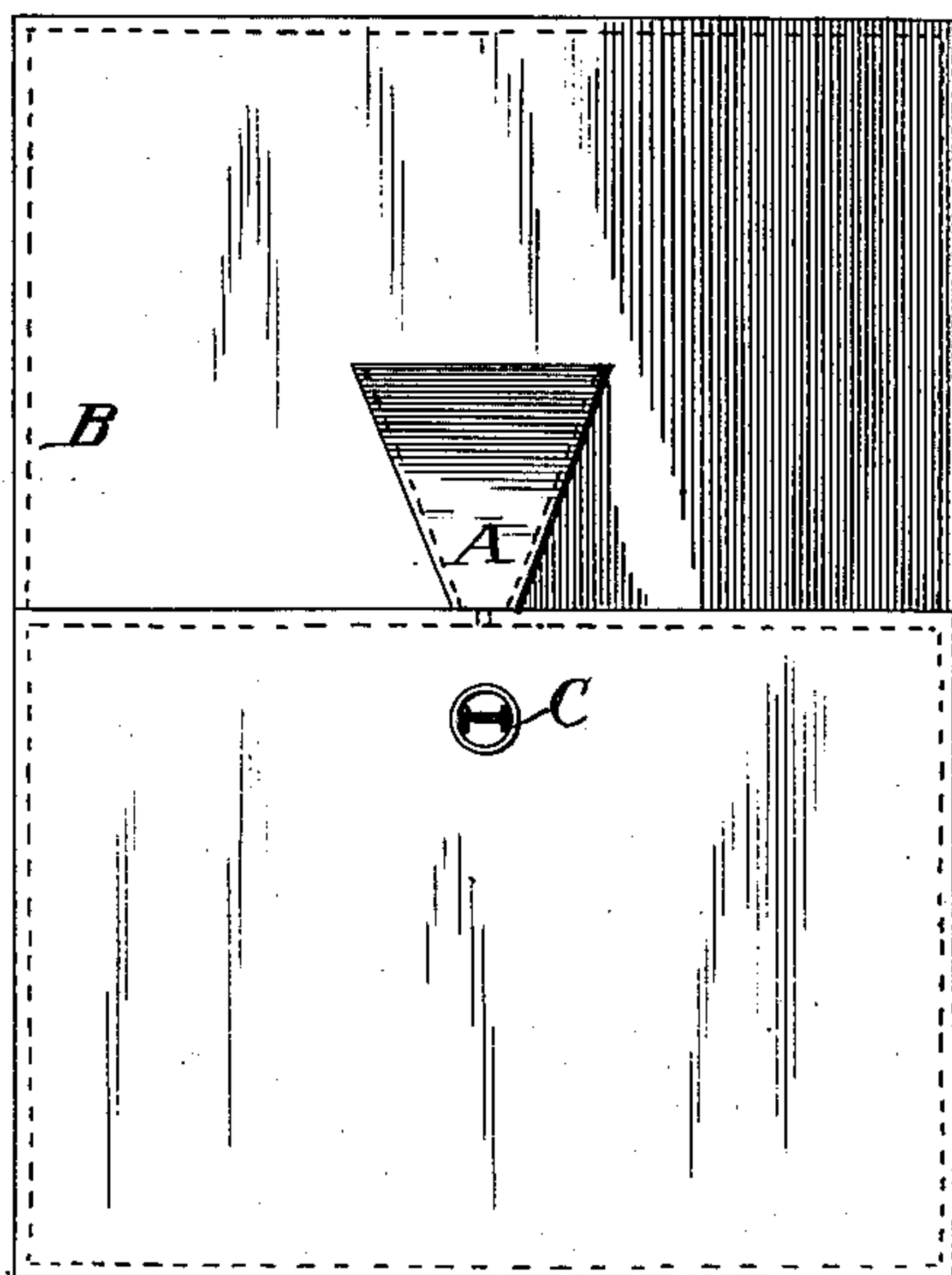
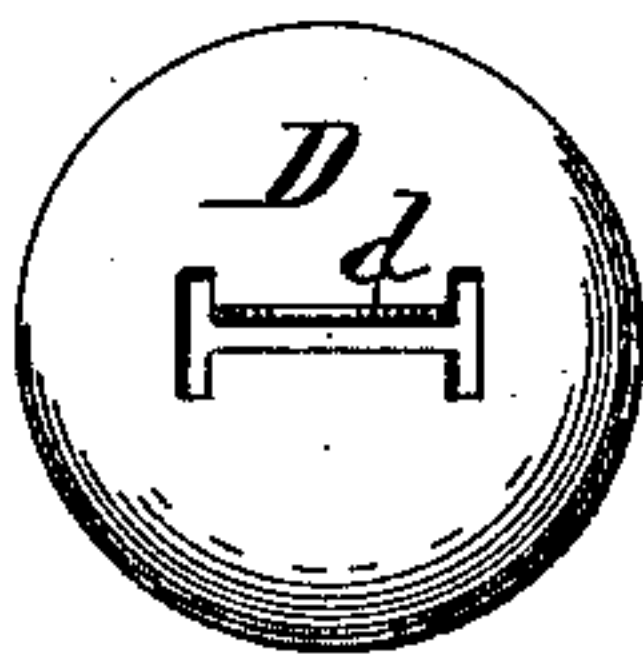


Fig. 3.



Witnesses
C. H. Raeder.

E. H. Bond.

Inventor
J. O. Bosworth

By his Attorney J. M. Robertson.

UNITED STATES PATENT OFFICE.

JOAB O. BOSWORTH, OF DENVER, COLORADO.

APPARATUS FOR GRANULATING LEAD.

SPECIFICATION forming part of Letters Patent No. 373,766, dated November 22, 1887.

Application filed July 13, 1886. Serial No. 207,913. (No model.)

To all whom it may concern:

Be it known that I, JOAB O. BOSWORTH, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Apparatus for Granulating Metal, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 represents a vertical central section of my apparatus; Fig. 2, a front elevation of the same, and Fig. 3 a detail of a jet employed in my apparatus.

This invention relates to certain new and useful improvements in apparatus for granulating metal; and it consists in the peculiar combinations and the novel construction, arrangement, and adaptation of parts, all as more fully hereinafter described and claimed.

Previous to my invention it had been the practice to granulate lead by pouring the same into a box or tray and agitating the same until cool. This method of granulating covered the granules with an oxide. It has also been proposed by Willard and Adams in their Patent No. 78,168, issued May 19, 1868, to subdivide metal, ores, &c., and to make litharge by forcing a blast of air or gas through a pipe having a round orifice against a stream of melted lead. In this method of granulation, however, the lead unites with the oxygen in the blast, and is thus oxidized. Lead has also been proposed for assayers' use by dropping the same into water, by which it is divided into small masses. There is very little oxidation in this process, but the particles of lead thus made are of relatively large size when compared with the result of my process. I have discovered that by using a jet of steam instead of air the lead will be finely granulated without oxidation, so that the grains of metal will be bright and shining like lead when first cut. Whether this is accomplished by the steam acting chemically on the metal or whether it is the heat of the steam that prevents the oxidation I am unable at present to determine; but the fact remains. The granulated metal thus produced is therefore easily distinguishable from the granulated lead heretofore made, inasmuch as the granules are of very small size and are bright and shining, whereas most of that now in the market is dis-

colored and the particles are of comparatively large size when made by any process that leaves them bright.

The production of granulated lead in very fine grains free from oxide has been found to be of great value by assayers and others, as the presence of the oxide in the lead seriously interferes with their assays and their estimates of the value of the substances submitted to their judgment, while if the brighter lead produced by the water process is used it will not evenly mix with the fine ore, and thus the ore floats on the top without melting down or mixing readily. It is to be understood, however, that if the granulated lead is kept for a sufficient length of time exposed to air it may, like any other lead, absorb oxygen, and thus lose its bright appearance, owing to the oxide with which it becomes coated, but it is normally of a bright color, and it will take months for this coating to form on lead produced by my method, whereas with lead subjected to the blast of air, as described in the Patent No. 78,168, before referred to, the lead is immediately oxidized, as stated in said patent, and is therefore never bright as mine is when first made. If my lead is kept from the air it will always remain bright, and therefore differs from that above referred to, which is oxidized by the process of manufacture. Where it is absolutely necessary that the lead shall be entirely free from oxide, it may be kept in tightly-stoppered bottles, in which case the access of air would be cut off and the granulated lead would remain practically free from oxide for years.

Referring to the accompanying drawings, which show what I at present consider the preferable form of apparatus, A represents a hopper arranged in front of a closed chamber, B, and having a small perforation, *a*, in its bottom.

C is a steam-pipe passing through the chamber-B and provided with a casting, D, forming a jet having an orifice preferably of the shape shown in Fig. 3. The upper edge of the metal forming the walls of the orifice is extended to form a lip, *d*, to prevent the rising of the steam and its blowing upward too much.

The operation is as follows: The lead being melted, it is poured into the hopper A, from whence it descends through the orifice *a* di-

rectly in front of the jet of steam entering through the casting D, and is by the force of said jet of steam scattered through the chamber B in a very finely-granulated powder, 5 which will be found to be not only free from oxide, such as is always found in the lead that is granulated by the ordinary process of agitation, but the lead is also made into much smaller particles and of more uniform size than 10 when made by the agitating process.

Any desirable means may be used for keeping the metal at the proper heat. The hopper A may, for instance, be surrounded or partly surrounded by a furnace, as shown in 15 dotted lines in Fig. 1.

I attach importance to the use of a long narrow jet of greater length than the diameter of the opening in the hopper, and especially to the slot through which the jet passes having 20 upturned ends, so as to project the steam in the form of a trough, into which the stream of melted lead falls. I find that with the wide jet the metal is much more evenly disintegrated, for with a narrow jet the steam appears 25 to scatter a portion of the metal at the sides of the chamber in comparatively large lumps, whereas with a wide jet the metal is subdivided into substantially equal particles. The

upwardly-projecting ends of the slots I find, also, to be very useful, as without them the 30 metal is projected in all directions and much of it is caused to adhere to the bricks of the side walls of the chamber into which it is blown; but with the jet passing through a slot provided with upturned ends this is not so, for 35 the steam issuing from these upturned ends acts to keep the metal more in the center of the chamber.

What I claim as new is—

1. The combination, in a granulating apparatus, of the hopper A, chamber B, and jet C 40 D, having an opening of greater width than the opening in the hopper, substantially as described.

2. The combination, in a granulating apparatus, of a hopper, A, chamber B, and jet C 45 D, having an opening consisting of a horizontal slot connected at its opposite ends with vertical slots, substantially as described.

In testimony whereof I affix my signature, in 50 presence of two witnesses, this 2d day of July, 1886.

JOAB O. BOSWORTH.

Witnesses:

A. VON SCHULZ,
E. H. BOND.