

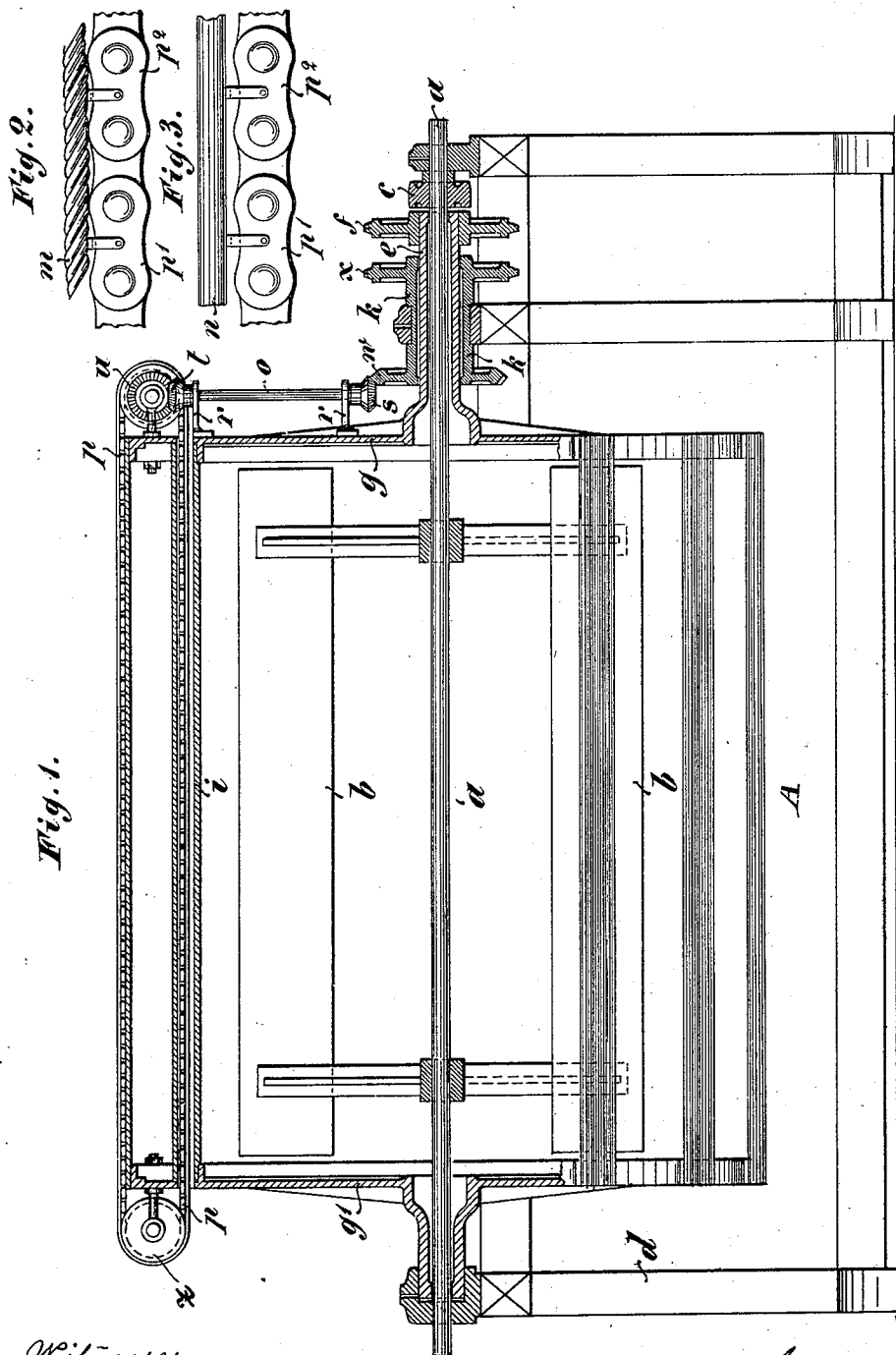
F. GILLI.

DEVICE FOR DRYING WARPS, YARNS, OR THE LIKE.

(Application filed Dec. 3, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:
William Schulz.
John Hickman.

Inventor:
Francesco Gilli
by his attorneys
Roeder & Breuer

No. 680,037.

Patented Aug. 6, 1901.

F. GILLI.

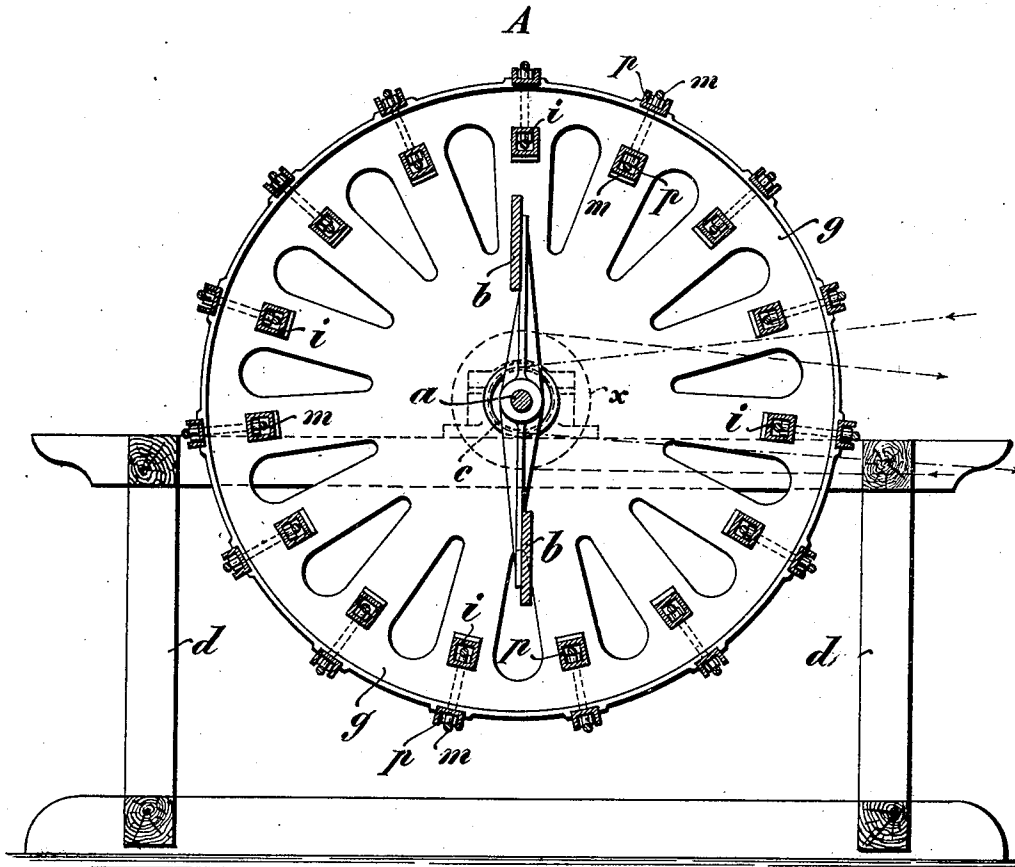
DEVICE FOR DRYING WARPS, YARNS, OR THE LIKE.

(Application filed Dec. 3, 1900.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANCESCO GILLI, OF FLORENCE, ITALY.

DEVICE FOR DRYING WARPS, YARNS, OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 680,037, dated August 6, 1901.

Application filed December 3, 1900. Serial No. 38,527. (No model.)

To all whom it may concern:

Be it known that I, FRANCESCO GILLI, manufacturer, a subject of the King of Italy, residing at Via Vigna Nuova 19, Florence, Italy, have invented a certain new and Improved Device for Drying Warps, Yarns, or the Like, of which the following is a specification.

This invention has reference to a machine or device for the drying of sized, glued, or dyed or otherwise moistened warp-threads, yarns, rovings, or similar material after it has undergone the sizing, dyeing, mercerizing, or bleaching process. My invention is especially distinguished by the combination of longitudinally-moving conveyers for the said warps or yarns with a drum rotating transversely to the direction of movement of the said conveyers, any suitable number of which may be arranged upon the surface of the said drum and combined with a fan or other suitable means for effecting the drying of the material wound upon the drum and upon the conveyers arranged upon its surface.

My invention is illustrated in a preferred form of construction on the accompanying drawings, in which—

Figure 1 is a part view and part longitudinal section of the apparatus. Fig. 2 is a detail of portion of the conveyer. Fig. 3 is a similar view of a modification of the conveyer, and Fig. 4 a vertical transverse section of the apparatus.

In the processes heretofore in use for the drying of warps and yarns the entire output of one day's work was hung up to dry at nights or was conducted over heated drums of considerable length, which necessitated very extensive buildings and a great expense both as regards fuel and labor. These methods presented, moreover, the inconvenience that only a limited amount of material could be worked, inasmuch as it was impossible to so combine the drying with the preliminary sizing, dyeing, bleaching, or mercerizing process that the material could be dried as fast as it entered the previous stages of its treatment. This is effected by my invention, whereby I am enabled to carry the whole process on continuously, the drying being so regulated that the material is leaving the drying apparatus in the same ratio in which

it is fed from the previous treatment. I thus do away entirely with the necessity of providing large buildings for effecting the drying, as was the case before my invention, and I avoid any interruption of work after the material has left the sizing, mercerizing, dyeing, or bleaching apparatus, and I do not need to provide special drying-rooms for carrying on the drying process.

In carrying my invention into effect I prefer to provide a drum with suitable perforations or a reel A, in the interior of which I arrange a fan or ventilator b, which in connection with a current of dry air serves to dry the warps, yarns, rovings, or similar material which is put upon the said reel or drum.

a is the shaft of the fan or ventilator, which receives its movement from a pulley c and is rotated freely within the hollow shaft e of the reel or drum A. Upon the said hollow shaft e is keyed the skeleton wheel or pulley f, which, through the shaft e, rigidly connected with the head g of the reel or drum A, imparts motion to the latter independently of the rotation of the fan or ventilator. Stays or uprights r are attached to the front side of the head g of the reel or drum A and serve as journals for the vertical shaft o, to the ends of which are attached the bevel gear-wheels s and t, respectively, the bevel gear-wheel t engaging with a gear-wheel u, keyed to the shaft of a chain-wheel or skeleton wheel, the rotation of which will cause the movement in a longitudinal direction of the endless chain p. These chains are passed around vertical rollers z at the extremities of the drum or reel A and are moving in guide-tubes formed on the surface of the reel or drum. The bevel gear-wheel s, which is keyed to the other extremity of the shaft o, engages with a bevel gear-wheel w on a sleeve k, surrounding and freely rotating upon the hollow shaft e of the reel or drum A by means of a chain wheel or pulley x, mounted upon the sleeve k. The wheels or pulleys x f c are driven from a common source and independently of each other, so as to be able to change the rotation of the reel and of the ventilator, and thereby vary the advance movement of the chain p according to the nature of the material under operation. The chains p are made up of several links pivotally connected with

each other in the manner of the so-called "Gall" chain and form each an endless conveyer, which is moved within its guides *i* by the rotation of the wheel. A suitable number of these endless chains or conveyers *p*—fifteen in the present instance—are arranged upon the surface of the reel or drum *A* and are driven by as many bevel gear-wheels *u* and *t* and shafts *o*, respectively, to all of which motion is imparted by the said skeleton wheel or pulley *x*. Only one of the said endless chains and connecting parts is shown in the drawings for the sake of clearness of illustration. On top of the endless conveyer-chains *p*, two links of which, *p'* *p''*, are shown in Figs. 2 and 3 of the drawings, I fix a flexible endless band or rope, preferably a rubber band *n* or a rope *m* of suitable flexible material.

The device operates as follows: Inasmuch as the direction of movement of the endless conveyers and of the rotating reel or drum *A* are at a right angle to each other, it is obvious that the warps, yarns, or the like after they have undergone their preliminary treatment will be laid in spirals upon the surface of the said reel or drum, and since the movement is a uniform continuous movement the distance of each of the coils of the spirals will always remain constant. The threads will remain on the reel until the whole surface of the same has been covered with the spirally-wound thread, all the coils of which are constantly moved toward the opposite extremity of the reel by the action of the endless conveyers without changing their position upon the said conveyer. The threads are thus kept in the same relative position in which they were first put upon the reel until they reach the other end of the same in a perfectly dried condition to be delivered to another reel or spool. By these means I avoid all influences which could cause a straining and consequent breaking of the threads, and I greatly facilitate the drying, as the threads while kept in constant tension are only supported in a few points. This will also prevent abrasion and unequal drying.

It is obvious that instead of link chains I

may also employ other flexible conveyers which are connected with suitable endless supports for the material to be dried without departing from the spirit of my invention.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. Apparatus for drying warps, yarns, rovings and similar material in the process of sizing, dyeing, mercerizing, bleaching, or the like, comprising the combination with a rotatable reel, carrying supports or guides, of endless conveyers within said guides, and flexible bands attached to the conveyers and serving as a support for the material under treatment, means whereby the reel may be rotated, and means for feeding the conveyers at right angles to the direction of rotation, substantially as specified.

2. Apparatus for drying warps, yarns, rovings and threads of any description comprising the combination with a reel, of endless conveyers supported upon the surface of said reel parallel to the axis thereof, a hollow shaft turning loosely upon the driving-shaft of the reel, means for transmitting an independent forward movement to the conveyers, flexible bands secured to the conveyers, and means whereby said hollow shaft may be rotated independently of the shaft of the reel, substantially as specified.

3. Apparatus for drying warps, yarns and threads of any description comprising the combination with a rotatable reel and a fan at the interior thereof, of endless conveyers parallel to the axis of said reel, the shaft of said reel being hollow and surrounding the shaft of the fan, and a hollow shaft turning loosely and independently upon the shaft of said reel, means for moving the conveyers in a longitudinal direction, and flexible continuous supports secured to said conveyers, substantially as specified.

In witness whereof I have hereunto set my hand in presence of two witnesses.

FRANCESCO GILLI.

Witnesses:

ENRICO WISMER,
EUGENIA ECCEKINI.