No. 797,080. PATENTED AUG. 15, 1905.

M. SMITH.

BRONZING MACHINE.

APPLICATION FILED FEB. 12, 1904.

2 SHEETS—SHEET 1.

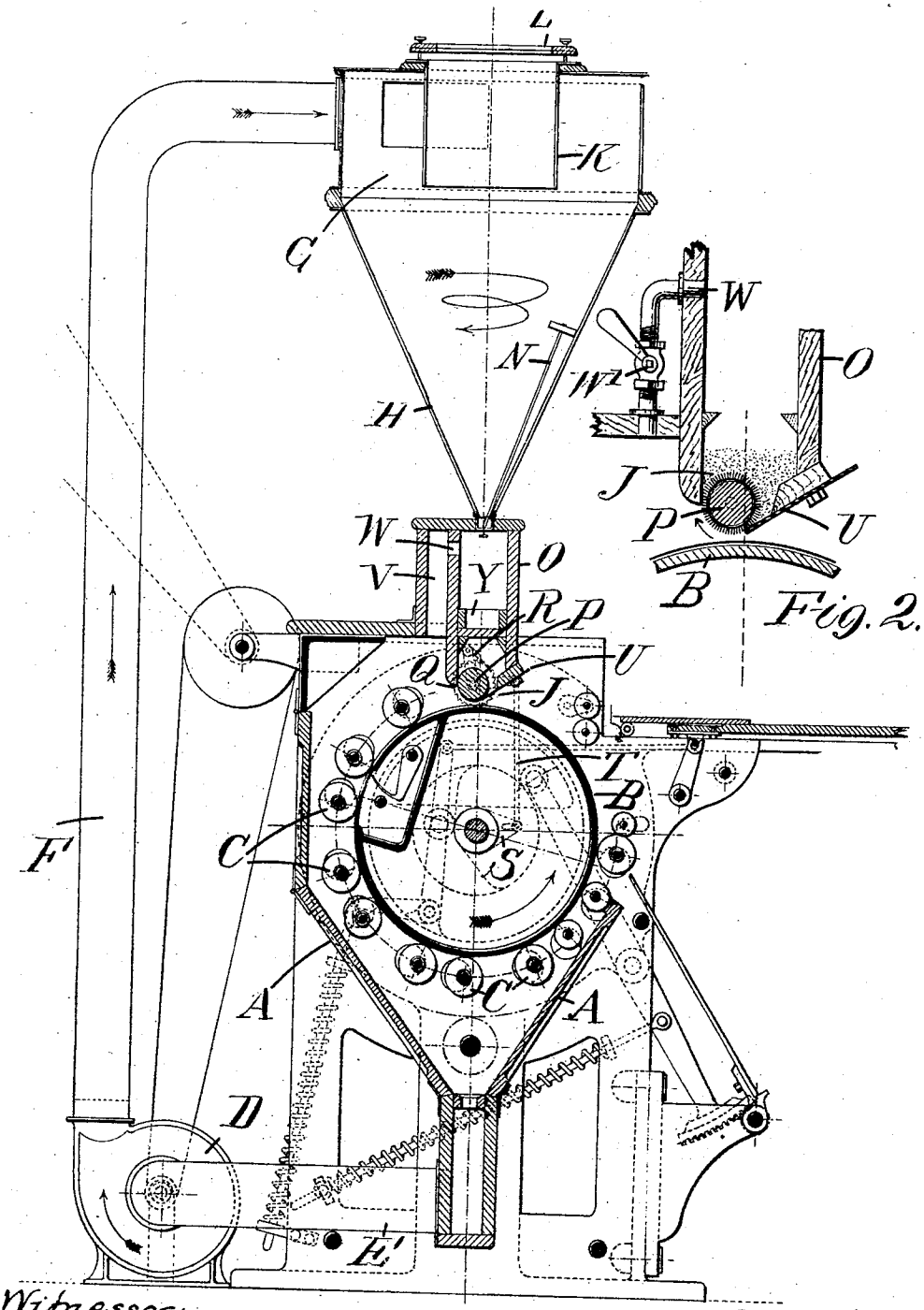


Fig. 2.

Fig. 1.

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ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON D. C.

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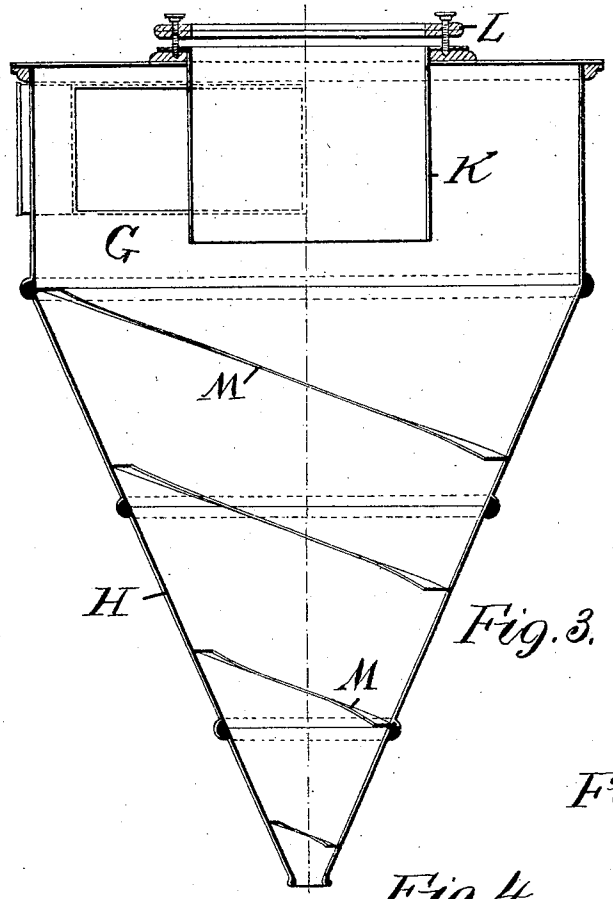


Fig. 3.

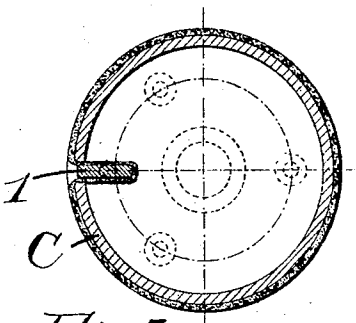


Fig. 5.

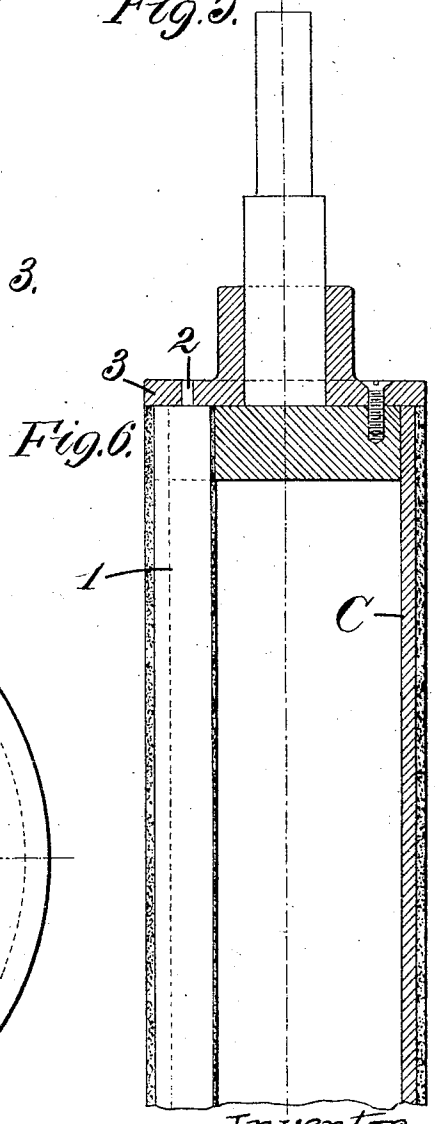


Fig. 6.

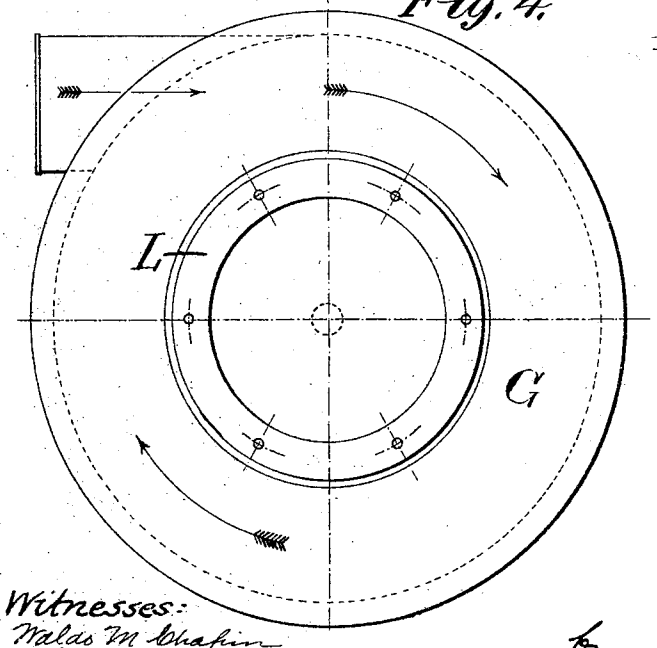


Fig. 4.

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# UNITED STATES PATENT OFFICE.

MARK SMITH, OF MANCHESTER, ENGLAND.

## BRONZING-MACHINE.

No. 797,080. Specification of Letters Patent. Patented Aug. 15, 1905.

Application filed February 12, 1904. Serial No. 193,228.

*To all whom it may concern:*

Be it known that I, MARK SMITH, a subject of the King of Great Britain and Ireland, and a resident of Manchester, in the county of Lancaster, England, have invented new and useful Improvements in Bronzing-Machines, of which the following is a specification.

It has long been known to conduct the process of bronzing or applying bronze or the like dust or powder to paper or fabrics in a closed or partially-closed chamber from which the air and the unused bronze-powder have been drawn out or exhausted by a fan or the like in such a manner that the air in the room in which the machine is situated is drawn inward into the bronzing-chamber, so that there has been no escape of bronzing-powder outward. The air and the bronzing-powder withdrawn by the fan from the bronzing-chamber have been passed through suitable pipes or passages to a filter bag or screen forming a chamber or receptacle from which the air might escape, but which would retain the bronze-powder, so that it might be again fed into the bronzing-chamber for use. With such filter chambers or screens it has been found that the filtering medium has quickly become choked and inoperative, with the result that air has constantly circulated through the machine without an adequate supply being drawn directly from the room containing the machine into the bronzing-chamber. The escape of the bronze into the workroom has thus not been effectively prevented. Such machines have also been provided with gripper or the like cylinders, which rotate within or partly within the bronzing-chamber and carry around or through the machine the sheet of paper or other fabric to which the bronze-powder is applied by revolving rollers or equivalent devices.

My present improvements relate particularly to devices for dealing with the air and bronze-powder withdrawn from the bronzing-chamber by the fan with the object of effectively separating the air and permitting its escape and of returning the powder to the machine without the use of screens, filters, or the like, to the construction of the rollers by which the bronze-powder is applied to the sheet under treatment, and to the appliances by which the bronze-powder is fed into the bronzing-chamber.

The accompanying drawings illustrate the improved details of the machine.

Figure 1 illustrates a complete bronzing-machine in vertical elevation. Fig. 2 is a sectional view to a larger scale of the bronze-powder-feeding device. Figs. 3 and 4 are views in vertical section and in plan, respectively, of the device for effecting the separation of the air and the bronze-powder. Fig. 5 is a cross-sectional view of one of the bronzing-rollers. Fig. 6 represents in longitudinal section part of the same roller.

A is a chamber, which is practically inclosed with the exception of very slight passages for the inflow of the necessary air and which contains or partly contains the gripper or like cylinder B of any usual or convenient construction.

C C are the bronzing or dusting rollers by means of which the bronze is applied to the paper or fabric.

D is a fan by which the bronze is withdrawn through the pipe E from the chamber in conjunction with the air in such a manner that there is a constant inward draft into the chamber from the surrounding air, ingress being permitted through the slight passages or openings left for the purpose—as, for example, where the gripper-cylinder B emerges from the chamber A.

F is the pipe conveying the mixed air and bronze-powder from the fan to the separator G, by means of which air is permitted to escape and the powder is collected or allowed to settle for return to the machine. This separator is of the cyclone construction and the current of air with the bronze-powder in suspension enters tangentially at its upper and cylindrical part. The bronze-powder is carried inward and downward within the inverted cone H, falling to the apex of the cone to be delivered to the machine, or to pass through an interposed distributing or feeding device J. The air escapes centrally and upward through the passage or pipe K.

L represents a plate which may be adjusted at any desired distance above the separator-outlet for the purpose of regulating the air-pressure within the separator.

The separator shown in Fig. 1 has a smooth or plain interior surface, but it may be differently formed. Thus, as shown in Fig. 3, the inner face of the inverted cone may be provided with a volute guide-flange M.

N is a stirring device or agitator mounted and disposed so as to be rotated within the separator under the influence of the air-currents.

The separator may deliver the bronze-powder direct to the bronzing-chamber A, or it may deliver it to an interposed chamber O, which in turn delivers it through a suitable feeding device J to the chamber A. This feeding device consists of a roller covered with plush or a roller-brush P mounted so as to be intermittently rotated at the bottom of the chamber O, the opening from which at the lower end it partly closes, as shown in Figs. 1 and 2. The plush roller or brush P is driven by the ratchet-wheel Q, which is mounted upon its shaft, and is actuated by a pawl or detent attached to an arm R, which is driven from a crank or the like S on the machine-shaft. The connecting-rod T, by which the motion of the shaft is transmitted to the reciprocating lever or arm carrying the detent, may be moved within a slot formed in the crank, so that the length of throw and the consequent motion of the feed-roller may be adjusted as desired. The brush rotates in contact with a plate or knife U, which closes the remainder of the opening at the bottom of the chamber. If desired, this knife may be adjusted or moved toward or away from the brush, so as to regulate the amount of powder passing to the bronzing-chamber. The powder is carried in and between the pile of the plush or the bristles of the brush, and as these leave the edge of the knife they give a spring or bound which has a most excellent effect in equably distributing the powder.

As the separator only delivers the powder or bronze-dust to the chamber O at one point, it is desirable to employ some means of distributing the powder as equally as possible along the length of the roller. To effect this, I may form the chamber with an outer compartment V, the wall or partition between the two being furnished at its ends with openings W. As the outer compartment communicates with the interior of the bronzing-chamber a slight draft is caused, the air passing from the chamber O through the compartment V to the bronzing-chamber. This slight draft is sufficient to cause the powder which is being delivered from the separator to distribute itself throughout the chamber O and upon the roller-brush P.

Y is a drawer, which may be put into place when desired to catch the powder when the latter is not required to be redelivered to the machine. This drawer is not in place when the machine is working with delivery of powder to the bronzing-chamber.

In place of the extra compartment V, as shown in Fig. 1, the chamber O may have the openings W, as before; but these openings may be arranged to communicate with the interior of the bronzing-chamber through the closable pipes W′, as indicated in Fig. 2.

It has been customary to cover the rollers C with plush or the like material, which has been stitched with a longitudinal seam where its edges have been joined. This seam very often left an impression upon the work and it soon wore through, so that the covering came off the roller. According to my improvements I form such a roller C (see Figs. 5 and 6) with a longitudinal slot or groove, within which the edges, joined or not, of the plush or like covering are inserted and are held in place by the lath or bar 1, which is afterward placed within the groove and is held in place by the ends 3, which are provided with holes fitting on pins 2 on the lath 1.

The ends 3 of the rollers C are of a slightly-larger diameter than the roller itself before the latter has its covering put into place, and slightly less than the diameter of the complete plush-covered roller. These uncovered ends 3 serve as guides, by means of which the rollers may be most accurately set in respect of and with regard to the gripper-cylinder.

The rollers C do not roll upon the gripper-cylinder, but rotate in opposite directions at the points of contact.

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

1. In a bronzing-machine, the combination of a chamber having openings to the atmosphere and containing the bronzing devices, means adapted to withdraw air and bronze-powder from the inclosed chamber, and a cyclone separator to which the air and the bronze-powder are delivered by the fan and in which the bronze is separated returned to the machine, all substantially as hereinbefore set forth.

2. In a bronzing-machine, the combination of a chamber having openings to the atmosphere and containing the bronzing devices, a suction device adapted to withdraw air and bronze-powder from the inclosed chamber, a cyclone separator to which the air and bronze-powder is delivered by the fan, and a feeding device which receives bronze from the separator and returns it to the machine, all substantially as herein set forth.

3. In a bronzing-machine, a feeding device for returning the bronze to the bronzing-chamber, and comprising a rotatable brush, means for varying the amount of rotation im-

parted to the brush, and a plate or knife between which and the brush the bronze is fed, all substantially as herein set forth.

4. In a bronzing-machine having a feeding device to which the bronze is delivered at one point, passages, channels or the like formed at the ends of the feeding device and placed in communication with the exhausted bronzing-chamber in order to effect an equal distribution of the bronze, substantially as herein set forth.

5. A bronzing-machine embodying in its construction a chamber having openings to the atmosphere and from which air and bronze-powder are to be withdrawn, and a cyclone separator in which the air and bronze-powder withdrawn from said chamber are separated and the powder permitted to return to the machine.

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

MARK SMITH.

Witnesses:
WILLIAM GEO. HEYS,
JOHN O'CONNELL.