Dec. 8, 1936. W. WILKE 2,063,282

MEANS FOR WINDING NATURAL SILK THREADS ON BOBBINS

Filed March 19, 1936 2 Sheets-Sheet 1

Fig. 1

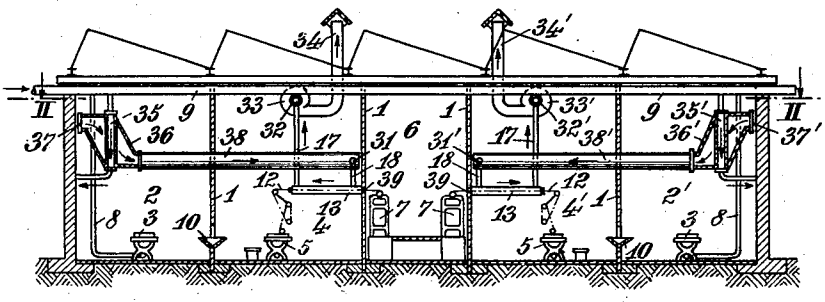
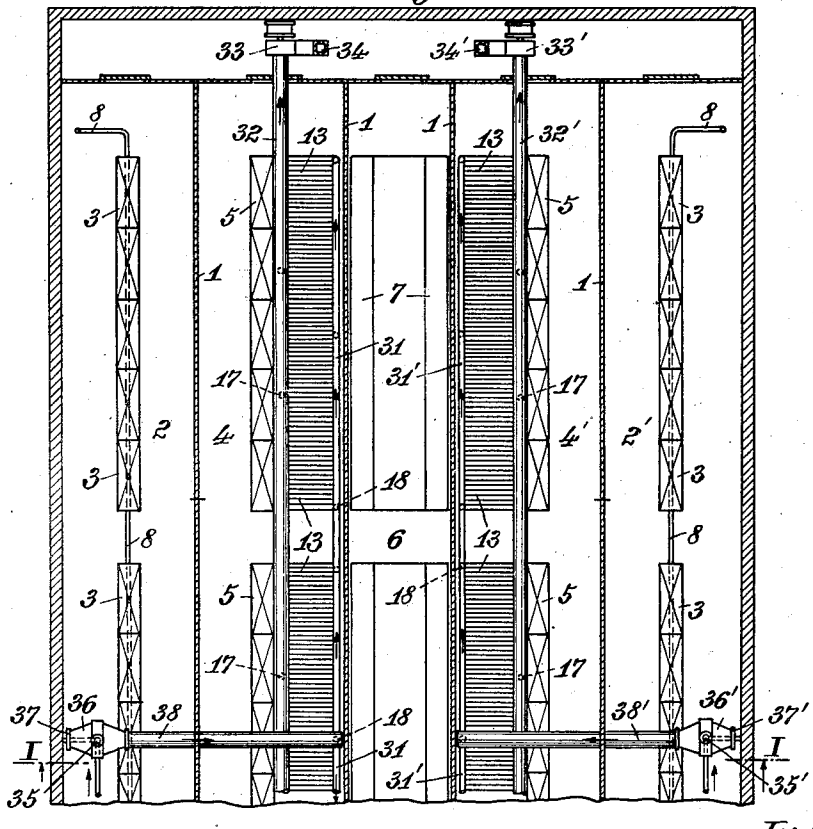


Fig. 2



Inventor:
WILHELM WILKE
ATTORNEYS:
Bailey & Parsons

Dec. 8, 1936. W. WILKE 2,063,282

MEANS FOR WINDING NATURAL SILK THREADS ON BOBBINS

Filed March 19, 1936 2 Sheets-Sheet 2

Fig. 3

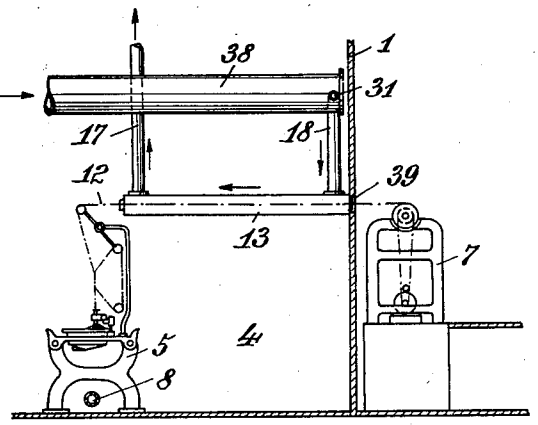


Fig. 4

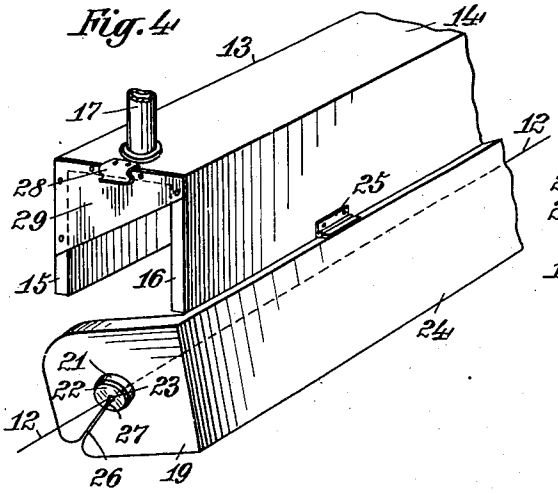


Fig. 6

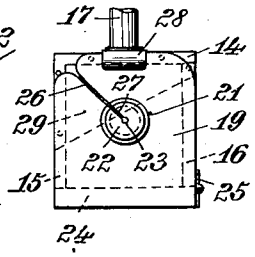
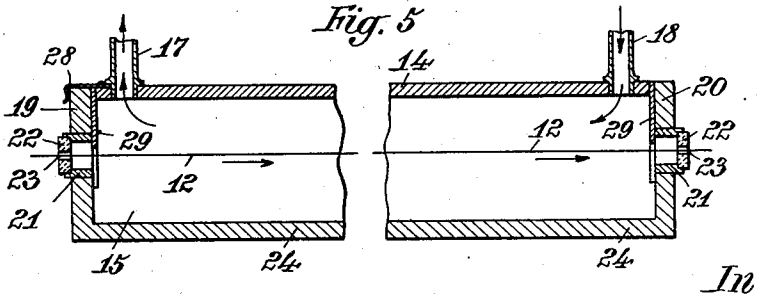


Fig. 5



Inventor:

WILHELM WILKE

ATTORNEYS:

Bailey & Parsons

Patented Dec. 8, 1936 2,063,282

UNITED STATES PATENT OFFICE

2,063,282

MEANS FOR WINDING NATURAL SILK THREADS ON BOBBINS

Wilhelm Wilke, Hanover, Germany, assignor to Seidenwerk Spinnhutte Aktiengesellschaft, Hanover, Germany, a German company

Application March 19, 1936, Serial No. 69,674
In Germany April 16, 1934

10 Claims. (Cl. 19—3)

The invention relates to a method of unwinding silk threads from silk-worm cocoons and winding these threads on bobbins and to means for the performance of the said method.

In the manufacture of raw silk as customarily practiced, after the cocoons have been duly softened in boiling pans, the threads are unwound from the cocoons by aid of a spinning machine and then wound on a swift or reel. With this method the threads are unwound intermittently and are liable to breakage; moreover, since they pass to the swift or reel in wet condition, they tend to adhere to one another.

The step of drying the threads between the spinning and winding operations is already known, but only obviates in part the drawbacks indicated. Besides, the operation of winding the skeins on a swift, withdrawing the same from the swift and winding them on a bobbin occupies much time, increasing the cost of manufacture; it also has an unfavourable effect on the quality of the threads.

In existing installations it is further a detrimental feature that the boiling and spinning tables as well as the winding devices are placed in one and the same compartment. The humidity developed by boiling in part nullifies the effect of the drying devices, so that notwithstanding the use of drying devices the threads tend to adhere together.

For the purpose of obviating the above drawbacks, in the method according to the invention the threads unwound from the cocoons, which have been softened in the usual manner, are conducted through a drying conduit through which hot air flows counter to the direction of travel of the threads, and are wound on bobbins directly after drying.

In this way there are eliminated operations liable to increase the cost of production and to interfere with the good quality of the work, such as would otherwise result from the use of swifts or reels. The thread wound directly on the bobbins is a high-grade product and is thoroughly dried and ready for subsequent use.

The invention also provides a lay-out in which separate compartments are provided for the spinning frames and for the winding devices, and which incorporate suitable sealing means adapted to prevent the threads passing through the drying conduits from taking up any moisture when in their passage from the spinning compartment to the winding compartment.

There are thereby established more satisfactory working conditions, particularly in the winding compartment, e. g., as to the humidity of the air, while the space available is better utilized and the work is better distributed.

Other features of the invention will appear from the following description with reference to the accompanying drawings in which there is illustrated by way of example the lay-out of an installation for performance of the present method.

Fig. 1 is a cross section through a work-room with the various machines therein;

Fig. 2 is a top plan view;

Fig. 3 is a front view to a larger scale of a spinning frame with the associated winder;

Fig. 4 shows in perspective a part of the drying conduit, the bottom flap being open;

Fig. 5 is a longitudinal section through the drying conduit, and

Fig. 6 is an end view of the drying conduit with the bottom flap closed.

By four partitions 1 running lengthwise of the work-room containing the various machines the work-room is divided into five compartments. The boiling tables or pans 3 are installed in the two outer compartments 2, 2'. In the two intermediate compartments 4, 4' adjacent thereto the spinning frames 5 are fitted. The central compartment 6 accommodates the winders 7.

As is clear from Fig. 2, the boiling pans 3 and the spinning frames 5, as well as the winders 7 (not shown in Fig. 2) are arranged in groups spaced lengthwise of the work-room, the arrangement being such that with each spinning frame 5 disposed in either of the compartments 4, 4' there are associated two boiling pans 3 in the compartments 2 and 2' respectively.

The boiling pans 3 are heated by means of steam which is fed to the pans by piping 8 connected to a main steam pipe 9.

The cocoons preliminary treated in the boiling pans 3 are transferred by the operators working in the compartments 2 and 2', through openings arranged in the walls 1 and closed by drop doors 10, to the operators working in the compartments 4, 4' at the spinning frames 5.

Naturally, there may be provided means for conveying the cocoons mechanically from the compartments 2 and 2', respectively, to the compartments 4, 4' housing the spinning frames 5, so that moisture and vapor are prevented from penetrating from one compartment into another compartment.

To this end suitably enclosed conveyor belts may be used.

The spinning frames 5 are equipped with the well-known devices illustrated diagrammatically

in Fig. 3 for preventing knotting and looping. They are further provided with the usual leases in order that the several threads, while being unwound from the cocoons, may be brought together and smoothed.

The threads 12 unwound from the cocoons in the spinning compartment 5 are led into drying conduits 13. Each drying conduit, as shown in the embodiment illustrated, is of rectangular cross section and comprises three walls 14, 15, 16 rigidly connected to one another, and a bottom flap 24 hinged to the side wall 16.

The supply and discharge pipes 18 and 17 for the drying medium, for instance hot air, register with openings in the wall 14. The drying medium traverses the drying conduit in the direction opposed to that of the travel of the thread (see the arrows in Fig. 5).

As shown in Fig. 5, thread guides are fitted in the two end walls 19 and 20 of the drying conduit, said thread guides comprising bushes 21 embracing agate discs 22 which are each provided with a fine aperture 23 through which a thread 12 passes.

The two end walls 19, 20 together with the bottom wall or flap 24 form a unit which is connected to the wall 16 of the drying conduit by hinges 25. As is clear from Fig. 4, each end wall 19 or 20 is provided with a narrow diagonal slot 26 extending to the edge thereof and rounded off at its outer end to avoid sharp corners. The slot 26 registers with a corresponding slot 27 in the bush 21 and disc 22 intersecting the aperture 23, so as to afford a passage for the thread.

As will be seen, the thread 12 can be readily inserted in the aperture 23 from the side through the guide slots 26 and 27 when the bottom wall or flap 24 and the two end walls 19, 20 occupy the positions shown in Fig. 4. The thread having been so inserted, the bottom wall or flap 24 is lifted, whereupon the end walls 19 and 20 engage spring catches 28, or are kept immovable by any other suitable means, such as fasteners or the like.

In order to prevent the ingress of cold air, the ends of the drying conduit 13 are partly closed by plates 29 slightly sunk into the ends of the three walls 14, 15, 16 so that flush bearing surfaces are presented to the end walls 19 and 20. The oblique lower edges of the plates 29 extend into close proximity to the thread-guiding apertures 23.

The described construction of the drying conduit 13 not only ensures perfect tightness in all directions, which excludes any appreciable loss of heat, but also renders practicable the production of the drying conduits at relatively low cost. The principal advantage of the arrangement is, however, that the thread removed from the interior of the drying conduit 13, when the bottom wall or flap 24 has been dropped, is readily visible and accessible in this position, so that insertion of a thread at starting and repair in case of thread breakage are materially facilitated.

The drying conduits 13 described are also arranged in groups, viz., in such wise that from each spinning frame 5 sixteen drying conduits 13 lead the threads to the winding bobbins 7 in the central compartment 6 of the work-room.

As explained, hot air is supplied to the several drying conduits 13 so as to traverse the same in the direction opposite to the direction of travel of the thread 12.

Through the pipes 18 communicating with two hot-air manifolds 31 and 31' the hot air enters the drying conduits 13, then flows therethrough and finally leaves the same through the pipes 17 to enter the manifolds 32 and 32' respectively, which latter are served by fans 33 and 33'. As appears from Fig. 1, after having passed through the drying conduits, the hot air is discharged through the pipes 34 and 34' into the atmosphere.

Obviously it would also be possible to arrange that the hot air leaving the drying conduits will return in a closed cycle to heating devices and be fed again to the drying conduits.

In the embodiment shown the heating devices consist of heaters 35 and 35', respectively, which, as shown in Fig. 1, are connected to the main steam pipe 9 and are placed in housings 36, 36' to which fresh air is supplied through the inlet connections 37, 37'. The other ends of these housings are connected to pipes 38 and 38', respectively, leading to the manifolds 31, 31'.

As shown in Fig. 3, the thread leaving the conduit 13 in a perfectly dry condition passes through an aperture 39 in the wall 1 directly to the winder 7. The passage of the thread through the wall 1 is effected in such wise that humidity is not allowed to penetrate from the spinning compartment 4 into the winding compartment 6.

It will be seen from Fig. 1 that the winders 7 in the compartment 6 are also arranged in groups, the several winders of each group being mounted on a common frame. These frames are placed side by side. In front of one row of bobbins in the compartment 6 there is placed another row of bobbins at a small distance from the first. This arrangement results in satisfactory utilization of the floor space and in simplified operation, since the operator is able to work in the compartment 6 on either side and is afforded a good survey over the whole equipment.

The thread wound on the bobbins is of excellent quality. As the moisture has been thoroughly removed from it, and it has not had any opportunity of subsequently absorbing moisture, the thread is ready for further treatment.

The particular arrangement in groups of the machines finally permits increase of the production combined with reduction of the cost of production.

I claim:—

1. An installation for winding natural silk threads on bobbins comprising spinning devices for unwinding the threads from cocoons, a spinning compartment housing said spinning devices, winding devices for winding the threads on bobbins, a separate compartment housing said winding devices, drying conduits through which the threads are led from said spinning compartment to said winding compartment, and means for passing hot air through said conduits in the direction opposite to the direction of travel of the threads.

2. An installation as claimed in claim 1, in which a plurality of drying conduits are led from each group of spinning devices to the winding compartment.

3. An installation as claimed in claim 1, in which a boiling compartment is disposed adjacent to the spinning compartment, and means are provided for conveying the cocoons from said boiling compartment to the spinning compartment.

4. An installation as claimed in claim 1 in which the spinning compartment is interposed between the winding compartment and a boiling compartment housing boiling tables arranged in a row transverse to the direction of travel of the thread.

5. An installation as claimed in claim 1 in which there are housed in the winding compartment two rows of winding devices, said winding compartment being partitioned from two spinning compartments one on each side of said winding compartment.

6. A drying conduit for air for drying natural silk thread passing from a spinning device to a winder, said conduit having an opening extending its entire length, and closure means for said opening, said closure means including end walls for said conduit, each end wall provided with an aperture for the passage of the thread and with a slot permitting the introduction of the thread laterally into the aperture.

7. A drying conduit as claimed in claim 6, in which the closure means consists in a flap hinged to one wall of the conduit.

8. A drying conduit as claimed in claim 6, in which the end walls are carried by and disposed at right angles to a flap hinged to one side wall of the conduit.

9. A drying conduit as claimed in claim 6, incorporating plates adapted partly to close the slots in the operative position of the end walls.

10. A drying conduit as claimed in claim 6 having at each end a fixed plate having an oblique lower edge, and serving to close the slot in the associated end wall approximately as far as the aperture in said end wall.

WILHELM WILKE.