2 Sheets—Sheet 1.

R. POOLE.

SHOT-POLISHING MACHINE.

No. 182,329. Patented Sept. 19, 1876.

Fig 1

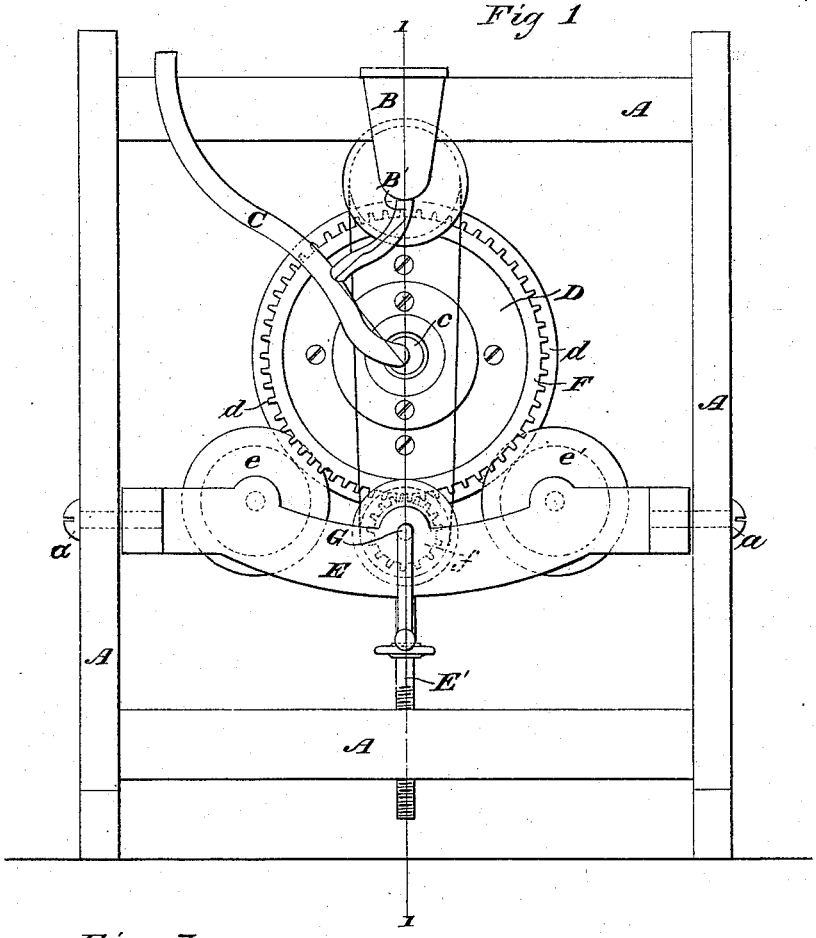
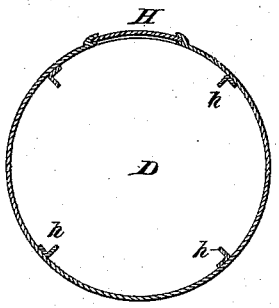


Fig 3



WITNESSES

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SHOT-POLISHING MACHINE.

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Fig 2.

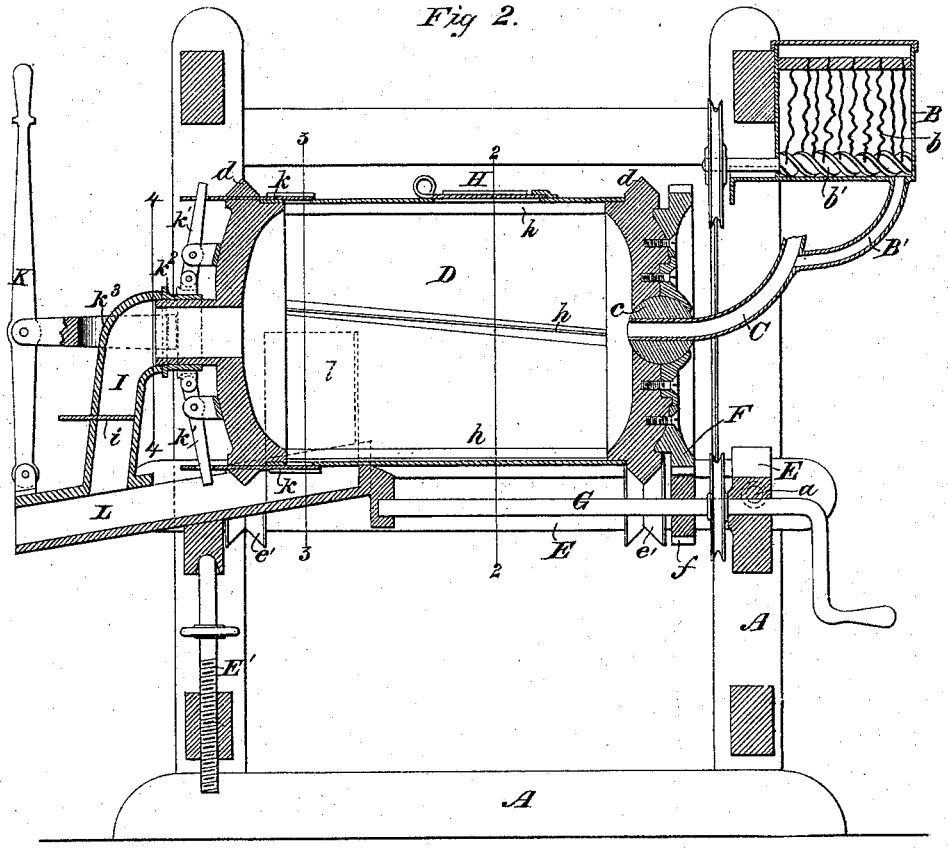


Fig 5

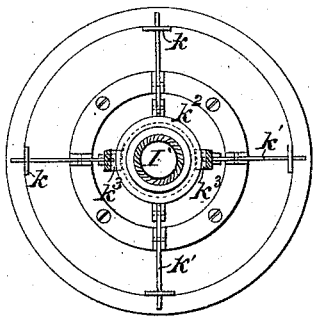
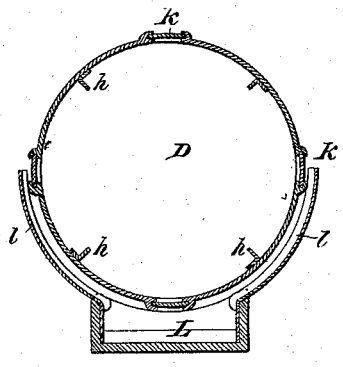


Fig 4



WITNESSES

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UNITED STATES PATENT OFFICE.

ROBERT POOLE, OF BALTIMORE, MARYLAND, ASSIGNOR TO POOLE & HUNT, OF SAME PLACE.

IMPROVEMENT IN SHOT-POLISHING MACHINES.

Specification forming part of Letters Patent No. **182,329**, dated September 19, 1876; application filed August 7, 1876.

To all whom it may concern:

Be it known that I, ROBERT POOLE, of Baltimore city, in the State of Maryland, have invented certain new and useful Improvements in the Art of Polishing Shot, and in apparatus therefor, of which the following is a specification:

Shot are generally polished by being mixed with the polishing material and revolved in a tumbling-barrel until properly smoothed and coated with the polishing-mixture by rubbing contact, when the rotation of the barrel is stopped and its contents discharged. This polishing substance usually consists of a powder, the tendency of which is to pack and clog, thus rendering it difficult to feed the material to the tumbling-barrel in regulated quantities.

The object of the first part of my invention is to obviate this difficulty, to which end my improvement consists in combining, with a hopper from which the powdered material is fed, a feeding screw or stirrer, and yielding rake-teeth, between which the threads of the screw work, whereby the material is continually stirred and prevented from clogging, and fed regularly to the tumbling-barrel.

The object of the next part of my invention is to mingle the shot thoroughly with the polishing material on their way to the tumbling-barrel, which end I attain by feeding the polishing material into a duct or channel through which the shot pass, and by the momentum of which they are thoroughly mixed and carried into the tumbling-barrel.

The object of the next part of my invention is to render the operation of polishing uninterrupted, so that the shot may pass through the tumbling-barrel in a continuous stream, in contradistinction to the common methods of filling the tumbling-barrel, polishing the charge, and then stopping the mechanism to discharge it; to which end my improvement consists in the hereinafter-described method of polishing shot, consisting in supplying them by a continuous feed, together with the polishing material, at one end of the barrel, and discharging them in a continuous stream at the opposite end thereof, after being polished by the rotation of the barrel and contact with the polishing material.

The object of the next part of my invention is to regulate the rapidity of the passage of the shot through the tumbling-barrel; which end I attain by mounting the apparatus in an adjustable frame, so as to vary the inclination of the axis of rotation of the barrel.

The object of the next part of my invention is to permit of the free rotation and adjustment of the tumbling-barrel relatively to the feed-duct; to which end my improvement consists in combining the feed-spout and tumbling-barrel by means of a universal or swivel joint in the head of the barrel, through which joint the feed-tube passes.

The object of the next part of my invention is readily to change from one size of shot to another; to which end my improvement consists in providing at the discharge end of the barrel a series of slide-valves for the escape of the shot, all controlled by a common lever, so that the discharge-openings may all be simultaneously opened or closed.

My improvement further consists in certain novel constructions of parts of the apparatus, as hereinafter set forth.

The accompanying drawings show all my improvements as embodied in one machine, in the best way now known to me. Obviously, however, some of these improvements may be used without the others, and in machines differing in construction from the one herein shown. The details of construction of the apparatus may also be varied in certain well-known ways, without departing from the spirit of my invention.

Figure 1 represents an elevation of the feeding end of so much of my improved apparatus as is necessary to illustrate the subject-matter herein claimed; Fig. 2, a vertical longitudinal central section therethrough, on the line 1 1 of Fig. 1; Fig. 3, a vertical transverse section through the tumbling-barrel, on the line 2 2 of Fig. 2; Fig. 4, a similar section on the line 3 3 of Fig. 2; Fig. 5, a view of the discharge end of the apparatus, partly in section, on the line 4 4 of Fig. 2.

The mechanism is mounted upon a stout

frame, A, of suitable construction. The polishing material is contained in a hopper, B, provided with yielding comb or rake teeth *b*, between which a feed-screw, *b'*, revolves, being driven by suitable well-known mechanism.

The spring-teeth, it will be seen, are moved at their lower ends, which engage with the screw-thread, toward the discharge end of the hopper by the revolution of the screw until they escape from the thread and spring back, to be again moved forward. The teeth are thus constantly vibrating or moving to and fro, and are repeatedly given a jerking or sudden quick movement, effectually preventing clogging of the material.

The powder escapes from a pipe, B', through the duct or channel C, through which the shot descends from any suitable receptacle, and, owing to their momentum, become thoroughly mingled with the powder before passing into the tumbling-barrel. The tube C terminates in a universal or ball-and-socket joint, *c*, in one head of the tumbling-barrel D, which mode of connection admits of the free rotation and adjustment of the barrel relatively to the fixed feed-tube.

The tumbling-barrel is provided with circular ways *d*, revolving on friction-rollers *e e'*, turning in suitable bearings in a frame, E, pivoted at one end to the main frame at *a*, and supported at the other by means of the adjusting-screw E'. The barrel revolves on an axis normally horizontal; but by means of this screw it can be raised or lowered at its discharging end.

As under my improved system the shot are fed continuously through the tumbling-barrel without stopping the machine to change or discharge it, this adjustment enables me to regulate the rate at which the shot flow through the barrel, and, consequently, the time during which they are subjected to the polishing operation.

The barrel may be rotated at any suitable speed by usual well-known mechanism. I prefer to use a large gear-wheel, F, about the size of the barrel itself, and to drive it by a spur-wheel, *f*, driven in any suitable well-known way. In this instance both the tumbling-barrel and the feed-screw are actuated from a common driving-shaft, G.

The tumbling-barrel is, by preference, provided with four internally-projecting flanges or ribs, *h*, inclined relatively to the axis, as shown in Fig. 2, to insure the thorough mixing and stirring of the shot, and to facilitate their lateral movement through the barrel.

A door, H, permits the inspection of the interior of the tumbling-barrel.

The polished shot normally escape through a discharge-tube, I, the mouth of which is concentric with the axis of rotation of the barrel, which tube is provided with a slide or gate, *i*, which regulates the flow.

By connecting the discharge-tube with the barrel in the line of its axis of rotation, it will be seen that a considerable amount of polishing material, and at all times corresponding body of shot, is retained in the barrel when in operation, thus aiding the work of polishing by increasing friction, and insuring uniform work, the freshly-admitted shot being prevented by the mass already undergoing operation from escaping too quickly from the barrel, as they might were they discharged from its periphery.

To discharge the shot rapidly, when it is desired to change from one size to another, openings, in this instance, four in number, are provided in its periphery near the discharge end, normally closed by slides *k* connected by rocking levers k^1 with a collar, k^2, sliding freely endwise on the revolving portion of the discharge-tube I, and connected by a yoke, k^3, with a hand-lever, K, by which means the attendant is enabled rapidly and simultaneously to open and close all the discharge-openings by means of a single lever. Guides *l* conduct the shot escaping through these openings to the trough L.

The operation of the apparatus will readily be understood from the foregoing description. The shot and polishing material are thoroughly intermingled before entering the barrel, and the former are polished by its rotation, and by their friction with each other, which polishing is facilitated by the inclined ribs *h*, which also tend to force the shot toward the discharge end of the tumbling-barrel, whence they flow through the discharge-pipe in a continuous stream.

The advantages of this automatic, continuous, and simple method of manipulation will be obvious to those skilled in the art without further enumeration.

I claim as of my own invention—

1. The combination, substantially as hereinbefore set forth, of the hopper which contains the polishing material, the yielding comb or rake teeth therein, and the revolving feed-screw, whereby the packing of the polishing material is prevented and a regulated feed secured.

2. The combination, substantially as hereinbefore set forth, of the hopper for containing the polishing material, the comb or rake teeth therein, the feed-screw, the discharge-pipe for the polishing material, the shot-duct, and the tumbling-barrel, whereby the polishing material is fed in regulated quantities into the shot-duct, and thoroughly mingled with the shot before entering the tumbling-barrel.

3. The hereinbefore-described improvement in the art of polishing shot, which consists in feeding them continuously to the tumbling-barrel at one end thereof, together with the polishing material, polishing them by the uninterrupted rotation of the barrel, and the contact of the polishing material, and discharging them at the end of the barrel opposite to that at which they entered in a continuous stream,

substantially in the manner and by the means set forth.

4. The combination, substantially as hereinbefore set forth, of the shot feed-tube, the tumbling-barrel, its discharge-pipe, and the adjustable supporting-frame, whereby the rate at which the shot flow through the barrel may be regulated.

5. The combination, substantially as hereinbefore set forth, of the feed-tube, the tumbling-barrel, and a universal joint in the head of the barrel through which the tube passes, whereby the barrel may be freely rotated and adjusted relatively to the feed-tube.

6. The combination, substantially as hereinbefore set forth, of the tumbling-barrel, a series of slides at its discharge end, and the lever by which said slides are simultaneously opened and closed, whereby the contents of the tumbling-barrel may readily be discharged when it is desired to vary the size of the shot to be polished.

7. The tumbling-barrel, constructed substantially as described, having a feed-tube and a discharge-tube, connected with its opposite ends, concentric with its axis of rotation, and also provided with peripheral openings and adjustable slides near its discharge end, for the purposes specified.

In testimony whereof I have hereunto subscribed my name.

ROBERT POOLE.

Witnesses:
WM. L. KLINEFELTER,
CLARENCE T. HAMILTON.