No. 703,466. Patented July 1, 1902.

J. A. PRINCE.

BRONZE MILL.

(Application filed Dec. 21, 1901.)

(No Model.) 2 Sheets—Sheet 1.

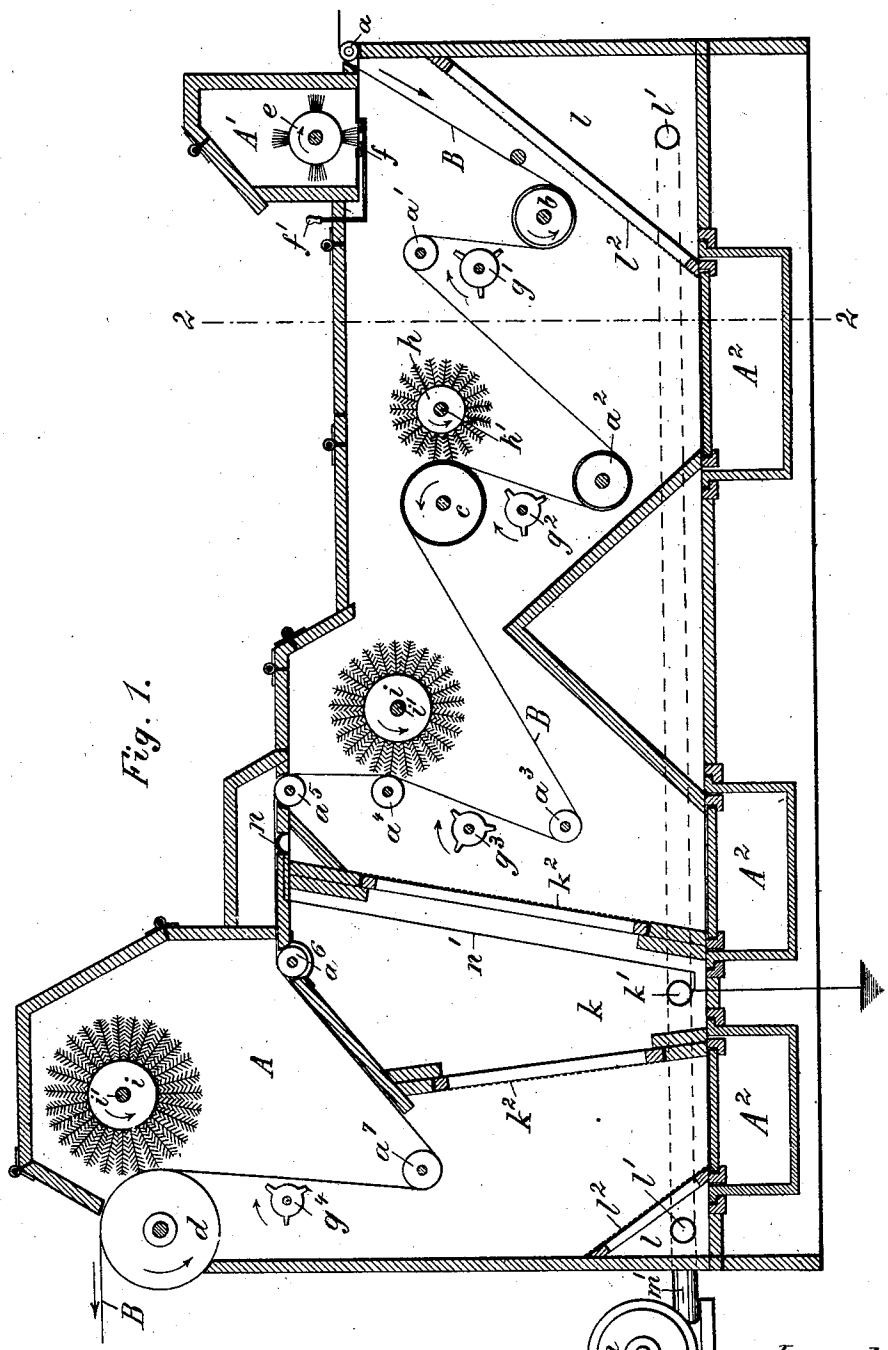


Fig. 1.

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William Schulz.

Inventor:
John A. Prince
by his attorneys
Poole & Friesen

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

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(No Model.) 2 Sheets—Sheet 2.

Fig. 2

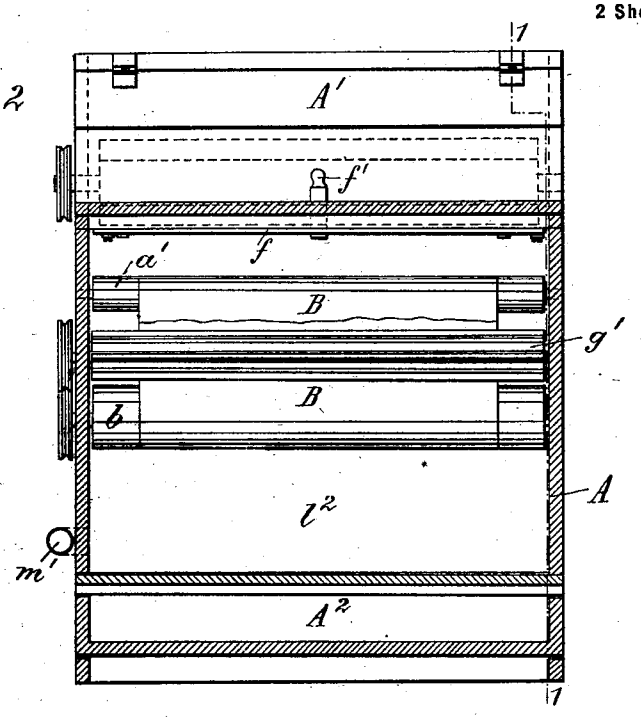


Fig. 3.

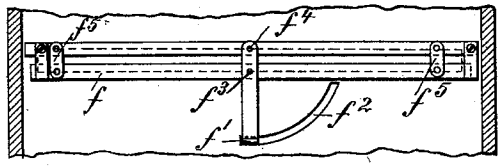


Fig. 4.

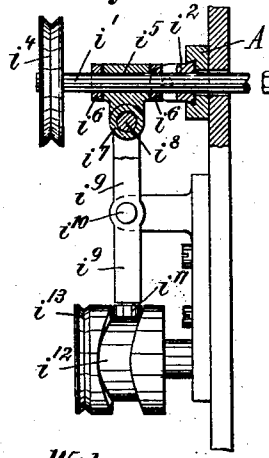


Fig. 5.

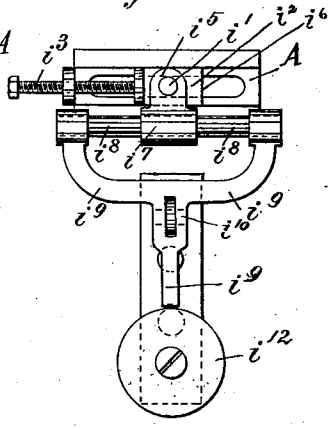
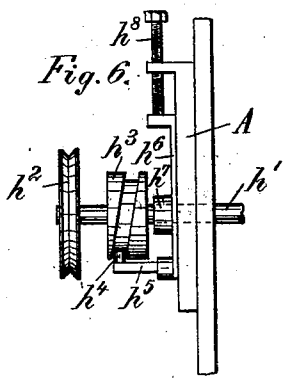


Fig. 6.



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

UNITED STATES PATENT OFFICE.

JOHN A. PRINCE, OF NEW YORK, N. Y.

BRONZE-MILL.

SPECIFICATION forming part of Letters Patent No. 703,466, dated July 1, 1902.

Application filed December 21, 1901. Serial No. 86,754. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. PRINCE, a citizen of the United States, and a resident of New York city, county and State of New York, have invented certain new and useful Improvements in Bronze-Mills, of which the following is a specification.

This invention relates to a mill for rubbing bronze-powder upon a sheet to be bronzed and which has been previously coated at suitable places with an adhesive. The machine is so constructed that while the bronze is effectively rubbed against the adhesive section of the sheet the loose powder is removed in a very thorough manner, so that clean work is obtained and waste prevented.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of my improved bronze-mill on line 1 1, Fig. 2. Fig. 2 is a vertical cross-section on line 2 2, Fig. 1; Fig. 3, a detail of the gate *f*. Figs. 4 and 5 are details of the mechanism for reciprocating the feather-rollers *i*, and Fig. 6 a detail of the mechanism for reciprocating the feather-roller *h*.

The letter A represents the casing or frame of the mill, through which the sheet B to be bronzed is conducted longitudinally in a zig-zag course. The sheet B, coated with an adhesive at the places where the bronze is to adhere, passes from idler *a* over covered roller *b* to idler *a'*, covered idler a^2, feed-roller *c*, idlers a^3 a^4 a^5 a^6 a^7 to feed-roller *d*. The feed-rollers *c d* draw the sheet through the casing, while the roller *b* is driven in a reverse direction and constitutes a rubber for pressing the bronze-powder against the sheet. This bronze-powder is contained in a chamber A', within which is hung a rotatory brush or stirrer *e* for throwing the powder through a gate *f* upon the sheet B between the idler *a* and the rubber *b*.

In order to adjust the gate *f* to discharge different quantities of powder, it may be opened or closed, more or less, by means of a handle *f'*, Fig. 3, turning in a curved segment f^2 and connected to the gate at f^3. The handle is pivoted to the bottom of chamber A' at f^4, and the gate is hinged to such bottom by links f^5.

Beaters g' g^2 g^3 g^4, driven in a direction opposite to that of the feed-rollers *c* and *d*, are arranged along the upward runs of sheet B. These beaters are provided with projections, which on striking the sheet cause the loose powder to drop. In order to brush the powder off the sheet, I provide three feather-rollers *h*, *i*, and *i*, that work, respectively, against the feed-roller *c*, idler a^4, and feed-roller *d*. These feather-rollers receive rotating motion in a direction opposite to the feed of the sheet and at the same time axially reciprocating motion. In this way the rollers pass transversely across the sheet while rotating, so as to effectively brush off the powder.

The roller *h* reciprocates once during each rotation, while the rollers *i i* may be set to reciprocate any desired number of times during each rotation.

In order to reciprocate the roller *h*, Fig. 1, its shaft *h'* carries the driving-pulley h^2 and a fast cam h^3. This cam is engaged by a roller h^4, connected by arm h^5 to a slide h^6, that carries the bearing h^7 of shaft *h'*. As the shaft is rotated it is simultaneously reciprocated by means of the cam and cam-roller, as will be readily understood. The slide h^6 is adjustably connected to frame A by set-screw h^8, the adjustment serving to set the roller *h* closer against the feed-roller *c* as the feathers are being worn down.

The shaft *i'* of each roller *i*, Figs. 4 and 5, turns in a sliding bearing i^2, movable in a groove of frame A and adjustable by set-screw i^3. The shaft *i'* carries the power-pulley i^4 and is loosely surrounded by a sleeve i^5, arranged between a pair of fixed collars i^6. The sleeve i^5 is provided with a transverse hub i^7, adapted to slide upon a pin i^8. This pin is held by the upper forked end of a lever i^9, fulcrumed to frame A at i^{10} and carrying a cam-roller i^{11} at its lower end. The roller i^{11} engages a cam i^{12}, which is driven independently from shaft *i'* by a belt and a groove i^{13}.

The rotation of cam i^{12} will vibrate lever i^9, so as to reciprocate sleeve i^5, and with it the shaft *i'*. As the feathers are worn the rollers *i* may be set more closely against the roller a^4 or *d* by turning the set-screw i^3. This will cause the hub i^7 to slide along the pin i^8, and in this way the adjustment may be effected without stopping the machine.

Within the casing A are contained one or

more vacuum-chests k and l, from which the air is exhausted by means of a suitable fan m and connections m' k' l'. The chests l are arranged near the front and rear end of the apparatus, while the chest k is arranged intermediate the feather-rollers i i and divides the casing practically into two sections. Each of the chests extends below the beaters and the feather-rollers, so that the suction is assisted by the gravity of the detached bronze-powder in order to cause the latter to drop. The chests l are provided at one of their faces with closely-meshed screens l^2, while the chest k is provided at both of its two opposite faces with such screens k^2. These screens permit the air to be drawn into the chest, but are of such mesh that the bronze-powder cannot enter. The powder, beaten, brushed, and sucked off the sheet B, drops between the chests into drawers A^2, where it is collected to be dumped into the chamber A'.

The electricity generated by the friction of the feather-rollers against the bronzed paper is drawn out of the paper by means of a copper bar n, arranged in proximity to the sheet B and connected to the ground by wire n'.

It will be seen that as the sheet passes through the machine it is subjected to the action of the rubber, beaters, reciprocating feather-rollers, and vacuum-chests. In this way the powder will be made to adhere firmly to the varnished portions of the sheet, while all loose powder will be effectively removed and re-collected.

What I claim is—

1. A bronze-mill provided with a feather-roller, a sleeve embracing the roller-shaft, a cam-lever pivotally connected to the sleeve, a cam engaged by the cam-lever, and means for rotating the cam, substantially as specified.

2. A bronze-mill provided with a feather-roller, a sleeve having a hub and embracing the roller-shaft, a pin embraced by the hub, a forked cam-lever carrying the pin, a cam engaged by the cam-lever, and means for rotating the cam, substantially as specified.

3. A bronze-mill provided with rollers for removing the loose powder from the sheet, and a vacuum-chest having a screened side and extending below said rollers, substantially as specified.

4. A bronze-mill provided with a pair of rollers for removing the loose powder from the sheet, and a vacuum-chest arranged intermediate said rollers and having a pair of screened sides facing in opposite directions, substantially as specified.

5. A bronze-mill provided with a series of rollers for removing the loose powder from the bronzed paper, and with a metal bar and ground connection for drawing the electricity out of the paper, substantially as specified.

Signed by me at New York city, county and State of New York, this 20th day of December, 1901.

JOHN A. PRINCE.

Witnesses:
F. v. BRIESEN,
EDWARD RAY.