

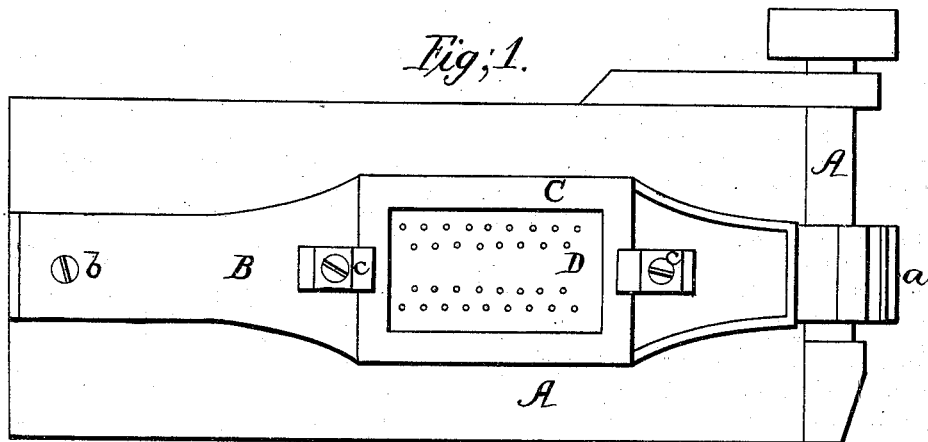
E. Shiver.

Process for Making Shot.

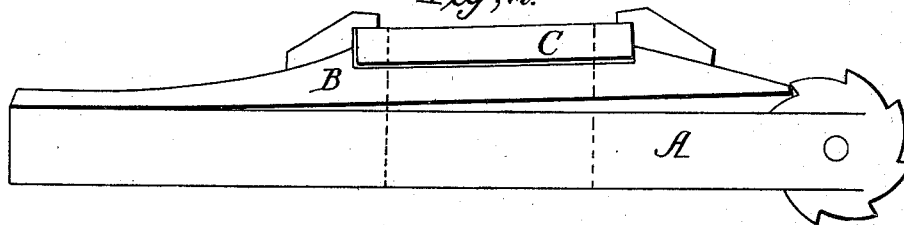
N^o 86,596.

Patented Feb. 2, 1869

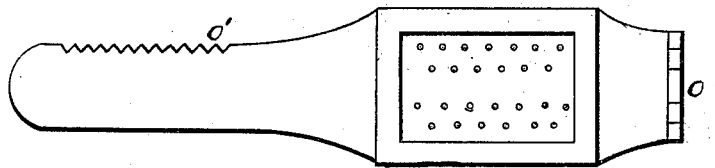
Fig; 1.



Fig; 2.



Fig; 3.



Witnesses;

*L. S. Hoyess
Fred Thomas.*

Inventor;

E. Shiver

UNITED STATES PATENT OFFICE.

E. SHIVER, OF COLUMBIA, SOUTH CAROLINA.

IMPROVEMENT IN PROCESSES OF MAKING SHOT.

Specification forming part of Letters Patent No. 86,596, dated February 2, 1869.

To all whom it may concern:

Be it known that I, ELISHA SHIVER, of Columbia, in the county of Richland and State of South Carolina, have invented a new and Improved Process of Making Shot; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates to an improved process for making shot; and consists, mainly, in the employment of certain chemical or other substances upon a perforated surface, in connection with a vibratory or other motion, as will be fully described hereinafter.

In the drawings, Figure 1 represents a plan view; Fig. 2, a side elevation of one form of apparatus used in my process, and Fig. 3 a plan view of another form.

In the manufacture of shot previous to this invention, the use of a tower or other elevated structure has been indispensable, and although the height of the fall has been materially reduced by inventions already patented, still, in each case, this has only been accomplished by a large increase in the cost of manufacture.

By the process hereinafter described, however, shot of good quality is manufactured at a small cost, without any fall (so to speak) whatever, the perforated sheet or card through which the metal is poured being placed immediately over the water.

The process is as follows: I first provide a frame or other suitable device for holding the perforated card, which is so arranged as to receive, in any suitable manner, a vibrating or other motion. In the drawings two forms of such apparatus are shown.

In Figs. 1 and 2, A represents a base-board of any suitable size, one end of which is provided with bearings for the shaft A', and through which is an opening corresponding to the perforated card D, as shown by dotted lines in Fig. 2. B also represents a spring-board having a corresponding opening through it, which is pivoted or otherwise attached at b to the base A. When pivoted, the board B may be swung around, if desired, and the cup of water be placed within the opening in the base-board. The board B is also provided with a sash, C, which is secured in place by

means of the buttons c c. This arrangement is intended for the purpose of permitting the card to be easily taken out and replaced when desired.

D represents a card of metal, which is perforated with a round instrument, the edge or burrs thus formed being left thereon, and the card, when in use, being laid in the frame with these burrs projecting from its upper side. a represents a ratchet-wheel attached to shaft A', the teeth of which bear against the free end of the frame B. By this means the necessary motion is communicated.

In Fig. 3 another form of apparatus is shown. This consists of two handles, hinged at r, between which the card is clamped. The trembling motion is produced, in this case, by drawing a stick back and forth across the notches o'.

It will of course be readily apparent that the form of the apparatus may be varied in countless ways, and also that the method of producing the proper motion may be changed at will.

A suitable apparatus having been prepared, the card is placed thereon, and is sprinkled with the dry sal-ammoniac; or it may be saturated with a solution of the same, if desired. After this the pure lead, or it may be lead alloyed with arsenic or other material, is poured through the perforated card.

It is best first to pour a little lead in between the line of the holes, and permit it to flow to either side. After this cools the metal may be poured in indiscriminately.

The machine now being put in motion, the hot metal is detached in drops, and falls into the water, which is placed immediately beneath the apparatus.

The heat of the metal and the distance from the water are points that require attention in order to insure perfect success. The metal should be neither too hot nor too cold, but at a temperature which will enable it to flow freely without being so hot as to burn the card.

I find, by practice, that it is best to place the card from an eighth of an inch to an inch above the water, though the distance necessarily varies somewhat with the circumstances of the case. I find also that sal-ammoniac is the best substance to place upon the card, although I have used other substances with more

or less success, such as the other salts of ammonia, borax, &c. The substances thus employed operate, in connection with the burrs and punctures of the card, in such manner that the molten lead, in passing through the card, is almost instantaneously reduced to perfect globules, so that it is not necessary that it should be dropped from a great height, as heretofore, to insure the rotundity of the shot; but its form may be permanently fixed by the cold-water bath almost immediately in contact with the card, as before described. I find also that lead alloyed with arsenic will make shot more or less successfully, without the sal-ammoniac; but when heated in the open air it is dangerously poisonous, and ought not to be employed.

The operation of the substances above described in connection with the cards, in the manner which I have set forth, is so powerful that even without the vibratory motion of the card perfect shot may be frequently obtained,

though the process is not uniformly successful without such motion.

I wish it distinctly understood that I do not limit myself to any particular kind of apparatus for producing such motion, or to sprinkling or saturating the card with the particular substance—sal-ammoniac; but

What I do claim, and desire to secure by Letters Patent, is—

The process herein described of making shot of pure or alloyed lead, by means of a perforated card sprinkled with sal-ammoniac, or its equivalent, to which is given a vibrating or trembling motion, substantially as described, for the purpose set forth.

This specification signed and witnessed this 22d day of October, 1868.

E. SHIVER.

Witnesses:

C. F. BROWN,
S. J. NOYES.