No. 785,195. PATENTED MAR. 21, 1905.

L. BUSCH.

PROCESS OF AND APPARATUS FOR SATURATING PAPER ROLLS.

APPLICATION FILED DEC. 28, 1903.

3 SHEETS—SHEET 1.

Fig. 1

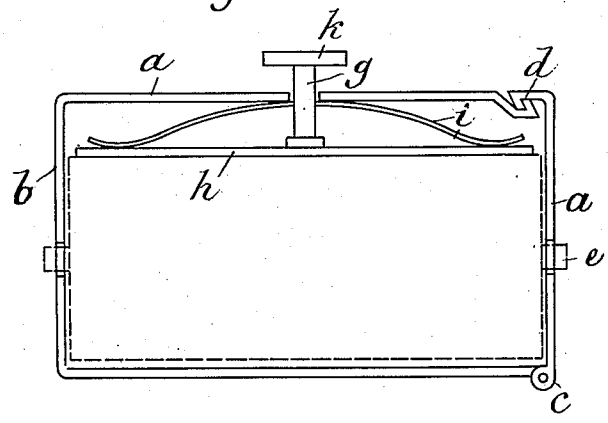


Fig. 2

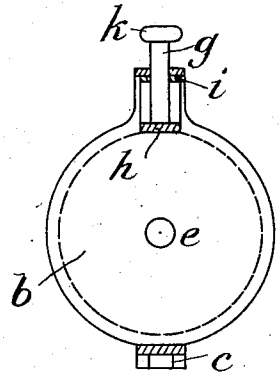
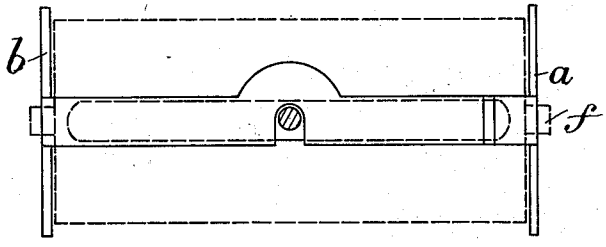


Fig. 3



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Inventor:

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3 SHEETS—SHEET 2.

Fig. 4

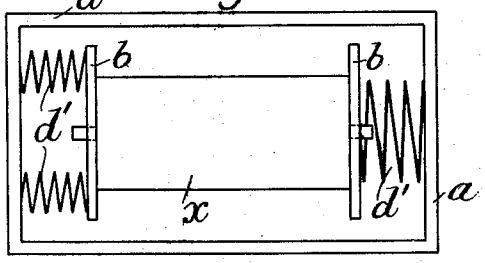


Fig. 5

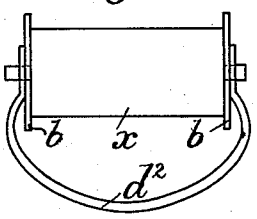


Fig. 6

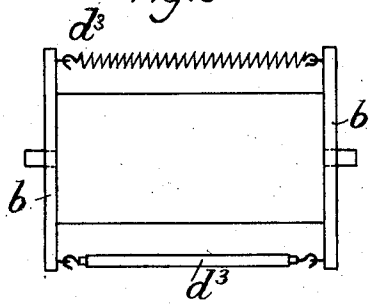


Fig. 7

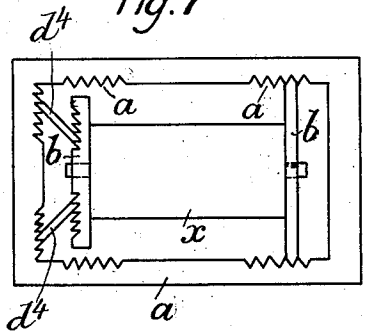


Fig. 9

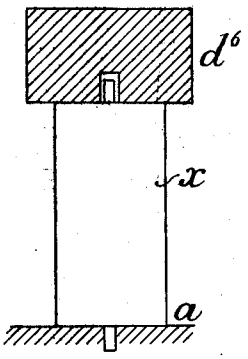
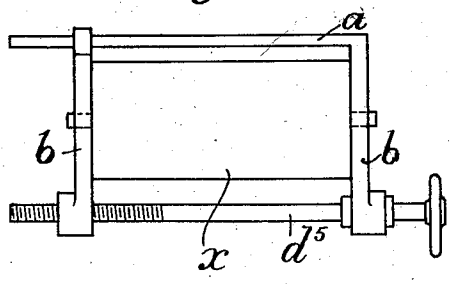


Fig. 8



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L. BUSCH.

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3 SHEETS—SHEET 3.

Fig. 10

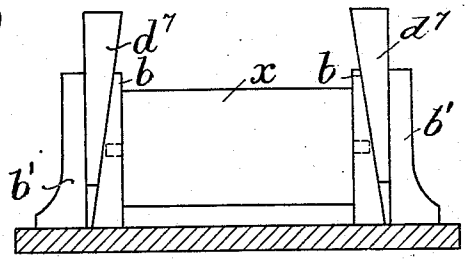


Fig. 11

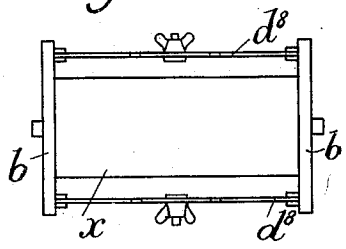


Fig. 12

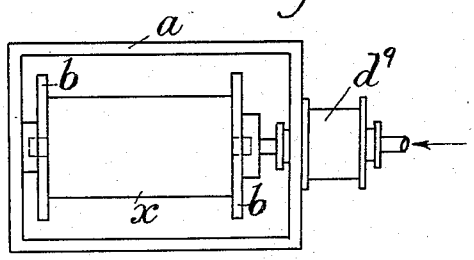


Fig. 11a

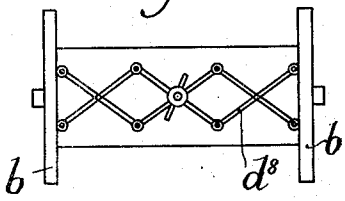


Fig. 13

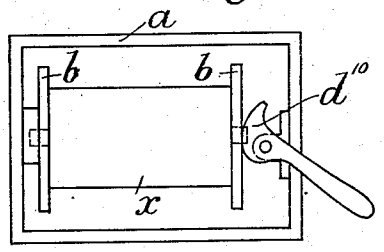
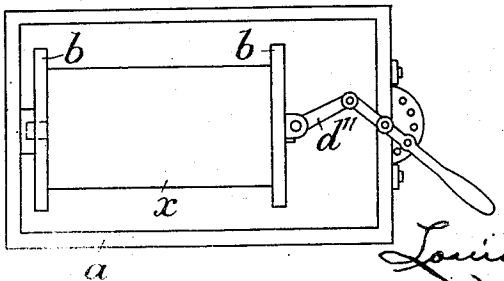


Fig. 14



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No. 785,195. Patented March 21, 1905.

UNITED STATES PATENT OFFICE.

LOUISE BUSCH, OF MUNICH, GERMANY.

PROCESS OF AND APPARATUS FOR SATURATING PAPER-ROLLS.

SPECIFICATION forming part of Letters Patent No. 785,195, dated March 21, 1905.

Application filed December 28, 1903. Serial No. 186,862.

To all whom it may concern:

Be it known that I, LOUISE BUSCH, a citizen of Germany, residing at Munich, Germany, have invented certain new and useful Improvements in Processes of and Apparatus for Saturating Paper-Rolls; 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.

My invention relates to a method and means for facilitating the saturation of paper-rolls intended for use in roller copying-presses, and has for its object the avoidance of difficulties and disadvantages which have heretofore attended the saturation of such rolls.

The copying of written or printed matter would be greatly facilitated and cheapened if it could be satisfactorily done by means of the ordinary paper-rolls as found in commerce and designed primarily for other purposes instead of requiring the use of specially-wound rolls. In consequence of the loose winding of paper-rolls, and particularly those intended for commercial use, it has been experienced that during the process of saturating the same the swelling of the paper causes an uneven displacement of the layers laterally and also a tendency to unwind, the result being that the paper presents an uneven end surface, which not only increases the difficulty of placing the roll in the machine, but also causes an uneven feeding of the paper and resistance to the passage of the same through the machine when drawn longitudinally. Attempts have been made to overcome these objections by saturating the rolls in a partial vacuum, whereby the uneven swelling of the paper is to a certain extent obviated. This method, however, requires the use of cumbersome and expensive apparatus and for this reason is in itself objectionable.

I attain the desired object by means of the simple but efficient apparatus illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation with the paper-roll in place. Fig. 2 is an end elevation, and Fig. 3 is a top plan view of a preferred form of apparatus, while Figs. 4 to 14, inclusive, represent modifications.

The apparatus preferably consists of a frame a, the ends of which are composed of circular plates b, one of which is hinged at c in order to permit the insertion of the paper-roll and when closed is held in that position by means of a spring-catch d. Each of these end plates is provided with a circular opening e, adapted to receive the spindle or axle f upon which the paper is wound. Mounted upon a rod g passing through one side of the frame a is a straight edge h, acting under the influence of the bow-spring i to press upon the paper-roll x when in position and prevent the unwinding of the same. The frame is proportioned in size to the paper-roll to be saturated, the relative dimensions being such that when the roll is in place there is no space between the edges of the rolled paper and the plates forming the end of the frame.

In operation the straight edge h is retracted by means of the handle k, and the roll of paper is inserted through the open end of the frame. The end plate is then closed and held in that position by means of the spring-catch d. The frame and the contained roll are then placed in a horizontal or vertical vessel containing water and left therein a sufficient length of time to permit the moisture to thoroughly permeate all of the layers of paper, the end plates effectually preventing by lateral pressure an uneven swelling of the layers, while the straight edge h precludes any unwinding of the roll. When the saturation is complete, the roll is removed by releasing the pressure of the straight edge and opening the end plate, when it is ready to be placed in the copying-machine.

The apparatus thus far described is that shown in Figs. 1, 2, and 3 of the drawings. Various modifications embodying the same general principle of operation will be found suited to particular circumstances.

In Figs. 4 to 14, inclusive, I have illustrated certain forms which I have found to possess advantageous features. In Figs. 4, 5, and 6 are shown modifications, in which the pressure is exerted upon the end of the roll by means of springs. In Fig. 4 compression coil-springs d' act directly upon the end plates or disks. In Fig. 5 a bow-spring d^2 exerts

pressure between its two ends upon the disks b. In Fig. 6 the two end plates are connected by tension-springs or elastic members d^3. In Fig. 7 cross-bars d^4 are arranged to adjustably engage with the sides of the frame to securely hold the end plates in position. The screw-spindle d^5 is used to reciprocate the end plates b in Fig. 8. In Fig. 9 the pressure is applied by means of a weight d^6, the other end of the roll resting upon a solid support. In Fig. 10 wedges d^7 are adapted to be forced between the end plates and a support b' in order to attain lateral pressure. Figs. 11 and 11^a show, respectively, in elevation and plan a modification in which toggle-levers d^8 form a lazy-tongs structure, by which the same result is secured. In Fig. 12 a cylinder d^9 is shown whereby pneumatic or hydraulic pressure may be brought to bear. In Fig. 13 is shown the application of a lever d^{10}, having one of its arms formed as a cam, and in Fig. 14 a lever and link d^{11} are shown.

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

1. The method of moistening paper, which consists in subjecting the roll to the influence of moisture and at the same time limiting the expansion of the paper lengthwise of the roll.

2. The method of moistening paper-rolls, which consists in subjecting the roll to the influence of moisture while under pressure exerted upon the end of the roll.

3. An apparatus for moistening paper-rolls, comprising a bath, a plurality of plates, and means for holding the plates against the ends of the roll.

4. An apparatus for moistening paper-rolls, comprising a bath, a plurality of plates having apertures forming bearings for the roll, and means for holding the plates against the ends of the roll.

5. An apparatus for moistening paper-rolls, comprising a bath, a plurality of plates, means for holding the plates against the ends of the rolls, a bar, and means for holding the bar against the surface of the roll.

6. An apparatus for moistening paper-rolls, comprising a bath, a plurality of plates, means for holding the plates against the ends of the rolls, a bar, and means for holding the bar against the surface of the roll in line with the axis thereof.

7. An apparatus for moistening paper-rolls, comprising a bath, a plurality of plates, means for holding the plates against the ends of the roll, a bar, and yielding means for holding the bar against the surface of the roll in line with the axis thereof.

8. An apparatus for moistening paper-rolls, comprising a bath, a plurality of plates having apertures for the reception of the axle of the roll, means for holding the plates against the ends of the roll, a bar, and yielding means for holding the bar against the surface of the roll in line with the axis thereof.

9. An apparatus for moistening paper-rolls, comprising a frame, end plates mounted thereon, one of the plates being hinged as a door to permit the insertion of the roll, a catch to hold the hinged plate in its closed position, and a bath arranged to receive the frame.

10. An apparatus for moistening paper-rolls, comprising a frame, plates or disks mounted in the ends of said frame, one of the plates being hinged as a door to permit the insertion of the roll, a spring-catch to hold the hinged plate in its closed position against the end of the roll, a bar, yielding means for holding the bar against the surface of the roll in line with the axis thereof, and a bath arranged to receive the frame.

In testimony whereof I affix my signature to this specification in the presence of two witnesses.

LOUISE BUSCH.

Witnesses:
ADOLF BUSCH,
ARTHUR BUSCH.