2 Sheets—Sheet 1.

J. E. GRANNISS & L. W. TRACY.

Lead Shot Grading Machine.

No. 218,379. **Patented Aug 12, 1879.**

Fig. 1.

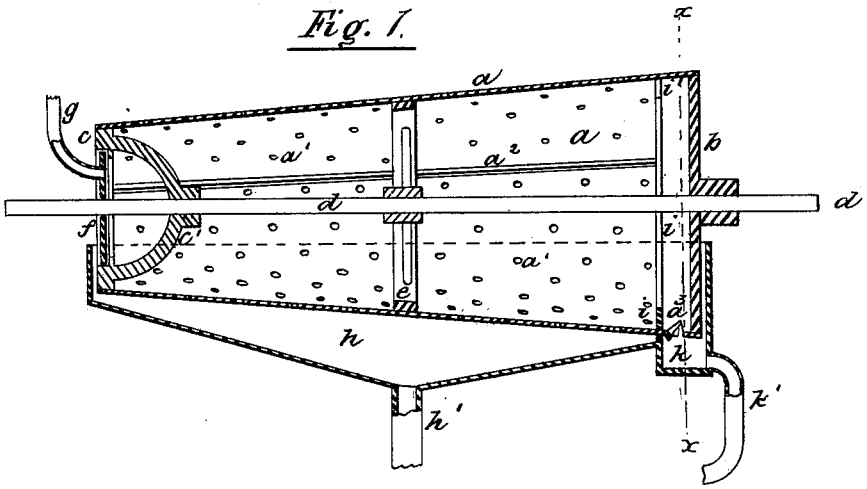
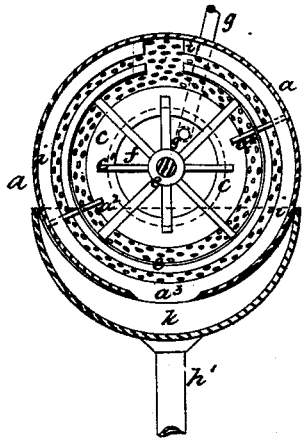


Fig. 2.



Witnesses.
H. D. Williams
Geo. P. Byrne

James E. Granniss
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Alfred Sheldock.
Atty.

2 Sheets—Sheet 2.

J. E. GRANNISS & L. W. TRACY.

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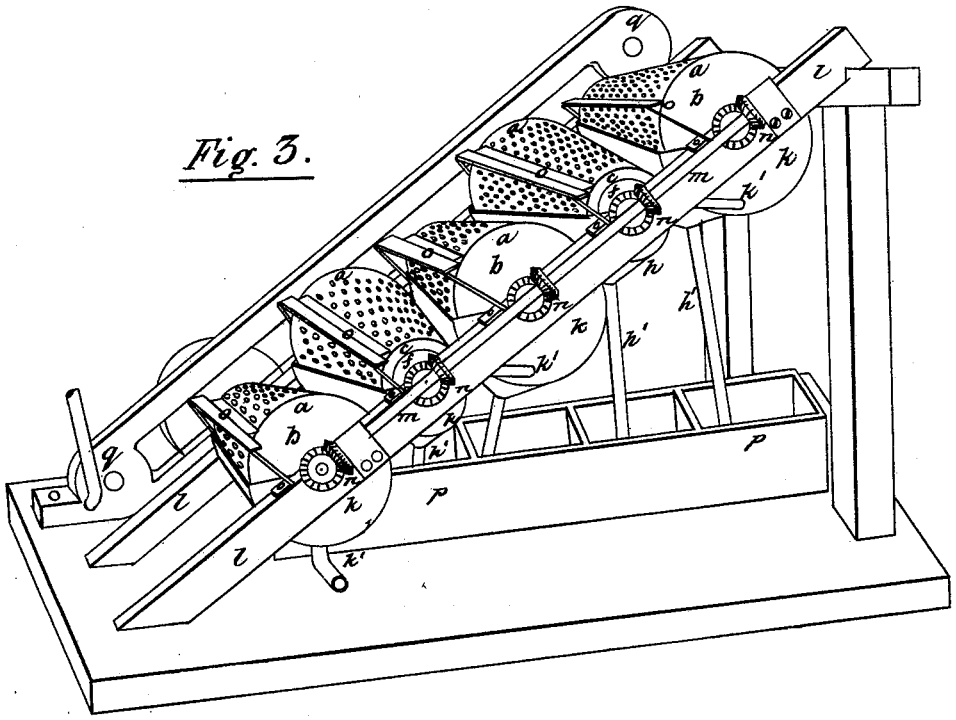
Fig. 3.



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UNITED STATES PATENT OFFICE

JAMES E. GRANNISS, OF NEW YORK, N. Y., AND LEWIS W. TRACY, OF PHILADELPHIA, PA.

IMPROVEMENT IN LEAD-SHOT-GRADING MACHINES.

Specification forming part of Letters Patent No. **218,379**, dated August 12, 1879; application filed March 22, 1879.

To all whom it may concern:

Be it known that we, JAMES E. GRANNISS, of New York, county and State of New York, and LEWIS W. TRACY, of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Lead-Shot-Grading Machines, of which the following is a specification.

Lead shot, after passing over the screening-table, are passed through the grading or assorting machine, which consists of a series of rotating perforated cylinders or drums working in bearings on a vertical or inclined frame. The perforations through the cylinders or drums are made to correspond to the different sizes of shot, and increase in size from the upper to the lower one. The mixed shot pass first into the upper cylinder at one end, and, as it rotates, the smallest shot fall through the perforations into a receiving-box; the remainder of the shot pass out at the other end of the cylinder into the next lower cylinder, in which the next size shot are separated from the rest, and so they pass through all the cylinders or drums until the grading or assorting operation is complete.

It often happens that some of the small shot, instead of passing through their right perforations, fall, with the remainder of the shot, into the next cylinder, and so mix with the larger ones. Now it is the object of this invention to overcome this difficulty, which we accomplish by placing in the perforated cylinders, near the end at which the shot are discharged therefrom, one or more broken rings, which act as internal flanges to retain the shot a longer time in the cylinders, as the openings in the flanges are opposite the discharge-openings in the cylinders, and so insure that all the shot that can shall pass through the perforations, as will be more fully hereinafter described by reference had to the accompanying drawings, forming part of this specification, in which—

Figure 1, Sheet 1, is a longitudinal central sectional view of our improved grading or assorting drum. Fig. 2, Sheet 1, is a transverse sectional view cut through the lines *x x* in Fig. 1; and Fig. 3, Sheet 2, is a perspective view of a series of our improved grading or assorting drums placed on an inclined frame and geared together by means of miter-gearing.

a represents the drum, which is made of sheet metal bent in the form of a truncated cone and perforated all over with holes a^1 a^1. In the large end of the drum *a* is fitted the head *b*, and in the small end is fitted the ring *c*, provided with the spider-arms *c'*. The shaft *d* passes through the centers of the head *b* and spider-arms *c'* of the ring *c*, and is secured firmly thereto; and to stiffen the middle part of the drum a light wheel, *e*, is placed on the shaft *d*.

The central opening of the ring *c* is closed by means of a disk, *f*, which is held stationary by being fastened to the frame of the machine or to the bearing in which the shaft revolves, and through this disk *f* passes the end of the pipe or duct *g*, which conveys the shot to the inside of the drum. The longitudinal ribs a^2 a^2 stir up the shot as the drum revolves, the shot gradually working down by their gravity toward the large end of the drum, the axis of the cylinder being in a horizontal plane, and all the shot that can fall through the perforations a^1 a^1 into the hopper *h*, whence they fall through the pipe *h'* into a receiving-box.

When the shot reach the larger end of the drum they are prevented from immediately falling out of the discharge-opening a^3 by the retaining-flange *i*. As this flange is only provided with one opening, *i'*, through which the shot can pass and this opening is diametrically opposite the opening a^3, as shown at Fig. 2, the shot are thereby retarded, and the liability of any of them leaving the drum that are small enough to pass through the perforations is reduced to a minimum.

We sometimes employ two or more flanges, with their openings opposite each other, but generally find that one is sufficient to accomplish to the object sought.

The shot that fall through the discharge-opening a^3 are conveyed by the hopper *k*, by its duct *k'*, into the small end of the next lower drum, which is placed immediately under the first one, but with the ends reversed, and in which the perforations are of a size corre-

sponding to the size of the next grade of shot, and so on. As many drums are arranged together as are necessary to properly grade the shot, they being alike in all respects except as to the size of the perforations.

At Fig. 3, Sheet 2, is shown a perspective view of a series of drums, *a a*, fitted in bearings in the frame *l*, and simultaneously revolved by means of the shaft *m* and miter-wheels *n n*. *o o* are brushes or strips of leather, held in suitable clamps, and bearing against the outside of the drums, the object of which is to keep the drums clean and to push back into the drums any shot that stick in the perforations. *h' h'* are the ducts which convey the assorted shot into the receiving-boxes *p p*, and *q* is an elevator for raising the shots to the top drum.

Having now described our invention, what we claim, and desire to secure by Letters Patent, is—

In a machine for grading or assorting shot, the ring *i*, provided with the opening *i'*, in combination with the perforated drum *a*, substantially as and for the purpose hereinbefore set forth.

In witness whereof we have hereunto set our hands this 3d day of March, 1879.

JAMES E. GRANNISS.
LEWIS W. TRACY.

Witnesses:
CHARLES HUBBARD,
F. B. LAWRENCE.