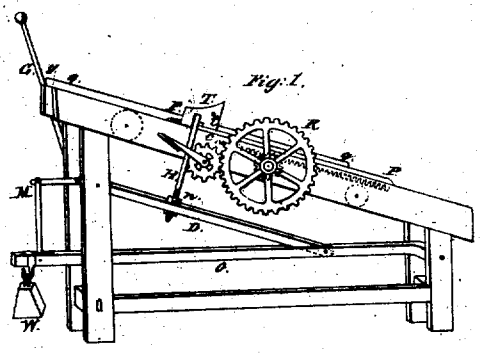
NO PRINTED SPECIFICATION AVAILABLE

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# J. Millard.

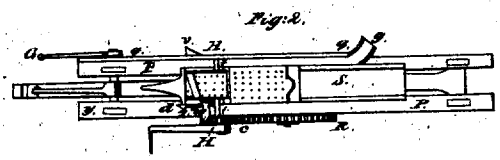
## Shot Machine.

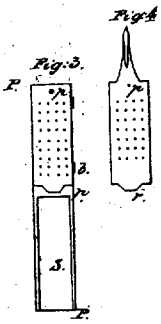
Patented July 10, 1830.

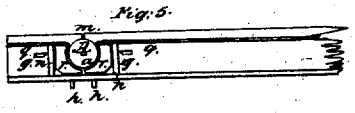


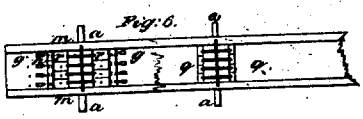


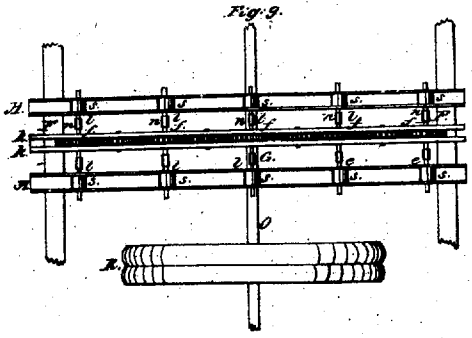




July 10. 1830

# Sublius Willard of the City of Baltimore State of Maryland

## Letters Patent

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To all to whom these presents shall come

Be it known that I Sublius Willard of the City of Baltimore and State of Maryland have invented a new and useful machine for making shot musket and rifle balls, called Willards Patent Shot Machine; and that the following is a full & exact description of the construction and operation of the said machine as invented by me. — The machine consists of two parts the casting bench by which the shot or balls are roughly formed and the Rolling machine or frame by which they are made spherical by rolling and compression. — In the annexed drawings fig.s 1. 2. 3 & 4 are views of the casting Bench, & its machinery. fig. 1 being an upright view and fig 2. a birds eye view of the same. It consists of a substantial wooden frame or bench, the top of which from an inclined plane upon which and in the space included between these sides the iron mould plate (P. P.) which is furnished on its under side with a crank, (called in fig. 3.) that works in a pinion on the axle of the large cog wheel (R) which is acted on by the crank (F) of the small cog wheel (C) and causes the mould and its pistons, to move up and down the plane of the plane of the operation. To relieve the friction occasioned by the sliding of the mould plate either or both of sides are placed under it as shown in fig 1. — fig. 3, and 4. shew the iron mould plate which is in two pieces, more distinctly, fig. 3. being

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the lower part which is made fast by two hinges a.b. to a block of wood fixed with sheet iron so to an iron plate, it has the upper part of one fitted as seen in the figure with a convenient number of moulds each being a hemisphere of the shot or ball, that is to be moulded the lower end (G) of the block or plate, is hollowed out into a valley or Mort, Fig 4. the upper part or lid of the mould which is about half the thickness of the diameter of the shot or ball, is fitted on its under side, so as to notch the lower plate, and is perforated opposite to these pits with small holes or gate ways which communicate from the upper side with the hollow spheres formed by the pits in the plates when laid together the plates being also supplied with an adjusting pin (p) and a levelled mount (M) so as to bring the Semispherical pits exactly opposite to each other, and the upper plate is prolonged into a hooked form as seen in the drawing Fig. 4 which serves for a handle, — I is a sheet iron box or hopper without a bottom. its lower edge is attached to a square brass frame having a knife f (Fig 2.) placed obliquely across the edge, of which lays in the same plane, with the lower surface of the brass frame; the frame projects over the out side of the box, and the outer edges corresponding to the lips of the mould, are turned down; or strong pieces are screwed thereon for the purpose of keeping it on the mould when the latter is moving up the plane — the frame also has two small fixed points (l.l.) to prevent the hopper from following the mould, by stopping it against the iron brace hooks M.M. which are attached to the bar or Cam, D, by the regulating screws, and nuts n, n, from the top of which they branch and rising along a groove, in the inner or outer sides (as shown in the drawing) of the top ends of the hook are turned inwards, and downwards and when the lever D, is acted on by the Cam C, to which the weight W is counterbalanced, hops on the upper surface of the brass frame of the hopper and keeps it

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in rubbed contact with the surface of the mould plate. G is a hand lever, connected by an axis with the inverted lever M. (and) is only intended to relieve the pressure of the brace hooks, when the hopper is to be removed by throwing it back, into the ketch (c Fig 2) on the side of the top rail g.g. is a strip of plank, or sheet iron, attached to the outer side of the top rail and rising a few inches above it has a small space g, at its lower end, forming together with the top surface of the rail, which is faced with sheet iron and a very narrow strip of sheet iron fixed edgewise on the rail next to the mould, a shoot to convey the shot, when cast as will be seen, — In using the casting bench, the mould is moved down the plane, until it is stopped by the spring ketch (d) on the side of the mould, which was omitted in the description against a fixed pin (L) in the top of the rail The hopper is then placed on the mould and pressed down by the brace hooks by throwing out the lever (G) A sufficient quantity of melted lead for a cast is thrown into the hopper the crank F is turned, the hopper remains stationary and the mould is made to ascend the plane till the spring ketch on its side takes hold on a fixed pin (f) at the upper part of the plane during this motion the moulds fill, and the oblique knife f. cleans the lid of the mould also the distance is so regulated that the lower part of the hopper at the end of the motion projects over the shoot or valley (S.) and the lead which may still remain in the hopper in a fluid state runs off is caught by the box in a ladle and returned to the kettle again the lever G is then thrown back into the notch a, which relieves the pressure of the braces on the hopper, the latter is then lifted off for which purpose it is supplied with a handle at, after which the mould is discharged by turning it upon its edge (for which purpose the hinge mentioned in the description are intended) in the shoot

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formed along the top of the rail and striking it a blow or two with a stick, It may be proper to mention that a little suet may be occasionally applied to the moulds when hot

The Rolling frame consists of several parallel wooden boxes or troughs A.A. Pl. Fig. 3 supported on frame F.F. so as to have a gentle inclination the parallel and in the same plane with the boxes two strong pieces of thick plank, or joists h.h. are set up edgewise and strongly framed together forming a bearing for a system of equal spur wheels the journal of every other one of which f f f f. Pl. projects on both sides and being square is connected by pieces of square connecting bands or links p, p, Pl. to the ends l, l, l, l, Pl. of the square journals of the rollers S.S.S.S. Pl. opposite thereto and contained in the trough A.A and the square journals of the rollers are connected in a similar manner to the rollers of the next trough and so on so that when the middle spur wheel at Q is made to revolve by means of the great wheel, R, (The strong bearings of whose axle (Q) are omitted in the drawing). the rollers in all the boxes, revolve together, and in the same direction, In place of spur wheels, wooden pulleys may be substituted, with a separate band to each winding on a drum fixed on the axle (Q) of the great wheel which will reduce the friction considerably In order to a more minute description of the rollers contained in the boxes Fig. 5. & 6 are varied views of a part of the same in fig 6. which is a birds eye view) (A) is the roller, made of cast iron a, a, its projecting square journals f f f f Pl. are longitudinal half round or nearly half round grooves, which may be 3. 4. or 5 in number, according to the size of the shot or balls; corresponding to these grooves are cast iron dies r, r, r, Pl. adapted to the cylindrical circumference of the roller, and each being something more than a quadrant so that each pair of dies embrace more than half the circumference of the roller and within they are at

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cyl[illegible] ings on the trough and opposite them passing in the roller a cylindrical ring is formed by their grooves and the grooves of the roller. The dies are destined to be only confined by the regulating screws g. g. g. g. h. h. &c. fixed in the upright wooden planes n. n. and the bottom of the box which upright pieces also serve as points of attachment for the sheet iron plates or floors g. g. Fig 5. between the rollers upon which the shot roll from one roller to the other, and in passing over them change their position, also a small plate of sheet iron (m. m.) is let into the sides of the shoot to prevent the shot from passing over the roller, Fig. 7 & 8. are side views of a roller and the concave surface of the dies of one side thereof. The operation of the rolling frame is as follows when the shot are cast as above described they are first handled to separate the very defective ones if any they are then thrown into a barrel with a small quantity of black lead after being agitated for a short time for the purpose of coating them slightly with the lead. which prevents them from adhering to each other in the rolling process, they are poured in proper quantities into a small hopper (not shown in the drawing) at the highest ends of the boxes A. A. of the rollers being set in motion the shot are taken in by the grooves of the first roller. partly rounded and thrown out on the sheet iron floor below it they descend to the next roller in passing through which their shape is still further improved and so on till passing through the 5th and last roller, which is the number I use, and have found to be sufficient, they come out ready for polishing. the manner of doing which it may be necessary to mention, as I have found the common method used for dusk shot not to answer to mill. — It consists simply in a large iron drum with wooden heads having gudgeons and a crank or any other contrivance by which it may be rotated. a quantity of

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of the shot are put into it and a small quantity of [redacted]
lead it is then turned into the shot they the claimed holds
after which they are taken out and hardened in the common
way, ~~—~~ Now what I claim as new and as my invention
is the casting Bench and Rolling frame and their machinery
as herein described applied to the purpose specified.

Given under my hand and seal this 5th day of July 1830

Witness
A. McIntire
Wm P. Elliot

Julius Willard

Wb Mfg C

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