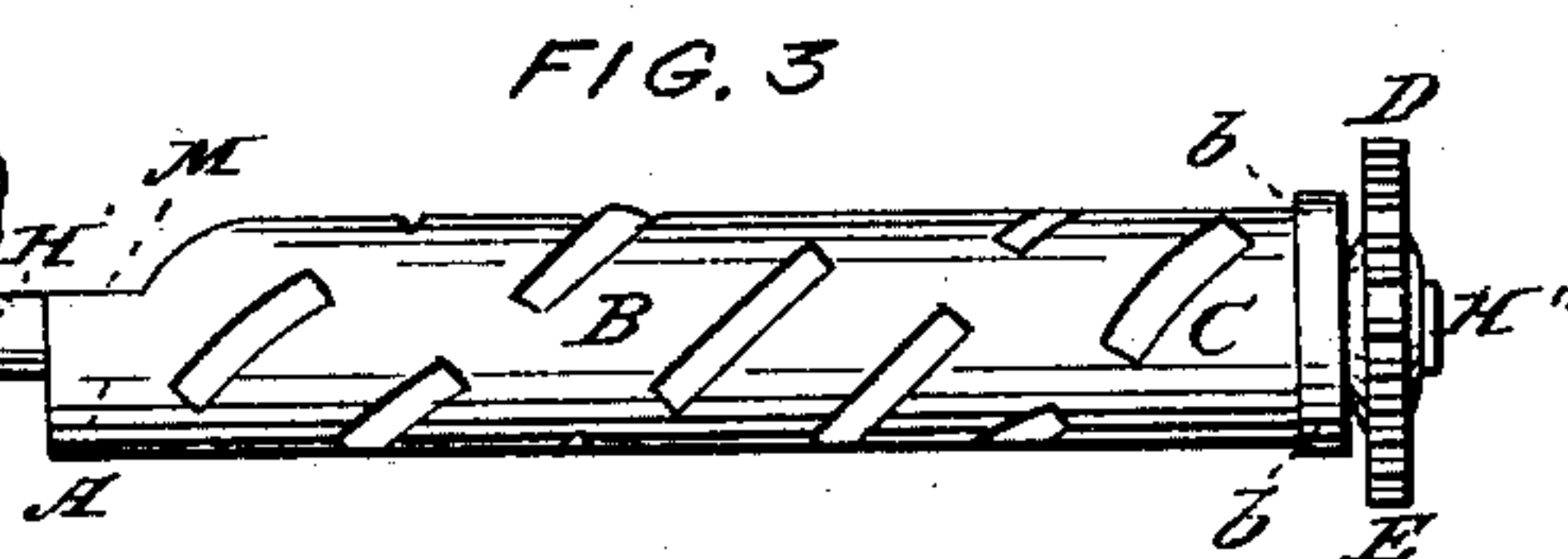
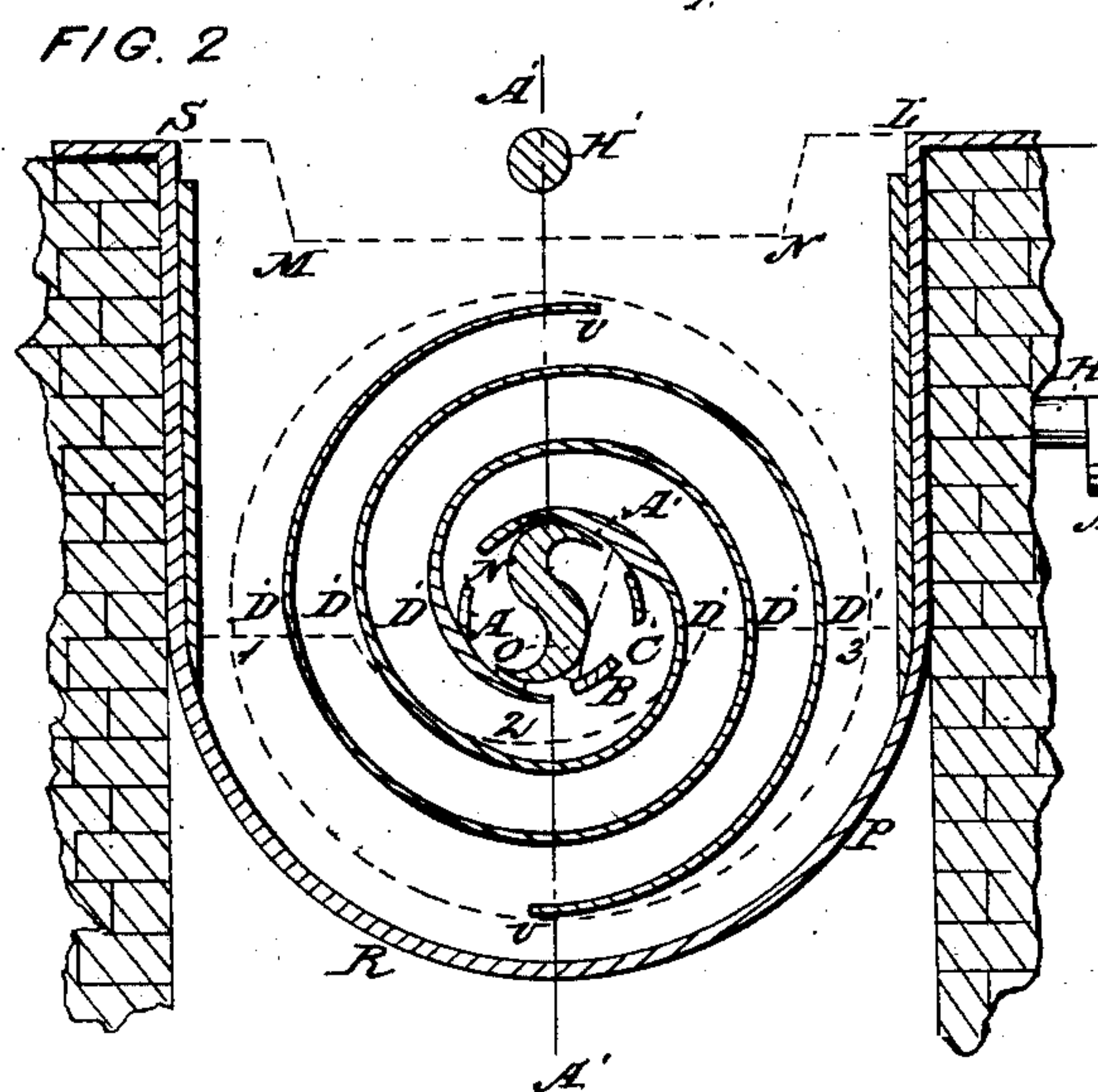
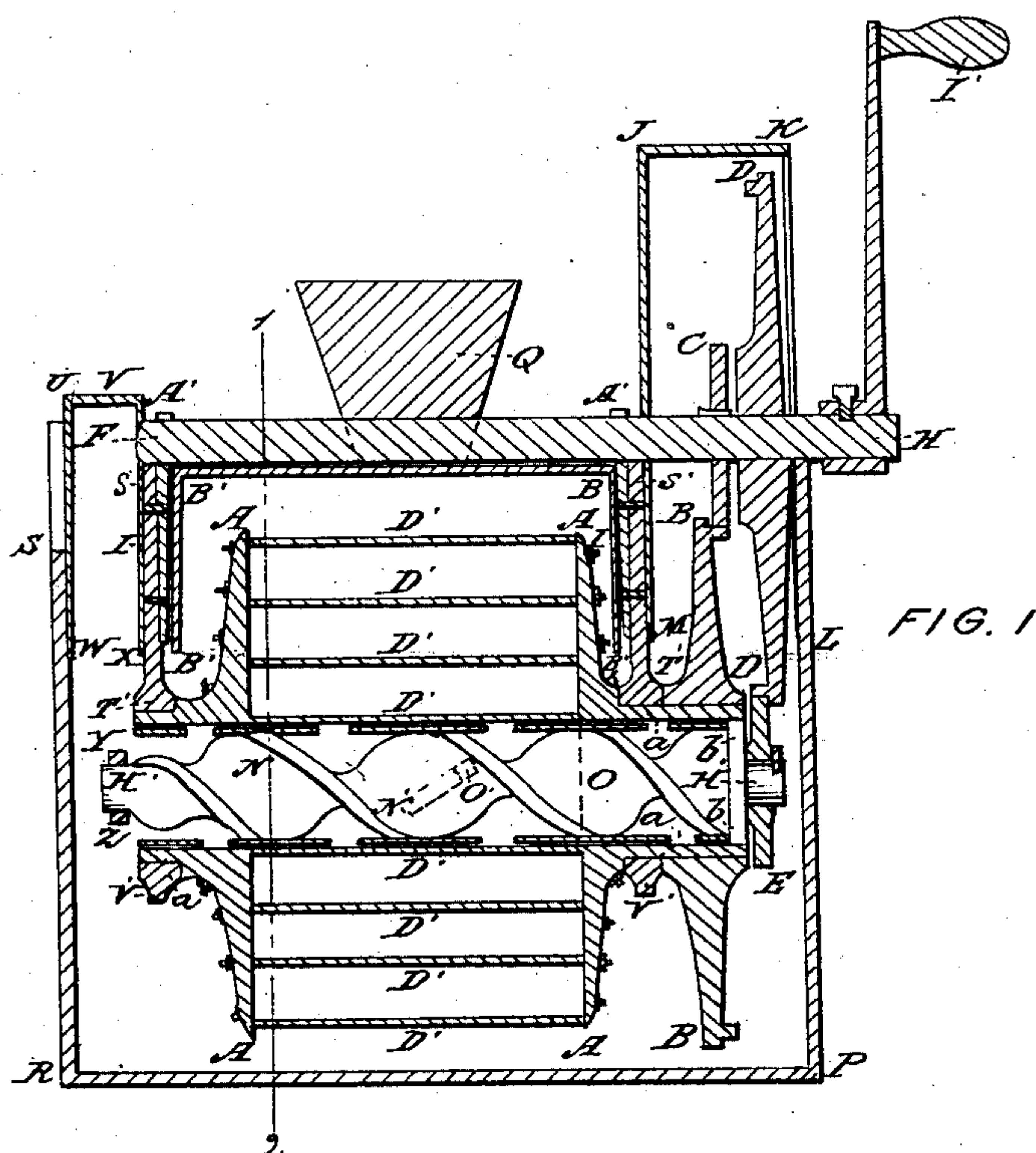


M. LAFLIN.
Ore Amalgamator.

No. 62,639.

Patented March 5, 1867.



WITNESSES:

George Fayson
L. H. Cort

INVENTOR:

Matthew Laflin

United States Patent Office.

MATTHEW LAFLIN, OF CHICAGO, ILLINOIS.

Letters Patent No. 62,639, dated March 5, 1867.

IMPROVEMENT IN APPARATUS FOR AMALGAMATING GOLD AND SILVER.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, MATTHEW LAFLIN, of Chicago, county of Cook, and State of Illinois, have invented certain new and useful improvements in the Amalgamator heretofore, to wit, on the twentieth day of September, A. D. 1864, patented by H. H. Scoville and P. W. Gates; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a longitudinal section through the centre of the amalgamator on the line A' A' A', fig. 2.

Figure 2 is a cross-section of the amalgamator on the line 1 2, fig. 1, and of a portion of the brick-work in which the kettle is set.

Figure 3 is a perspective view of the hollow cylinder or casing containing the screw N O, fig. 1.

The same letters do not always denote the same parts in the several drawings.

The object of my invention is to provide a simpler and more efficacious means than any hitherto known for mixing the pulverized quartz thoroughly with the melted lead used in the process of amalgamating, and at the same time excluding the air from the lead, so as to prevent its oxidization.

To enable others skilled in the art to construct and use my invention, I will proceed to describe its construction and operation.

In doing this I shall necessarily describe portions of what is to be found in the original invention, specifying hereafter what I claim as new.

L P R S, figs. 1 and 2, is an iron kettle at the bottom on the sides, but with straight or perpendicular ends, and set in a furnace of brick, as shown in fig. 2. The end of this kettle at T S is depressed in the middle, as shown by the dotted line S M N L, fig. 2, so as to allow the refuse quartz to flow over after passing through the lead, as hereinafter shown. It would be better not to have it any wider than the mouth of the cylinder A B C, figs. 2 and 3. This kettle is divided into three compartments, of very unequal size, by two slides or partitions, S' T' V', fig. 1, which start from the top of the kettle but run only about two-thirds of the way down, thus leaving the lower part of the kettle open from end to end. The form of these partitions and the shape in which they are rounded down at the bottom are shown by the dotted lines 1, 2, 3, in fig. 2. The partitions slide in grooves in the sides of the kettle, so as to be easily removed, together with the other parts attached to them, when necessary. In the middle one of these three compartments, and which, as will be seen in fig. 1, is much larger than either of the others, occupying, in fact, about two-thirds of the kettle, is placed the scroll-wheel A A A A, fig. 1, which revolves on the bearings or journals *a a a a*, fig. 1, in openings or boxes made in the two partitions. These bearings are themselves hollow and open through their whole extent, and should be made sufficiently large for the screw N O, fig. 1, and its casing A B C, figs. 2 and 3, to revolve freely within them. The two circular disks or plates A A A A, which form the ends of the scroll-wheel, are connected with each other by two spiral sheets of metal, the edges of which fit closely to the sides of the disks and are attached to them by tongues and keys or in any other convenient way. These spirals are indicated in fig. 1 by the lines D', and, in fig. 2, we have a cross-section of them, showing more plainly their form and position. The number here given is two, and this I consider best in practice, but more or fewer may be used, if desired. In the centre of the scroll-wheel, and within the two hollow journals *a a a a*, fig. 1, is the screw N O, fig. 1, with its casing A B C, fig. 3, both of which turn at their right end on the shoulder *b b*, figs. 1 and 3, and the left end on the journal H', figs. 1 and 2, this last journal being simply the end of the screw N O drawn out and rounded into the proper shape. The shoulder *b b* is made to revolve within the hollow journal *a a*, and the journal H' in the bent strap or bar Y Z, the two ends of which are attached to the sides of the partition S' T' V', while the middle is bent outwards so as to cross the open ends of the hollow journal *a a* and the casing A B C at a sufficient distance not to interfere with either of them in turning. The shape of this iron strap may be more readily understood by reference to the bent line S M N L, fig. 2, which it closely resembles. B' B' B' B' is a deep square cover, just large enough to fit inside the main compartment of the kettle beneath the shaft F H, and going low enough for its lower edge to dip into the lead. A small place is cut out at each side to receive the two shoulders A' I, which would not be necessary if the shaft F H is made to rest on supports outside the kettle, thus dispensing with these shoulders,

as explained below: If the shoulders are used the cover B' B' may be cast whole, with a groove in each side for the shoulders to slide in. This cover, after it is put on, may be covered with powdered charcoal so as still more effectually to exclude the air and retain the heat. U V W X is a second cover, fitted in like manner to slide down into the left-hand compartment, of which it covers about one-third. A corresponding cover, not shown in the drawing, fig. 1, covers the opposite side of this compartment, leaving about one-fourth of the space, or that part over the mouth of the journal *a a*, open for the escape of the quartz. If desired, these covers may be made double, and packed with powdered charcoal, so as more perfectly to confine the heat, or charcoal may be first poured over the lead and the cover then put on. That part of this left-hand compartment which is without a cover will be constantly full of the refuse quartz, which will cover the melted lead to a depth of several inches, and thus effectually prevent its oxidization. J K L M is a semicircular cover that shuts down into the right-hand compartment over the driving-wheel D D. It is cut out in the middle of each side to receive the shaft F H, and at the two inner corners to fit the projections forming the grooves in which the partitions S' T' V' are made to slide. All these covers must be made deep enough to dip into the lead. Before putting on its cover the right-hand compartment should also be filled with powdered charcoal, to retain the heat and prevent the lead from oxidizing or from adhering to the gearing. Q is a hopper, attached to the cover B' B' B' B', through which the quartz, after being properly heated, is introduced into the machine. While in operation it should be kept constantly full, or nearly so, to exclude the air. The cylinder A B C, figs. 2 and 3, with one of its shoulders cut off at a bevel, as shown at M, fig. 3, to permit the escape of the quartz, encloses the screw N O, to which it is firmly attached so as to revolve with it. It is made, as shown in fig. 3, with numerous narrow openings running spirally like the edges of the screw, but in the opposite direction, as shown by the dotted lines N' O', fig. 1. These openings should not extend quite across from one edge of the screw to the other, but should leave about one-fourth of the space on each side still covered. As shown in the drawings, these openings extend the whole length of the casing, and the screw N O extends the whole length of the journal *a a* at the right-hand, fig. 1. It is better, however, to have no openings in the casing where it passes through the journals *a a*, so that the journals may not be worn by quartz getting between them and the casing. It is better, also, to have the screw end at O, fig. 1; and in that case the shoulder *b b* should be made wide enough to extend to O, or there can be a narrow shoulder at O for the screw to turn on, with an axis running from it to the wheel D E.

Having thus described the several parts, a few words will suffice to explain the operation.

A fire is kindled beneath the kettle and lead is put in until the scroll-wheel is covered to about seven-eighths of its height, or so that the wheel, in turning, will not fail to catch and carry down the quartz. No precise directions can be given on this point, so much depends on the size and shape of the kettle, the size of the wheel, and the rate at which it moves. If the lead is too high and the wheel moves at an unsuitable speed; the lead will be carried over to the opposite side of the scroll from where it takes up the quartz, and the quartz will not be carried down by the wheel. A little experience will show the amount of lead necessary in each instance. The pulverized quartz, previously heated so as to expel all air and moisture, is then poured into the hopper Q, and, passing through this, enters the main compartment of the kettle and there covers all the surface of the lead. As soon as the lead is entirely melted the driving-shaft F H is put in motion, and the scroll-wheel A A, catching the quartz in its open mouths *vv*, fig. 2, as it revolves, carries it, mixed with the melted lead, through all its convolutions till it passes through the narrow openings in the cylinder A B C, fig. 3, and is thence expelled by the screw N O out into the left-hand compartment at Y Z. Here the refuse quartz rises to the surface and flows over and out of the kettle at S, while the lead, and whatever gold or other metal it may have taken up while passing through the scroll, sink to the bottom, and, mingling with the main body of the lead, are ready again to go through the same operation, and so on until the lead becomes saturated, when it must be removed and a fresh supply introduced in its place. How much gold, &c., the lead can carry without being rendered unfit for further use in the machine, of course may be readily learned by trial. In order to remove the lead the wheels, partitions, and covers may all be drawn out of the kettle, or, if so preferred, a spout, running out through the brick-work, may be arranged at the bottom of the kettle and the lead drawn off through that. If the supply of lead at any time requires replenishing it may be introduced through the hopper Q. The manner in which motion is communicated to the wheel and screw will be at once perceived from the drawings. F H is the main shaft, and may be turned, as in the drawings, by a crank, or by a drum or pulley, or cog-wheel attached, in place of the crank, with suitable gearing to connect it with the steam engine or horse-power, or whatever may be employed for the purpose. This shaft turns in sockets in the two shoulders A' I, which are riveted to the sides of the partitions S' T' V'; but, in practice, I think it better for the shaft to revolve in bearings projecting beyond the kettle and brick-work, so as to escape the heat. This shaft carries the cog-wheel C B and the toothed wheel D D, the first of which drives the wheel B B, which turns the scroll-wheel, and the second drives the cog-wheel D E, which turns the screw N O. There being thirty-three teeth in each of the large wheels and only ten on each of the small wheels, it is manifest that the screw will turn nearly eleven times while the scroll is turning once, this greater velocity being necessary for the more effectual expulsion of the melted lead and quartz. Some twenty revolutions a minute I have found to be sufficient for the scroll-wheel.

I have not thought it necessary to say anything about the size of this amalgamator, as that may be indefinitely varied according to the occasion. For ordinary use I consider a kettle three to four feet long and two to three feet in depth and width, and having the other parts in proportion, to be sufficient.

The advantages of my invention are twofold: first, the extremely simple yet efficacious manner in which the quartz is mixed with the lead during their long and circuitous journey through the scroll-wheel, leaving little chance for any of the gold to escape; and, second, the manner in which the lead, by means of the covers

and charcoal dust is kept from oxidizing. These two are by far the most important requisites in all amalgamators in which melted lead is employed, and my invention, I believe, possesses them in a greater degree than any other.

The scroll-wheel in the original invention, on which this is an improvement, was altogether inferior in design, and wholly incapable of effecting the end intended.

Having thus described the various parts of this amalgamator, I do not claim a scroll-wheel generally, as that is already known, but what I claim as my invention, and desire to secure by Letters Patent, is—

1. A kettle, with partitions dividing it into compartments in the upper part, but leaving it open at the bottom, substantially as described.
2. The method of excluding the air from the lead by means of the covers, one or all of them, substantially as described.
3. The improved scroll-wheel, with one, two, or more spiral plates, substantially as described.
4. The screw and its casing, substantially as described.
5. The combination of a scroll-wheel and screw, substantially as described.
6. The combination of a scroll-wheel, screw, and casing, substantially as described.
7. The combination of a kettle, partitions, and scroll-wheel, substantially as described.
8. The combination of a kettle, partitions, scroll-wheel, and screw, substantially as described.
9. The combination of a kettle, partitions, scroll-wheel, screw, and casing, substantially as described.
10. The combination of a kettle, partitions, and cover or covers, substantially as described.

Chicago, February 15, 1867.

MATTHEW LAFLIN.

Witnesses:

GEORGE PAYSON,
OBADIAH JACKSON,