W. S. DUELL.

DRYING APPARATUS.

APPLICATION FILED MAY 3, 1909.

1,046,058.

Patented Dec. 3, 1912.

3 SHEETS—SHEET 1.

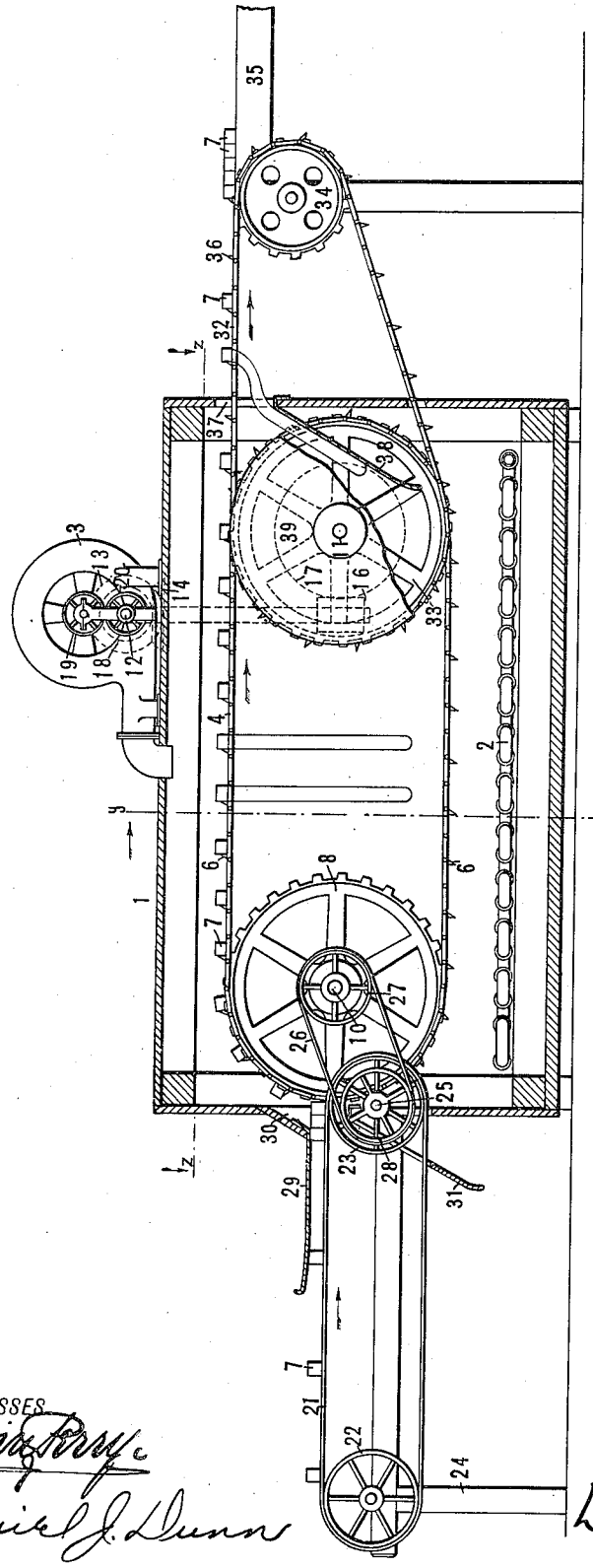

FIG. 1.

WITNESSES

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3 SHEETS—SHEET 2.

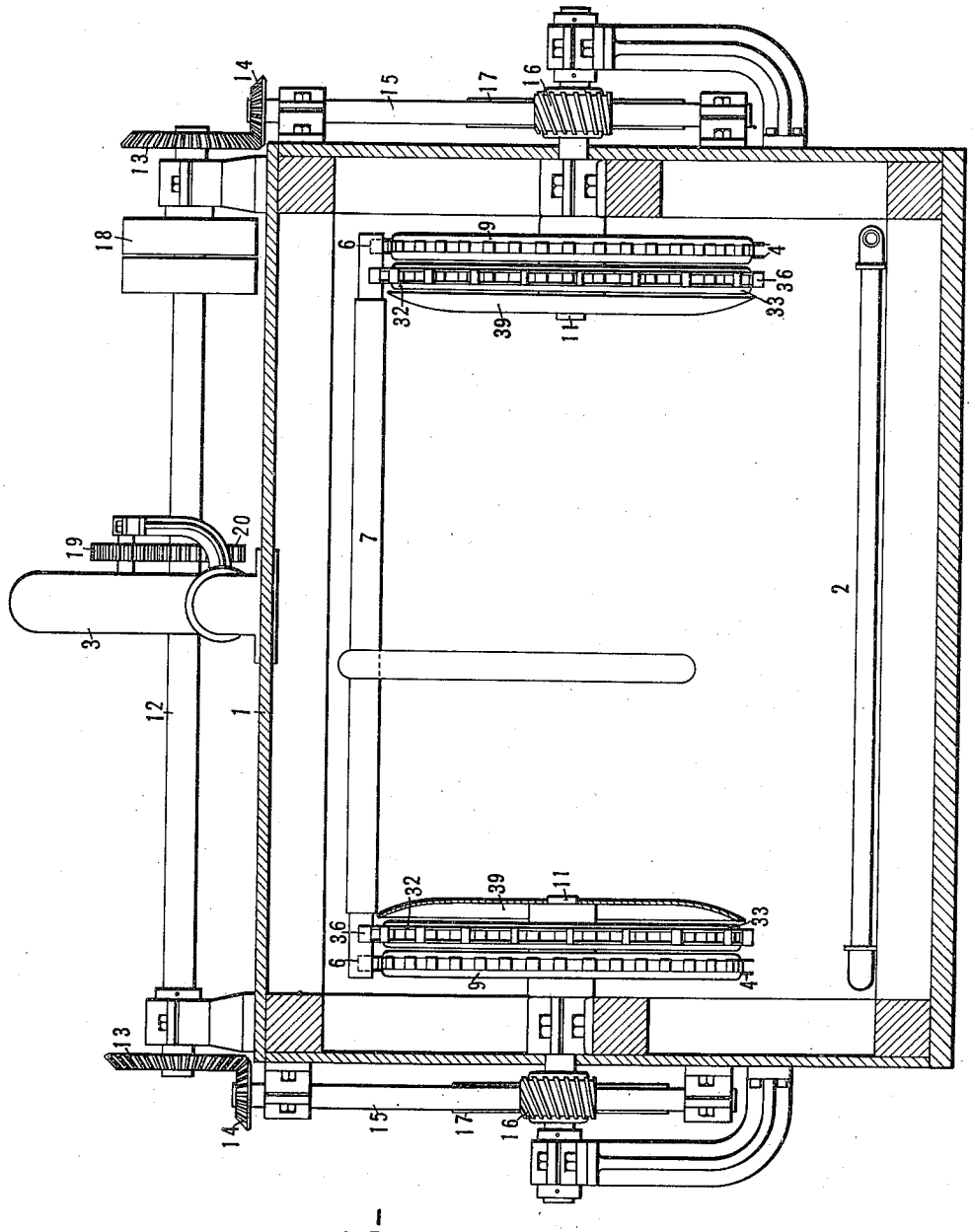

FIG. 2.

WITNESSES

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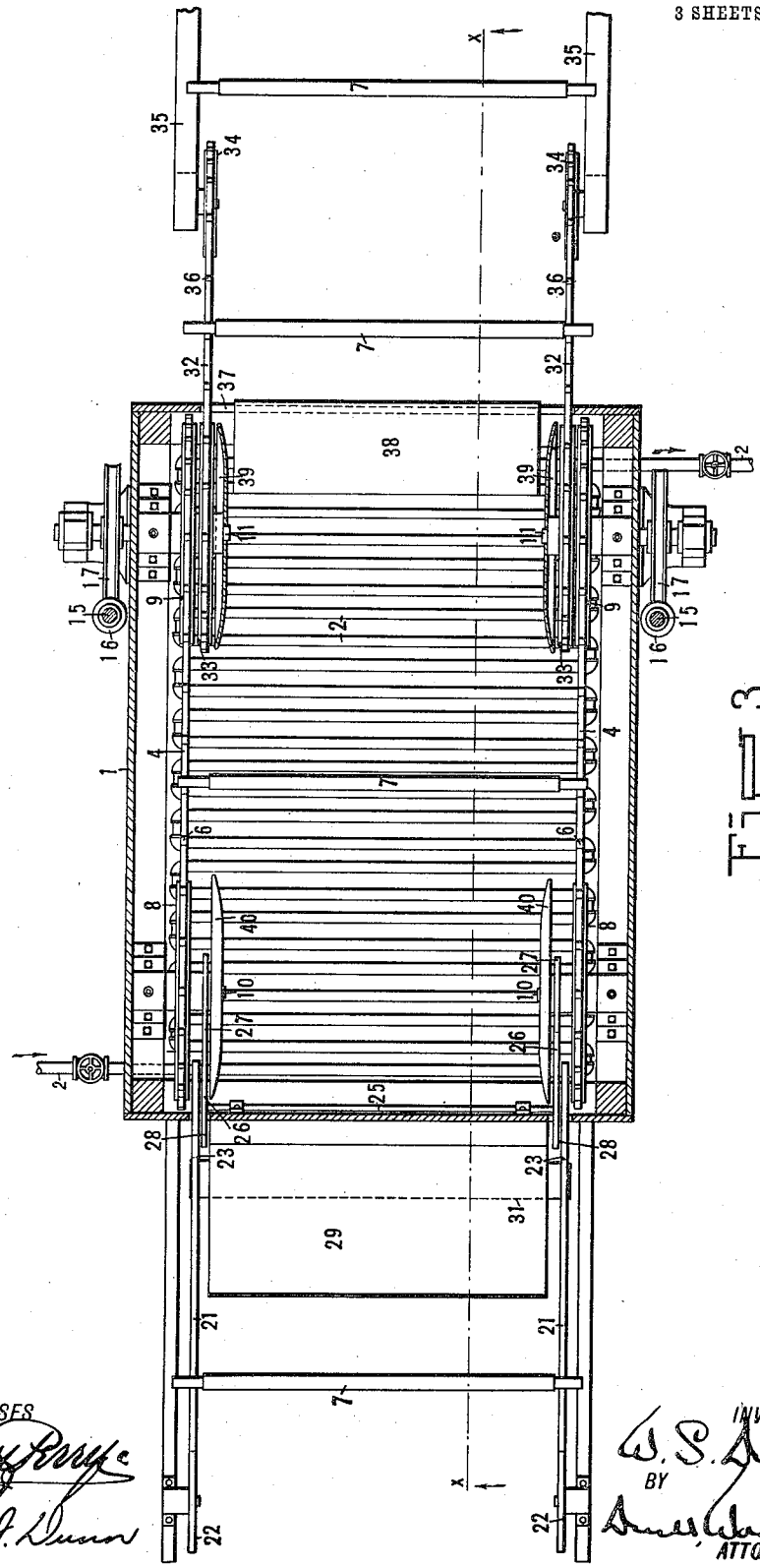

FIG. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM SACKETT DUELL, OF AMSTERDAM, NEW YORK, ASSIGNOR TO KLAUDER-WELDON DYEING MACHINE COMPANY, OF AMSTERDAM, NEW YORK, A CORPORATION OF NEW YORK.

DRYING APPARATUS.

1,046,058. Specification of Letters Patent. Patented Dec. 3, 1912.

Application filed May 3, 1909. Serial No. 493,705.

To all whom it may concern:

Be it known that I, WILLIAM SACKETT DUELL, a citizen of the United States, residing at Amsterdam, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Drying Apparatus, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to drying apparatus, and with regard to its more specific features to apparatus of this character adapted to be employed in the drying of skeined materials.

One of the objects is to provide practical and efficient apparatus of this character by means of which material is automatically fed into and discharged from a drying chamber.

Another object is to provide apparatus of the above nature in which the material will be automatically deposited upon a support after having been discharged from the drying chamber.

Further objects are to provide drying apparatus of economical, reliable and efficient operation and the construction of which is simple, inexpensive, and durable.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, wherein is shown one of various possible embodiments of the invention, Figure 1 is a longitudinal, sectional view of the apparatus taken on the line *x*—*x* of Fig. 3, one of the wheel guards being removed and the other one broken away for the sake of clearness; Fig. 2 is a vertical, sectional view taken on the line *y*—*y* of Fig. 1; and Fig. 3 is a sectional view taken on the line *z*—*z* of Fig. 1.

Similar reference characters refer to similar parts throughout the several figures.

Referring to the drawings, 1 indicates a drying chamber which may be constructed of any suitable material and which may be of any desired shape or size, having positioned therein heating means which, in the embodiment shown, consists of piping 2 adapted to be connected to a source of supply of a suitable heating medium, such as steam. A pressure fan 3 is preferably provided which is in communication with the interior of the chamber 1 for the purpose of causing circulation of the air therein.

Extending lengthwise of the chamber adjacent each of its sides are the endless conveyers 4, each of which, in the embodiment shown, consists of a chain provided with outwardly extending fingers 6 which are adapted to engage supporting members 7 upon which the material is carried, as hereinafter described. Each of the conveyers 4 passes around sprocket-wheels 8 and 9 fixed upon shafts 10 and 11 located adjacent the front and rear walls, respectively, of the drying chamber 1 and supported in any suitable manner. The conveyers 4 may be driven in any suitable manner, as by means of a driving shaft 12 which is provided at its outer ends with bevel-gears 13 meshing with bevel-gears 14 secured to vertical shafts 15. These shafts may be provided with worms 16 engaging worm-wheels 17 fixed upon the shafts 11 upon which the rear conveyer wheels 9, 9 are mounted. The shaft 12 may be driven in any suitable manner, as by means of a belt coacting with tight and loose pulleys 18. It will, of course, be understood that any other suitable means may be employed for actuating the conveyer chains, although the arrangement shown possesses many advantages. Pressure fan 3 is driven from shaft 12 by means of gear-wheels 19 and 20.

For feeding the material to the conveyers 4, a pair of endless conveyers or belts 21 are provided, which pass over pulleys 22 and 23. the former of which may be journaled upon supports 24 and the latter of which are preferably mounted upon the outer ends of a shaft 25 journaled upon the front wall of the drying chamber. These belts are driven by belt 26 upon pulleys 27 and 28 upon the shafts 10 and 25, respectively, as clearly shown in Fig. 1.

Members 7 upon which the material is suspended are held down upon belts 21 and prevented from overriding one another by a guard 29 which projects outwardly from the front wall, as shown in Fig. 1, and extends above the supporting members.

To reduce to a minimum the escape of the heated air from within the chamber 1, the opening 30 in the front wall through which the material is fed is so constructed that its height will be but little greater than the thickness of the members 7 and a guide plate 31 is provided adjacent the lower edge of the opening and inclined outwardly, as shown in Fig. 1. This plate may be constructed of any material which will provide a smooth surface, in order that as the skeins are carried thereover there will be no danger of their being deranged or torn. In this manner the skeins or other material are drawn, without being deranged, into the drying chamber through a small opening, thus avoiding an undue escape of the heated air and yet permitting a rapid action of the machine.

After the material has passed through the chamber and been dried, as hereinafter described, it is discharged therefrom by means of endless conveyers 32, each of which passes around sprocket-wheels 33 and 34, the former of which are preferably mounted upon the shafts 11 upon which the rear wheels 9 of the conveyer chains 4 are mounted, and these wheels 33 are preferably of the same size as the wheels 9. The wheels 34 are journaled upon a support 35 external to the drying chamber, as clearly indicated in Figs 1 and 3, and conveyers 32 are preferably formed of chains similar to conveyers 4 and are provided with outwardly extending fingers 36 for the purpose of engaging the members 7 upon which the material is suspended as hereinafter described.

The opening 37 in the rear wall, through which the material is discharged, is made comparatively small to prevent undue escape of the heated air and in order to prevent the material from engaging with the inner surface of the rear wall, a downwardly extending, inclined guide plate 38 is positioned within the chamber adjacent the lower edge of the opening, which plate is similar to the plate 31 secured to the front wall of the chamber and serves a similar purpose.

Shields 39 and 40, preferably in the form of a concave disk, are mounted upon the inner ends of the shafts 10 and 11 for the purpose of preventing the material from coming into engagement with the conveyer wheels. These shields may be formed of any suitable material and may be mounted to rotate with the shafts with which they are associated, or they may be mounted upon sleeves within which the shafts rotate, as desired.

The operation of the device, which should be largely obvious from the above description, is as follows: The material to be dried, which is preferably in the form of skeins, is suspended upon the supporting members 7, which may be sticks of wood, there being any suitable number of skeins carried by each stick. These sticks are placed upon the feeding conveyers 21, as indicated in Figs. 1 and 3, by means of which they are carried forward into the path of the fingers 6 upon the conveyer chains 4, by which fingers they will be picked up one by one and carried through the drying chamber 1, as indicated in Fig. 1. The skeins are thus drawn through the small opening into the drying chamber and are positively guided in such manner that the machine may be run at a high speed without danger of tearing or entangling the same. The speed of the conveyers 4, 4 and the length of the drying chamber are so arranged and proportioned that the material will be completely dried during its travel therethrough. When the members 7 upon which the material is supported reach the rear end of the chamber, they will be removed from the conveyers 4 by the fingers 36 upon the discharge conveyers 32, 32 and drawn over plate 38 through the small opening 37 in the rear wall to the support 35 upon which they will be deposited and, as indicated in Fig. 1, from which they may be removed at will.

It will be seen from the above description that the apparatus is extremely simple in its construction and operation, and that the material will be fed into the drying chamber, carried therethrough and discharged therefrom upon the support automatically, thus materially reducing the amount of manual labor required. It will also be seen that by employing small openings in the front and rear walls and the guide plates associated therewith the amount of heated air which escapes from the chamber is comparatively small and practically negligible, thereby insuring a great saving in the amount of the heating medium which is used. Furthermore, the material is fully protected from contacting with the walls of the chamber or with the mechanism during the entire operation, thus avoiding all danger of tearing or otherwise mutilating the same.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I

claim as new and desire to secure by Letters Patent is:

1. In an apparatus of the class described, in combination, a completely inclosed drying chamber, endless conveyers adapted to support the material to be dried within said chamber in a freely suspended state and to convey it therethrough, said chamber being provided with an opening in one of its walls, the height thereof being less than the length of the suspended material, forwardly extending means for preventing the material from contacting the wall in which said opening is formed, and endless feeding conveyers without said casing passing through said opening for feeding the material to said first mentioned conveyers, said first mentioned conveyers being provided with fingers adapted to remove the material from said feeding conveyers.

2. In an apparatus of the class described, in combination, a drying chamber, traveling means adapted to support the material to be dried therein, a conveyer outside of said chamber for feeding material to said traveling means, said chamber being provided with an opening in the wall operatively related to said means and conveyer through which the material is adapted to pass, a rigid guard positioned beneath said opening and adapted to support material as it passes therethrough, a second conveyer at the opposite end of said chamber for removing material to be dried from the said traveling means, and a stationary support for receiving the material from said second conveyer.

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

W. SACKETT DUELL.

Witnesses:
HENRY P. PUTNAM,
BURTON FISHER.