E. SHIVER.

Shot-Machine.

No. 228,481 Patented June 8, 1880.

Fig. 1

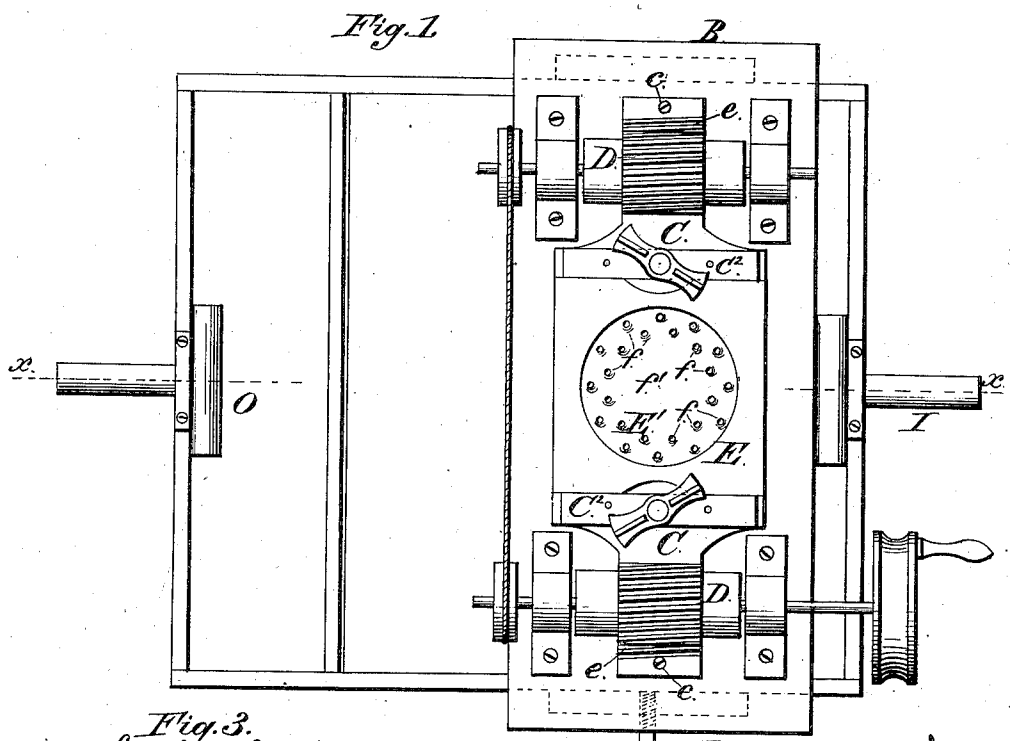


Fig. 3.



Fig. 2.

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UNITED STATES PATENT OFFICE.

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SHOT-MACHINE.

SPECIFICATION forming part of Letters Patent No. 228,481, dated June 8, 1880.

Application filed October 16, 1879.

To all whom it may concern:

Be it known that I, ELISHA SHIVER, of Washington city, in the county of Washington and District of Columbia, have invented certain new and useful Improvements in Shot-Machines; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to portable apparatus or machines for making drop-shot without the use of a tower; and the said invention consists in certain new and useful improvements upon the invention patented to me August 14, 1877, No. 194,271, as follows:

First, in a provision or arrangement of water inlet and outlet pipes at the top of the tank, whereby the surface-water in the tank is always changing and a constant stream of fresh cool water at all times passing over the surface portion of the water in the tank, instead of passing through the tank from top to bottom, or merely being filled and emptied occasionally from the top or otherwise, as is usual and employed in my former patents, thus presenting a constant cool bath to the regularly-falling shot; second, in a novel construction and arrangement of the sieve-frame and mechanism for actuating the same, whereby the same is regularly agitated at each end or side, instead of only being agitated at one end of the sieve-frame, as in my patent. Thus a more perfect oscillation of the sieve is assured and better results obtained; third, in the employment of mica instead of paper, as heretofore, whereby the frequent replacement of the sieve or perforated card is obviated, owing to the indestructibility of the mica, and the mica being an elastic flexible material, it is kept in vibration by the lead falling upon it, and better results obtained, whereas with paper cards, as in my patent, the paper being inelastic, no natural vibration of the same is caused, and after limited use it becomes dished and bent, consequently useless, thus requiring frequent renewing.

By the use of mica these defects and objections are removed and far better results produced.

Referring to the drawings, Figure 1 is a plan, and Fig. 2 a vertical transverse section, of a machine constructed according to my invention; Fig. 3, detached view of the sieve.

A is the cooling-tank, of any appropriate or desirable size, depth, proportions, &c., directly upon the top of which is received the frame or body B, which supports the shot-producing mechanism. This frame B may be so constructed as to be adjustable upon the tank by set-screw or otherwise, or it may be stationary thereon, and it is provided through its central portion with an opening, B′.

C is the sieve-frame, horizontally suspended on the frame B by means of guide-rods *c c*, and held up in position upon springs *d d*. This sieve-frame is also constructed with a large central opening, C′, immediately over the opening B′ in the frame B.

At each top side of the sieve-frame C, about over the position of the springs *d d*, is formed transverse grooves or serrations *e e*, which engage with the fluted rollers D D, mounted in bearings at each side of the top of the frame B. These rollers D D are actuated by any suitable arrangement of bands and pulleys and hand or other power, as shown.

C^2 C^2 are cleats or guides, with thumb-bolts at top, within which the sieve-box E is secured. The bottom E′ of this box is made of mica, and the perforations *f* therein are made from the under side, leaving projecting sides to the openings, as shown in Fig. 3.

Within the water-tank A is placed, at any suitable angle, a bottom or chute, A′, leading from the top, directly beneath the opening through the shot-making apparatus or sieve, down to and into a box or partitioned-off portion, A^2, of the bottom of the tank. Spaces are left around this bottom A′ and box A^2 for the circulation of the water, so that the parts are all touched by the water, and consequently kept cool.

At the extreme top edge of the tank, upon opposite sides thereof, I place an inlet, I, and outlet O, through which is kept flowing a constant stream of water.

The operation of the machine is as follows: Molten metal (lead) is poured upon the sieve E′ and, striking upon the unperforated center *f′*, flows around over the sieve until the top of the perforations *f* are reached, when the drops or pellets of metal drop through and immediately strike and enter the water. Reaching the inclined plane A′, they roll downward, and settle into the receptacle A^2, from whence they may be removed as desired. At the same time, during the operation of pouring the metal into the sieve, the entire sieve-frame, with sieve, is, by means of the fluted rollers D D, serrations *e e*, and springs *d d*, being set in motion, kept in a constant agitation or vibration, said movement of the sieve being both horizontal and vertical, whereby the molten metal in the sieve is kept in a jarring agitating motion, thus insuring its proper discharge through the sieve and the construction or formation of the pellets. Added to this, by the constant changing of the water at the point that first receives the hot shot—consequently the first to get hot and lose its effectiveness—the proper cooling of the drop of lead is effected much more certainly and effectively than when dropped from a distance and into stagnant heated water.

By my mode and apparatus shot of superior quality may be made from any form or quality of lead; or even pure lead may be used, and without the admixture of foreign ingredients—bismuth, arsenic, &c.—to give the same density and hardness as is necessary in shot formed by dropping from a tower.

The purer the lead of which shot is formed the better will be the shot, owing to its density and weight.

In the use of this apparatus, because of the immediate entering of the shot into the cool water as fast as it is formed, no opportunity of its being affected by the action of the air in falling is occasioned as in tower-shot. Therefore pure lead can be successfully used, whereas in towers pure lead cannot possibly be used, owing to its softness and consequently easily being affected by falling through the air, which makes it take irregular shapes. To overcome this difficulty arsenic, &c., is used to give it the proper hardness to resist the action of the air; but at the same time that it makes it hard it diminishes its weight, which is the desideratum in shot—to have the greatest weight in a given size.

By this it will at once be seen that with my machine the shot produced is, with a given size, heavier, therefore better, and the cost, attendant risks, &c., of the use of arsenic, &c., removed.

Having thus described my invention, its operation, advantages, &c., what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for making shot, the water or cooling tank, constructed at its top extreme edge with one or more wide flaring-mouthed inlet-pipes, I, and one or more wide flaring-mouthed outlet-pipes, O, at opposite sides, substantially as and for the purposes described.

2. The water-tank or cooling-receptacle, constructed with an inclined chute and shot-receptacle at one side, and at the top opposite sides with water inlet and outlet pipes, substantially as and for the purposes described.

3. The sieve-frame containing the sieve, supported at each side upon springs, and also operated upon each side by means of fluted rollers acting upon serrated portions on the sieve-frame, whereby both ends of the sieve-frame are agitated and jostled by the rollers at the same time, substantially as and for the purposes described.

4. The sieve or card of a shot-producing machine, constructed of a perforated sheet of mica.

5. The combination, in a shot-machine, of adjustable sieve-body, sieve-frame, independently oscillating at each end upon springs, and two independent fluted rollers acting at each end, with suitable machinery for actuating or driving the same, all substantially as and for the purposes described.

6. The combination, in a machine or apparatus for producing shot, of a shot-pellet forming or dividing apparatus and the cooling-tank, arranged close together, and constructed at its top opposite edges with suitable water inlets and outlets, whereby a constant stream of cooling liquid is always passing between the shot-producing mechanism and shot-receptacle, for the purposes specified.

7. The combination and arrangement, in a machine for forming shot, of shot-forming mechanism or sieve having a double vibratory motion at each end, a cooling-tank with inclined bottom and water inlet and outlet pipes at its top opposite edges, fluted rollers D D, serrations *e*, and springs *d*, all substantially as and for the purposes described.

In testimony that I claim the foregoing I have hereunto set my hand this 15th day of October, 1879.

ELISHA SHIVER.

Witnesses:
J. W. HAMILTON JOHNSON,
WM. H. BRERETON.