

No. 747,703.

PATENTED DEC. 22, 1903.

J. L. HARRIS & J. W. SHIELDS.
DISCHARGE FOR STAMP MACHINES.

APPLICATION FILED MAY 12, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

FIG. 2.

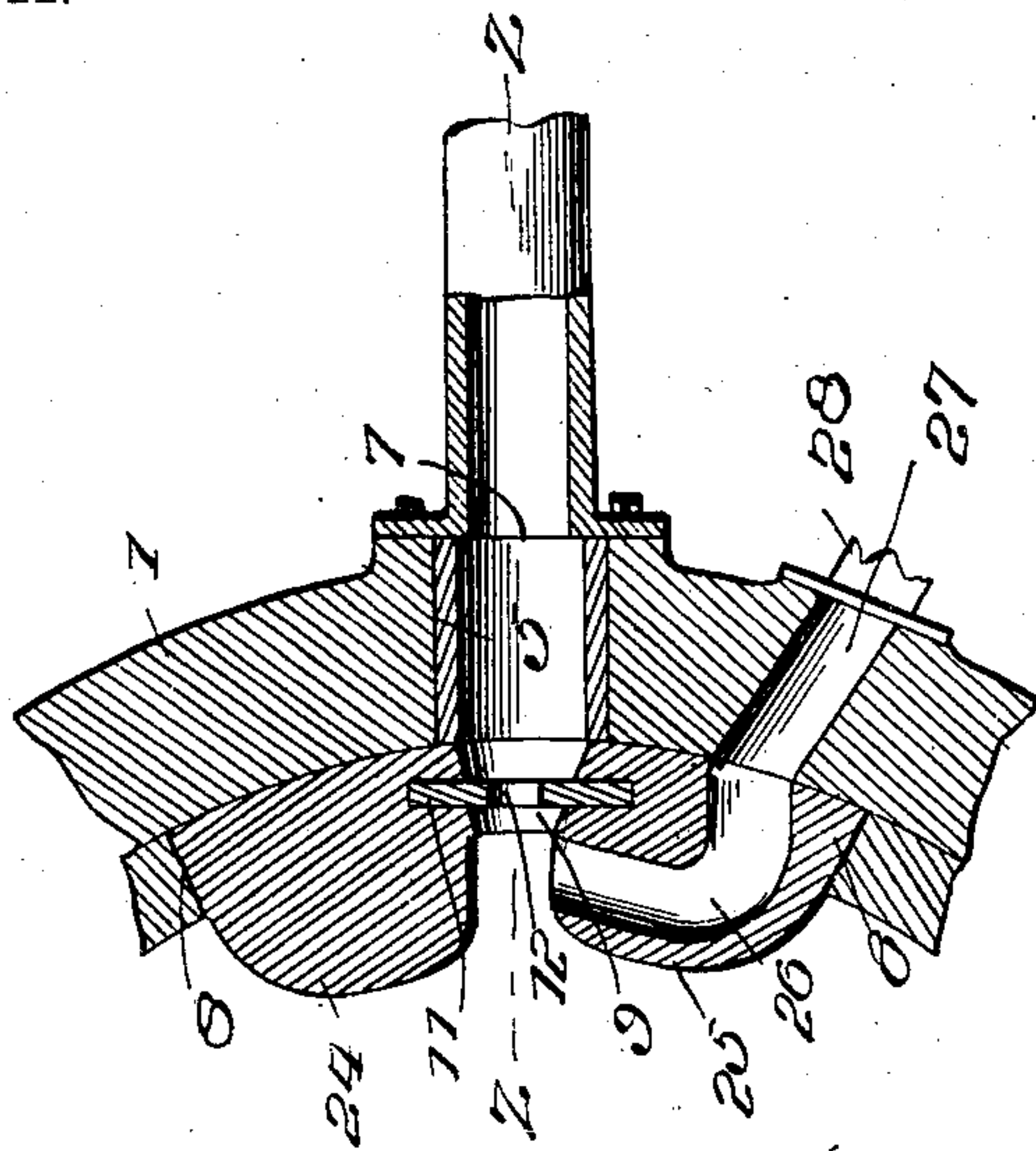


FIG. 4.

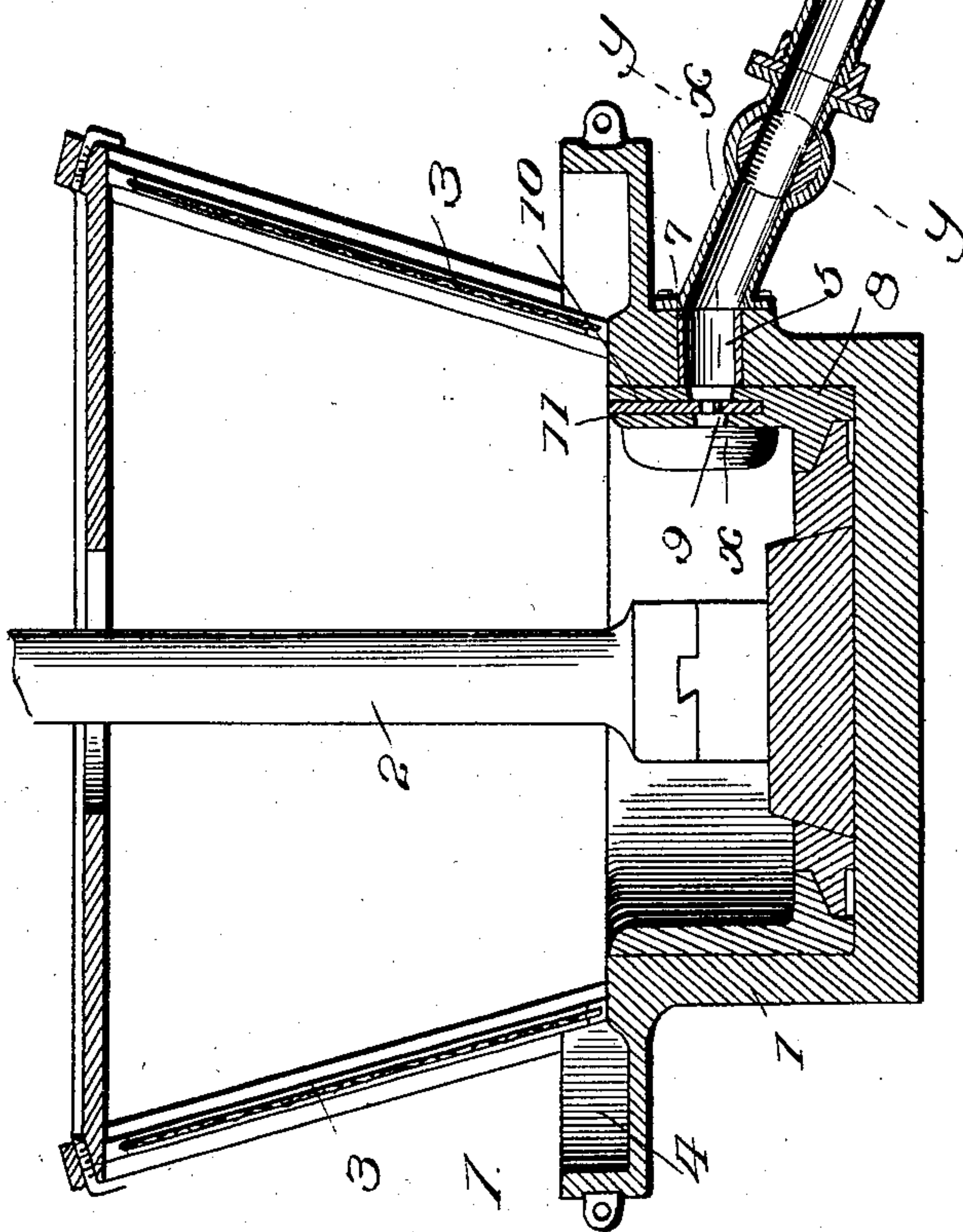
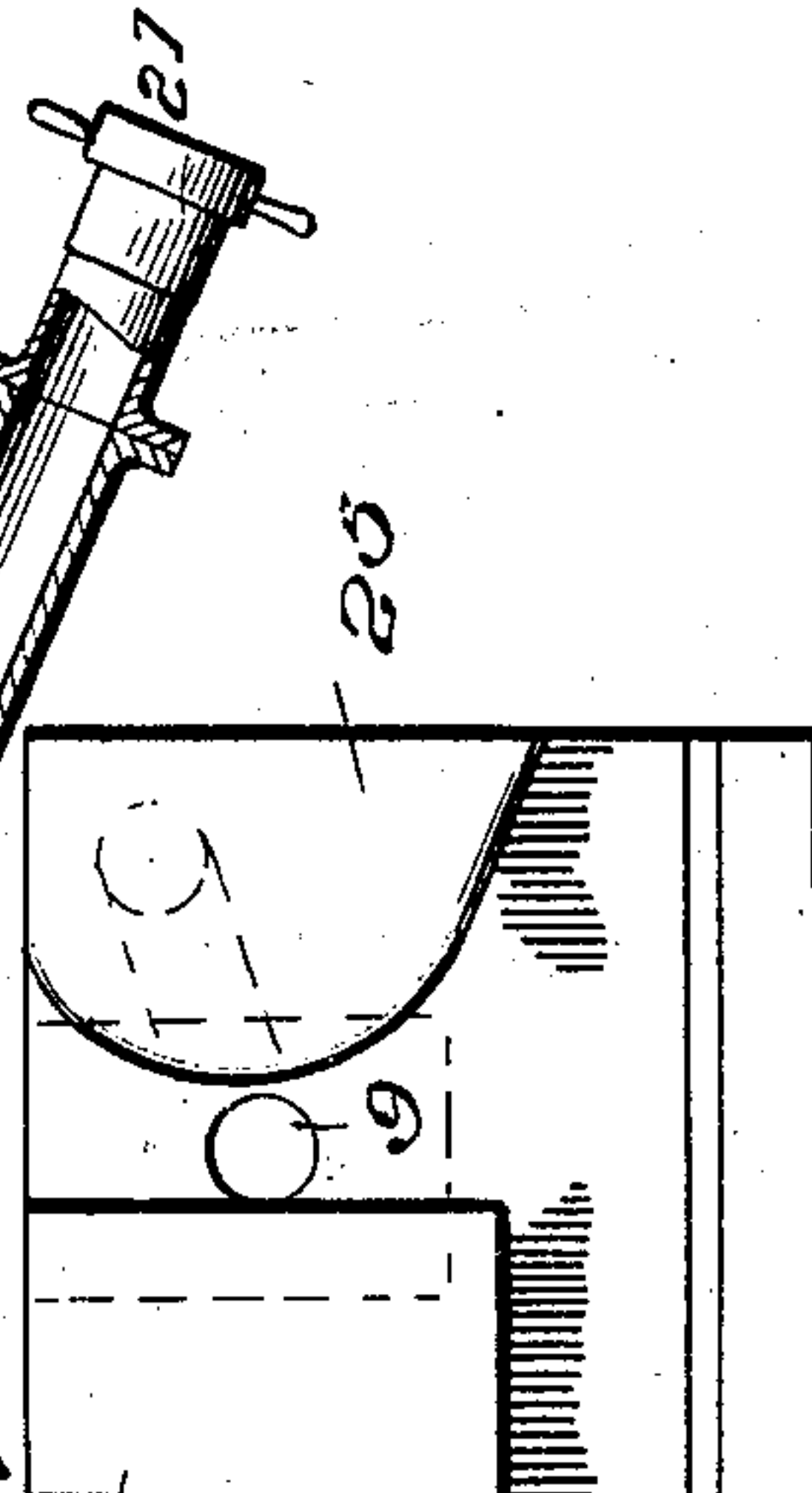
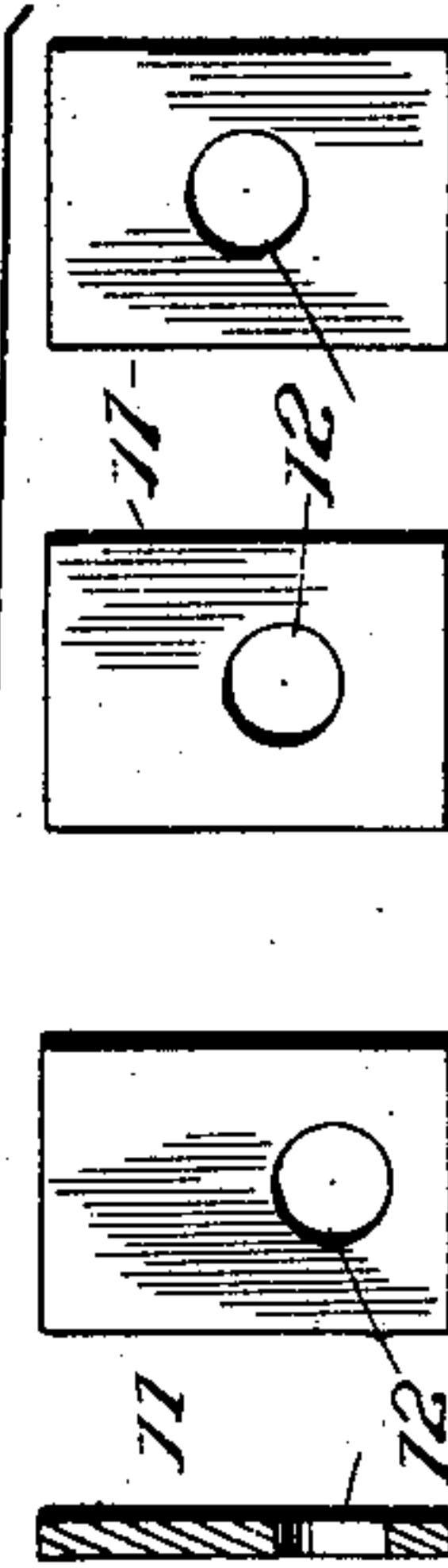


FIG. 1.

FIG. 3.



Witnesses

Genieve Mathews
George G. Hatt

By

J. L. Harris
J. W. Shields.

R. H. B. Lacey, Attorneys

Inventors

UNITED STATES PATENT OFFICE.

JOHN L. HARRIS AND JAMES W. SHIELDS, OF HANCOCK, MICHIGAN.

DISCHARGE FOR STAMP-MACHINES.

SPECIFICATION forming part of Letters Patent No. 747,703, dated December 22, 1903.

Application filed May 12, 1903. Serial No. 156,801. (No model.)

To all whom it may concern:

Be it known that we, JOHN L. HARRIS and JAMES W. SHIELDS, citizens of the United States, residing at Hancock, in the county of Houghton and State of Michigan, have invented certain new and useful Improvements in Discharges for Stamp-Machines, of which the following is a specification.

This invention provides a novel form of discharge for ore-crushers to carry off the flakes or large pieces of metal not permitted to pass by the usual outlet or escape, thereby expediting the operation of reducing the ore as well as producing a material saving of the ore-crushing machinery and increasing its period of usefulness.

The invention is particularly designed for stamp-mills having the mortar surrounded by a separating screen or grate through which the fine ore is delivered by splash due to action of the stamp, and is shown in connection with an ore-crusher of this type in the accompanying drawings.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical central section of an ore-crusher provided with a discharge embodying the essential features of the invention. Fig. 2 is a horizontal section of the discharge on the line X X of Fig. 1 on a larger scale. Fig. 3 shows a series of plates having the openings progressively arranged. Fig. 4 is a detail view of a portion of the mortar adjacent to and surrounding the discharge-opening as seen from the inner side. Fig. 5 is a vertical section of the mortar on the line Z Z of Fig. 2, showing a plate having the opening at a higher level. Fig. 6 is a side view of a portion of the mortar, showing the discharge-opening provided with a liner or bushing of square form. Fig. 7 is a longitudinal section of the outer end of the discharge-pipe, on a larger scale. Fig. 8 is a transverse

section of the discharge-pipe on the line Y Y of Fig. 1, on a larger scale. Fig. 9 is a detail perspective view of the outer end of the discharge-pipe and the cap, the parts being separated.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The ore-crusher illustrated is of the single-stamp variety and comprises mortar 1, stamp 2, grate or screen 3 at the sides of the cavity of the mortar, and launder 4 exterior to grate 3 and the mortar-cavity. A discharge-opening 5 is formed in a side of the mortar and extends horizontally outward from the cavity and communicates at its outer end with the discharge-pipe 6. The discharge-opening 5 is protected by a liner or bushing 7 of any form and held in place by stave-liner 8 and flanged end of discharge-pipe 6. This bushing or lining 7 is removable, and the opening therethrough may be of any shape.

The opening 9, formed through the stave-liner, registers with opening 5 and intersects with pocket 10, formed in the stave-liner, and adapted to receive one of a series of plates 11, each having opening 12, the openings in the series of plates being differently positioned and having a progressive arrangement to admit of varying the height of the effective outlet from the mortar or receptacle in which the ore is crushed. It is an established fact that the bed formed in the mortar depends upon the shoe—that is, with a new shoe the bed is formed lower down in the mortar, but with an old shoe it rises or, in other words, the bed gets deeper. Hence the advantage of varying the elevation or position of the outlet.

The discharge-pipe 6 forms a continuation of the discharge-opening 5 and is in alignment therewith, thereby obviating bends, offsets, and turns, which tend to impede the free outflow of the metal, and consequently cause choking of the discharge. The discharge-pipe may be of a single length or composed of a number of sections coupled together in any desired manner. As shown, the sections comprising the discharge-pipe are outwardly flanged at their ends and are bolted together, thereby admitting of the parts being readily separated for any desired purpose and quickly

assembled when required. A valve 13 is fitted to the upper portion of discharge-pipe 6 and is approximately of cylindrical form and snugly fitted in a seat forming a part of the discharge-pipe, the latter being oppositely swelled to accommodate the valve. The opening 14, formed transversely of the valve, corresponds with the bore of the discharge-pipe and practically forms a part thereof when the valve is open, as shown most clearly in Fig. 1, thereby providing a clear and unobstructed passage for the escape of the outflowing metal from the ore-crusher. This construction affords protection for the valve-seat whether the valve is open or closed, thereby insuring a perfect-fitting valve free from leakage at all times.

The valve-chamber 15 is closed at one side by a cap-plate 16, so as to admit of placing the valve in position and removal thereof when desired. The valve-operating stem 17 is mounted in a stuffing-box applied to cap-plate 16, and its inner end is constructed to interlock with valve 13, so as to cause movement of the valve when the stem is turned either to open or close the valve. An operating-handle 18 is fitted to the outer end of stem 17 and is adapted to be secured in proper position by means of a curved bar 19, secured to the discharge-pipe and having a curved slot in which operates a clamp-screw 20 for securing of handle 18 in the located position. The valve is completely housed and leakage is prevented by having the stem 17 mounted in a stuffing-box and interlocking with the valve by entering an opening formed therein out of communication with opening 14.

The lower end of the discharge-pipe 6 is closed by means of a cap 21, the same being provided at opposite points with inner extensions 22, threaded to match corresponding extensions 23, projected outward from pipe 6 at diametrically opposite points. The extensions 22 and 23 have complementary thread for drawing the cap close against the lower end of pipe 6 upon rotation thereof. To remove or place the closure 21 in position, it is necessary to turn same to bring extensions 22 opposite the spaces formed between extensions 23 and the latter opposite the spaces formed between the extensions 22, when the cap may be slipped either upon or from pipe 6. When placed in position, a turning of the cap causes the thread of the extensions 22 to engage with thread of the extensions 23, thereby securing the cap and at the same time drawing it close against the extremity of pipe 6, so as to prevent leakage.

The stone-liner is thickened at each side of the discharge-opening 9, as shown at 24 and 25. A passage 26 is formed in the thickened part 25 and is in communication with opening 27 through wall of mortar 1, with which water-injection pipe 28 connects. The passage 26 inclines downward slightly, as shown in Fig. 4, and is arranged to deliver a jet of

water across outlet 9 at a point within the mortar. This water-jet is of a strength to prevent the passage of slime, gravel, sand, and rock into the discharge, while admitting of particles of metal passing freely from the mortar through the discharge-opening 9 into pipe 6. A splash-abutment is formed by thickened part 24, the water-injection impinging thereagainst and creating an eddy and agitation, which assists in the separation of the particles of material from the other matter.

The feature of the straight discharge is of vital importance, as it prevents choking and obstruction and insures working of the crusher to its full capacity. The valve-seat being protected is not worn by the metal in its passage through the valve. Hence leakage and frequent repairs are obviated. The coupling of the several sections in the manner disclosed renders the parts readily accessible for repairs and any other desired purpose. The discharge in its entirety is of simple construction and can be readily applied to any type of ore-crusher and same is not liable to become choked because of the straight passage, any metal passing from the mortar or ore-crusher through the delivery-opening readily finding its way to the discharge because of the straight and unobstructed passage afforded.

Having thus described the invention, what is claimed as new is—

1. In combination with an ore-crusher provided with a discharge-opening, a straight discharge-pipe in line with said discharge-opening and provided in its length with means for interrupting the discharge therethrough, and an injection-pipe in communication with the mortar adjacent to the juncture of said discharge-pipe with the discharge-opening and arranged to deliver a jet of water within the mortar across said discharge-pipe, substantially as set forth.

2. In combination with an ore-crusher provided with a discharge-opening, a straight discharge-pipe in line with said discharge-opening and having a valve-casing near its upper end, a valve of approximately cylindrical form mounted in said valve-casing and having an opening therethrough to align with and form a part of the bore or opening through said discharge-pipe, means for operating said valve, a controlling means applied to the lower portion of said discharge-pipe for interrupting the passage therethrough, and an injection-pipe in communication with the upper portion of the mortar and arranged to deliver a jet within the mortar across the discharge-pipe to prevent escape of slimes while permitting free outflow of metal, substantially as set forth.

3. In combination with an ore-crusher provided with a discharge-opening, a straight discharge-pipe in line with said discharge-opening and having a valve-casing near its up-

per end, a valve of approximately cylindrical form mounted in said valve-casing and having an opening therethrough in line with and forming a part of the bore or opening through said discharge-pipe, an operating-stem mounted in the casing and adapted to interlock at its inner end with said valve, a handle applied to the outer end of said stem, means cooperating with said handle for securing thereof in proper position, means applied to the lower portion of the discharge-pipe for controlling the outflow therethrough, and an injection-pipe in communication with the mortar and arranged to deliver a jet within the mortar across the discharge-pipe, and a splash-abutment, substantially as specified.

4. In combination with an ore-crusher provided with a discharge-opening, a straight discharge-pipe in line with said discharge-opening and provided near its upper end with a controlling-valve, outer extensions at the lower end of the discharge-pipe exteriorly threaded, a cap for closing the lower end of the discharge-pipe and provided with inner extensions provided with threads complementary of the threads of said outer extension of the discharge-pipe for cooperation therewith, and an injection-pipe in communication with the mortar and arranged to deliver a jet within

the mortar across the discharge-pipe, substantially as set forth.

5. In an ore-crusher having a lateral discharge-opening, means for changing the elevation or relative position of said opening, substantially as described.

6. In an ore-crusher having a lateral discharge-opening, and a pocket intersecting said opening, and a series of plates having openings progressively arranged in vertical alignment, any one of the plates being adapted to be placed in the said pocket, substantially as described.

7. In an ore-crusher having a discharge-opening, a stave-liner having an opening in register with said discharge-opening and a pocket intersecting with said opening, and a plate removably fitted in said pocket and having an opening to register with the openings of the stave-liner and ore-crusher to admit of the outlet being raised or lowered, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN L. HARRIS. [L. S.]

JAMES W. SHIELDS. [L. S.]

Witnesses:

E. R. LYNCH,

C. K. HITCHCOCK, Jr.