

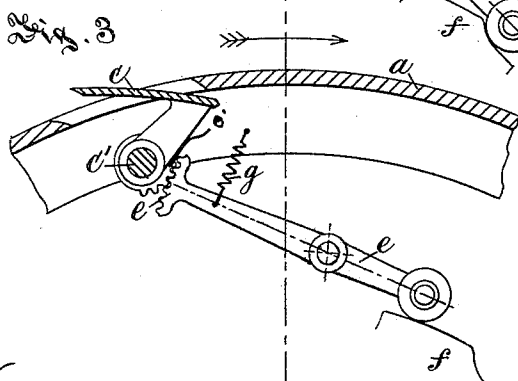
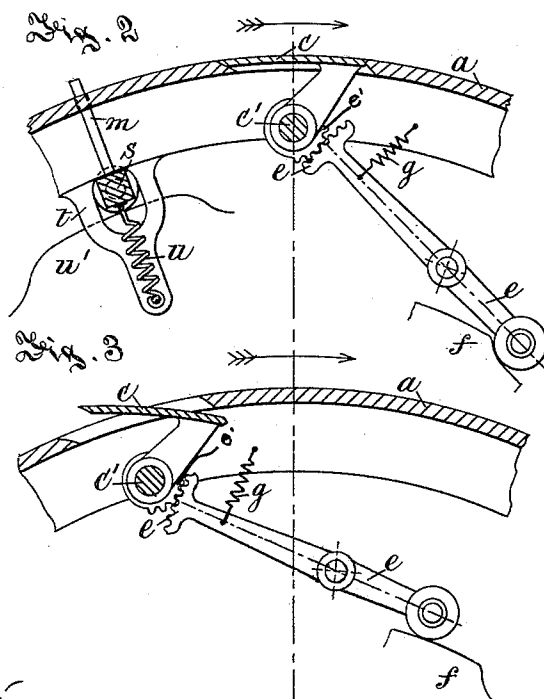
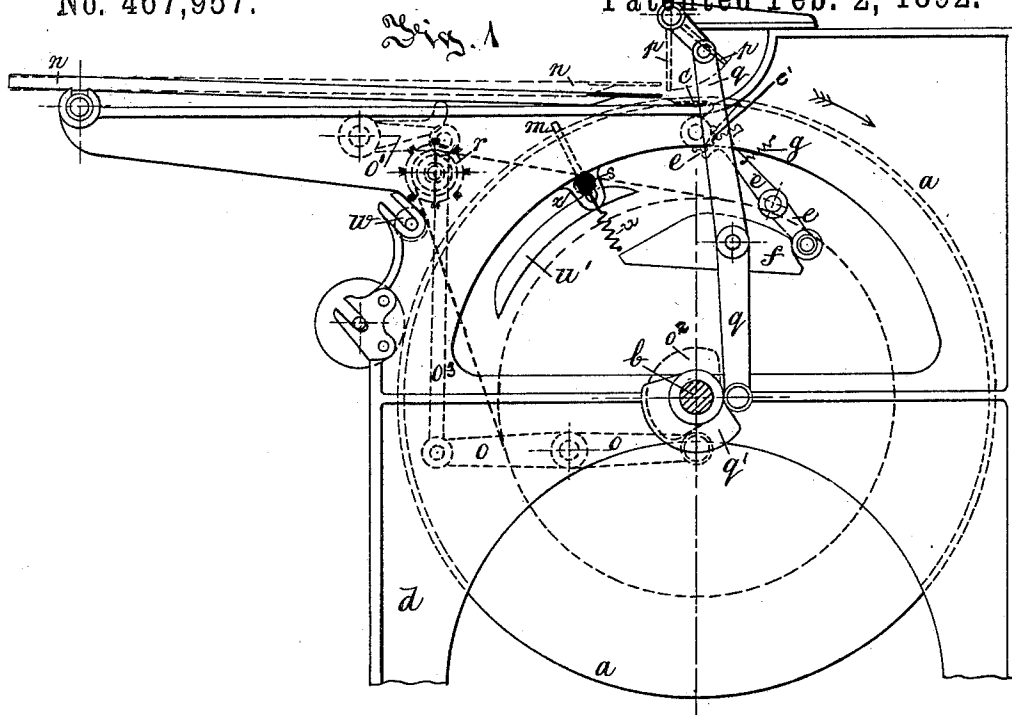
(No Model.)

3 Sheets—Sheet 1.

W. B. SILVERLOCK.
BRONZING MACHINE.

No. 467,957.

Patented Feb. 2, 1892.



Witnesses:
A. S. Babcock
Amel Ballin

Greenleaf
Wm Brewster Schoolbook
by Wm H Babcock
Attorney

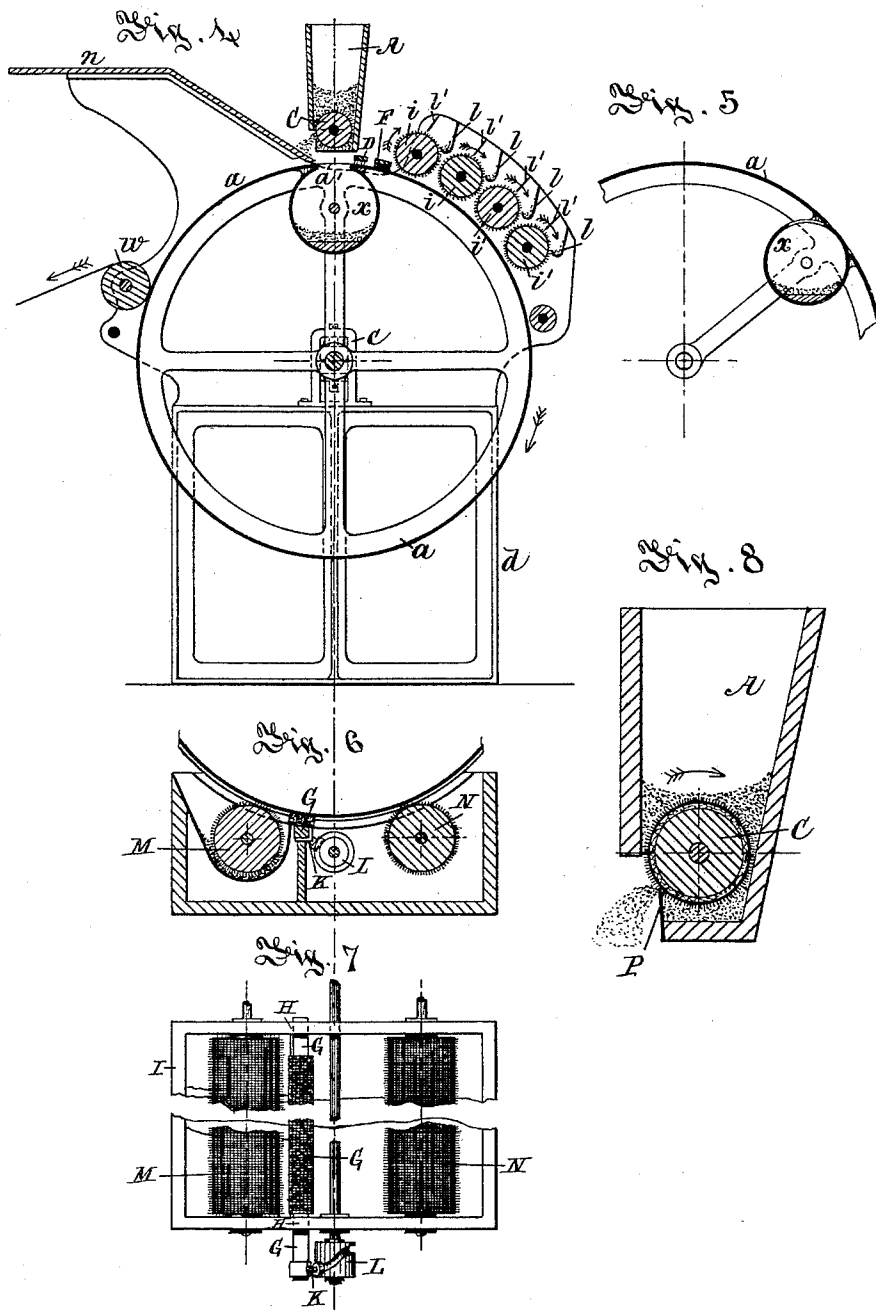
(No Model.)

3 Sheets—Sheet 2.

W. B. SILVERLOCK.
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Witnesses:
A. S. Babcock
Amelia

Inventor:
W. B. Silverlock
by W. H. Babcock
Attorney.

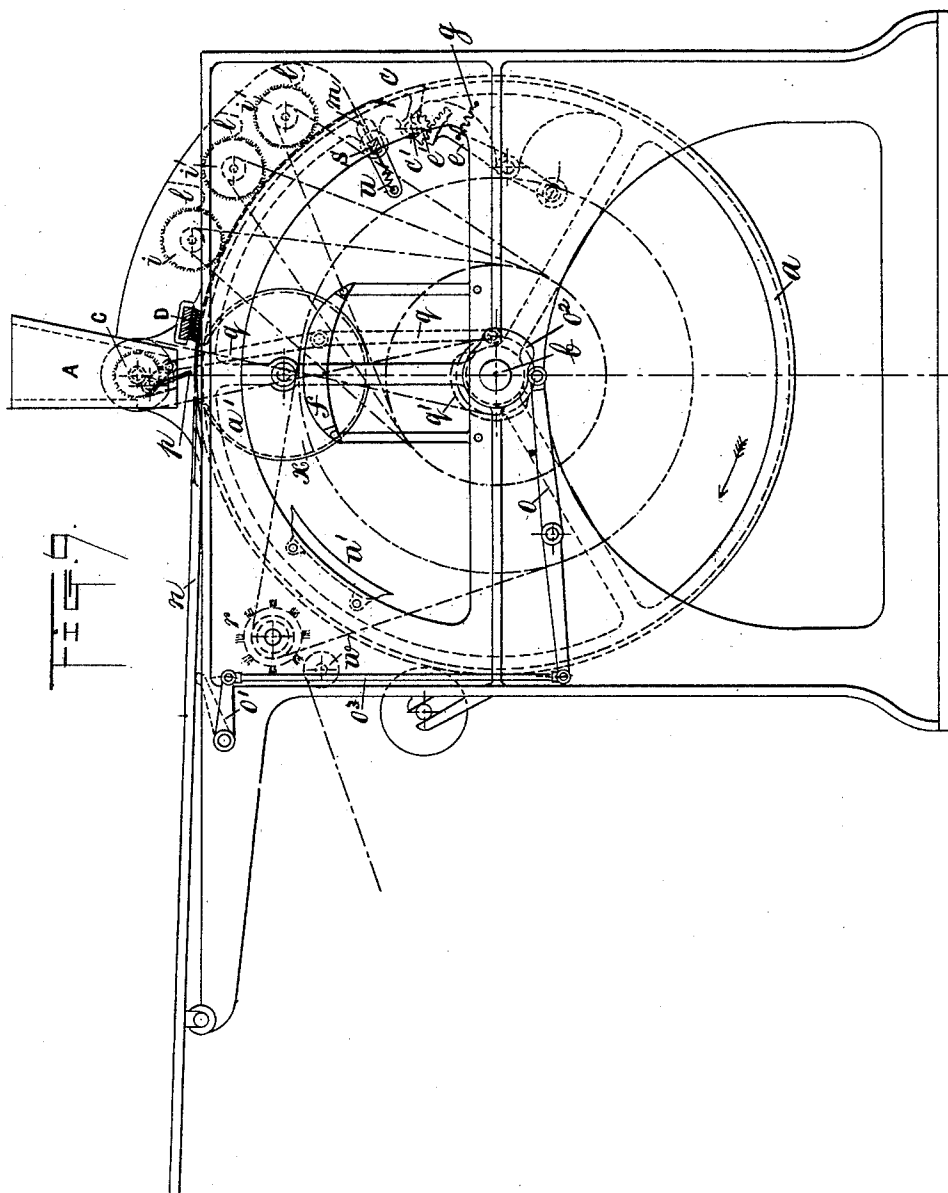
(No Model.)

3 Sheets—Sheet 3.

W. B. SILVERLOCK.
BRONZING MACHINE.

No. 467,957.

Patented Feb. 2, 1892.



Witnesses:
W. Harry Muzzy
John Cullen

Inventor:
Wm B Silverlock
By W H Babcock
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM BREWER SILVERLOCK, OF LONDON, ENGLAND.

BRONZING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 467,957, dated February 2, 1892.

Application filed August 23, 1890. Serial No. 362,905. (No model.) Patented in England March 28, 1887, No. 4,627, September 8, 1887, No. 12,182, December 1, 1887, No. 16,533, and March 6, 1889, No. 3,969, and in France July 7, 1885, No. 170,001, and May 9, 1889, No. 198,091.

To all whom it may concern:

Be it known that I, WILLIAM BREWER SILVERLOCK, printer, a subject of the Queen of Great Britain, residing at London, in the county of Middlesex, England, have invented new and useful Improvements in Bronzing-Machines, (for which I have obtained Letters Patent in Great Britain, dated March 28, 1887, No. 4,627, September 8, 1887, No. 12,182, December 1, 1887, No. 16,533, and March 6, 1889, No. 3,969, and in France, dated May 9, 1889, No. 198,091, Certificate of Addition, dated February 18, 1888, to Letters Patent, dated July 7, 1885, No. 170,001, and Certificate of Addition, dated September 23, 1887, to Letters Patent dated July 7, 1885, No. 170,001,) of which the following is a 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 it is applicable more especially to the bronzing-machine for which I obtained Letters Patent in the United States of America No. 347,652, dated August 17, 1886.

The objects of my improvements are, first, to provide means by which the edge of the paper is firmly held for its full width until released at the proper time; second, to remove the edge of the paper from the cylinder when it is released and to insure its being carried away and delivered at the proper place; third, to facilitate the application of the powder to the surface of the paper; fourth, to remove the surplus powder which does not adhere to the surface of the paper, so that the rollers and other parts of the machine are kept clean, and, fifth, to rub the powder lightly to insure its adherence to the surface of the paper. I attain these objects by the mechanism illustrated in the accompanying drawings—that is to say—

Figure 1 is a side elevation of part of a machine, showing the mechanism by which the edge of the paper is held and by which when released it is removed from the cylinder. Figs. 2 and 3 are sectional views, on a larger scale, of the gripping and releasing mechanism in

different positions. Fig. 4 is a longitudinal section through a machine, showing the method of applying bronze-powder and removing the surplus powder and keeping the machine clean, a fixed feeding-table being shown instead of the movable one shown in Fig. 1. Fig. 5 is a similar section of part of the cylinder, showing the device for receiving the surplus powder in a different position. Fig. 6 is a transverse section, and Fig. 7 a plan, showing the modifications of the device for rubbing the powder upon the paper. Fig. 8 shows the hopper on a larger scale. Fig. 9 represents in side elevation the devices embodying my invention.

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

a is the main cylinder of the machine, carried upon an axis *b*, revolving in bearings in a frame, as shown in the specification of my former Letters Patent already referred to.

n is a feeding-table, from which the sheet of paper having the design printed upon it in adhesive varnish is fed to the cylinder *a*, where its edge is caught by a gripper.

The gripper consists of a transverse plate or strip *c*, carried by one or more arms turning upon a shaft or center *c'*. The plate is fitted into a recess or opening in the periphery of the cylinder *a*, and is of such shape that when closed it fills the opening in the cylinder, the periphery of which is then continuous, as shown in Figs. 1 and 2. On the other hand, when the plate *c* is open, as shown in Fig. 3, it allows the edge of the sheet of paper to be introduced between itself and the edge of the recess or opening. The strip or plate *c* is opened and closed at the proper times in the ordinary way by means of the toothed lever *e*, gearing with the toothed wheel or segment *e'* upon the arm of said plate *c*, and opened by the cam *f*, fixed to the frame of the machine, the lever *e* being brought back to its original position by the spring *g* when it leaves the cam, so as to close the gripper, as illustrated in Figs. 1, 2, and 3.

The feeding-table *n* is shown in Fig. 1 rising and falling at the proper times by means of the levers *o o'*, cam *o''*, and rod *o'''*, and a movable stop or plate *p* is used, which adjusts

the front edge of the sheet so that it may be seized by the gripping-plate *c* being moved to or from its position to receive the edge of the paper by means of the lever *q*, operated by the cam *q'*, Fig. 1.

In order to remove the edge of the sheet from the cylinder when it is released from the pressure of the gripper *c*, a sufficient number of movable studs or pins *m*, Figs. 1 and 2, are used passing through radial holes in the cylinder *a* under the edge of the sheet and connected inside the circumference of the cylinder *a*, as shown in Figs. 1, 2, and 9, with a rod or bar *s*, moving in guides *t* and drawn down by a spring or springs *u* and operated by a second cam *w'*, fixed to the frame of the machine in such manner that when the edge of the sheet is released from the gripper *c* the pins or studs *m* are projected from the cylinder and raise the edge of the sheet sufficiently to be caught by revolving brushes, (indicated at *r*, Fig. 1,) the brushes revolving at a suitable speed, so that they catch the edge of the paper when released, as above described, and direct it over one or more rollers *w*, by which it is conveyed away in the usual way. Two or more sets of gripping-strips *c* and of pins or studs *m*, with the actuating devices connected with them, may be arranged round the periphery of the cylinder or drum *a* at suitable distances apart, so as to operate upon sheets of paper of the required size.

In Figs. 4 and 5 are shown rollers or cylinders by which the bronze or other powder is supplied to the sheet and the surplus powder is removed upon the upper side of the cylinder instead of below it, and also the means by which any of the powder which does not adhere to the surface of the sheet is collected and the rollers and other parts of the apparatus are kept clean.

I make that part of the circumference of the cylinder *a* upon which the sheet of paper or other material is supported while the powder is applied to it as true and smooth as possible, and a sufficient part of the remainder of the circumference of the cylinder at *a'* I remove altogether.

x is a hollow cylinder turning freely upon centers at its ends in the arms of the cylinder *a* and having an opening at its top coinciding with the opening *a'* in the cylinder *a*. The lower part of the cylinder *x* is weighted, so that it retains the same position as the cylinder *a* revolves, the closed part of the cylinder *x* covering the opening in the cylinder *a*, except when in the proper position at the top of its revolution to receive the powder through the opening, as shown in Fig. 5. The sheet of paper or other material is supplied to the upper side of the revolving cylinder *a* in the usual way, its edge being caught by the gripper, already described, but not shown in the drawings; or, instead of one gripper, two or more may be used at different parts of the circumference of the cylinder, the latter being itself made to correspond, so that instead of

one sheet two or more are treated at each revolution of the cylinder.

Somewhat in advance of the point where the sheet is seized by the gripper a hopper *A*, Fig. 4, and shown on a larger scale in Fig. 8, containing the powder, is arranged, having an opening below or at its side. The hopper also contains a roller *C*, made to revolve continuously or intermittently at any desired speed, its surface being covered with plush, artificial sealskin, or other material having a sufficiently long pile, or with brushes, to which as the roller revolves the bronze or other powder adheres. I arrange a flat plate or strip *P*, preferably of metal, parallel with the roller *C* in such a position that its edge just touches the pile of the material which covers the roller, bending it back and then releasing it as it passes, so as to scatter the powder uniformly upon the material to which the powder is to be applied.

A transverse piece of sealskin or other suitable material *D* is arranged and fixed so as to press lightly against the sheet which is passing below it after receiving the powder upon its surface, the fibers being directed downward and slightly backward, so that it collects the surplus powder upon the passing sheet and discharges it into the opening or recess *a'* in the cylinder as the latter passes under. It will be seen that this part of my invention consists in arranging an opening in the circumference of the revolving cylinder, through which the surplus powder falls into the suspended hollow cylinder *x*. In advance of this collecting device just described is arranged a bar or pad *F*, parallel with the cylinder, covered with sealskin or other suitable material and made to oscillate backward and forward by means of suitable mechanism for the purpose of rubbing the powder upon the sheet. In advance of this pad *F* are arranged one or more rollers *i i' i''*, parallel with the cylinder *a* and turning in bearings in the end frames of the apparatus, these rollers being made to revolve at a suitable speed by toothed wheels or other equivalent means in a direction, as shown by the arrows, opposite to that of the moving sheet beneath them. They serve the purpose of polishing the bronze or other design upon the sheet. Behind each of these rollers is preferably arranged a light curved tray *l*, which forms divisions between the rollers, preventing the loose bronze dust from being thrown from one roller onto the next one. Fixed narrow bars or plates *l'* touch the fibers on the rollers as the latter revolve and remove the bronze or other powder, scattering it into the receivers *l*.

By the improved apparatus described the whole of the rollers, being at the top, are easy of access and can be readily removed or replaced, and the polishing and dusting-off rollers are kept clean and free from powder, which is removed from them and discharged at the proper time, while any powder falling from the rollers when the paper or other sheet is

not passing drops at once through the opening in the cylinder into the tray or recess, from which it may be removed from time to time, as required. The longitudinal edges of the tray may be provided with a strip of sheepskin or other soft material at *s s*, by which a sufficiently tight joint is made between the tray and the inner side of the cylinder. Any desired number of the polishing, dusting-off, and other rollers may be used. The cylinder may be balanced, if desired, in order to insure its uniform rotation. The entire apparatus is simple, cheap, and durable.

In Figs. 6 and 7 a modification of the rubbing pad or bar is shown, (adjusted to the bronzing-rollers arranged under the cylinder *a*, as shown in my former Letters Patent.) *G* is a bar extending across the paper or other material and covered with a soft material (such as sheepskin) similar to that with which the rubbing-rollers are ordinarily covered. The bar *G*, which may be of wood or other suitable material, is supported near its ends in guides at *H* upon the sides of the box *I*, which contains the bronzing-rollers, so that it can move longitudinally backward and forward in the guides. At one end of the bar *I* arrange a projecting arm or stud *K*, which may preferably be provided with a friction-

roller, and this stud enters a properly-shaped groove or "cam-path" on the surface of a cylinder *L*, so that as the cylinder revolves the bar is driven backward and forward in the direction of its length, so that its soft surface rubs the paper or other material which is being bronzed. The cylinder *L* may be driven in any other convenient way. *M* represents the roller by which the bronze or other powder is supplied to the surface of the paper, and *N* is a roller by which any surplus powder is removed from the paper.

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

1. In a bronzing-machine, the pins or studs *m*, projecting through the cylinder *a*, in combination with the bar *s*, spring *u*, and cam *u'*, substantially as and for the purpose set forth.

2. The combination, with the soft oscillating rubber-bar *F*, of polishing and dusting-off rollers *i i'*, movable curved trays *l*, and fixed bars or plates *l'*, substantially as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

WILLIAM BREWER SILVERLOCK.

Witnesses:

JANE GRAY ARCHER RIDGWAY,
ARTHUR ERNEST EDWARDS.