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Sheet 1

C. F. Bennett.

Cloth-drying Mach.

No. 49,947. Patented Sept. 12, 1865.

Fig. 1.

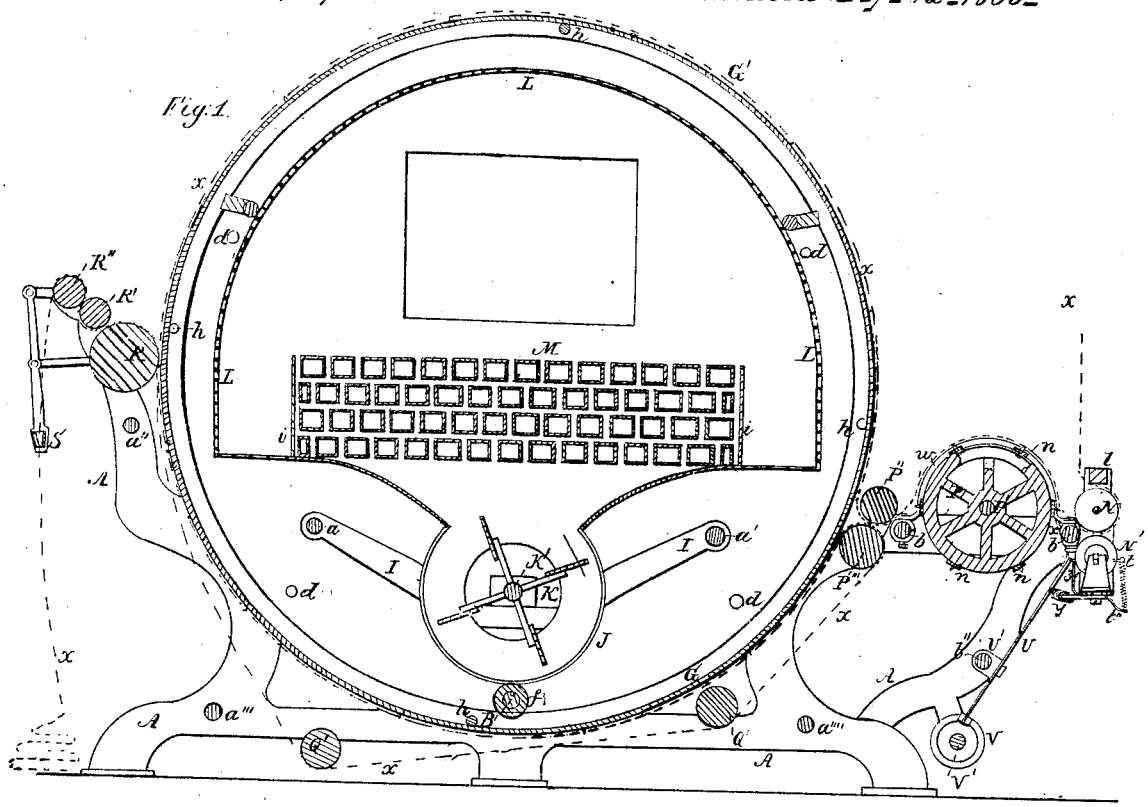
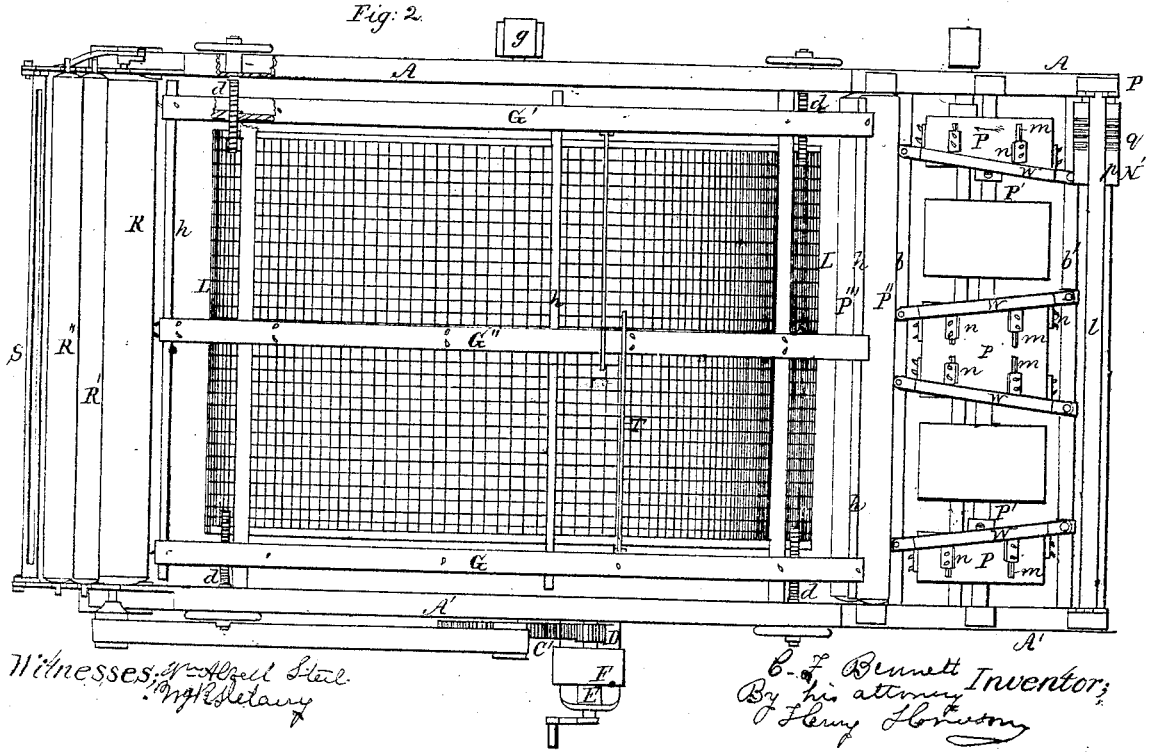


Fig. 2.



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Wm. R. Delany

C. F. Bennett Inventor;
By his attorney
Henry Howson

2 Sheets
Sheet 2

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Fig: 6.

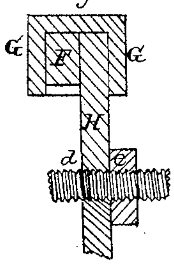


Fig: 3.

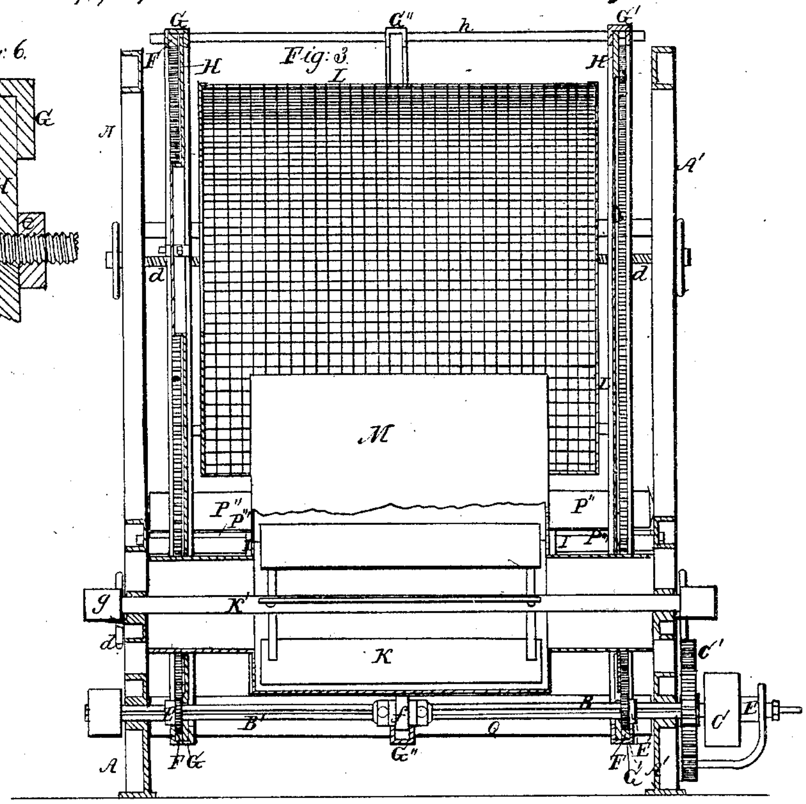
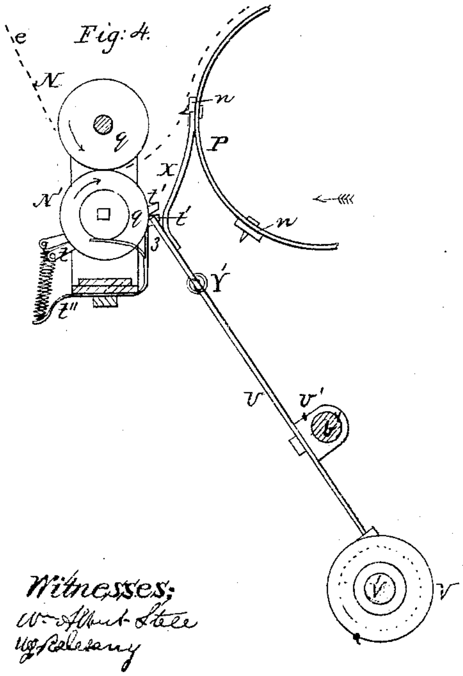
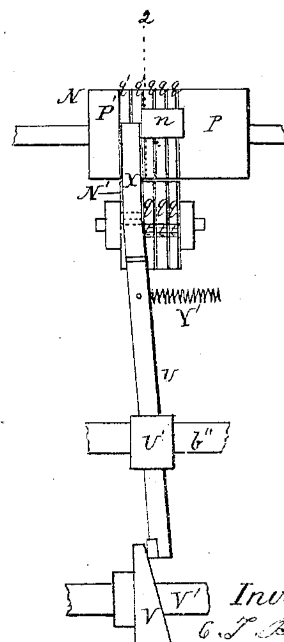


Fig: 4.





Witnesses;
W. Albert Steele
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UNITED STATES PATENT OFFICE.

CHARLES F. BENNETT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO MARIA BENNETT, OF SAME PLACE.

IMPROVEMENT IN CLOTH-DRYING MACHINES.

Specification forming part of Letters Patent No. **49,947**, dated September 12, 1865.

To all whom it may concern:

Be it known that I, CHARLES F. BENNETT, of Philadelphia, Pennsylvania, have invented an Improved Cloth-Drying Machine; and I do hereby declare the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to improvements in that class of drying-machines in which the cloth is carried over and caused to traverse with a cylinder while it is subjected to the action of heated air; and my said improvements, which are fully described hereinafter, have been designed with a view to a more rapid drying of the fabric than heretofore by causing the cloth to traverse entirely around a heating apparatus.

My improvements further consist of devices described hereinafter, whereby the cloth itself determines the position of the stretching-blocks on the tentering-wheels, and whereby the preliminary stretching of the fabric is effected without the aid of an attendant and without the tedious manipulation required by other machines.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1, Drawing No. 1, is a vertical section of my improved cloth-drying machine. Fig. 2, Drawing No. 1, is a plan view; Fig. 3, Drawing No. 2, a tranverse vertical section; Figs. 4 and 5, Drawing No. 2, detached views of part of the machine drawn to an enlarged scale; Fig. 6, Drawing No. 2, a detached sectional view of part of the machine.

A and A′ are the opposite side frames of the machine, and are connected together by the cross-bars a, a', a'', a''', b, b', and b''. In the opposite side frames turns the main shaft B, which is furnished at one end with a cog-wheel, C, into which gears a pinion, D, on the small driving-shaft E, Fig. 2. This shaft has a groove throughout its entire length, adapted for the reception of keys or feathers in the pinions E and E′, the former gearing into the internal teeth of a wheel, F, secured to the inside of a rim, G, and the latter into the teeth of a similar wheel secured to the inside of the rim G′. These rims are about eight feet in diameter, and are arranged to revolve on circular plates H. The manner of constructing this portion of the machine will be best observed on reference to Fig. 6, which represents a sectional view of the rim, circular plate H, and wheel F, the latter being arranged in segments, and being secured to the rim by suitable set-screws or bolts, and the edge of the plate H fitting snugly in the recess formed in the ring, but not too tight, so as to prevent the rim from revolving freely.

The plates H always remain in the same vertical position, but are adjustable laterally, each plate by means of four screw-rods, *d d d d*, each of which is arranged to turn freely in the side frame of the machine, but to have no other movement in the same, each screw being adapted to a nut, *e*, secured to the inside of the plate. (See Fig. 6.)

Midway between the opposite side frames of the machine is another rim, G″, which revolves with the exterior rings, but which can have no lateral movement owing to a wheel, *f*, the edge of which fits in the ring, and which is always maintained by collars in the same lateral position on the shaft B. (See Fig. 3.) Horizontal rods *h* are permanently secured to the central rim, but pass freely through and act as guides for the exterior rings, so that in turning the screws *d*, previously alluded to, either of the exterior rims may be adjusted farther from or nearer to the central rim.

Two rods, *a* and *a′*, have been referred to as assisting other rods in securing the two side frames of the machine together. To these rods *a* and *a′* (which pass through the end plates, H, so that the latter can slide freely on them) are secured two hangers, I I, Fig. 1. The latter supports the internal structure of the machine, which I will now proceed to describe.

A cylindrical casing, J, is secured to the hangers, and within this casing are the vanes of a fan, K, secured to a shaft, K′, which turns in suitable bearings on the side frames of the machine, on the outside of which the shaft is furnished with a suitable driving-pulley, *g*, each end of the casings having a tubular projection, and these projections passing through the end plates, H H, so as to form passages

for the admission of air to the fan. Another casing, L, of the form represented in Fig. 1, and made of wire-gauze or perforated plates, forms a part of and communicates with the casing J of the fan, and within this casing L are arranged a series of pipes, M, which, in the present instance, are of a square form, and communicate with each other so as to form a zig-zag or circuitous passage for a supply of steam admitted at one end of the passage and discharged at the other through suitable pipes. This system of heated pipes is surrounded by shield-plates *i*, so that the air forced by the fan must of necessity be brought into contact with the heated surface of the whole series of pipes before it gains access to the interior of the casing L, which is consequently furnished with a constant supply of heated air, the latter escaping through the meshes or perforations of the said casing, so as to impinge against the surface of the cloth, as will more fully appear hereinafter.

It should be understood that independently of the pinion F and F′ for driving the wheels and rims G and G′, the latter are steadied and their free movements on the plates H insured by additional pinions or guiding-rollers *j*, revolving freely on the shafts *d d*. The fabric *x* to be dried passes under the cross-bar *l* secured to the frames of the machine, (see Fig. 1,) between the rollers N and N′, thence over the tentering-wheels P on a shaft, P′, thence under the rollers P″, thence over and around the rims G, G′, and G″ to the rollers P‴, over the latter to the guiding-rollers Q and Q′, upward to the roller R, between the rollers R′ and R″, and thence through a slotted bar, S, at the lower end of a frame, to which is imparted, by any suitable mechanism, a vibrating motion, so that the dried cloth may be deposited on the floor in folds.

It will be understood that the rims G, G′, and G″ are furnished with a number of pointed projections or tentering-hooks, or with ordinary cards, by means of which the cloth is not only caused to traverse in the course pointed out, but is maintained tight laterally.

The machine is arranged for drying broad-cloth or narrow fabrics, two pieces of the latter being acted on simultaneously, and extending between one of the outer rims to the central rim, while the broader cloth extends from one outer rim to the other outer rim. It will be evident that these outer rims may be readily adjusted by means of the screw-rods *d* to suit fabrics of different widths. It will also be evident that the fabric must be subjected to the direct action of a volume of heated air as it is carried over the casing L.

In order to prevent the fabric from sagging, rods T are secured to the outer rims and project across the central rim, so as not to interfere with the lateral adjustment of the outer rims. There are three tentering-wheels on the shaft P′, the central one being what may be termed a "double" wheel, as seen in Fig. 2.

In the periphery of each wheel are cut a series of transverse slots, in which slide small blocks *n*, the latter having hooked projections for seizing the cloth.

Near one edge of each of the outer tentering-wheels and near each edge of the central or double tentering-wheel is a metal strip, W, arched so as to be in close contiguity to the wheel, and so secured to the stationary cross-bars *b b′* of the machine that they may be adjusted to any desired position longitudinally thereon, and made to assume any desired angle in respect to the tentering-wheels.

The rollers N and N′, between which the cloth passes in the first instance, are constructed in a peculiar manner, and form an important feature of my invention.

On the shafts of both rollers are secured, at intervals, pulleys or collars *p*, Fig. 5, and between the latter are a number of disks, *q*, which are permitted to revolve freely on the shafts, a series of these disks being arranged on both shafts at points where the edge of the fabric must pass, and being maintained in their proper position longitudinally on the shafts by the aforesaid collars *p*.

On reference to the enlarged views, Figs. 4 and 5, it will be seen that each disk *q* has two projections, *t* and *t′*, the former being connected by a spiral spring to the plate *t″* secured to the frame of the machine, and the spring tending to turn the disk in a direction contrary to that pointed out by the arrow, Fig. 4. The other projection, *t′*, of each disk is such that under circumstances described hereinafter it will arrest one movement of the lever U, which is hung to a block, U′, on the cross-bar *b″* of the machine, and to which a movement in one direction is imparted by a cam, V, on a shaft, Y′, and in the other direction by a spiral spring, Y″. At the upper end of the long arm of this lever is a bar, X, so situated as to act on the blocks *n* of the tentering-wheels in the manner described hereinafter.

In Fig. 5, which is a view of Fig. 4, looking in the direction of the arrow, the line 2 represents the edge of the fabric which is traversing in contact with the pulley *p* and the disks *q q q*, but is free from contact with the disks *q′ q′*, the latter, unaffected by the fabric, remaining stationary, and the springs consequently maintaining the projections *t′* elevated above the range of the vibrating lever U, but the disks *q q q* acted on by the traversing fabric are turned by the same to an extent permitted by a lip, 3, secured to the frame of the machine, and the situation of the disks *q* is such that their projections *t* will present obstructions to the lever U as it is moved by the spring Y″, so that the plate X of the lever cannot move the blocks *n* of the tentering-wheel beyond the point determined by the projections *t* of the disks, and this point is determined by the position of the edge of the fabric. Whatever may be the position of the edge of the fabric, therefore, the blocks *n* will be moved just so far that their

pins can penetrate it and no farther, each block being pushed back in succession by the lever, and the blocks being moved forward by contact with the inclined strips W as the tentering-wheels turn.

Tentering-wheels with sliding blocks have been heretofore used in connection with cloth-drying machines, the blocks having an unvarying movement, so that the constant adjustment of the fabric as it entered the machine to suit the blocks became necessary, and this adjustment demanded a constant and careful manipulation of the fabric, the necessity of which is obviated by the devices above described, which serve to stretch the fabric to a given width until it reaches the rims G, G′, and G″, although before it reaches the machine it may vary considerably in width.

In other cloth-drying machines the heating apparatus is detached from the machine and placed beneath the floor, an arrangement which results in the loss of heat and demands an excessive power to operate the fans for forcing the heated air to the cloth.

It will be evident that by causing the cloth to traverse entirely round and close to the heating apparatus in the manner described it must not only be dried more rapidly, but less power must be required to operate the fan.

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

1. The combination of two or more revolving rims, G G′, with the stationary plates H H, and the system of heating-pipes herein described, or the equivalents to the same, secured to the frame of the machine and arranged in respect to the said rims, substantially as and for the purpose herein set forth.

2. Constructing each rim with a recess in the inside for the reception of the wheel F and the edge of the stationary plate H.

3. The central rim, G″, and outer rims, G and G′, the latter being guided by the rods *h*, secured to the central rim, and being rendered adjustable to and from the latter by the screw-rods *d* or their equivalents, for the purpose specified.

4. The fan K and system of heating-pipes described, or their equivalents, the whole being secured to the frame of the machine and surrounded by the revolving rims, substantially as set forth.

5. The combination of the fan-casing J, casing L, of wire-gauze or perforated plates, system of heating-pipes, or their equivalents, and the shield I.

6. The combination of the rims G and G′, their internal wheels, F F, and pinions E and E′ on the grooved driving-shaft B.

7. The combination of the central rim, G″, with the retaining-wheel *f* on the driving-shaft B.

8. The tentering-wheels, P, with their sliding blocks *n*, in combination with the disks *q q* on the shafts N N′, and the devices herein described, or the equivalents to the same, whereby the position of the blocks before their hooks seize the fabric is determined by the position of the edge of the said fabric, for the purpose specified.

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

CHAS. F. BENNETT.

Witnesses:

HENRY HOWSON,

W. J. R. DELANY.