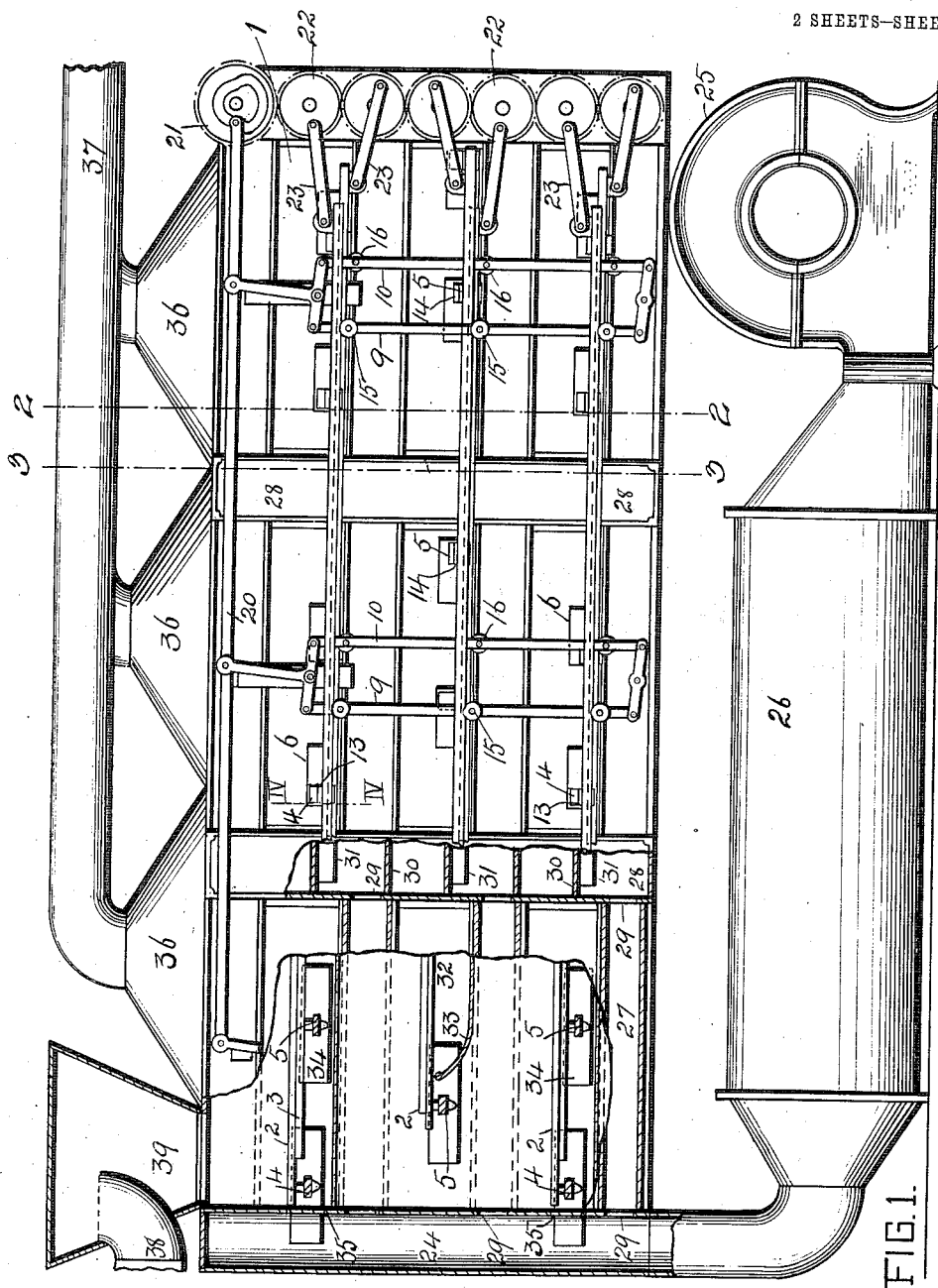


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MACHINE FOR DRYING WOOL AND OTHER TEXTILE MATERIALS.
APPLICATION FILED APR. 14, 1910.

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Patented Mar. 7, 1911.

2 SHEETS-SHEET 1.



Witnesses

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S. Whitford

Inventor

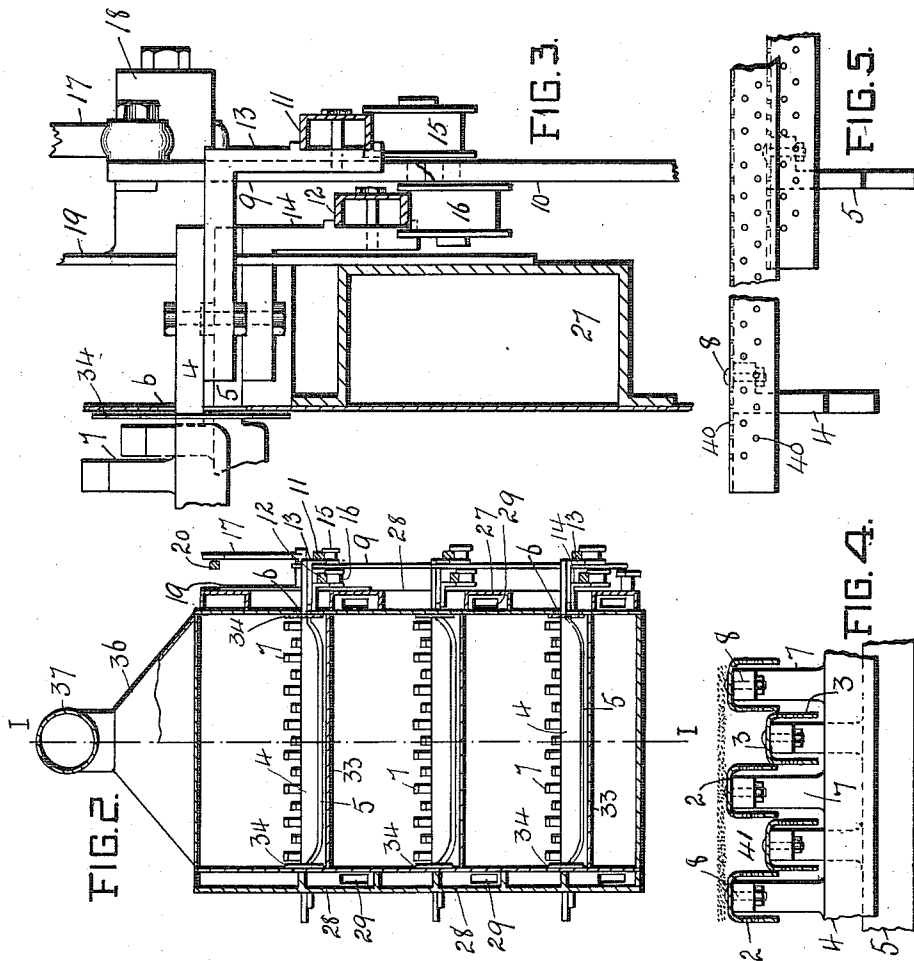
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UNITED STATES PATENT OFFICE.

JOHN FRANCIS WHITE, OF BRADFORD, ENGLAND.

MACHINE FOR DRYING WOOL AND OTHER TEXTILE MATERIALS.

986,253.

Specification of Letters Patent.

Patented Mar. 7, 1911.

Application filed April 14, 1910. Serial No. 555,381.

To all whom it may concern:

Be it known that I, JOHN FRANCIS WHITE, a subject of the King of Great Britain, residing at Bradford, Yorkshire, England, have invented certain new and useful Improvements in Machines for Drying Wool and other Textile Materials and the Like; 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.

This invention relates to improvements in drying machines for drying wool, textile materials and the like.

The object of the invention is to insure a quick and effective forwarding of the fiber through the machine and a more effective drying of the same, and with this object in view the forwarding tables are built up of sets of longitudinal members both of which sets of longitudinal members are given both horizontal and vertical reciprocations. In order to avoid rubbing between the longitudinal members and the underside of the layer of wool the horizontal and vertical reciprocating means are arranged independent one of the other so that these reciprocations as far as possible take place at different times the longitudinal members being for this purpose first raised, then forwarded, then lowered, then forced back and then raised so as to obtain what may be termed a "square" motion.

Another object is to more effectively dry the fiber by arranging chambers underneath the tables into which hot air is forced and in such a way that it can only escape up through the tables, that is to say, in a direction at right angles to the course in which the fiber is traveling on the tables. To enable this object to be better carried out the forwarding tables are formed with a number of channel irons which are perforated to allow of the hot air passing up through them, and at the same time are so arranged as to continuously and momentarily form a series of air chambers immediately under the fiber which air chambers are continually being closed and re-formed by the reciprocating action of the channel irons forming the upper part of the tables.

In the accompanying drawings Figure 1 is a side elevation of a drying machine constructed in accordance with the present invention with certain parts broken away to

allow of the interior arrangements being shown. Fig. 2 is a cross section of Fig. 1 of which that part to the right of the central chain dotted line I—I is taken on the line II—II of Fig. 1 and that on the left hand side of the chain dotted line on line III—III of Fig. 1, the mechanism for operating the channel irons being omitted in the latter case. Fig. 3 is a large detailed view of a portion of the channel iron operating mechanism taken on approximately the line IV—IV of Fig. 1 and looking toward the right. Fig. 4 is a fragmentary sectional end view of the forwarding tables. Fig. 5 is a side elevation of Fig. 4.

As shown in the drawings the apparatus consists of a casing 1 in which are arranged superposed traveling or forwarding tables for the fiber. These tables are built up of lengths of inverted perforated channel irons 2 and 3 (Figs. 1, 4 and 5). The channel irons are mounted upon two sets of (say three) cross bars 4 and 5, alternate channel irons 2 and 3 being connected to the different sets of cross bars 4 and 5 respectively, so that as these cross bars 4 and 5 are raised and lowered alternately the alternate channel irons 2 and 3 will also be raised and lowered alternately. The ends of the cross bars 4 and 5 project through the end of the casing 1 at each side and move in slots 6 arranged in the side of the casing 1. The cross bars 4 and 5 are each provided with upstanding lugs 7 on to which the inverted channel irons 2 and 3 are secured by suitable means such as bolts 8. The ends of the corresponding cross bars 4 and the ends of the corresponding cross bars 5 each carry elbow pieces 13 and 14 which are connected to horizontal rails 11 and 12 respectively which rails are supported by rollers 15 and 16 secured to vertical lift rods 9 and 10, the rails 11 and 12 being capable of horizontal reciprocation with the cross bars 4 and 5 as hereinafter described. The adjacent lift rods 9 and 10 are connected at their upper ends by means of an inverted T or double bell crank lever 17 which bears on a pin 18 projecting from a plate 19 secured to the casing 1.

As is shown in the machine set forth in the drawings there are three cross bars 4 and three cross bars 5 supporting the channel irons and there are naturally therefore three sets of adjacent lift rods 9 and 10 on each side of the casing necessitating the

employment of three inverted T or double bell crank levers 17 on each side of the casing. The levers 17 on each side the casing are connected at their upper ends to a cam rod 20 actuated by a double cam 21 having two diametrically opposed dwells whereby the cam rod 20 is held stationary for the greater part of the rotation of the cam and given a quick horizontal reciprocating motion at the diametrically opposite point where the two dwells on the cam connect. This cam rod 20 will naturally in its reciprocation cause an intermittent vertical reciprocation of the lift rods 9 and 10.

At the end of the casing 1 and preferably at that end at which the cam 21 above described is located and on both sides are a series of gear wheels 22 driven by any suitable means and gearing the one with the others or suitable interconnected driving means. There are arranged two gear wheels 22 on each side of the casing to each table or platform, that is to say, one gear wheel for each set of channel irons 2 and 3. These gear wheels 22 act as crank disks and carry connecting rods 23 which are connected to the different sets of channel irons 2 and 3 so as to impart independent horizontal reciprocating motion. The gear wheels 22 are so arranged relative the one to the others that the different sets of channel irons 2 or 3 in each table are always being reciprocated in opposite directions and so that the set of channel irons 2 or 3 which is momentarily raised by the lift rods 9 and 10 is always moved forward, that is to say, to the right in the drawings, while the set which is momentarily lowered is moved backward, that is to say, to the left in the drawings in the case of the uppermost table. The horizontal reciprocation of the cam rod 20 and therefore the vertical reciprocation of the lift rods 9 and 10 are so timed by means of the cam 21 that they take place when the connecting rods 23 are at the dead centers of the crank disks 22 so that the vertical reciprocations of the longitudinal members will take place when these latter are practically stationary as regards their horizontal reciprocation. The tables or platforms built up of the channel irons 2 and 3 are arranged so as to alternately project up to alternate ends of the casing so as to insure the fiber being traveled the length of each table before falling on to the next table as is usual in the present type of machine.

In the casing and at the end of the same there is arranged a vertical air duct 24 connected up to a suitable fan 25 and heating device 26. Branching off from this vertical air duct 24 are a series of horizontal air ducts 27 shown both in section and elevation in Fig. 1 and in cross section in Figs. 2 and 3. These air ducts 27 in their turn communicate with vertical air ducts 28 through

orifices 29 arranged in the side of the ducts 28. These ducts 28 are provided with a series of division plates 30 and also each with a further orifice 31, which latter communicates with an air chamber 32 formed under the respective forwarding tables and bounded by the sides of the casing, the under surface of the tables and a piece of sheet metal 33 arranged across the casing under each table. The ends of these sheet metal division plates 33 are turned up close to the end of the respective tables over which the fiber falls on to the table below substantially as shown in Fig. 1. In the drawing there are shown to be two vertical air ducts 28 on each side of the machine so that each hot air chamber will receive hot air through the orifices 31 on each side of the machine.

To prevent the escape of fiber and air through the slots 6 in the casing it is necessary to provide each of the cross bars 4 and 5 with plates 34 which move with the respective cross bars and are of such a size as to keep the slots 6 closed in all positions of the cross bar. The plates 34 at the ends of the machine work in slots 35 in the wall between the vertical air duct 24 and the main portion of the machine. The main casing in the arrangement shown in the drawings is provided with three domes 36 which are connected to a suction pipe 37 whereby air is removed from the casing. Also in the method shown in the drawings the feed is fed by means of a so-called exhaust box which consists of a pneumatic conveyer pipe 38 through which the fiber is blown and a perforated and closed funnel shape structure 39 which opens downward into the casing in known manner allowing the fiber to fall upon the uppermost conveying table. The channel irons 2 and 3 are provided with perforations 40 both on their sides and upper surfaces. It will be obvious that the air which is forced into the air chambers 32 can only escape upward through the tables and through the perforations 40, that is to say, up through the fiber at right angles to the travel thereof. The air which passes through the fiber located on the lower tables or platforms will escape in a course opposite to that in which the fiber is forwarded and pass over the top of the fiber on the upper tables until it escapes into the domes 36. The fiber is fed by the exhaust box 38, 39 into the machine and on the top or uppermost tables or platforms along which it will be led much more speedily and effectively than heretofore owing to both sets of channel irons 2 and 3 being reciprocated and owing to the table not being built up as heretofore of stationary channel irons and reciprocating bars.

It will be seen from the foregoing description and clearly shown in Fig. 4 that small hot air chambers 41 are continually

being formed for the whole length of the table under the layer of fiber resting thereon, the air from which is forced up through the fiber as the set of channel irons 2 momentarily higher than those 3, descend and those channel irons 3 ascend when a fresh series of small hot air chambers will be formed. The formation of air chambers such as 41 can also be brought about but to a more limited extent by having one of the sets of channel irons 2 or 3 fixed and the other set only given the necessary forwarding motion.

I declare that what I claim is:—

1. In machines for drying wool and other textile materials a casing, means for feeding material to said casing, means for supplying hot air to said casing and permitting the escape of hot air therefrom, forwarding tables, said forwarding tables comprising sets of longitudinal members, means for imparting a horizontal reciprocating motion to certain of said longitudinal members and means independent of said horizontal reciprocating means for imparting a vertical reciprocating motion to said longitudinal members.

2. In machines for drying wool and other textile materials a casing, means for feeding material to said casing, means for supplying hot air to said casing and permitting the escape of hot air therefrom, forwarding tables, said forwarding tables comprising sets of longitudinal members, rotating crank means and connecting rods connected to certain of said longitudinal members to impart a horizontal reciprocation thereto and rotating cam means connected to said longitudinal members, said cam means being timed to operate said longitudinal members when said connecting rods and crank means are at their dead centers.

3. In machines for drying wool and other textile materials a casing, means for feeding material to said casing, means for supplying hot air to said casing and permitting the escape of hot air therefrom, forwarding tables, said forwarding tables comprising sets of longitudinal members, cam means for simultaneously raising one set of longitudinal members and lowering the other set of longitudinal members, crank and connecting rod mechanisms adapted to force forward said longitudinal members when raised by said cam like means and to force back said longitudinal members when lowered by said cam like means.

4. In machines for drying wool and other textile materials a casing, a series of forwarding tables in said casing, each of said tables being arranged to permit of the passage of air up through them, a partition in said casing under each table and parallel with the upper surfaces of each table, said partition together with the sides of the cas-

ing and under surfaces of the tables forming compartments under each table; means for forcing hot air into each of the chambers formed by said partition substantially as described.

5. In machines for drying wool and other textile materials a casing, a series of forwarding tables within said casing, a fan, an air heater connected to the delivery end of said fan, an air duct leading from said heater to said casing, a series of horizontal air ducts on each side of the casing communicating with said air duct, partition plates in said casing under each of said forwarding tables, said partition plates together with the sides of the casing and the tables forming compartments under each of said tables, means connecting said horizontal air ducts with the compartments formed under the tables by said partition plates, means for permitting the escape of air from said casing.

6. In machines for drying wool and other textile materials a casing, a series of horizontal forwarding tables in said casing, partition plates forming hot air compartments under each of said tables, hot air ducts leading to each of the compartments formed as aforesaid, means for permitting the escape of hot air through said tables into said casing and away from said casing.

7. In machines for drying wool and other textile materials a casing, forwarding tables within said casing, perforated inverted channel irons comprised in said tables, means for operating said channel irons to forward material along said tables, a partition plate in said casing underneath each of said tables, said partition plates forming with the sides of the casing a compartment under each table, means for forcing hot air into the compartments formed as aforesaid.

8. In machines for drying wool and other textile materials a casing, forwarding tables in said casing, a plurality of inverted channel irons forming said tables, said plurality of channel irons being arranged in two sets and the channel irons of each set arranged alternately with the channel irons of the other set, cross bars supporting channel irons of one set and further cross bars supporting the channel irons of the other set, a horizontal rail on the outside of the casing and on each side connected to all the cross bars supporting one set of channel irons and a further rail outside the casing on each side of the same connecting all the cross bars of the other set of channel irons, a plurality of vertical lift rods on each side of the casing supporting the rails connected to one set of channel irons, a second plurality of lift rods on each side of the casing supporting the rails connected to the other set of channel irons, rocking members between the vertical lift rods of each set of

channel irons and means for rocking said members and imparting a vertical reciprocation to the lift rods and horizontal reciprocation to the rails together with means for imparting horizontal reciprocation to the channel irons and means for forcing a drying medium into the said casing.

9. In machines for drying wool and other textile materials a casing, cross bars arranged across and projecting through the sides of the said casing, duplicate means outside of said casing for imparting a horizontal and vertical reciprocation to said cross bars, one of the said duplicate means being connected to one half of the cross bars and the other half of said duplicate means being connected to the other half of said cross bars, means for supporting the material to be treated mounted on said cross bars and assembled to form a table and means for forcing hot air to said casing.

10. In machines for drying wool and other textile materials a casing, a plurality of superposed forwarding tables in said casing, a plurality of perforated parallel longitudinal members assembled together to form said tables, means for imparting to certain of said parallel members a vertical and horizontal reciprocating motion and means for forcing hot air up through said casing.

11. In machines for drying wool and other textile materials a casing, a plurality of superposed forwarding tables in said casing, a plurality of perforated parallel longitudinal members assembled together to form said tables, means for imparting to certain of said parallel members a vertical and horizontal reciprocating motion, partitions across the casing under each of said tables, air ducts leading to the space between said partitions and said tables and means for forcing hot air into said air ducts.

12. In machines for drying wool and other textile materials a casing, a plurality of superposed forwarding tables in said casing, a plurality of parallel longitudinal inverted channel irons assembled to form said tables, means connecting and supporting alternate of said channel irons, means for imparting to said connecting and supporting means vertical and horizontal reciprocations, means for supplying a drying medium to said casing and means for permitting the escape of the drying medium from the top of said casing.

13. In machines for drying wool and

other textile materials a casing, a plurality of superposed forwarding tables in said casing, a plurality of parallel longitudinal inverted perforated channel irons assembled to form said tables, means connecting and supporting alternate of said channel irons, means for imparting to said connecting and supporting means vertical and horizontal reciprocation, and means for forcing hot air up through the said tables.

14. In machines for drying wool and other textile materials a casing, a plurality of perforated supporting means for the material to be treated in the said casing, alternate of said supporting means being in sets and connected to and supported the one with the others, means for imparting independent reciprocating motions to the different sets of supporting means and means for supplying a drying medium to the said casing.

15. In machines for drying wool and other textile materials a casing, two alternate rails arranged along each side of said casing, anti-friction rollers supporting each of said rails, vertical lift rods supporting said anti-friction rollers, means for imparting vertical reciprocation to said lift rods, elbow pieces carried by said rails, cross bars arranged across said casing, and projecting through the walls of the same supported by said elbow pieces, upstanding lugs on each of said cross pieces, perforated inverted channel irons assembled to form a table for the material to be treated with the casing, means for supplying hot air to the casing and means for imparting a horizontal reciprocating motion to the said rails.

16. In machines for drying wool and other textile materials a casing, a plurality of superposed forwarding tables within said casing, means for operating said tables to forward the material resting thereon, horizontal air ducts built into and forming part of the sides of said casing, means for forcing hot air into said horizontal air ducts, means for permitting the drying medium to pass from said horizontal air ducts into said casing under each forwarding table substantially as described.

In witness whereof I have hereunto signed my name this 22nd day of March 1910, in the presence of two subscribing witnesses.

JOHN FRANCIS WHITE.

Witnesses:

HUBERT PUMPHREY,
CHARLES HIBBERT.