(No Model.)

G. T. HARING.

MACHINE FOR SCREENING SHOT.

No. 446,867. Patented Feb. 24, 1891.

Fig: 1.

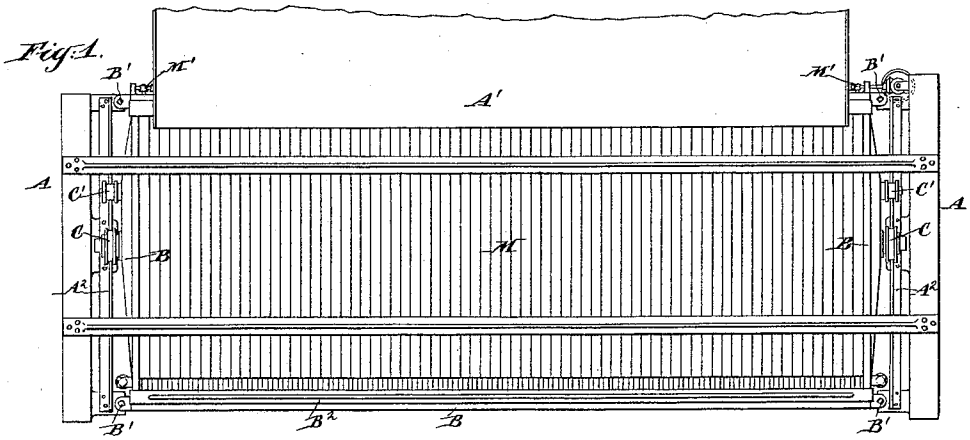


Fig: 4.

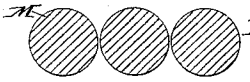


Fig: 2.

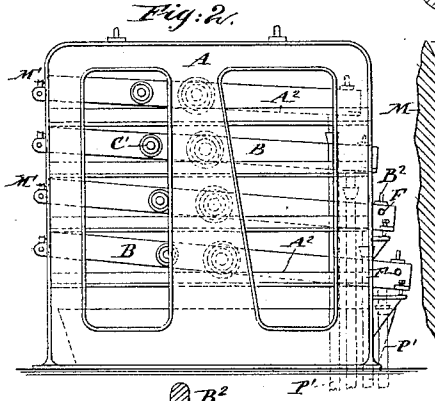


Fig: 9.

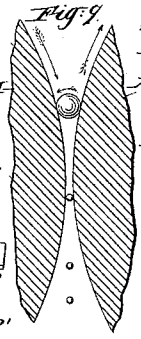


Fig: 3.

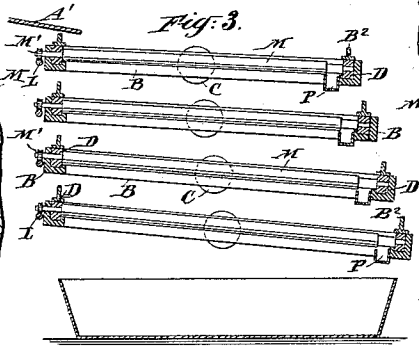


Fig: 10.

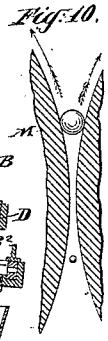


Fig: 5.

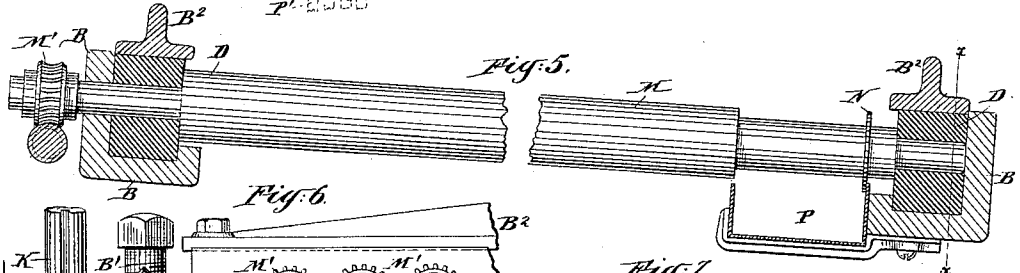


Fig: 6.

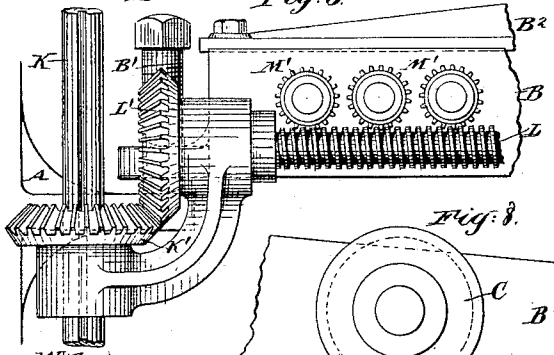


Fig: 7.

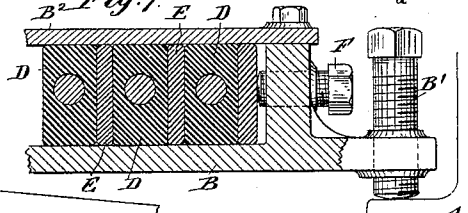
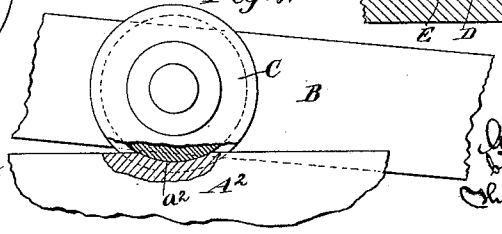


Fig: 8.



Witnesses:
Charles R. Searle.
H. A. Johnstone.

Inventor:
Geo. T. Haring
by his attorney
Thomas D. Stetson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE T. HARING, OF BROOKLYN, NEW YORK.

MACHINE FOR SCREENING SHOT.

SPECIFICATION forming part of Letters Patent No. 446,867, dated February 24, 1891.

Application filed September 30, 1890. Serial No. 366,636. (No model.)

To all whom it may concern:

Be it known that I, GEORGE T. HARING, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Machines for Screening Shot, of which the following is a specification.

The ordinary modes of screening by devices analogous to sieves can be made with suitable care to operate successfully; but there are difficulties. With the infinitely-modified sizes of shot to be treated some are certain to become lodged in the holes in the screens, requiring frequent clearing. If the operation is hastened, the passage of the small shot through the proper holes is not assured. If, on the other hand, the machine be run with sufficient slowness to allow all the small shot to be certainly brought to the holes under proper conditions to quietly fall through, the operation is too slow for economy. I provide straight parallel rollers with provisions for gaging them accurately at a certain distance apart and treat the shot by causing them to roll in the approximately V-shaped space between two such rollers. All the rollers of a set are turned in the same direction, so that the shot are kept lively and the spaces between the rollers are certainly clear to allow all the shot that are sufficiently small to fall rapidly through. All that are too large to go through remain and are supported in a rolling condition. The rollers are set inclined, so that the shot move rapidly forward while thus rolled and are discharged through wider spaces provided at the lower end and received in suitable troughs, which guide them away.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a plan view. Fig. 2 is an end elevation, and Fig. 3 is a central vertical section showing certain parts in their proper relations without the main frame. The remaining figures are portions on a larger scale. Fig. 4 is a cross-section through several rollers. Fig. 5 is a side view of one of the rollers with a vertical section of the tilting frame in which it is supported. Fig. 6 is a rear elevation of a portion. Fig. 7 is a vertical section through a portion near the front. It is on the line x x in Fig. 5. Fig. 8 is an elevation partly in section and showing one of the wheels for supporting the tilting frames and allowing them to rock. It also shows the notched way in which the wheel is held. Fig. 9 is a cross-section through the adjacent portions of two rollers on a still larger scale. This shows a large shot stopped and held in the rolling condition and one or more small shot dropping through the space between the rolls. Fig. 10 is a corresponding section showing a modification.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A is the fixed frame-work, of cast-iron or other suitable material, and A′ the lower edge of the ordinary "tables" on which the shot are spread and down which the perfect ones roll. They are discharged from the lower edge A′ upon a set of parallel rollers M, the contracted bearings of which are supported in blocks or boxes D, carried in tilting frames B, supported on wheels C, which run on horizontal tracks A^2, constituting portions of the frame-work. These several frames and their sets of rollers are similar each to the other, except that the lower frames are wider and the rollers therein are longer than the upper. A description of one will suffice for all.

The track A^2 is notched, as indicated at a^2, to receive the wheels C. Another pair of wheels C′ is mounted on separate pivots in the sides of the frame B. When it is desired to move the frame out on the track, it is tilted enough to throw the load upon the secondary wheels C′, and then the whole may be easily moved.

The boxes D, which support the bearings of the rollers M, are held firmly and accurately in the positions required to have the peripheries of the rollers at the proper distance apart. Their condition may be adjusted in this respect.

E E are blocks of a uniform thickness matched in the spaces between the boxes D. Screws F, tapped through the framing, allow the boxes to be tightly compressed together, so that their spaces will be accurately gaged by the blocks E. When it is desired to make

the spaces between the rolls greater, so as to allow larger shot to pass, the pinching-screws F are slackened and the blocks E taken out and a larger set inserted and the screw again tightened. Similar changes must be made at each end of the rollers. When the rollers are to be set nearer together to allow only finer shot to pass downward between them, the blocks E are removed and a smaller set inserted and the screws F again turned to drive the boxes D firmly together in the new and slightly-narrower spaced positions. The several rollers M are revolved, all of one set being turned in the same direction, so that the shot which are supported and move along in the pockets between each roller and the next are constantly agitated and rolled. This insures that the space between the rollers is never allowed to clog with shot. All the shot that are sufficiently small drop through. All the remainder move down to one end of the set of rollers and are discharged into a spout and conveyed away. This movement of the shot which are too large to fall through the spaces toward one end of the rollers is facilitated by the inclination of the rollers.

Each frame which supports a set of rollers is capable of being tilted on its supporting-wheels C. I adjust the inclination of the frames and hold them firmly in the required positions by means of screws B′. The lower frames are wider and the rollers mounted therein are correspondingly-longer than those above, and they are so adjusted that the shot are discharged from the upper set into the next, and from the next into the third, and so on to the end of the series, whatever the number of sets of rollers may be. I have shown four sets; but a greater number or even a less number may serve.

The provisions for rotating the several rollers are shown clearly in Fig. 6. On the higher end of each set of rollers M is a worm-wheel M′, which engages with a transverse screw L, turned by a bevel-gear L′, supported in bearings carried on the frame B and engaged by bevel-gear K′, feathered on the upright shaft K, supported in stationary bearings and rotated at the proper speed by suitable means. (Not shown.) The feathering of the wheel K′ upon the shaft K allows it to be moved up and down as the frame B is tilted, keeping always in gear and always rotating the several rollers M.

N are disks applied on the contracted part of alternate rollers. Each is a little larger than the roller, so as to extend beyond the line traversed by the shot as they roll down the incline. In case the shot accumulates considerable speed in rolling down the inclined pocket it is liable to be projected against the block.

Under the delivering end of each set of rollers is placed an inclined spout P, arranged to receive the shot, which, being too large to fall through the uniform spaces between the rollers, remains suspended in the pockets between the rollers, and as the rollers revolve are allowed to move more or less rapidly down the incline and be delivered at the lower end thereof. The spouts P lead all the shot of corresponding size into a vertical spout P′ contiguous to the series of rollers. The shot from each spout are led into separate bins.

B^2 are binders mounted on the frames B and extending across over the several boxes D and hold each firmly down. These prevent the rollers from being ever lifted by the action of the screws F, which work on the under side and are liable, if there is much resistance to the rotation of the rollers, to develop a considerable lifting force. The binders must be removed when the rollers are to be readjusted.

The imperfect shot should all be taken out previous to the sorting. The dust and too-fine shot, if any such are formed, will pass down through a final set of rollers, which should be placed so close together as to prevent the passage of the smallest useful shot. This waste lead falls into a suitable pan placed underneath and is taken away through a spout or otherwise to be remelted.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. Instead of turning all the rollers in a frame in the same direction, they may be divided into two series and turned each with their upper surfaces moved away from the other series. In such case the two rollers at the center both turn in the direction to lift the shot. Fig. 9 shows the central pocket between the rollers of a frame thus divided into two series. It is obviously important that none of the rollers shall turn in the direction to draw the shot down through the spaces.

Instead of making the boxes absolutely rectangular and holding them apart by blocks E, having parallel faces, I can make the boxes D with their faces uniformly inclined and give the blocks E, which hold them apart, a corresponding wedge shape. Such would allow for adjusting the spaces by filing off the lower edges of the wedges to allow them to descend farther, or making suitable provision for holding up one or more of the wedges to allow the rollers to come nearer together. It is important that the best workmanship be applied to give the spaces between the rollers of each set absolute uniformity or to attain that condition as nearly as possible.

The several series of rollers need not be of equal size. It may be preferable for some reasons to use rollers of smaller diameter for the lower series. I can, if preferred in any case, mount the bearings of all the rollers of each set in one continuous bar, thus insuring an absolute fixity of position of the axis of each roller in its respective frame without the capacity for adjustment.

I claim as my invention—

1. In a machine for screening shot, two or more inclined revolving rollers having con-

tracted diameters at the lower ends adapted to discharge the small size or sizes downward through the spaces between the main bodies of such rollers and to retain and convey laterally the larger sizes, in combination with provisions for supplying the shot above such rollers, provisions for leading away the larger sizes, and with the disks N for arresting their end movement, all substantially as herein specified.

2. In a machine for screening shot, two or more inclined revolving rollers adapted to discharge the small size or sizes downward through the spaces between them and to retain and convey away laterally the large size or sizes, in combination with gearing, as the right-and-left driving-screw L and right-and-left worm-wheels M′ for so revolving the rollers that one shall always tend to lift the shot, and with the tilting frames B, carrying said rollers, and provisions, as the screws F, for varying the inclination, substantially as herein specified.

3. In a machine for screening shot, two or more inclined revolving rollers adapted to discharge the small size or sizes downward through the spaces between them and to retain and convey away laterally the larger size or sizes, the tilting frames B, carrying the rollers and connected gearing for driving them, mounted on centers C, with provisions, as the screws F, for varying the inclination, the boxes D, spacing-blocks E, binders B^2, and pinching-screws B′, combined and arranged to serve as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

GEORGE T. HARING.

Witnesses:

ROBT. A. KELLOND,

CHARLES R. SEARLE.