A. K. EATON.

Ore Amalgamator.

No. 10,734. Patented Apr. 4, 1854.

Fig. 1.

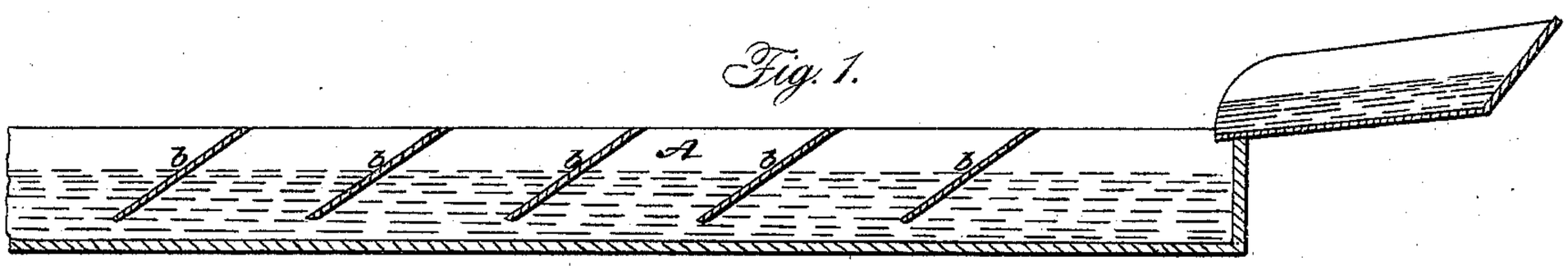

Fig. 2.

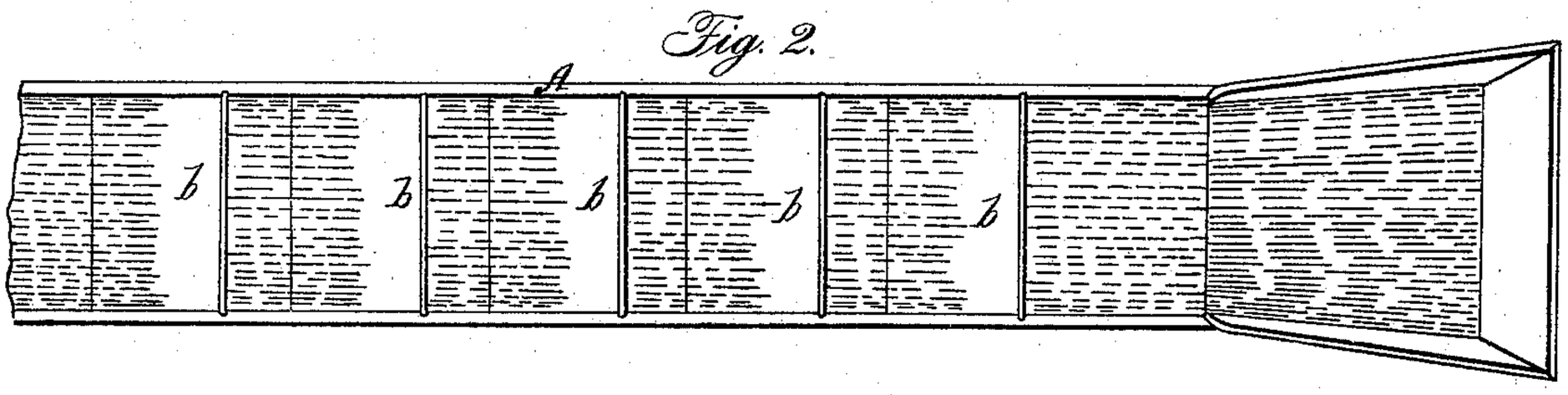

Fig. 3.

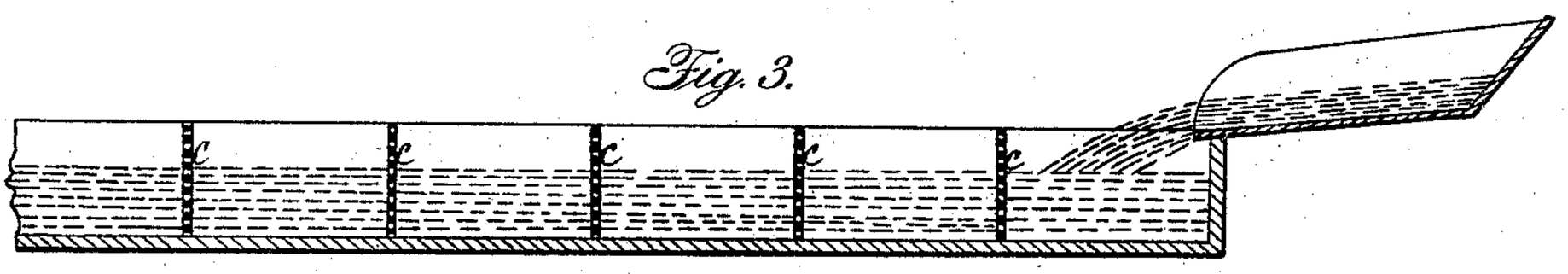

Fig. 4.

UNITED STATES PATENT OFFICE.

A. K. EATON, OF NEW YORK, N. Y.

IMPROVEMENT IN AMALGAMATING GOLD AND SILVER.

Specification forming part of Letters Patent No. **10,734**, dated April 4, 1854.

To all whom it may concern:

Be it known that I, A. K. EATON, of the city, county, and State of New York, have invented certain new and useful Improvements in the Process of Separating Precious Metals from their Ores by Amalgamation and Washing, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of this specification, and in which—

Figure 1 represents a top view, and Fig. 2 a longitudinal section, of an amalgamating-trough.

In the process of extracting the precious metals from ores it is usual, first, to roast the ores to reduce the sulphurets and expel the sulphur, next to grind the roasted ores, and then to stir the finely pulverized ore among mercury, or bring it in contact with the mercury, that the latter by virtue of its strong affinity for the precious metals may attract or absorb them from the earthy matter. During the operation of stirring the ore and mercury together, a considerable quantity of the latter is reduced to a state of fine division, and these finely-comminuted particles float off on the surface of the water with which the earth is washed out, and thus a great loss results. Moreover, numerous fine particles of the precious metal are floated off in the same manner and lost.

It is the chief object of my present invention to prevent the before-mentioned loss, both of the mercury and precious metal; and it consists in maintaining a bright metallic surface of the mercury employed, and increasing its affinity for the precious metals by alloying it with a small portion of zinc—say, from one to ten per cent., according to the quantity of sulphur present in the ore; the sulphuration of the mercury is by this means prevented, as the affinity of zinc for sulphur is much stronger than that of mercury; and my invention further consists in causing all the water with which the ore is washed to flow as it escapes in contact with amalgamated bars, plates, or other surfaces of amalgamated zinc, which will collect all the fine particles, both of the mercury and precious metals, and thus prevent waste.

As the method of forming an amalgam of zinc and mercury is well known, it is unnecessary here to describe it further than to say that the quantity of zinc used must be sufficient to protect the mercury from sulphuration.

As the same ore when roasted well will contain far less sulphur than when badly roasted, the quantity of zinc to be used cannot be reduced to any exact rule. It is, however, desirable to do with the least possible quantity when the amalgam is mixed in mass with the ore, as the zinc very rapidly destroys the fluidity of the mercury; but in case the amalgam is not to be used in the ordinary way by mixing it with the ore, but instead is to be used to collect fine particles of floating metal, then the preservation of the fluidity of the amalgum is not of so much importance, and it may be formed in a convenient and suitable manner by applying mercury to the surface of a bar or plate of zinc, and arranging the bar so amalgamated in any convenient manner so as to bring it into contact with the particles of precious metal or mercury to be gathered by it.

The presence of the zinc in the mercury is found greatly to exalt the affinity of the latter for the precious metals.

As apparatus of innumerable forms might be devised for presenting amalgamated surfaces of zinc to the water escaping from the washer, I shall merely describe three:

The first is shown in Figs. 1 and 2, in which A represents a trough to convey the water off. Across this trough a series of inclined bars, *b*, of amalgamated zinc are placed in such a manner that the water as it passes through the through will have to run in contact with them.

A second plan would be to place perforated diaphragms *c* of amalgamated zinc across the trough through which the water would be compelled to run in numerous fine streams, and would of course be brought in contact with a large aggregate surface of the amalgamated metal, as illustrated in Fig. 3.

Another method would be to place a funnel-shaped diaphragm, *d*, perforated with numerous small holes round its sides in such position that the water would run through, and in so running the numerous vortexes that will be produced will cause the water to pass in contact with so large an amount of the amalgamated surface that it would be exceedingly

difficult for it to bear off a particle either of mercury or gold. This modification is shown in Fig. 4.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The employment of an alloy of mercury and zinc, instead of pure mercury, in the process of amalgamating precious metals.

2. The method of collecting the fine particles of mercury and precious metal that float off in the water with which the amalgam is washed, by means of surfaces of amalgamated zinc, in contact with which the water is caused to flow as it escapes, substantially as herein set forth.

In testimony whereof I have hereunto subscribed my name.

A. K. EATON.

Witnesses:
P. H. WATSON,
PETER HANNAY.