(No Model.) 2 Sheets—Sheet 1.

W. B. SILVERLOCK.

BRONZING MACHINE.

No. 347,652. Patented Aug. 17, 1886.

Fig. 1.

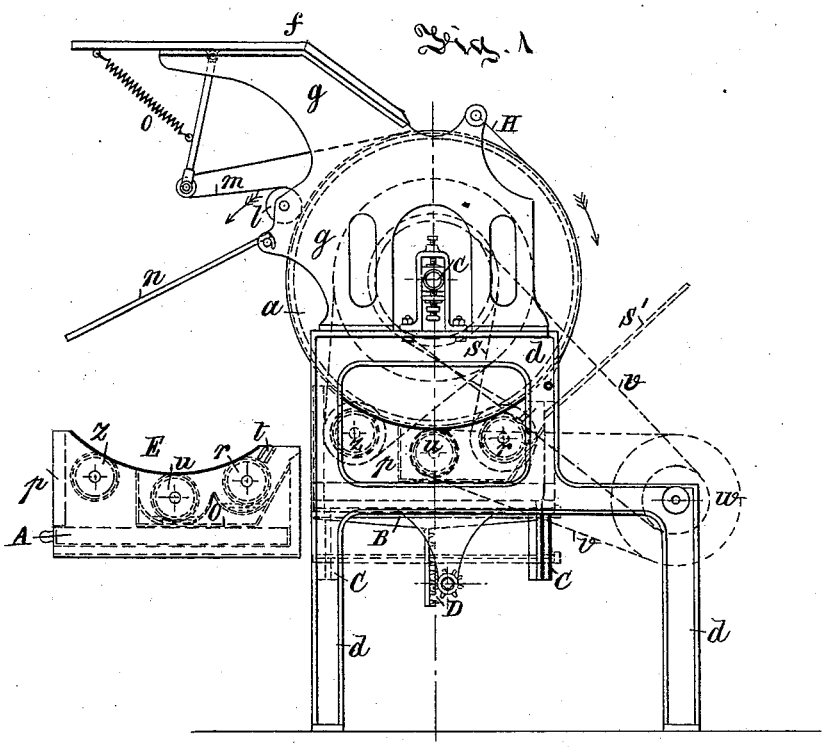
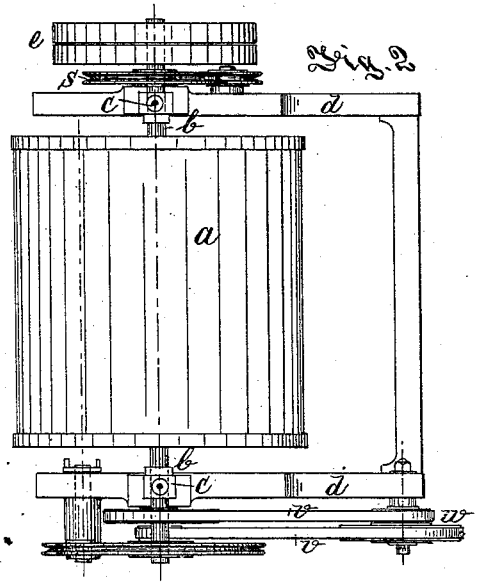


Fig. 2.



Witnesses:
W. Reed Haight
Alex. Mc. Colland

Inventor:
William Brewer Silverlock
by W. H. Babcock
Attorney

(No Model.) 2 Sheets—Sheet 2.

W. B. SILVERLOCK.

BRONZING MACHINE.

No. 347,652. Patented Aug. 17, 1886.

Fig. 3

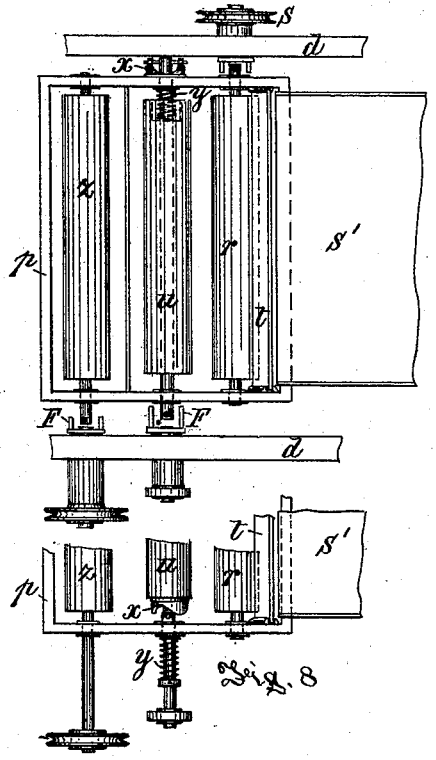


Fig. 8

Fig. 4

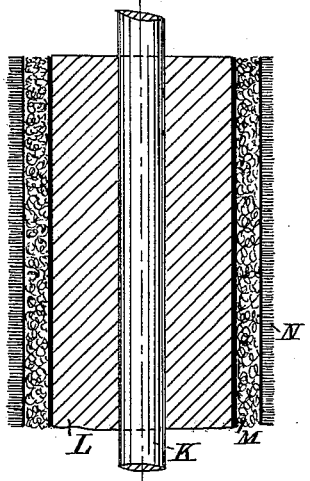


Fig. 5

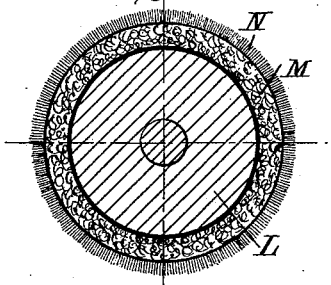


Fig. 6

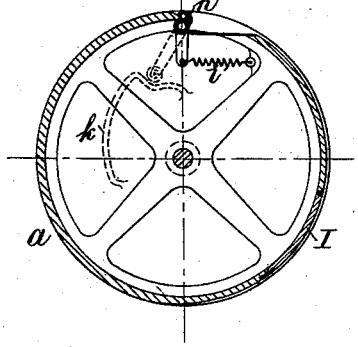
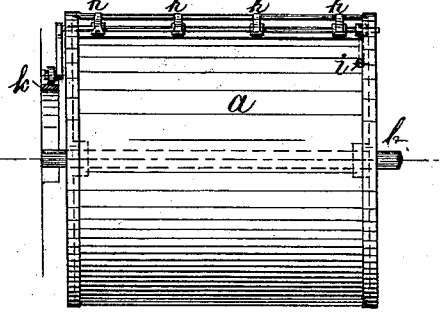


Fig. 7



Witnesses:
W. Reed Haight
Alex M^c Gilland

Inventor.
William Brewer Silverlock
by Wm H Babcock
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM BREWER SILVERLOCK, OF LONDON, COUNTY OF MIDDLESEX, ENGLAND.

BRONZING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 347,652, dated August 17, 1886.

Application filed August 24, 1885. Serial No. 175,173. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BREWER SILVERLOCK, a subject of the Queen of Great Britain, residing at London, in the county of Middlesex, England, have invented a certain new and useful Bronzing-Machine; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in bronzing-machines, in which bronze-powder, gold, silver, or other powder is applied to designs printed in varnish, printing-ink, or other adhesive substance upon the surface of paper or flexible material of the like kind, and the objects of my improvements are, first, to apply the bronze-powder to the paper continuously and in proper quantity; second, to cause the bronze-powder to adhere firmly when so applied; third, to remove any surplus bronze-powder from the paper; and, fourth, to prepare the surface of rollers by which these operations are effected, so that they are efficient and durable and do not become clogged or injured in working. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the entire machine; Fig. 2, a plan of the machine with the feeding-table and roller-box removed; Fig. 3, a plan of the roller-box and rollers and the devices for driving the rollers; Fig. 4, a longitudinal section, and Fig. 5 a transverse section on a larger scale of one of the rollers; Fig. 6, a transverse section, and Fig. 7 a front view of the main cylinder of the machine; and Fig. 8, a plan of part of the roller-box and rollers, showing modified devices for driving the rollers.

Similar letters of reference refer to similar parts throughout the several views.

a is the main cylinder of the machine, carried by an axis, *b*, turning in adjustable bearings *c c* on the frames or standards *d d*, and driven at the proper speed in the direction of the arrow by means of the driving-pulley *e*. A feeding-table, *f*, is carried by side frames, *g*, and from it the sheets of paper having the design printed upon them in adhesive varnish are fed one by one to the cylinder *a*, where their edges are caught in the usual way at the proper time by grippers *h h h h* in the cylinder *a*. These grippers being brought down upon the edge of the sheet by the spring *i*, Figs. 6 and 7, and after carrying the sheet round the cylinder *a*, release it at the proper time by the action of the cam *k*, the sheet being then carried over the roller *l* and delivered upon the hinged table, at *m*, by the tape *m*, which is kept tight by the spring *o*.

Below the cylinder *a* is fitted a box, *p*, provided with bearings in which revolve rollers of the kind hereinafter described. The roller *r* is driven by a belt or cord, S, from the cylinder-axis, so that it revolves in the same direction as the latter, its periphery touching the surface of the sheet to be bronzed, but moving, preferably, at a somewhat greater speed.

The bronze or other powder to be applied is supplied to the roller *r* from a chute or hopper, at S′, and the quantity upon the roller is equalized by means of a transverse board or cleaner, at *t*. The bronze-powder having been in this way applied to the adhesive design, the paper is carried forward over another similar roller, *u*, by which it is fixed upon the paper. For this purpose it is necessary that the powder should be rubbed with a gentle and soft pressure, and I accordingly give to the roller *u*, while touching the paper, an endlong motion backward and forward in the direction of its axis. The roller *u* is made to revolve at a considerable speed, preferably in the opposite direction to the cylinder *a*, by means of belts and pulleys *v v*, intermediate loose pulleys, *w*, being used, by which the desired speed is attained. The axis of the roller is also provided with a cross-bar carrying friction-wheels running upon a concentric fixed cam, as shown at *x* in Fig. 3, the spring *y* always keeping the friction-wheels in contact with the cam, and the roller *u* consequently has while revolving a movement backward and forward in the direction of its length; and as its lower circumference dips in the bronze-powder contained in the box *p*, it takes up the powder with it

and insures the presence of a sufficient quantity upon the designs. After leaving the roller *u* the paper passes over the roller *z*, which is shown revolving in the opposite direction to the cylinder *a* and removes any surplus powder from the sheet, which powder falls back into the box and can be removed when necessary by the drawer A and reused.

Instead of the roller *z*, two or more such rollers may be used, the sheet passing over each in succession; or a fixed soft pad may be used instead of a roller.

The box *p* is arranged so that it can be readily removed from the machine and replaced or a different one containing powder of a different kind substituted. For this purpose a platform or frame, B, Fig. 1, is arranged so as to work up and down in guides C C, and is raised and lowered by a rack and pinion, D, or by a screw or levers.

When it is desired to remove the box *p*, the platform B is lowered, as shown in dotted lines, and the box and rollers can then be drawn out endwise, as shown at E. To replace it it is pushed back upon the platform B, which is raised to the proper height, and is held in its position by adjusting screws or wedges.

The driving-pulleys may be keyed upon the axles of the rollers, as shown at Fig. 8, and withdrawn with the box *p* and rollers, sufficient space being left between the frames *d d;* or they may be fixed upon driving-axles permanently carried in the frames, as shown in Fig. 3, driving-couplings being provided at F, by which the rollers are driven when the box *p* is in its place.

H is an elastic tape by which the paper is kept upon the surface of the cylinder *a* before it reaches the roller *r*, and the cylinder *a* may have a hinged door, as shown at I, Fig. 6, by which ready access can be had to its interior, if required.

I have found that it is necessary, in order that the machine should work well, that the peripheries of the rollers should be very soft and yielding; that they should readily take up the bronze or other powder, and that they should not be liable to become clogged or injured when working.

In Figs. 4 and 5, K is the axle of the roller, L is a wooden cylinder fixed upon the axle, and M is a coating of sheep-skin, or preferably lamb-skin, fitted upon the cylinder L, with its woolly side outward, (with or without an intermediate covering of felt.) N is an outer coating or sheath of fabric, well known as "imitation seal-skin," or other similar material, fitted outside the lamb-skin M, its fibers being three or four sixteenths of an inch in length, preferably. By the use of these rollers the bronze or other powder is readily applied to the adhesive design upon the sheet and their surface does not become clogged. The powder is made firmly adherent by the rubbing movement of the roller, and the surplus powder is readily and effectually removed. The transverse board or cleaner *t* is also covered with the imitation seal-skin where it touches the roller *r*.

The box *p* is shown divided by partitions *o*, so that while the lower edges of the rollers *r* and *u* dip into the powder as they revolve, the roller *z* revolves freely and discharges the powder which it removes into the drawer A.

The partition O may be made of perforated metal, so that if too much powder be present it is forced by the rollers through the perforations into the drawer A.

The box *p* may be of wood or other suitable material; but I prefer to make it of metal enameled or glazed.

The periphery of the cylinder *a* is shown at Fig. 6 slightly reduced in diameter except at its edges at that part of its circumference not covered by the sheet of paper, so that the rollers do not touch it at such reduced part. The edges being left of the full diameter, the roller *l* rests upon and is driven by them. This roller *l* is preferably made of the ordinary elastic composition used for printing-rollers.

I am aware that it is not new to provide a distributing-roller with cams or flanges at its ends and arrange it to be reciprocated endwise by the action of another rotating roller or cylinder against said cams or flanges or by equivalent positively-acting devices. This I do not claim; but

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The rubbing-roller *u*, provided with a cross-bar carrying friction-wheels, in combination with the cam *x* and spring *y*, substantially as and for the purpose set forth.

2. In combination with the cylinder *a* and rollers *r*, *u*, and *z*, the adjustable box *p* and the rising and falling platform B, substantially as described, for the purpose specified.

3. The rollers having axis K, center L, coating M, and outer sheath or coating, N, substantially as set forth and shown.

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

WILLIAM BREWER SILVERLOCK.

Witnesses:
EDMUND EDWARDS,
ARTHUR E. EDWARDS.