2 Sheets—Sheet 1

J. T. ASHLEY.

Bronzing-Machine.

No. 208,358. **Patented Sept. 24, 1878.**

Fig. 1.

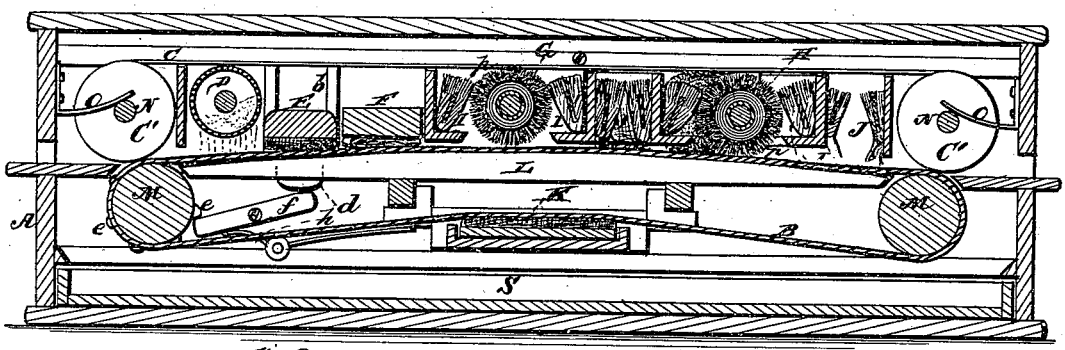


Fig. 2.

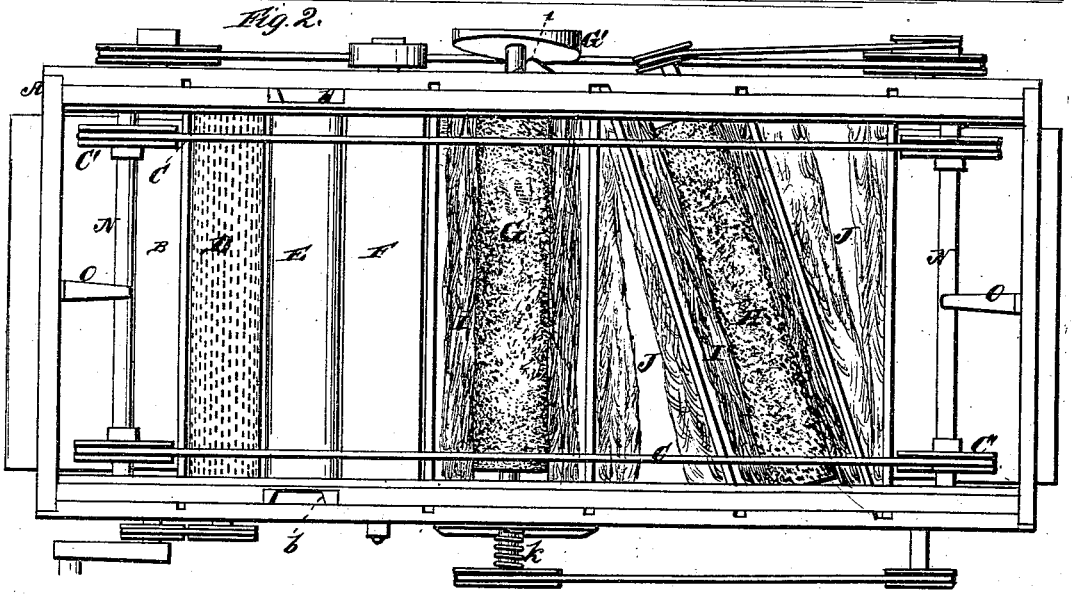
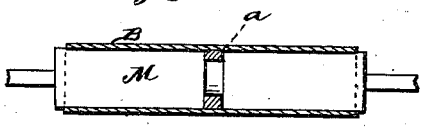


Fig. 3.



WITNESSES

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Fig. 4.

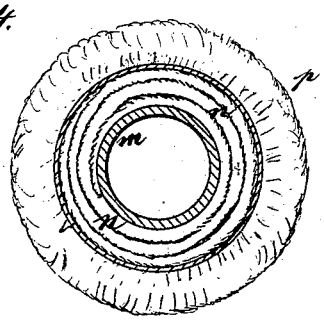
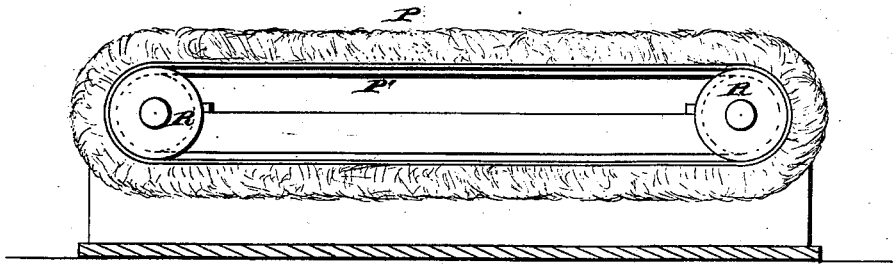


Fig. 5.



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JOHN T. ASHLEY, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN BRONZING-MACHINES.

Specification forming part of Letters Patent No. **208,358**, dated September 24, 1878; application filed August 10, 1878.

To all whom it may concern:

Be it known that I, JOHN T. ASHLEY, of Brooklyn, in the county of Kings and State of New York, have invented a new and valuable Improvement in Bronzing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a longitudinal central section of my bronzing-machine. Fig. 2 is a top-plan view of the same. Figs. 3 and 4 are sectional detail views, and Fig. 5 is a modification.

My invention relates to machines for applying bronze or other substance to the surface of paper or other material; and it consists, chiefly, in an endless carrying-apron moving over a curve, tapes to bind upon the curved surface of the apron, with their carrying-wheels projecting beyond the rollers of the apron, a bronzing brush or pad with a vertical motion, a stationary rubbing pad or brush, a roller with a laterally-reciprocating motion, a roller placed obliquely, a revolving bronze-hopper, wiping devices for the cleaning-rollers, and also stationary pads for cleaning the face of the apron and for doing the same to the work, all as hereinafter more fully set forth.

The annexed drawings, to which reference is made, fully illustrate my invention.

A represents a frame or box for containing the general mechanism. This frame or box may be made of any suitable material; but wood is to be preferred, because it is light and comparatively cheap and best adapted for the purpose. This box and the partitions therein, together with the drawer, &c., are coated with talc, Chemnitz white, or other substance refractory to bronze. The object of this coating is to enable persons using the machine to clean it readily of one bronze when they desire to change to bronze of another color. With a coating of material that sheds bronze the cleaning for a change may be immediate and thorough. Without such provision the effort to rid the machine of bronze takes a very long time, and even then it cannot be made perfectly clean. This box is to be placed on a stand, and to be provided with a feed-table at one end and a receiving-tray at the other.

B represents an endless carrying-apron. That part of it which carries the material to be bronzed is curved by passing over a curved backing. The object of having it so curved is that the tapes or bands which act with it may be allowed to bend to said curve, and by so doing bind the sheet firmly upon the face of the apron its entire length. This secures a certain carrying forward of the sheet against the action of the devices employed for putting on the bronze and cleaning, which cannot be done on a straight line, whether said line be straight the whole length of the machine or divided into two inclinations. The backing or bed which supports the apron and holds it to its curve is marked L, and may be one plain piece, or of slats or their equivalent, so long as a suitable arc be provided.

While the curve shown is only longitudinal, it may also be crosswise, and this either alone or in combination with the longitudinal curve. The use of such transverse curve would be to afford an extra binding or hold upon extra thin paper in the act of being bronzed.

The endless apron B passes around rollers M M, and the inner surface of the apron in contact with the faces of these rollers has secured to it a band, *a*, which runs in an annular groove in each roller. This device is provided for keeping the apron in place, as in the case of wide aprons there is a tendency to run to one side. Sometimes more than one of these bands are desirable.

In a machine made on purpose for work of some set size, when the carrying-tapes and their wheels may be fixed to some particular width, a series of bands may be used instead of the solid apron; but in machines that have to be changed to different widths the apron is to be preferred, as the tapes, which help to carry the work, could not be effective over the spaces between the bands.

C C represent tapes to hold the sheet down to the curved face of the apron, and C′ C′ are the wheels for giving the same motion. Only two tapes are shown, this number being enough for a large part of the work that is done; but when the sheets of paper are large, and the spaces between the printed impres-

sions will allow, one or more intermediate tapes may be employed in addition to the two on the margins.

It will be seen that the wheels C′, which carry these tapes, project over the rollers M, that carry the apron. By this means I obtain a thorough binding pressure upon the curved apron, and also compensate for slackness that may occur, and so hold the sheets more firmly than could be done if the wheels rested upon the tops of the rollers.

Instead of tapes with a motion, stationary strings or wires may be employed. This may be the case in small machines for small work, when the friction of the apron alone is enough to carry the sheets forward; but on large sheets and when the work is heavy the carrying-tapes are needed to co-operate with the apron. Instead of having the wheels at both ends of the machine to project beyond the apron-roller, such may be the case with those at one end only, and then it should be at that end where the paper is run out.

The wheels C′, at each end of the machine, are mounted on a shaft, N, the ends of which are placed in vertically-slotted bearings in the sides of the box A, and a spring, O, is arranged to bear on said shaft to hold the wheels down.

D is the hopper for holding and sprinkling the bronze. This hopper is made cylindrical, and has its journal-bearings in the sides of the box. The cylindrical form is best adapted to give a uniform supply of bronze. In practice there will be a brush inside for the purpose of forcing the bronze through the perforations. The hopper D, so-called, consists of a perforated cylinder, which is placed over the endless carrying-apron, and is not inclosed in a case or hopper having a slot or opening in its bottom, as has been heretofore practiced, the reason being that when using fine material, as bronze or colored powders, a small cylinder is desirable; but where coarse material, as flock, is used, a large cylinder with coarse perforations is required, for the reason that such coarse material requires more space in the cylinder than is needed for the other finer and denser material. In view of the changes needed to meet these requirements, I prefer to use the cylinder alone, for when incased these changes cannot be effected.

E is a pad or brush having an up-and-down motion. The ends of this pad or brush are placed in guides *b b* on the sides of the brush and rest upon slides *d d*. These slides are actuated by means of pivoted levers *f f*, which receive motion from projections *e e* on the ends of the apron-roller M at that end of the box. These projections, coming in contact with the levers, turn them to raise the slides, and with them the pad. Springs *h h*, suitably arranged, throw the levers and slides back to their former position.

The object of this up-and-down motion is to dab or strike the bronze into the size upon which it has been sprinkled. By such action a greater body is given to the work than when the bronze is simply rubbed over the surface. It also makes the bronze stronger against the action of the cleaning-rollers, and is not so apt to smear. This device is peculiarly adapted for very heavy work—that is, work with much solid bronzed surface. Instead of the dabbing-pad, the bronze may be compressed by means of a comparatively hard roller.

F is a stationary rubbing pad or brush to assist in giving a uniform surface to the work. On light bronzing this stationary pad or brush may be used alone—that is, it may be the only one employed for spreading the bronze after it has been sprinkled by the hopper. Instead of being at a right angle with the sides of the frame of the machine, as shown, it may be placed obliquely to the same. The object of such position would be to facilitate the passage of very light paper beneath it, as by being so placed it would act on the front edge of the sheet only a little at a time, beginning at one corner.

A stationary pad or brush for rubbing on bronze is of specific value in small machines, inasmuch as such brush holds the bronze in repose, and so prevents its flying about inside. In large machines, where there is much space and more appliances for cleaning than can be in small ones, this brush or pad may be given a laterally-reciprocating motion corresponding with that of the cleaning-roller G; but even then the action should be easy and without tendency to give much agitation to the bronze.

I do not, of course, restrict myself to only one of these pads or brushes any more than I do with either of the other devices, since I may multiply any or all of the parts as far as may be necessary to the greatest degree of perfection in relation to the work to be done.

G is a cleaning-roller, having two motions—one that of regular revolution and the other transverse and reciprocating. The value of this twofold motion is to compensate for any unevenness in the surface of the roller that may occur, and so insure a greater uniformity of action on the general surface of the work. This lateral motion also serves to lessen the resistance of the roller to the front edge of the paper, since by it a gliding action is given, which is much better than to have the roller to butt directly on the edge—a result which could not be compassed with a roller the surface of which is made in longitudinally-reciprocating sections, since the edge of each particular section, in course of being revolved, would expose the front edges of the sheets of paper to being caught and turned up, to the consequent injury of the work and spoiling of the material.

The journals of the roller G project beyond the sides of the box, and on the end of one of them is secured a cam, G′, working against a stud, *i*, for drawing the roller in one direction, while a spring, *k*, on the other journal causes it to move in the other direction. The same back-and-forth motion may, of course, be obtained by means of a double screw or a cam

grooved on its radial surface, or by means of a lever acting on a fulcrum, one end of the lever being attached loosely to the end of the journal and the other actuated by a cam. I prefer, however, the device shown, it being the most simple and the smoothest in action.

While the device as shown actuates a roller when revolving, it could be used as a means of motion to a pad or brush for rubbing bronze on—as, for instance, to give motion to such a pad as that which has already been shown as stationary. The use of such a device would be to give a cross-rubbing to the bronze on the sheet while being carried forward longitudinally. The advantage of this direct rectangular movement, as compared with any that swings on a center, is that it would do the work more evenly and leave more room for the other devices necessary.

H is a second clearing-roller placed obliquely in the machine. The object of this arrangement is twofold: first, to diminish its action of resistance to the front edge of the sheet as it comes in contact with it; and, secondly, such obliquity increases its cleaning-surface and action on the work. These parts of the mechanism, although called "cleaning-rollers," serve a double purpose, for while in their action they remove the surplus bronze from the surface of the work, they also polish or smooth it.

As it is important to have these rollers with as much softness and elasticity as possible, in order that they may have a springing pressure upon the work, I make them by first providing a stock, *m*, and then placing between its circumference and the pelt of the fur *p* a soft cushion, *n*, of down, cotton, or other suitable material.

When the pelt of the skin is made to bear upon a hard stock, as of solid wood, the springiness or elasticity can be no more than that afforded by the length of the fur, whereas by my method this important quality can be increased to any degree required, according to the thickness and lightness of the cushion.

The stock *m* of the roller is a paper tube, as preferable for lightness, although it may be other material, and suitably mounted on a shaft. This style of roller is desirable, because, as bronzing is exceedingly delicate work, the devices for doing it should be as light and easy-running as possible. The spring or elasticity of the roller could be obtained by placing suitable springs around the stock and having them to bear against the pelt of the fur covering; but this would not so well answer, and would be more expensive to the parties using the machine.

The cushion may be attached to the skin instead of the stock, the effect being the same.

Another peculiarity in my construction of rollers is that I put the fur covering *p* on in sections instead of having it in one continuous piece. By doing this, a like length and thickness of fur can be selected and cut out from different skins, and so a uniformity of surface be obtained, which cannot be done with whole skins. It also allows of a change when one section becomes more worn than another, and so affords a roller of longer duration.

In some cases, when the work is very heavy, an extra great acting-surface is required. To provide for this I put into machines for such work another device instead of rollers. This device consists of an apron, P, made of fur, plush, velvet, or other suitably soft material, and run upon two rollers, R R. By this arrangement a large surface is brought to bear upon the work, and the spring necessary is acquired by that portion of the apron which is between the rollers. It also accommodates itself to a curve, as of the carrying-apron.

In making these apron-brushes of large size parts of different skins have to be sewed together, and thereby a number of seams with their stitches have to be in the pelt. These seams, of course, give the surface next to the rollers an unevenness, and prevent the fur apron from running as it should, but causes it to work off the rollers. To prevent this, and to hold the apron in its place, I secure to the pelt side a band, P′, and make grooves in the rollers to receive it. This device controls the fur apron and prevents it from running to either side.

So far as covering the seams is concerned, it could be done with a suitable soft lining, and the apron be run on plain rollers; or I could fit a canvas or other band in one piece or in sections at intervals, and hold them in place by spurs on the rollers, and tack the pelt of the fur to said apron or sections of apron. I prefer, however, the plain pelt and band, as shown.

I I are devices for keeping the cleaning-rollers constantly wiped, the object being to take the bronze from the cleaning-rollers as fast as said rollers take it from the work. They consist in what may be called "galleries" at the sides of the rollers, said galleries being intended to hold and keep close to the rollers the material used for wiping.

Of the different substances that may be used I find cotton and wool to be superior, on account of their great power for absorbing bronze-powder. The manner of applying these substances for the purpose described is simply to take some of the material named and pack it into the receptacles called "galleries," and to so place it that it shall all the time be in contact with the surfaces of the rollers.

In the machines in practical operation I have lids hinged, and with a spring to each, to force the wiping material down and to press it against the rollers, as also to keep it from working out on the sides of the rollers that have the upward movement in course of making their revolutions. When one supply of the cotton or wool becomes surcharged with the bronze taken from the rollers it is to be taken out and a fresh

supply put in; or the bronze can be shaken out and the same cotton or wool be returned to the galleries, if desired.

An additional advantage that these soft wiping devices have over anything like a comb is that while they act on every part without any omissions, as in the spaces of a comb, they prevent the wear on the brush that a comb inflicts, and also take and retain any hairs that may work off, thereby keeping the refuse bronze and the work extra clean.

J J are stationary wiping-pads to act on the face of the work. In a practical machine, where there is room, I use more of them, one being across the machine at the end where the sheets run out placed between the last partition and the tape-wheels.

As cotton or wadding has great affinity for bronze and is softer than wool, I prefer to use this material for these wiping devices. They are very effective in the matter of cleaning off what may remain after the rollers have done their work.

In the inside arrangement of my machine it will be seen that I have several compartments. The object of this is, independent of holding in place the wipers of the rollers, to keep each device separated from the others, and so to prevent the bronze from being scattered from one to the other, as also to keep it from going out at the opening at the ends of the body of the machine. In practice, as already stated, each compartment has its own cover.

K is a pad, made to be put into the machine through the frame, and so brought into contact with the face of the endless apron when down and next to the drawer S for receiving the bronze. The use of this pad is to wipe the bronze from the face of the apron when it reaches this point, and to let it fall into the drawer below.

I prefer to have this wiping or cleaning device stationary, because any device in motion at this point keeps the bronze astir, and causes it to float through the entire machine. The bronze needs to be allowed to settle as much as possible. As this wiping-pad accumulates bronze, it should be drawn out from time to time and the bronze be knocked out of it. This may be done into the drawer of the machine, said drawer being first drawn out; or it may be done into some separate receiver at a distance from the bronzing-machine.

The various rotating parts of the machine are operated by belts and pulleys, arranged in any suitable or convenient manner.

I make no claim to a roller the surface of which is composed of a series of pads, each of which has a reciprocating motion; nor do I claim a perforated cylinder incased in a hopper having a slot or opening in its bottom.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a bronzing-machine, an endless apron adapted to pass over a curved surface between the carrying-rollers, to present the surface of said carrying-apron to the action of the pads or brushes, substantially as and for the purposes set forth.

2. The bands C and band-wheels C′, arranged so as to project over the tops of the apron-rollers, for the purpose of obtaining a continual strain upon the tapes, as herein set forth.

3. In a bronzing-machine, the revolving perforated cylinder D, placed within the frame of the machine and over the endless carrying-apron, substantially as and for the purposes set forth.

4. In a bronzing-machine, a pad or brush having an up-and-down motion, for dabbing or pressing the bronze into the work, as described.

5. In a bronzing-machine, the stationary pad composed of fur, down, or other soft material, for spreading the bronze, as shown and described.

6. In a bronzing-machine, a combined revolving and reciprocating roller covered with fur or other suitable material, for spreading the bronze or cleaning the surplus bronze from the face of the work, as shown and described.

7. In a bronzing-machine, the combined revolving and reciprocating roller, operated by the cam G′ and the spring *k*, as shown, for the purposes specified.

8. A roller placed diagonally to cause it to bear upon the sheets of paper gradually, beginning at one corner, as described.

9. A bronzing-roller, provided with a cushion between the stock and the outer surface, for the purposes described.

10. In a bronzing-machine, a brush of fur or equivalent material, made in the form of an endless apron, as and for the purposes set forth.

11. In a bronzing-machine, the combination of the cleaning-roller with the wiping devices I, kept in contact therewith, substantially as and for the purpose set forth.

12. In a bronzing-machine, the pad for cleaning the face of the endless apron, adapted to be inserted and removed through the side of the frame of the machine, as shown and described.

13. In a bronzing-machine, the stationary wiping-pads, in combination with the endless apron, for the purpose of cleaning the face of the work, as set forth.

14. A bronzing-machine having its interior coated with material refractory to bronze, for the purpose specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JOHN THOMAS ASHLEY.

Witnesses:
K. E. ASHLEY,
J. P. ASHLEY.