N. W. TAYLOR & J. W. BRIGHTMAN.

MACHINE FOR DRYING SIZED PAPER.

No. 35,117. Patented Apr. 29, 1862.

Fig. 7.

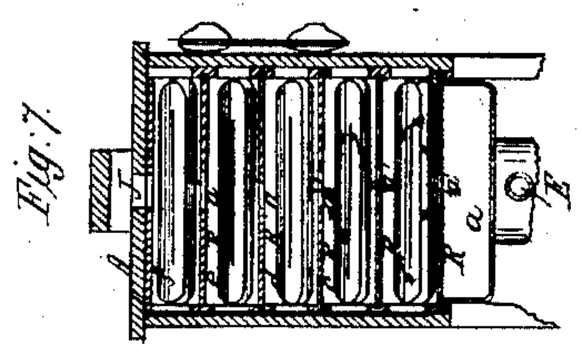


Fig. 2

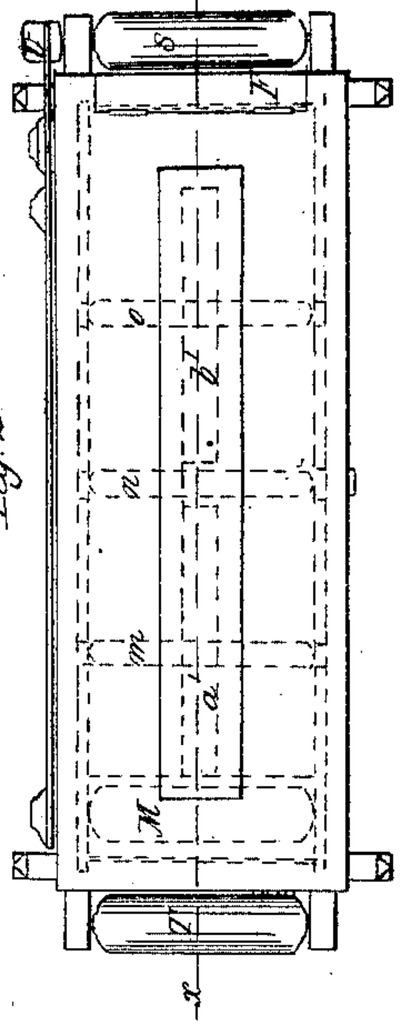


Fig. 5.

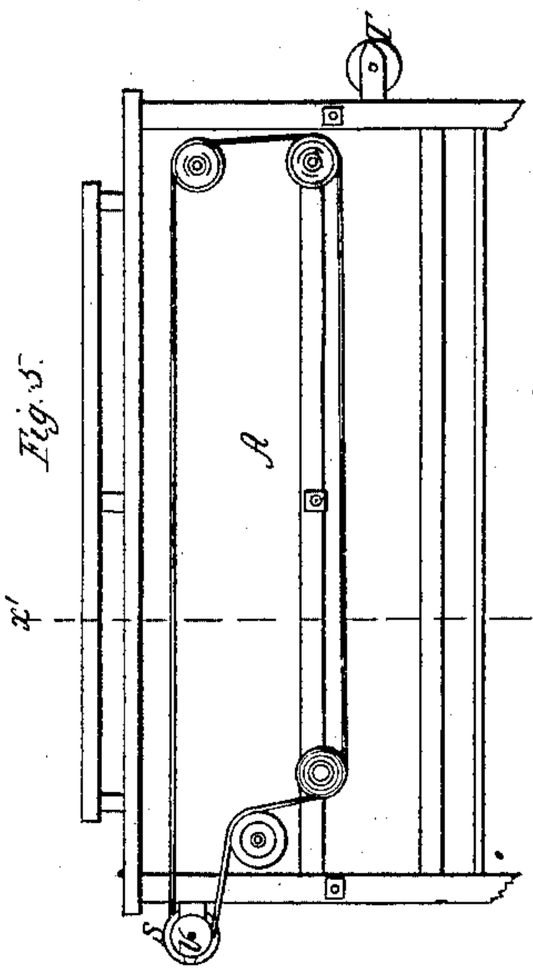


Fig. 6.

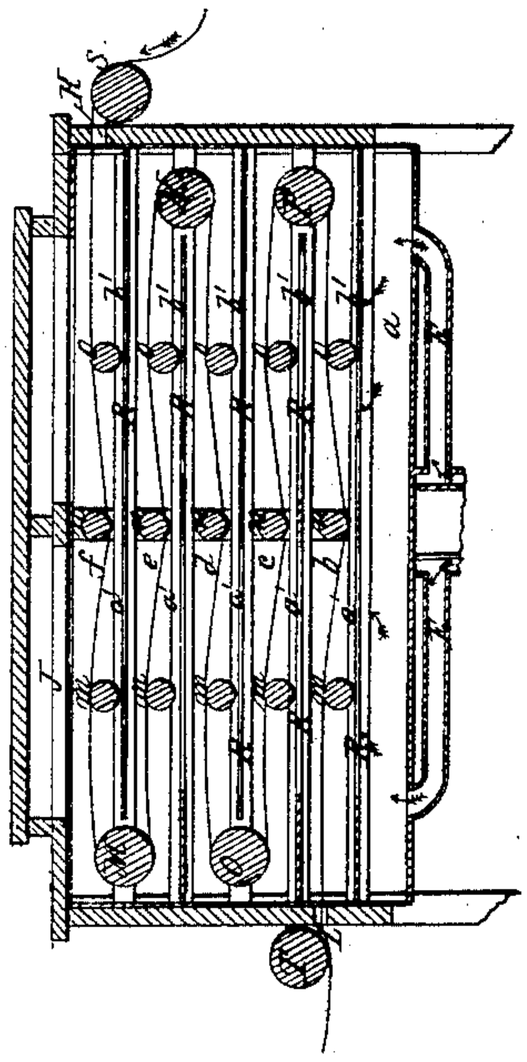


Fig. 4.

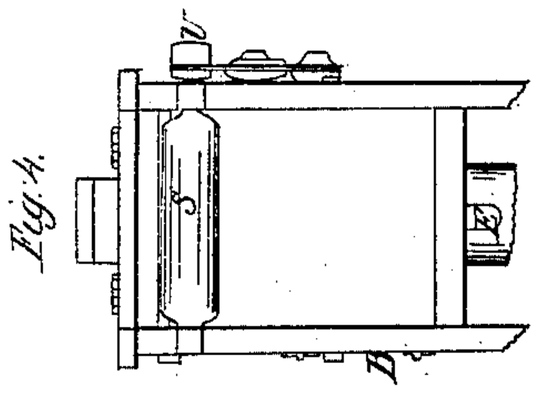


Fig. 1.

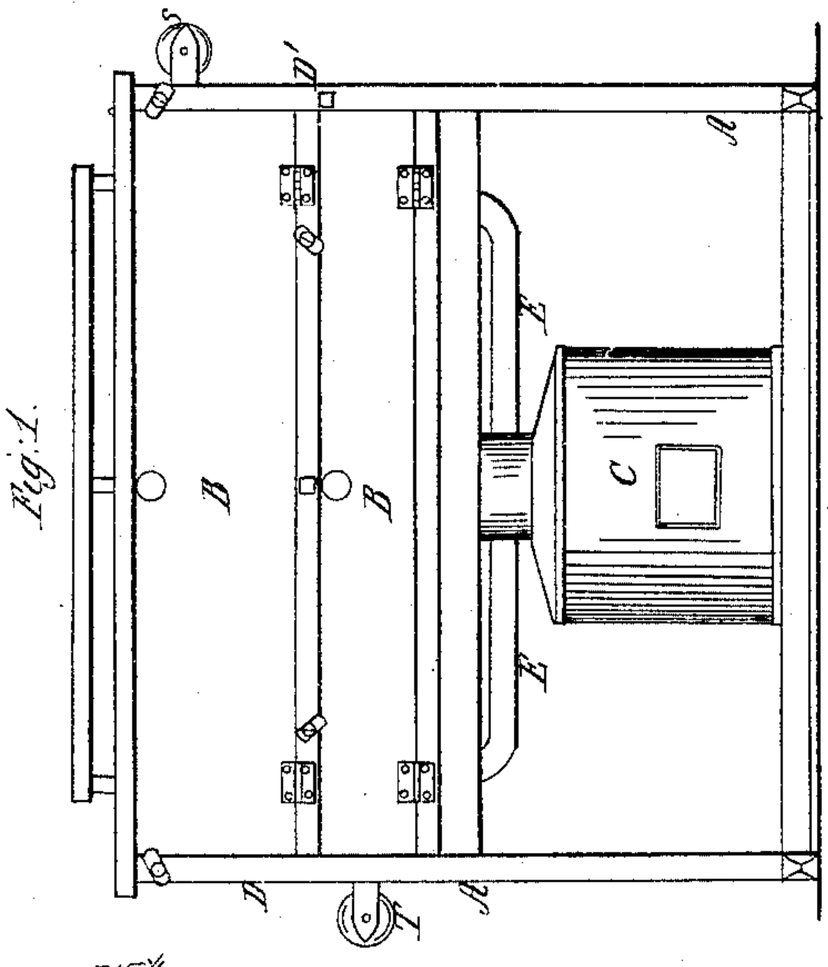
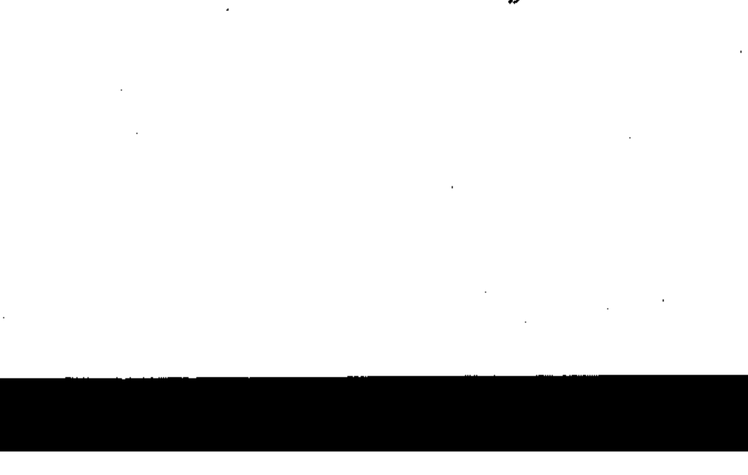


Fig. 3.



Witnesses;
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UNITED STATES PATENT OFFICE.

N. W. TAYLOR AND J. W. BRIGHTMAN, OF CLEVELAND, OHIO.

IMPROVEMENT IN MACHINES FOR DRYING SIZED PAPER.

Specification forming part of Letters Patent No. **35,117**, dated April 29, 1862.

To all whom it may concern:

Be it known that we, N. W. TAYLOR and J. W. BRIGHTMAN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and Improved Sized-Paper Drier; and we do hereby declare that the following is a full and complete description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side view. Fig. 2 is a top view. Fig. 3 is a view of the end D. Fig. 4 is a view of the end D′. Fig. 5 is a side view. Fig. 6 is a vertical section in the direction of the line *x x* in Fig. 2. Fig. 7 is a vertical section in the direction of the line *x′ x′* in Fig. 5.

The same letters of reference refer to corresponding parts in the different views.

Our improvement relates to an apparatus by means of which sized or wet paper is first subjected to a moist-heated atmosphere and then conveyed gradually into an atmosphere of increased heat and dryness until it passes out of the dryer.

A represents the frame of the drier, with lids or doors B B on one side.

C is a furnace below, with an annular heater, the heated air from the furnace being conveyed through the pipes E E up into the lower chamber, *a*, of the drier, as indicated by the arrows in Fig. 6.

The drier is divided off into chambers *a b c d e f* by partitions or plates R, in each of which are two long narrow openings, *a′ b′*, for the passage of heat from one chamber to another, producing a current through the drier. At alternate ends of these partitions are rollers M N O P, by means of which the paper is carried from one chamber to another, and it is conveyed in and out of the drier by similar rollers, S and T, on the outside. These rollers are all operated by pulleys on the ends of their shafts and an endless belt, as shown in Fig. 5, *v* being the driving-pulley. The paper is guided and carried through the chambers by a number of small rollers, *m n o*, supported by frame-work, the rollers *n* in the center being elevated above the others. The paper passes from the reel and is carried into the sizing-trough under a roller, and from thence over the roller *s* through the opening H in the end of the drier, over the small roller *o*, under the roller *n*, over *m*, and round the roller M into the next chamber below, and so on through all the chambers until it passes out at the opening L and under the roller T, as indicated by the red lines in Fig. 6. The doors B B can be opened to guide the paper right at first over the rollers, or to arrange it if it gets out of order or broken. The heated air from the furnace passes along the pipes E E into the lower chamber, *a*, up through the openings *a′ b′* under the paper, and as the partitions fit closely to the sides of the drier the heated air cannot ascend directly, but must pass back again over the top of the paper, up through the narrow openings in the center of the next partition into the chamber above, as indicated by the arrows in Fig. 7, and so on through all the chambers until it passes out at the openings J J in the top of the drier, which correspond to the openings *a′ b′* in the partitions. In this way the heated air comes directly under, around, and above the paper, bringing both surfaces in contact with the heated air about the same time, drying it well and rapidly. The openings *a′ b′* and J J produce a continued current through the drier, causing the heated air to ascend constantly and uniformly. There is moisture or steam generated in the chambers from the dampness of the paper, which rises to the top, so that the wet paper from the sizer first comes in contact with a moist and heated atmosphere, and gradually into a dryer atmosphere, giving the paper sufficient time to absorb the sizing, for if paper immediately after it is sized is brought into a dry hot atmosphere before the size is absorbed the size becomes dried on the surface, rendering it hard and horny and not fit for use as writing-paper. When paper is passed over rollers in a vertical direction and the heat is applied at the bottom, the paper passes alternately from a heated to a moist atmosphere, and the weight of the paper as it is suspended in a vertical or inclined direction is very liable to break it, and when broken cannot easily be arranged over the rollers, as some of them are so elevated; but with our arrangement these difficulties are entirely overcome, the paper passes gradually from a moist to a dryer atmosphere, being uniformly and rapidly dried, and as it passes over rollers horizontally

and is supported by them it is not so apt to be broken or injured in any way. The lids F and F′, by the rollers S and T, (shown in Figs. 2 and 3) can be raised to aid in putting the paper in and out of the drier. The pulleys on the rollers S M N O P are successively larger in the order in which they are named, so as to give the rollers a slower motion in order to compensate for the shrinkage of the paper in drying. Otherwise the very act of shrinkage, where the bearing-rollers moved with the same velocity, will rend the paper.

What we claim as our improvement, and desire to secure by Letters Patent, is—

1. The herein-described construction of a drier, consisting of an inclosed chamber provided with suitable openings, for the purposes specified, and which can be closed at pleasure, and having within said chamber the bearing-rollers placed in horizontal rows, and the successive sets so arranged in relation to each other and the points of introduction for the paper and the heated air that the paper will pass continually from a moist to a dry and heated atmosphere, as and for the purpose specified.

2. Moving the rollers S M N O P at decreasing velocities, for the purpose set forth.

3. The plates R and openings a' b', arranged as and for the purpose described.

N. W. TAYLOR.
J. W. BRIGHTMAN.

Witnesses:
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J. BRAINERD.