

(No Model.)

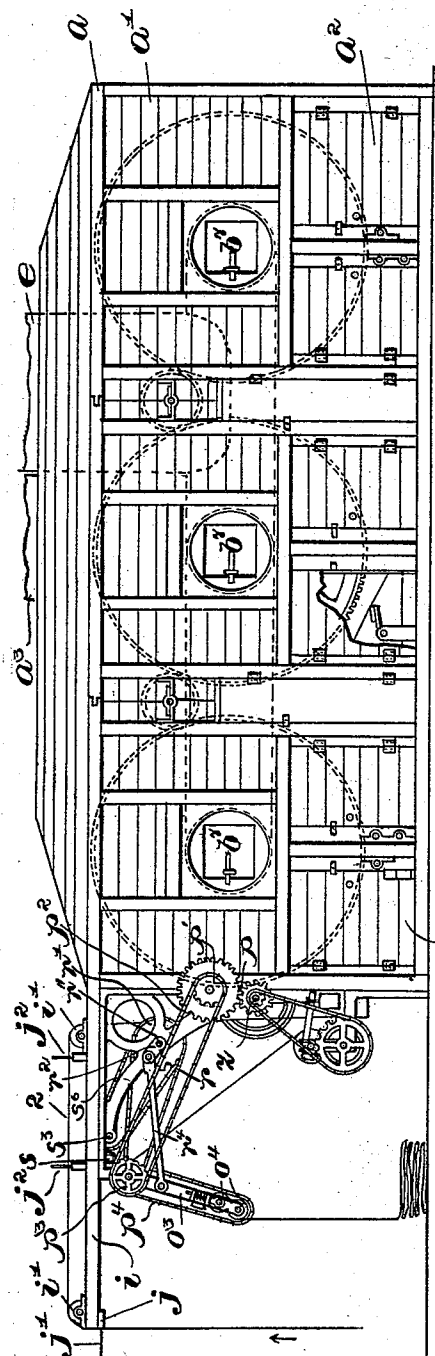
3 Sheets—Sheet 1.

G. R. BURNS.

APPARATUS FOR DRYING WARP THREADS.

No. 532,262.

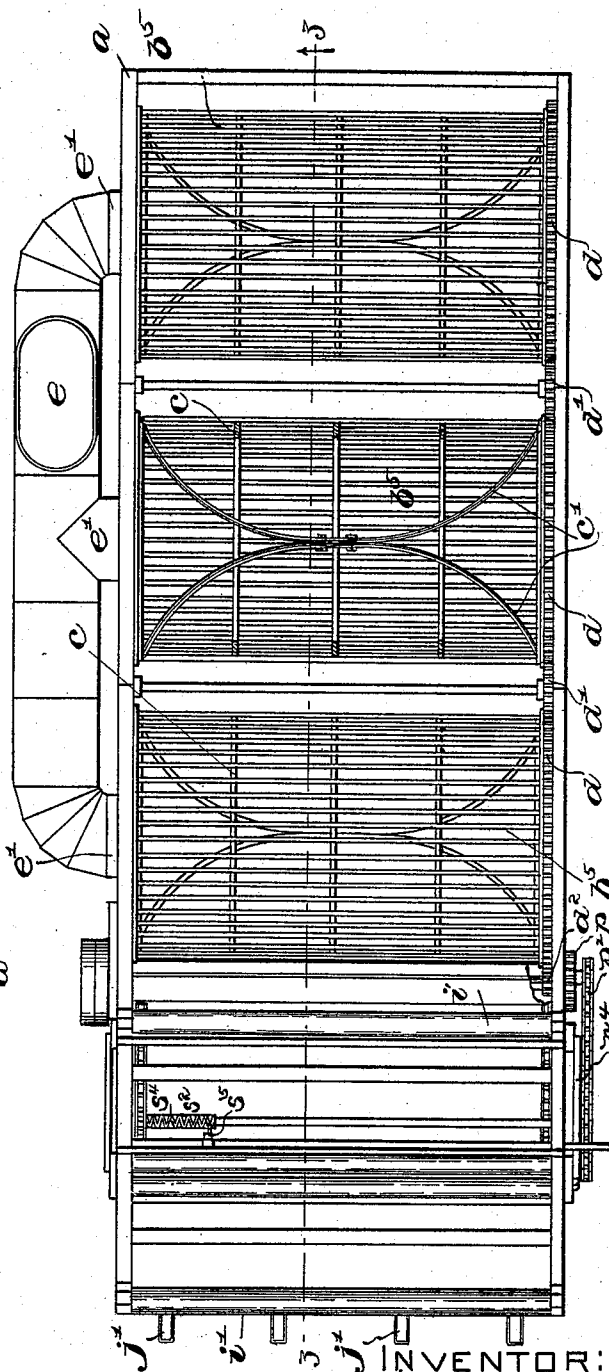
Patented Jan. 8, 1895.



WITNESSES:

A. D. Harrison
J. Davis.

FIG. 1



INVENTOR:

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FIG. 2

(No Model.)

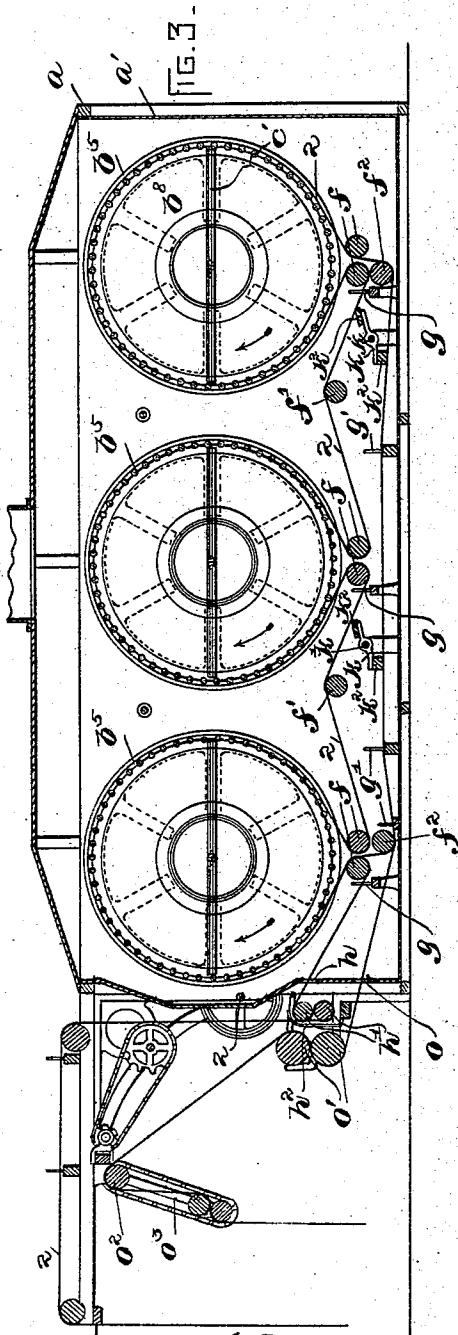
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G. R. BURNS.

APPARATUS FOR DRYING WARP THREADS.

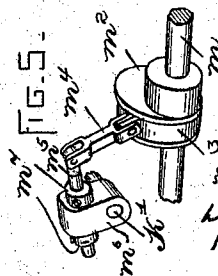
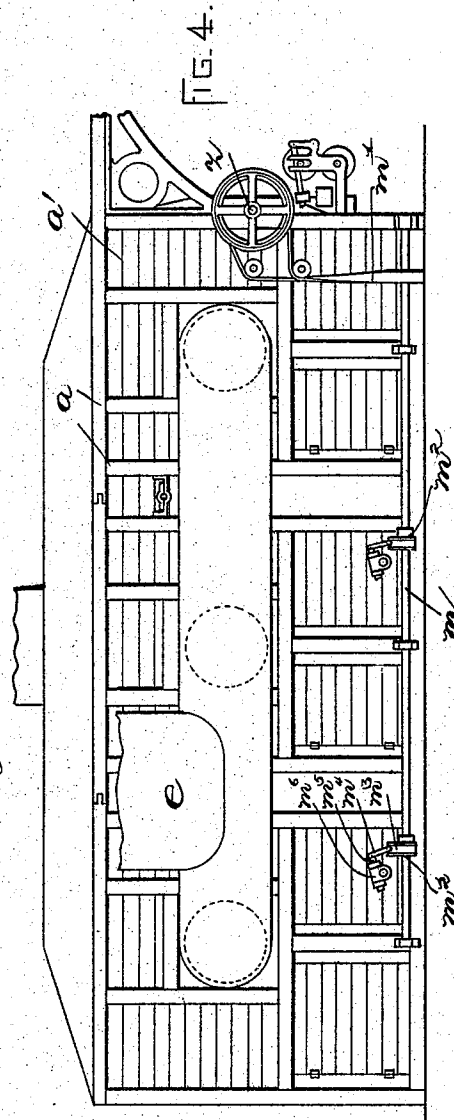
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FIG. 7.

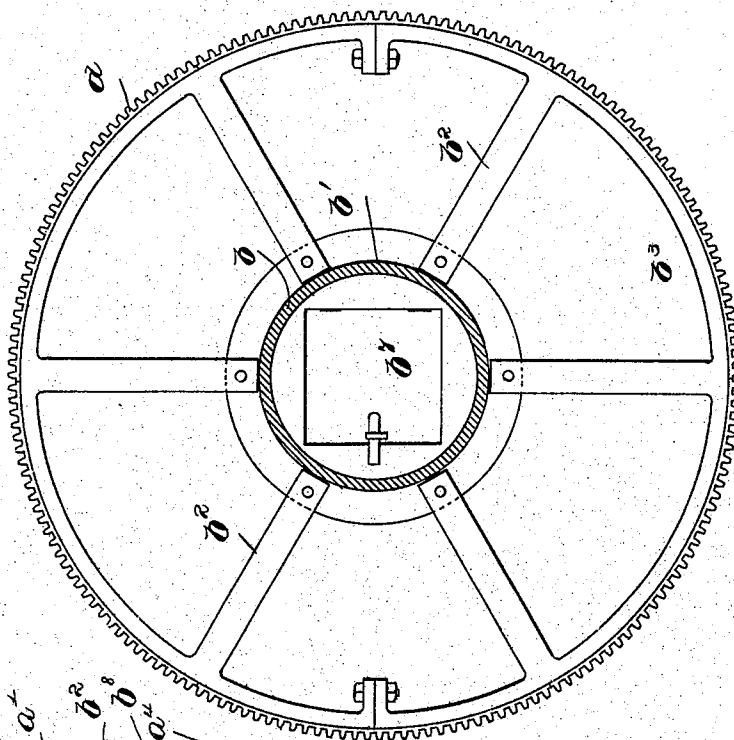
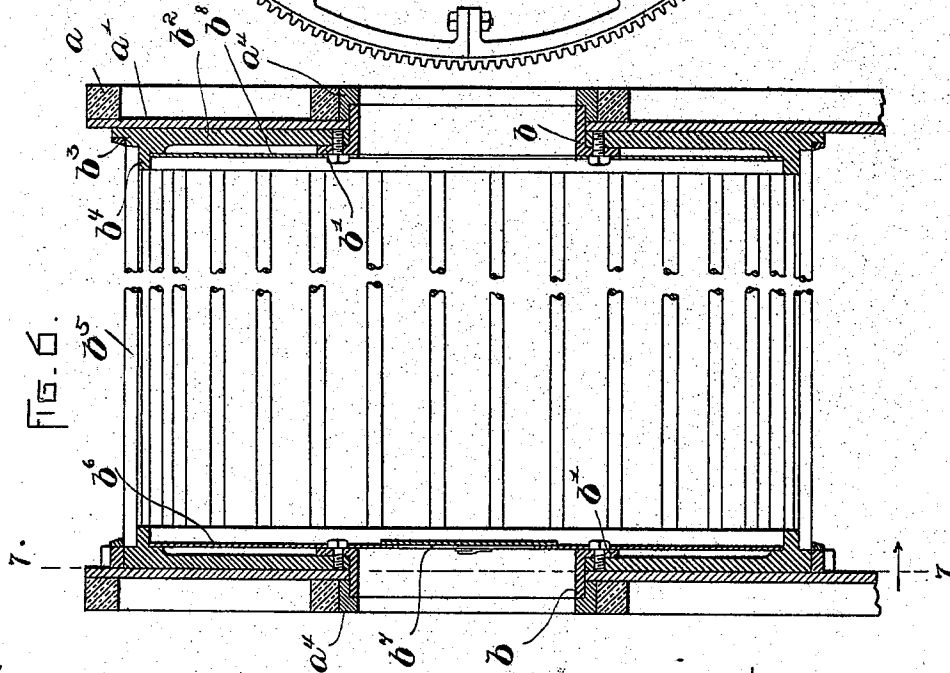


FIG. 6.



WITNESSES:

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INVENTOR:

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UNITED STATES PATENT OFFICE.

GEORGE R. BURNS, OF LAWRENCE, MASSACHUSETTS.

APPARATUS FOR DRYING WARP-THREADS.

SPECIFICATION forming part of Letters Patent No. 532,262, dated January 8, 1895.

Application filed July 18, 1894. Serial No. 517,883. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. BURNS, of Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Drying Warp-Threads, of which the following is a specification.

This invention has in view the provision of an apparatus which will dry the long threads employed for warps in fabric, in a more expeditious and satisfactory manner than heretofore, and to this end the invention contemplates the employment of one or more rotating slatted cylinders around which the threads are carried, and into which it is the design to introduce blasts of hot-air in such a way as to most effectively act on the threads.

The invention extends to a number of appurtenances to the above, including means for taking out the kinks occurring in the threads.

An apparatus embodying the invention is illustrated in the accompanying drawings which form part of this specification.

Figure 1 shows a side elevation of the apparatus. Fig. 2 is a top plan view with the top of the casing removed. Fig. 3 shows a longitudinal vertical section. Fig. 4 shows an elevation of the opposite side to that seen in Fig. 1, some of the parts being omitted. Fig. 5 shows a detail of means for imparting vibratory motion to certain beaters. Fig. 6 shows an axial section of one of the cylinders on a greatly enlarged scale. Fig. 7 shows a section on line 7—7 of Fig. 6.

The exterior casing of the apparatus is built up of beams, a , and sheathing, a' , and is preferably made in sections to facilitate shipment. Doors, a^2 , are provided at the lower part of the casing to permit ready access to the interior thereof for purposes of adjustment and repair. At the center of the top of the casing a flue, a^3 , is erected to take away the hot-air which circulates in the casing as hereinafter explained. Metallic bushings or bearings, a^4 , are fitted to openings provided in the casings and these bearings support the drying cylinders or drums whose trunnions are journaled therein. There are here shown three drying cylinders arranged in a horizontal row side by side, and each cylinder is of the following described construction: Trunnions, b , of annular form journal in the bearings, a^4 , and are formed

with flanges, b' , to which are bolted radial arms, b^2 , of skeleton heads, b^3 , for the cylinder. These heads are formed with annular flanges, b^4 , to which slats, b^5 , are secured, the said slats constituting the periphery of the cylinder and being separated so that spaces exist between all of them. The slats are preferably round in cross-section so as to present no sharp corners which might be injurious to the threads.

One end of the cylinder is completely closed by a plate, b^6 , fastened to the skeleton head and to the trunnion-flange, but a door, b^7 , is provided at the middle by which to gain access to the interior of the cylinder. The opposite end of the cylinder is partially closed by a plate, b^8 , but the latter is left open at the center so that a clear opening exists at all times through the trunnion at this end. Hot-air conducted into the cylinder through this opening impinges against the opposite closed head of the cylinder and rebounds therefrom, and such hot-air will distribute itself throughout the cylinder and passing outward between the slats will most effectually act upon matter lying on said slats.

Hoops, c , are provided in suitable number to properly support the slats throughout their length, and the cylinder is braced lengthwise by bowed pieces, c' , fastened at their ends to the heads of the cylinder, and fastened together at the middle.

The cylinder being of considerable diameter, the skeleton heads, b^3 , are made in sections, as shown. Each cylinder carries a gear, d , which is also made in sections, and which is secured in suitable manner to the periphery of one of the skeleton heads. These gears are connected through intermediates, d' , so as to cause rotation of the cylinders all in the same direction.

Hot-air is conducted to the interior of the cylinders through a pipe or flue, e , having branches, e' , entered loosely in the open ends of the cylinders so as to permit free rotation thereof.

The cylinders are driven by a small pinion, d^2 , on the driving-shaft, z , and meshing with one of the gears, d . Below each cylinder a pair of idle rollers, f , is arranged to hold the threads around as great a portion of the cylinder as possible, and between these pairs other rollers, f' , are arranged and are ele-

vated somewhat above the rollers of the pairs so as to hold the threads taut in the stretches thereof extending between the said pairs. Just below one of the rollers of each end-pair
 5 a roller, f^2 , is arranged so that the threads can pass readily between this roller and the other roller of the pair, and from which rollers, f^2 , the threads can be carried off out of the machine. At points adjacent to the rollers, f , rows of pins, g , are arranged to separate the threads, and similar rows of pins, g' ,
 10 are arranged at suitable points between the rollers, f^2 . The threads enter the casing through openings, h , therein, in front of which openings tension rollers, h' , are supported in suitable bearings, one of said rollers being suitably weighted so as to exert pressure on the threads passing between them. Thread-guides, h^2 , are arranged adjacent to the said
 20 rollers.

Beams, i , project horizontally from the upper part of the casing and support a pair of idler rollers, i' , over which the threads brought to the machine first pass.

25 The threads, 2, when brought to the machine are in a number of bunches or bundles and the machine here shown is adapted for four of such bundles,—a cross-bar, j , extending between the outer ends of the beams, i ,
 30 being equipped with four staple-shaped guides, j' , for the bundles of threads. The threads pass from the guides, j' , over the rollers, i' ,—other staple-shaped guides, j^2 , being provided between these rollers,—and thence
 35 are carried downward and under the lower roll, h' , and between the same and its mate and over the latter, and then through the openings, h , in the casing, the threads being still in their bundled form. After entering
 40 the casing the threads pass under the nearest roller, f , of the first pair and thence around the first cylinder, and under the other roller, f , of the pair, and in like manner these threads are carried around the other two cylinders.
 45 After passing around all the cylinders, the threads are carried back under the rollers, f^2 , and wound again around the cylinder, and this is repeated as many times as found desirable. The threads are finally led off from
 50 the rollers, f^2 , and out of the casing. The bundles of threads are spread out on the cylinders and all the threads are separated from each other in their passage through the apparatus. All the time that they are passing
 55 around the cylinders, each separate thread is subjected to the action of the hot-air which circulates through the cylinders and out between the slats thereof, and when the threads finally emerge from the casing they are thoroughly dried.
 60

An apparatus of the character above described is capable of handling a large quantity of material with great facility and dispatch, and the method of drying is not calculated to remove the gloss from the thread,
 65 as is found to be the case with some systems of drying.

For the purpose of removing kinks which occur in the threads the following described instrumentalities are employed: Between the stretches of thread passing over the rollers, f' , and the stretches extending from one roller, f^2 , to the other, I arrange what I term "beaters" to act against the threads in such a manner as to remove kinks occurring therein.
 75 Each beater is double-ended so as to act against the stretches of thread between which it is located, and said beater is constructed of arms, k , centrally affixed to a shaft, k' , journaled in suitable bearings on the bottom of the casing; and bars, k^2 , of wood or other suitable material fastened to said arms on opposite sides of the shaft. The beaters are constantly vibrated while the machine is in operation so as to cause the bars, k^2 , to beat up
 85 the threads and by a rubbing action thereon, to take out the kinks. The beaters are vibrated through the following described means: A shaft, m , extends along one side of the casing and is connected with the driving shaft, z ,
 90 by a belt, m' , and said shaft, m , carries eccentrics, m^2 , whose straps, m^3 , are connected by joints with links, m^4 . These links are jointed to rods, m^5 , which pass through arms, m^6 , affixed to the beater-shafts, k' , and are adjustably held lengthwise in said arms by collars,
 95 m^7 . By adjusting the rods, m^5 , the extent of vibration of the beaters is determined.

I have here shown mechanism for delivering the dried threads, but as this forms no part of the present invention, it will not be necessary to enter into a detailed description of it. A brief enumeration of the parts and their functions will suffice.

The threads pass out through openings, o ,
 105 in the end of the casing and are carried between tension rollers, o' , and thence up to and over a roller, o^2 , at the upper end of a swing-frame, o^3 , which carries at its lower end tension-rollers o^4 . The threads pass between
 110 these tension-rollers, o^4 , which are driven through the following connections with the driving-shaft, z . The latter is connected by gears, p , with a shaft carrying a sprocket-wheel, p' , and the latter is connected by
 115 chain, p^2 , with a sprocket-wheel, p^3 , on the shaft which forms the pivot of the swing-frame. Another sprocket-wheel on this shaft is connected by a chain, p^4 , with a sprocket-wheel on the journal of one of the
 120 tension-rollers, o^4 . A third sprocket-wheel on this same shaft is connected by a chain, r , with a sprocket-wheel, r' , on a shaft, r'' , carrying a crank, r^2 , which is connected by a rod or pitman, r^4 , with the swing-frame.
 125 Through these last described means the said frame is oscillated so as to lay the thread in coils in a well-known way. The threads are also moved sidewise so as to make them coil evenly without becoming entangled, the means employed being of the following description.

A laterally movable bar, s , is fitted to suitable guides adjacent to the roller, o^2 , and

equipped with pins, s' , between which the threads pass. An elongated enlargement, s^2 , on a shaft, s^3 , is formed with a spiral groove, s^4 , and an arm, s^5 , on the bar, s , engages said groove so that in rotation of the said shaft, s^3 , the bar will be moved longitudinally. The said shaft is connected by a chain, s^6 , with a sprocket-wheel on the shaft, r'' .

10 Having now described an embodiment of my invention, what I claim is as follows:

1. In an apparatus for drying warp-threads, one or more vibrating beaters arranged to act against stretches of the threads for the purpose described.

15 2. In an apparatus for drying warp-threads, one or more double-ended vibrating beaters arranged between stretches of the threads and adapted to act against the same, for the purpose described.

20 3. An apparatus for drying warp-threads comprising in its construction an inclosing casing having an exhaust-flue, a number of rotary slatted cylinders arranged side by side in said casing and connected by gearing, the said cylinders being closed at one end and
25 open at the other to receive a blast of hot air, rollers arranged in pairs below the cylinders and adapted to hold the threads around the

latter, and rollers arranged below the said pairs from which the dried threads are led away. 30

4. An apparatus for drying warp-threads comprising in its construction an inclosing casing having an exhaust-flue, a number of rotary slatted cylinders arranged side by side 35 in said casing and connected by gearing, the said cylinders being closed at one end and open at the other to receive a blast of hot air, rollers arranged in pairs below the cylinders and adapted to hold the threads around the 40 latter, rollers arranged below the said pairs from which the dried threads are led away, and vibrating beaters arranged to act on the stretches of thread extending between the pairs of rollers and between the rollers below 45 said pairs, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 14th day of 50 July, A.D. 1894.

GEORGE R. BURNS.

Witnesses:

C. F. BROWN,
A. D. HARRISON.