

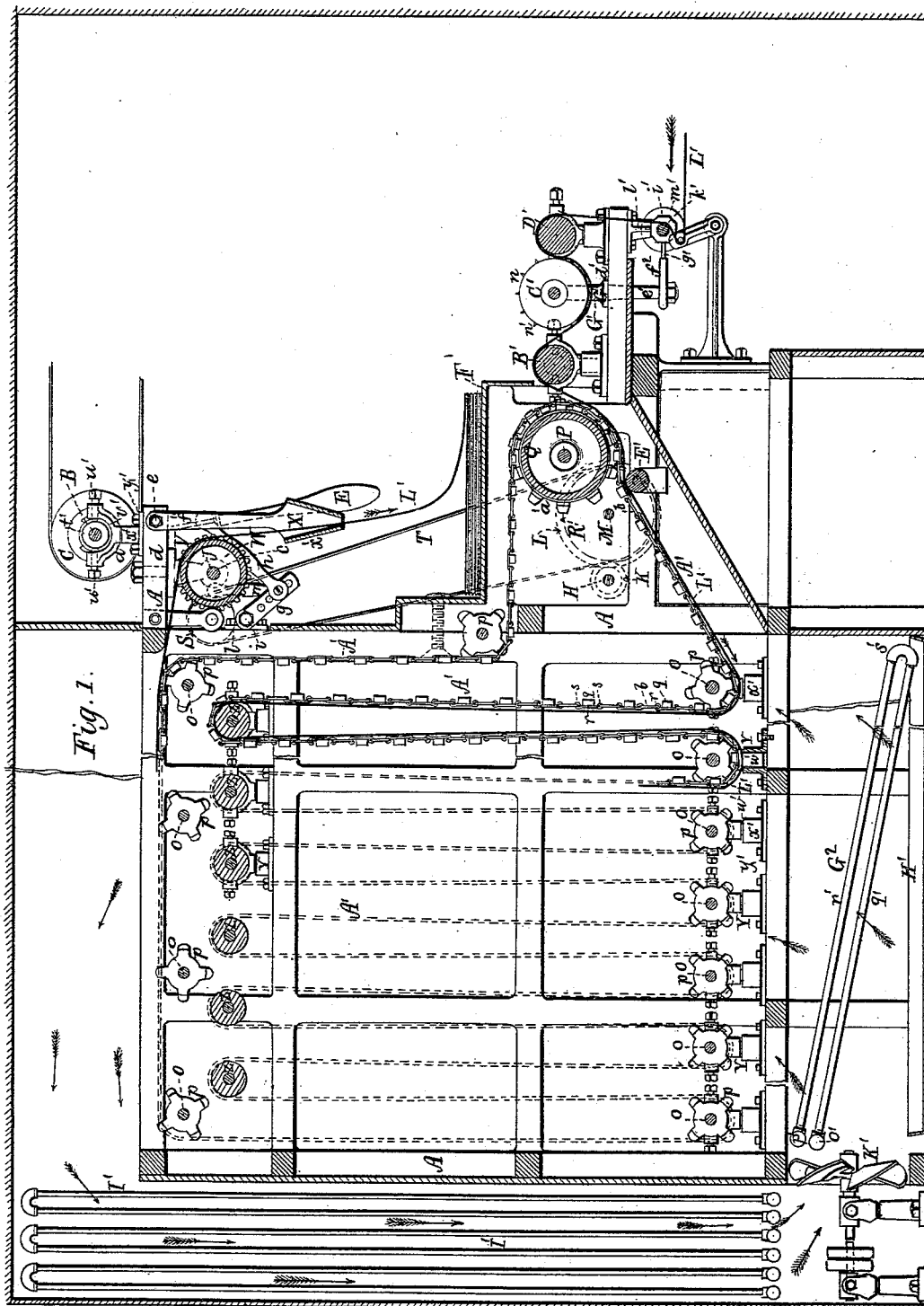
(No Model.)

3 Sheets—Sheet 1.

B. STETSON.
MACHINE FOR DRYING FABRICS.

No. 420,215.

Patented Jan. 28, 1890.



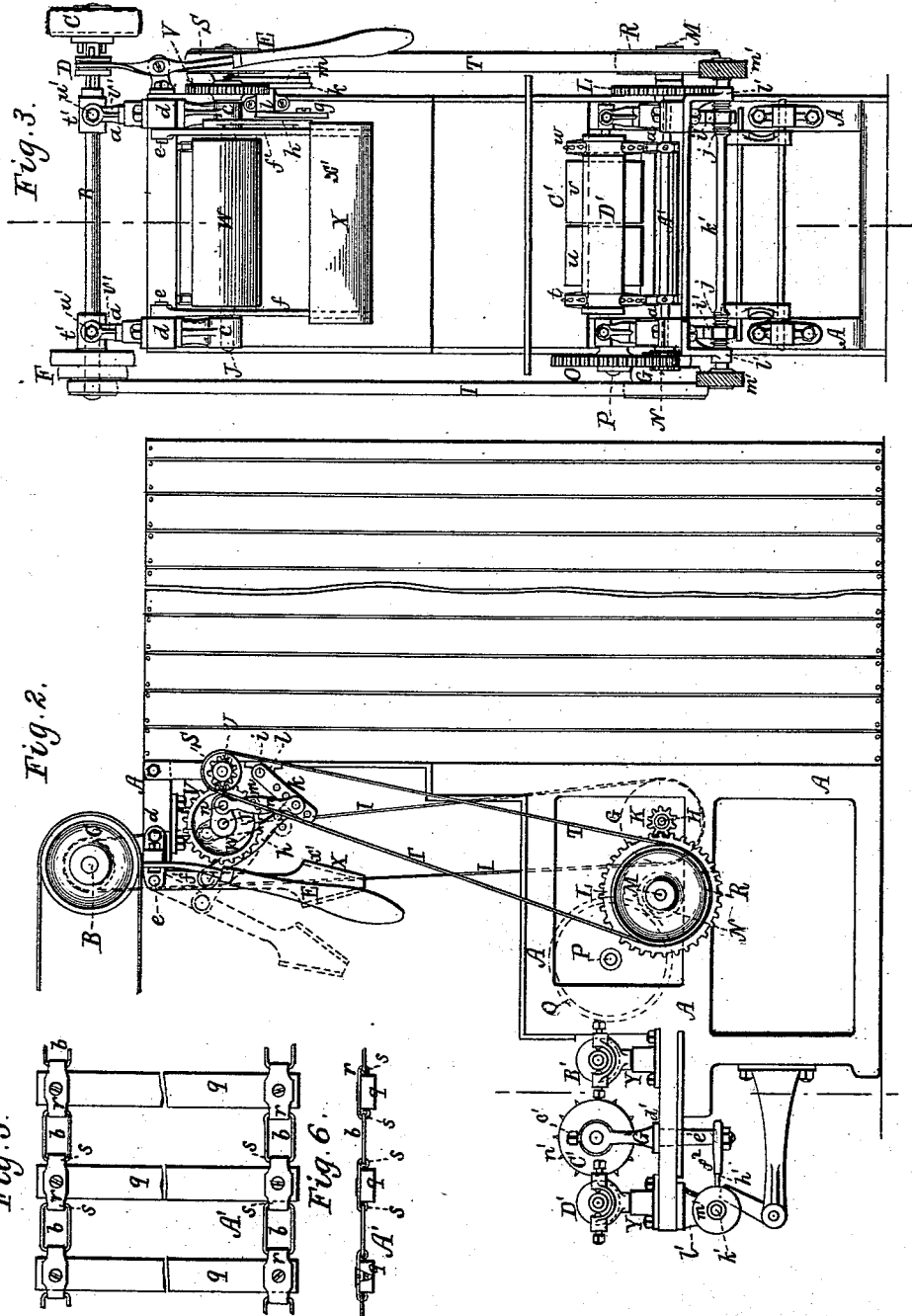
Witnesses
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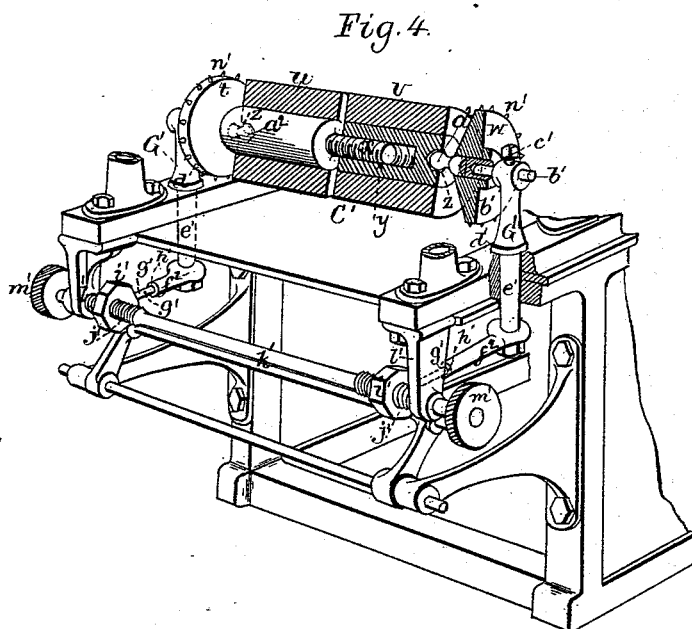
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UNITED STATES PATENT OFFICE.

BRADFORD STETSON, OF UXBRIDGE, MASSACHUSETTS.

MACHINE FOR DRYING FABRICS.

SPECIFICATION forming part of Letters Patent No. 420,215, dated January 28, 1890.

Application filed February 18, 1889. Serial No. 300,288. (No model.)

To all whom it may concern:

Be it known that I, BRADFORD STETSON, a citizen of the United States, residing at Uxbridge, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Machines for Drying Fabrics; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a broken longitudinal, median, and vertical section, Fig. 2 a broken side elevation, and Fig. 3 a front end elevation, of a drying-machine of my invention, Fig. 1 showing a heater, a blower, and a condenser arranged with said machine. Fig. 4 is a perspective and sectional view of the tentering devices and the mechanism for operating them, whereby said devices can be made to increase or diminish the width of the cloth, as may be desired. Fig. 5 is a top view, and Fig. 6 a side view, of a portion of the chain.

My invention relates to a new and useful machine for drying textile fabrics, warp-yarns, &c.; and it consists in arranging with said machine a heater, a blower, and a condenser, said fabrics or yarns being introduced into said machine and carried against and supported by a chain and rolls in their passage through it, and being subjected to a blast of dry heated air, which on being forced into the bottom of the machine passes into contact with a condenser, which receives the moist vapors from the air and renders it dry, said condenser being so constructed that there is a continuous flow through it of cool water, owing to which the temperature of the condenser is such that on the heated air being forced into contact with it the moist vapors in the air will collect and condense on the said condenser and drop therefrom into the trough underneath, while the air in the closed room, in which the machine is placed, is maintained at a high temperature, and after passing through the fabric and up through the machine is drawn downward through the

heater and forced again by the blower through the condenser and into contact with the fabric.

By the aid of my machine, which I will now proceed to describe, the drying of textile fabrics, warp-yarns, &c., can be carried on to great advantage and with the best results.

In the drawings, A denotes the frame of the machine.

B is the counter-shaft, supported in suitable bearings *a a* erected on the frame. On one end of the said shaft B and applied to it so as to revolve thereon is a clutch-pulley C, to which motion is imparted by a belt from a suitable motor. A clutch-sleeve D, splined to the counter-shaft, is connected to a lever E, pivoted to a projection from the frame, and by the lever said sleeve can be moved into or out of connection with the pulley C to put the shaft B into operation or to stop it. On the other end of the shaft B is a cone-pulley F, about which and another cone-pulley G, fixed on a shaft H, an endless belt I extends and imparts motion from the shaft B to the shaft H, on the other end of which is a pinion K, which connects with a gear L, fixed on a shaft M, supported in a frame. On the other end of the shaft M is a pinion N, which engages with and gives motion to a gear O, secured to a shaft P, on which is arranged within the frame a chain-drum Q, as represented. At each end of the said drum is a sprocket-wheel *a'*, the teeth of which enter the links *b b* of the binding-chain A', to be hereinafter described.

Fixed on the shaft M, outside of the gear L, is a pulley R, about which and a pulley S, sustained on a journal extended from the frame, is arranged an endless belt T. A pinion U, fixed to the pulley S, connects with a gear V, secured to the shaft J of a drum W, supported in bearings *c c*, extended from the frame. Pivoted to the upper bars *d d* of the frame at *e e* are the arms *f f'*, said arms having secured to their lower ends a guide *x'* of a vibratory folder X, to the said arm *f'* of which and to another arm *g* is jointed a link *h*. The arm *g* is fixed to a short shaft *i*, which has also another arm *k*, similar to the arm *g*, fixed to its other end, the said shaft

being supported in a bearing *l*, secured to the frame. A link *m* connects the arm *k* to a crank *n*, projecting from the gear *V*.

From the above it will be seen that motion is transmitted by the belt *T* from the pulley *R* to the pulley *S*, and from thence through the pinion *U* to gear *V*, then from the crank *n* through link *m*, arm *k*, shaft *i*, arm *g*, and link *h* to arm *f'* of the folder, whereby the folder is made to vibrate to fold the cloth on the table below it as the said cloth is fed through it from the feeding or binding chains *A'*. The arms *g* and *k* are each provided with a series of holes, whereby the swing of the folder can be increased or diminished to enable the width of the folds of the cloth to be varied, if desired.

Within the frame, which is closed at its ends and sides and open at the top, as represented, is a series of shafts *o*, each of which has arranged on it near each end of it a sprocket-wheel *p*, the series of said sprocket-wheels ranging with those marked *a'* on the shaft of the drum *Q*, hereinbefore mentioned. The journals of the said shafts *o* are supported in self-adjusting bearings *Y*, to be hereinafter described, as are also the journals of rollers *Z*, arranged in the upper portion of the frame and a short distance below the upper row of sprocket-wheels *p*, although some of the said shafts *o* and *Z* are represented in Fig. 1 as unprovided with said bearings. The bearings *Y*, which support the shafts of the machine, are constructed to swivel in horizontal and vertical planes, the boxes *t'* in which the shafts revolve being supported on pivots *u'*, screwed into the ends of a fork *v'*, having a journal *w'*, which enters a vertical socket *x'*, erected on a flange *y'*, through which bolts are screwed into the frame of the machine. The object of making the aforesaid bearings *Y* as described is to do away with friction resulting from the springing of the said shafts or warping of the rolls applied to said shafts, as in some cases wooden rolls are used, which sometimes warp, and were it not for the swivel-bearings would cause much friction. The journals *w'* of the bearings of the shafts *o*, both at the bottom and top of the machine, are connected to the sockets in which they swivel, so that they will not be drawn therefrom under the draft of the binding-chain *A'*, said connection not being shown in the drawings, as it is intended to make this bearing *Y* the subject of a separate application for patent.

The binding-chain *A'*, which is endless, receives its motion from the teeth of the wheels *a' a'* at the ends of the drum *Q*, partially around which it extends, and then passes under and over the series of sprocket-wheels *p*, and also over the rollers *Z*, as represented. It (said chain) is composed of a series of slats *g*, plates *r*, and links *b*. The plates *r* are each provided with two hooks *s*, and the ends of the said hooks, when the plates are secured to the slats, as shown in Fig. 5, rest against

the edges of the slats, as shown in Fig. 6, and hold the links *b* in connection with the hooks. By removing the screw which connects the plate *r* to the slat the links *b* can be readily disconnected from the hooks *s*.

In front of the drum *Q* are three rollers *B'*, *C'*, and *D'*, the middle one *C'* being of larger diameter than the other two, and is formed in four sections *t u v w*, as shown, its construction permitting of its length being varied as required to conform to the width of the cloth applied to it. The middle or body sections *u v* are adjustably connected to each other by a male screw *x* fixed to one section, and a female screw *y* formed in the other section. In the outer ends of the body-sections *u v* are sockets *Z*, which receive ball-shaped projections *a'*, extending inward from the end sections *t w*. The outer ends of the said end sections are also socketed to receive the slide-rods *b'*, supported in the heads of standards *G'*, so that they can be slid therein and into the sockets in the end sections and be confined to the heads of the standards by set-screws *c'*. The standards *G'* are each provided with a shoulder *d'*, which rests on the frame, and below said shoulder have a shank *e'*, which extends through the part of the frame on which the standard rests. Fixed to the lower ends of the said shanks are arms *f'*, socketed in their outer ends at *h'*, and into said sockets arms *g'* project from nuts *i'*, screwed on threads *j'*, formed on a shaft *k'*, and pitched in opposite directions. The shaft *k'* is supported in brackets *l'* fastened to the frame, and each end of the said shaft is provided with a hand-wheel *m'*, as represented. By revolving the shaft *k'* by means of the said hand-wheels *m'* the nuts *i'* will approach or recede from each other, which will turn the standards *G'* on their axes and incline the end sections *t w*, so that the cloth in passing from the roll *D'* under and against the sections of the roll *C'* and into contact with the tenter-points *n'* on the peripheries of the sections *t w* may have the width of it increased or diminished as desired, the inclining the said section *t w* in one direction causing the points to spread the edges of the cloth apart from each other, and the inclining them in the opposite way causing said edges of the cloth to approach each other, the width of the cloth when it leaves the tenter-points being preserved as it passes over the roll *B'* and down underneath and against the binding-chain *A'*, passing about the drum *Q* and between said chain and a roll *E'*, supported in the frame, and against said chain and between it and the rolls *Z* throughout the length of the machine, and finally is carried over and on the top of the chain to and over the drum *W*, and down through the vibratory folder *X* to and is laid in folds on the table *F'*.

The machine hereinbefore described is arranged in a closed room, the air of which is maintained at a high temperature, and in the lower part of said machine and under-

neath the chain A' is a condenser G², through which cold water is kept in circulation, it consisting of two pipes o' p', extending horizontally and widthwise of the machine, the former having a series of pipes q', connected to it and communicating through elbows s' with a series of pipes r', attached to the pipes p'. Said condenser is inclined, as shown, and underneath it is a trough H' to catch the drip caused by the moist vapors exhaled by the fabric collecting on said condenser.

Back of the machine and between it and the wall of the room is a series of pipes which constitute a heater I', and between said heater and the condenser is a blower K', operated by a belt from a suitable motor, said blower operating to keep the air in the room in constant circulation. It will be observed that the machine is closed in on all sides except at the top and at the point where the blower is located; also at the points where the cloth enters the machine and where it leaves the chain to wind around the drum W.

The cloth is shown at L', which, on being introduced into the machine, is in a wet state, and in following the course indicated by arrows in Fig. 1 is subjected to a constant blast of dry heated air forced against and through it by the blower K'. The air, after passing through the cloth and the machine, being laden with moisture, is drawn downward, around, and in contact with the pipes of the heater I' and reheated, and as it is drawn through the blower and forced by it between and against the pipes of the condenser the vapors or moisture in the air will collect and be condensed on the condenser and descend in a liquid form to the trough H', while the dry air is forced upward through the cloth, as before described.

By means of the mechanism hereinbefore described pieces of cloth or chains of warp-yarns can be thoroughly dried by passing through the machine, and in much less time than has heretofore been required to accomplish the same result.

Having described my invention, what I claim is—

1. The drying-machine, substantially as described, consisting of the drums Q and W and their supporting-shafts, the shaft B, and the intervening mechanism for operating said drums, comprising the pulleys F G R S, belts I T, gears K L N O U V, shafts H M, the chain A', the wheels a' a' on the shaft of the drum

Q, the sprocket-wheels p, shafts o, and rollers Z and E', all sustained by the frame A, in combination with the heater I', the blower K', and condenser G², arranged and to operate essentially as set forth and represented.

2. The folding mechanism, substantially as described, consisting of the guide x', arms f, f', g, and k, pivoted to the frame A, said arms g and k being each provided with a series of holes, the links h and m, the former pivoted to arms g and f' and the latter to arm k and crank n, in combination with the drums Q W and their supporting-shafts, the shaft B, and the intervening mechanism for operating said drums, comprising the pulleys F G R S, belts I T, gears K L N O U V, the said gear V having the crank N and shafts H M, the chain A', the wheels a' a' on the shaft of the drum Q, the sprocket-wheels p, shafts o, and rolls Z and E', all sustained by the frame A, the heater I', blower K', and condenser G², all arranged and to operate essentially as set forth and represented.

3. The tentering mechanism, substantially as described, consisting of the rolls B', C', and D', supported in bearings on the frame, the roll C' being formed in sections t u v w, the end sections being provided with pins, the middle sections u v being adjustable lengthwise relatively to each other by means of the male and female screws x and y and sustained on bearings extending from the end sections t w, the standards G', pivoted in the frame, slide-rods b', supported in the standards, the set-screws c', the socketed arms f², the nuts i', provided with arms g' to enter the sockets in arms f², the shaft k', having right and left screws j', and hand-wheels m', in combination with the drums Q W and their supporting-shafts, the shaft B, and the intervening mechanism for operating said drums, comprising the pulleys F G R S, belts I T, gears K L N O U V, and shafts H M, the chain A', the wheels a' a' on the shaft of the drum Q, the sprocket-wheels p, shafts o, and rolls Z and E', all sustained by the frame A, with the heater I', blower K', and condenser G², all arranged and to operate essentially as set forth and represented.

In testimony whereof I affix my signature in presence of two witnesses.

BRADFORD STETSON.

Witnesses:

S. N. PIPER,
ISRAEL B. TAYLOR.