(No Model.)

3 Sheets—Sheet 1.

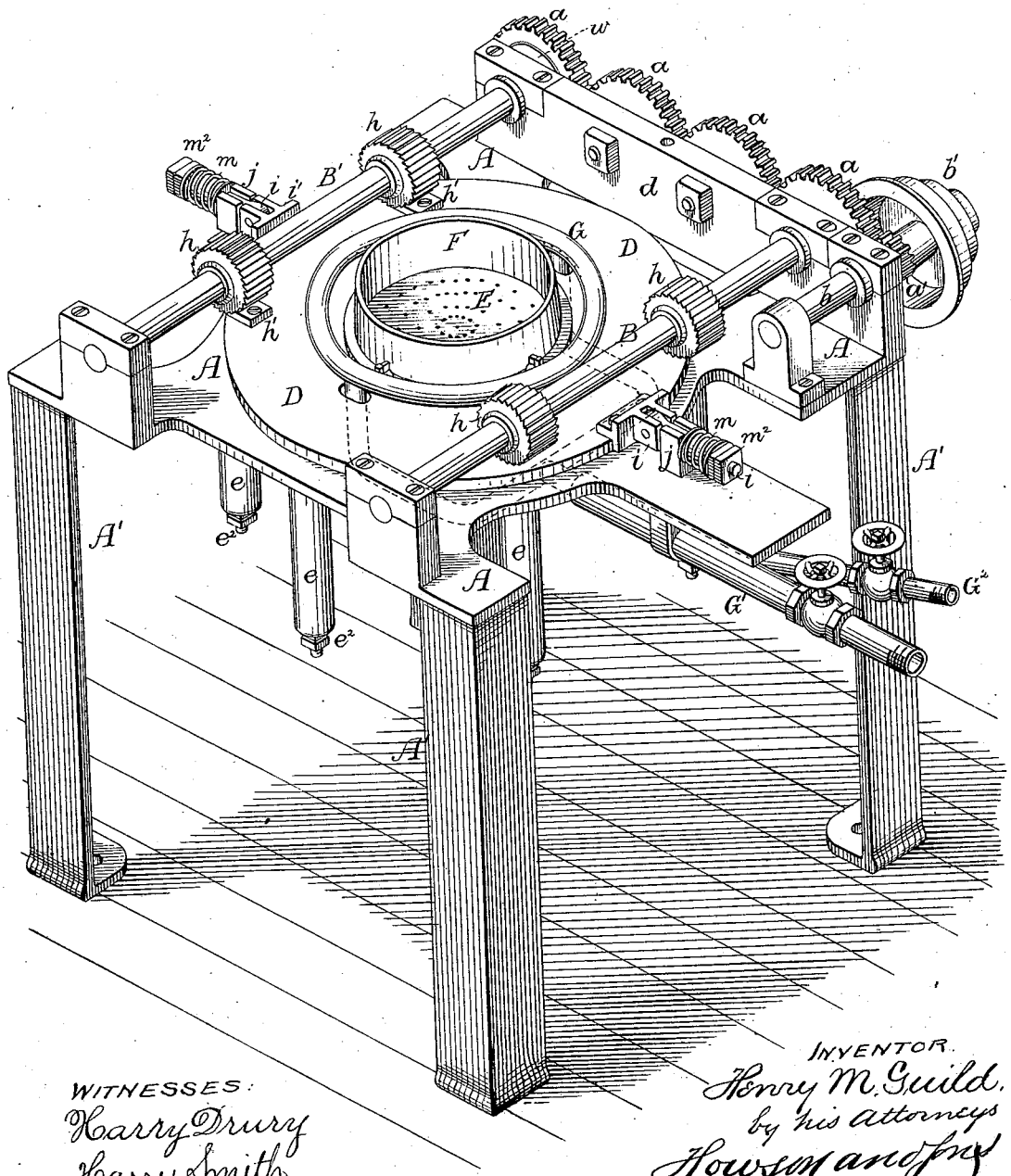
H. M. GUILD.

SHOT MAKING MACHINE.

No. 260,976.

Patented July 11, 1882.

Fig. 1.



WITNESSES:
Harry Drury
Harry Smith

INVENTOR.
Henry M. Guild.
by his attorneys
Howson and Sons

(No Model.) 3 Sheets—Sheet 2.

H. M. GUILD.

SHOT MAKING MACHINE.

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Fig. 2.

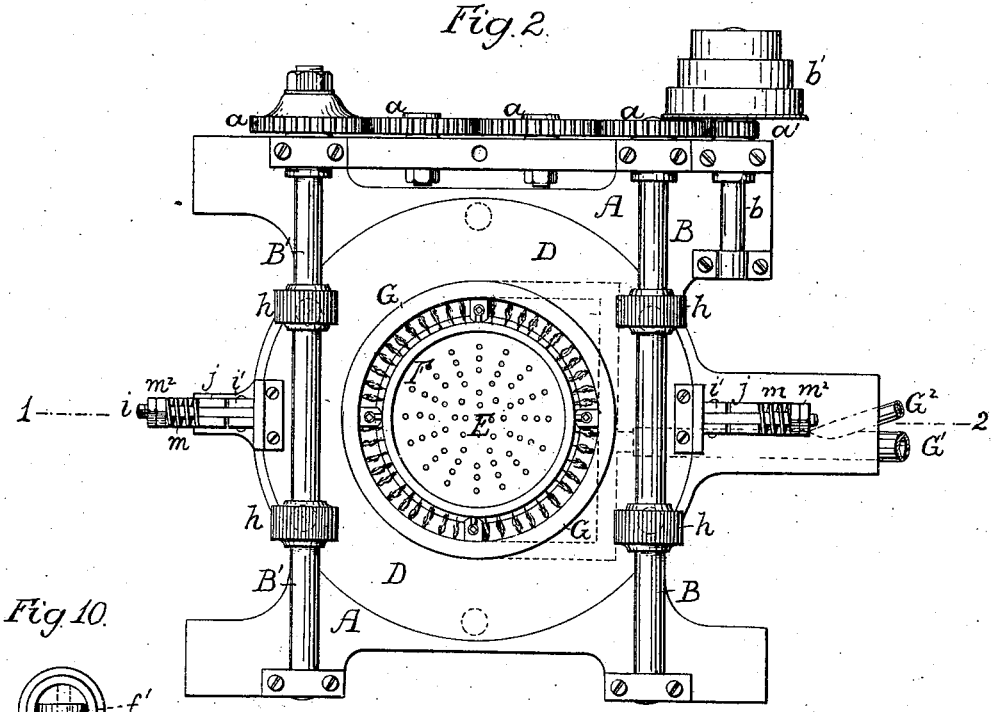


Fig. 10.

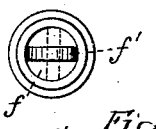


Fig. 3.

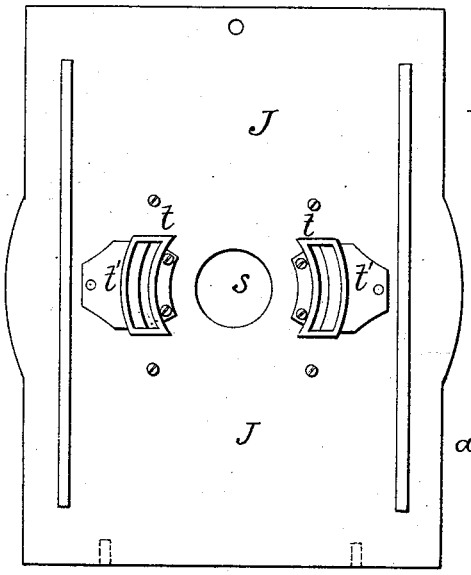


Fig. 12.

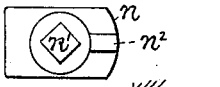


Fig. 13.

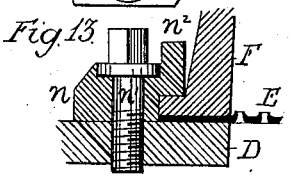


Fig. 14.

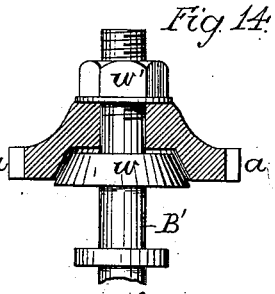
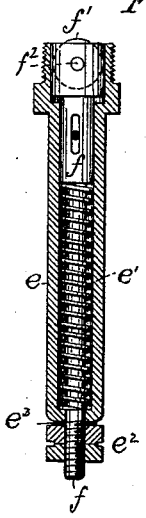


Fig. 11.



Witnesses
Harry Drury
Harry Smith

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(No Model.) 3 Sheets—Sheet 3.

H. M. GUILD.

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Fig. 9.

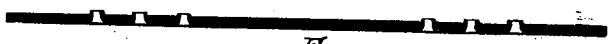


Fig. 4.

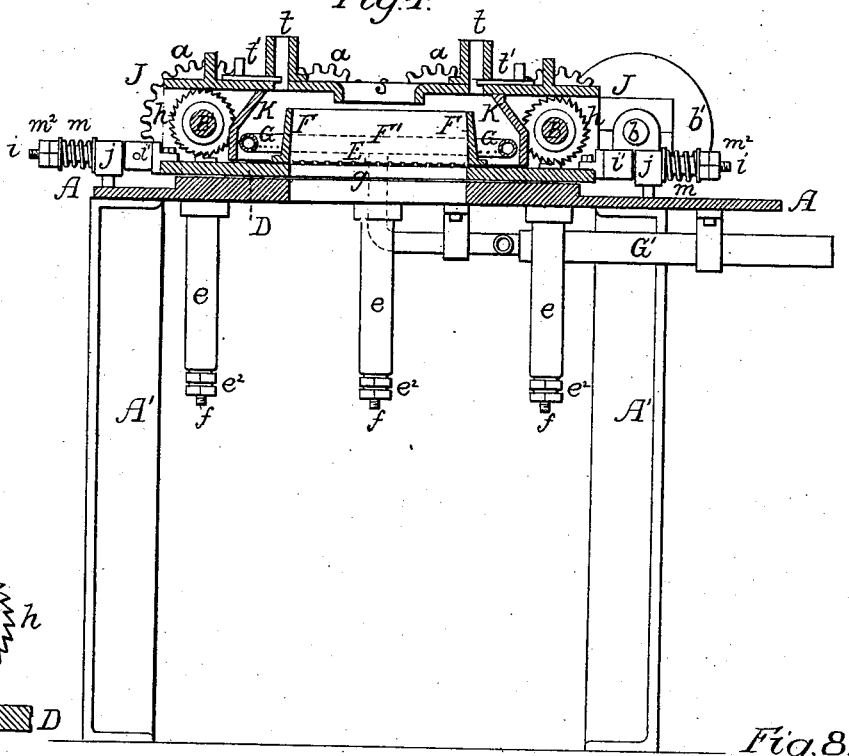


Fig. 6.

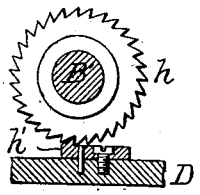


Fig. 8.

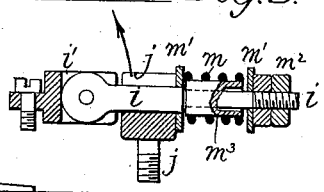


Fig. 7.

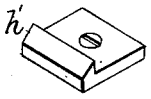
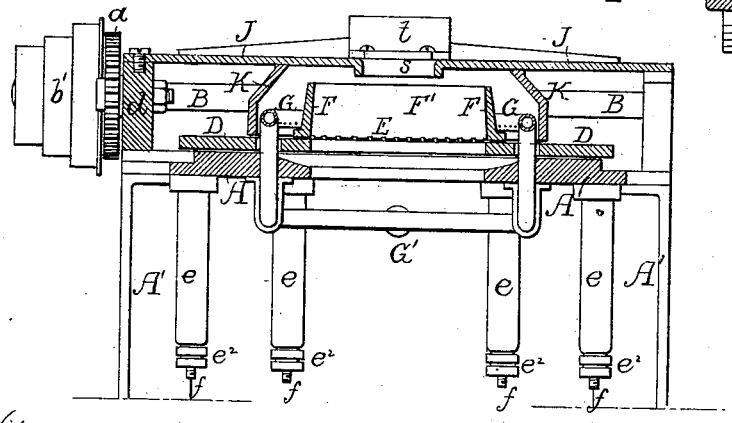


Fig. 5.



Witnesses
Harry Drury
Harry Smith

Inventor
Henry M. Guild
by his attorneys
Howson and Sons

UNITED STATES PATENT OFFICE.

HENRY M. GUILD, OF WOODBURY, N. J., ASSIGNOR TO THE AMERICAN MACHINE SHOT COMPANY OF THE UNITED STATES, OF PHILADELPHIA, PA.

SHOT-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 260,976, dated July 11, 1882.

Application filed October 17, 1881. (No model.)

To all whom it may concern:

Be it known that I, HENRY M. GUILD, a citizen of the United States, residing in Woodbury, Gloucester county, New Jersey, have invented certain Improvements in Shot-Making Machines, of which the following is a specification.

My invention relates to certain improvements in that class of shot-making machines in which the molten metal is poured upon a perforated plate to which a tremulous motion is imparted, the molten metal being shaken through the perforations in the plate in the form of drops, which assume a globular form before falling into the water in a tank beneath the machine.

My invention comprises certain details in the construction of such a machine, whereby perfectly-formed shot of any desired degree of fineness are produced without waste, the machine being compact and capable of being readily transported from place to place and set up in any suitable location.

In the accompanying drawings, Figure 1, Sheet 1, is a perspective view of my improved shot-making machine, with the cover-plate removed; Fig. 2, Sheet 2, a plan view of the same; Fig. 3, a plan view of the cover-plate; Fig. 4, Sheet 3, a longitudinal section on the line 1 2, Fig. 2, with the cover-plate in place; Fig. 5, a transverse section of Fig. 4; and Figs. 6, 7, 8, and 9, Sheet 3, and 10, 11, 12, 13, and 14, Sheet 2, detached views, on an enlarged scale, of various parts of the machine.

A is a table or platform, mounted upon suitable legs, A′, and having bearings for two transverse shafts, B B′, and for a train of spur-wheels, *a*, whereby said shafts are geared together, motion being imparted to the said train of gearing by a pinion, *a′*, carried by a short shaft, *b*, which is furnished with a cone-pulley, *b′*, adapted to receive a belt from a pulley on any adjacent power-driven shaft; or in small machines, or machines of limited capacity, the shaft *b* may be driven by hand.

The spur-wheels *a a*, between the wheels of the shafts B B′, are carried by short spindles having threaded stems and nuts, whereby they are secured to a bar, *d*, extending between the bearings of the shafts B B′, the edge of the table A being recessed at this point, so as to isolate the bar *d* and prevent the undue heating of the same.

Secured to and projecting beneath the table A are a series of tubular casings, *e*, (six in the present instance,) and guided by and free to slide vertically to a limited extent in each of said casings is a rod, *f*, to a recess in the upper end of which is adapted a roller, *f′*, hung to a pin, f^2; and between a shoulder on the rod and the lower end of the casing *e* intervenes a spring, *e′*, the tendency of which is to elevate the rod, the extent of elevation being limited by the adjustment of a pair of nuts, e^2, adapted to the threaded lower end of the rod, which projects through the lower end of the tubular casing.

Rounded projections on the rods *f* may, if desired, take the place of the rollers *f′*; but the latter are preferred, as they permit an easier movement of the plate D.

A washer, e^3, of rubber, leather, or similar elastic or semi-elastic material, is interposed between the lower end of the casing *e* and the uppermost nut, e^2, to prevent the jarring and noise which might be caused if said nut came into contact with the lower end of the casing.

Supported upon the rollers *f′* of the series of rods *f* is an annular plate, D, the central opening, *g*, of which is covered by a perforated metal plate, E, and surrounding said opening is an upwardly-projecting annular flange, F, forming a chamber, F′, for containing the molten lead, which is caused to pass through the perforations in the plate E, owing to the shaking or tremulous motion which is imparted to the annular plate D.

The agitation of the plate D is effected by the action of ratchet-wheels *h*, carried by the shafts B B′, upon lugs or projections *h′*, secured to the plate D, as shown in Figs. 6 and 7, there being in the present instance four of such ratchet-wheels and lugs, as shown in Fig. 2.

The shafts B B′ revolve in opposite directions, and by this means a combined vertical and longitudinal shaking motion is imparted to the plate D, the elastic support furnished by the rods *f* permitting these movements.

By adjusting the nuts e^2 of the rods *f* the proper leveling of the plate D may be effected, and the lugs *h′* brought more or less under the

influence of the ratchets *h*, so as to vary the extent of movement imparted to the said plate D.

In order to impart stability to the plate D without interfering with the necessary shaking movements of the same, I provide said plate with arms *i*, hung to lugs *i'* on the opposite edges of the plate, and adapted to fit into the vertically-slotted heads of bolts *j*, secured to the table A, a suitable spring, *m*, and washers *m'* intervening between the head of each bolt *j* and a pair of nuts, m^2, carried by the threaded end of the rod *i*. (See Fig. 8.) These springs thus serve to steady the movements of the plate D and restore it to its normal position after each action of the ratchets. The plate can, however, be released from the control of the springs by elevating the rods *i*, as shown by the arrow in Fig. 8, until they are free from the slots in the heads of the bolts *j*. The washers *m'* are not necessary; but their use is preferred.

A tubular sleeve, m^3, is preferably interposed between each rod *i* and its spring *m*, so as to support the latter in its proper position concentric with the rod, and thus insure uniformity of action of the spring.

The annular flange F and perforated plate E are secured to the plate D by means of turn-buckles *n*, Figs. 2, 12, and 13, adapted to an external shoulder formed on the lower edge of said flange.

Each of the turn-buckles *n* is hung to a bolt, *n'*, adapted to a threaded opening in the plate D, and each turn-buckle has a lug, n^2, which is adapted to be acted upon by a projection on the head of a socket-wrench applied to the angular head of the bolt *n'*, so that the turn-buckle and the bolt will be turned together. It will thus be seen that when the buckle is turned away from the flange F, or in the direction of the arrow, Fig. 12, it is free to rise slightly, and when it is turned in the opposite direction there will be a corresponding depression of the turn-buckle, so as to cause it to bind tightly upon the shoulder of the flange F.

The bolt *n'* may be tightened without turning the buckle *n* by applying the wrench to the head of the bolt in such a manner that its projection will not be brought into contact with the lug n^2 of the turn-buckle.

Surrounding the flange F is an annular pipe, G, having on its inner side a series of openings, from which jets of gas mixed with air are projected against the said flange, so that the latter is always maintained in a highly-heated condition, and the chilling or partial solidification of the mass of molten metal contained in the chamber F' bounded by said flange is prevented.

Gas is supplied to the pipe G through a tube, G', connected by flexible hose or other suitable means with any adjacent supply, and air derived from a blower is forced into the said gas-pipe G' through a branch pipe, G^2, so that a thorough admixture of air and gas is effected before the openings in the annular pipe G are reached.

The tube G' has branches extending through openings in the table A and plate D, the openings in the plate being elongated to such an extent that the branches do not interfere with the shaking movements of the table.

The cover-plate J of the machine is supported upon the shaft-boxes at the opposite sides of the table A, and is furnished on the under side with a hood, K, surrounding the flange F and heating-pipe G, this hood extending to within a short distance of the plate D.

The cover-plate J has a central opening, *s*, and two flues, *t*, each of which is furnished with a sliding valve or damper, *t'*, so that the degree of heat imparted to the flange F can be regulated, the opening of the dampers permitting the heated products of combustion to escape directly through the flues after impinging upon the flange F, and the closing of the dampers compelling said products of combustion to pass in intimate contact with the flange and over the upper edge of the same until they escape through the central opening, *s*, of the cover-plate, through which the molten lead is poured into the chamber F'.

In order that the ratchets *h* of the shaft B' may be so set in respect to those of the shaft B as to insure the proper alternate action of said ratchets on the lugs of the plate D, I make the spur-wheel *a* loose on the shaft B', and form in the said wheel a recess adapted for the reception of a collar, *w*, on the shaft, the latter being threaded at its outer end for the reception of a nut, *w'*, the whole forming a friction-clutch whereby the spur-wheel may be secured to or released from the shaft B' at pleasure. (See Fig. 14.)

In carrying out my invention I use sheet-iron or steel for the plate E, and make the proper holes therein, so as to form burrs on the upper surface of the plate, these burrs being allowed to remain after having their rough edges removed by means of a suitable tool. By this means I obtain a durable plate, and am enabled to dispense with the use of sal-ammoniac, the lead flowing freely through the perforations in the plate.

I claim as my invention—

1. The combination of the table A, the plate D, and shaking devices therefor with the casings *e*, having rods *f*, and supporting-springs for said rods, as set forth.

2. The combination of the table A, the plate D, and the shaking devices with the casings *e*, the rods *f*, the springs *e'*, and the nuts e^2, as set forth.

3. The combination of the table A, the plate D, and the shaking devices with the casings *e* and the spring-rods *f*, having rollers *f'*, as specified.

4. The combination of the shaking plate D of the machine with the longitudinal springs *m*, connected to the opposite ends of the plate, in line with the direction of movement of the same, as set forth.

5. The combination of the plate D, the pivoted rods *i*, with nuts m^2 and springs *m*, and the bolts *j*, having slotted heads, as set forth.

6. The combination of the plate D, the bolt *j*, with slotted head, and the pivoted rod *i*, with spring *m*, nuts m^2, and sleeve m^3, as set forth.

7. The combination of the shaking plate D, its perforated plate E and flange F, and means for heating said flange, as set forth.

8. The combination of the shaking plate D, its perforated plate E and flange F, the annular pipe G, the gas-supplying tube G′, and the air-supplying branch G^2, as set forth.

9. The combination of the shaking plate D, its perforated plate E, and flange F with the cover-plate J, as specified.

10. The combination of the shaking plate D, its perforated plate E and flange F, the heating-pipe G, and the cover-plate J, having a hood inclosing said flange and heating-pipe, as specified.

11. The combination of the shaking plate D, its perforated plate E and flange F, the heating-pipe G, and the cover-plate J, having a central opening, *s*, the hood K, and valved flues *t*, as set forth.

12. The combination of the plate D, the shouldered flange F, the bolts *n*′, with angular heads, and the turn-buckles *n*, with lugs n^2, as set forth.

13. The combination of the plate D, the shafts B B′ and their ratchets *h*, and a friction-clutch whereby the spur-wheel *a* is secured to the shaft B′, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

H. M. GUILD.

Witnesses:
HARRY DRURY,
HARRY SMITH.