April 27, 1954 R. T. MOORE 2,676,352

TRAVELING FAN MECHANISM FOR THE LINT AND DUST CLEANING OF TEXTILE MACHINES

Filed Jan. 7, 1949

2 Sheets-Sheet 1

Fig. 1.

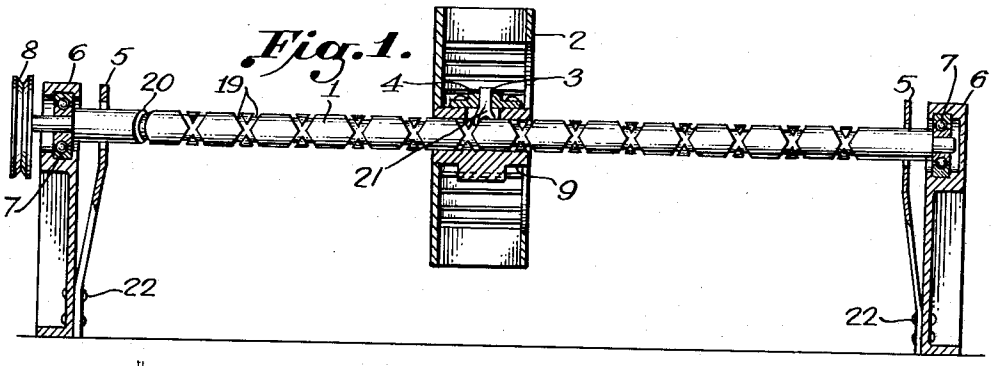


Fig. 2.

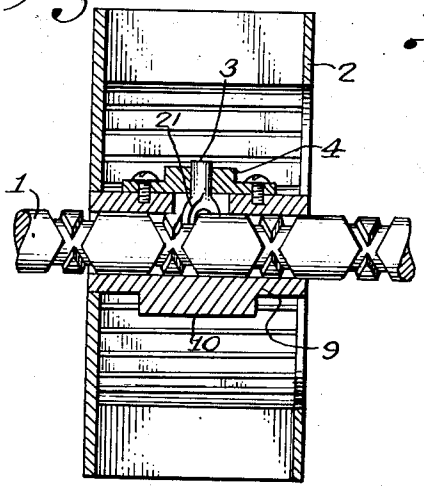


Fig. 3.

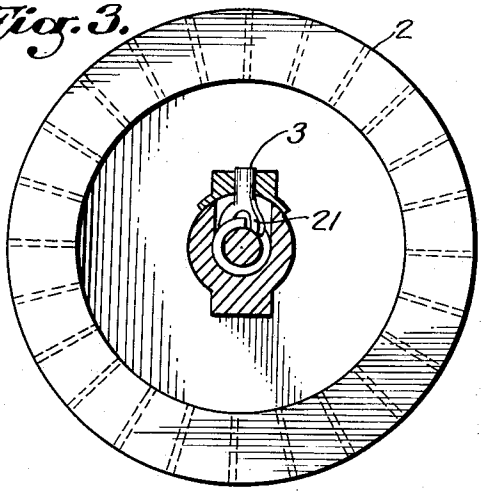


Fig. 5a.

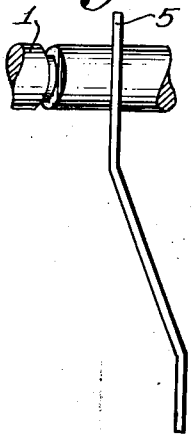


Fig. 5.

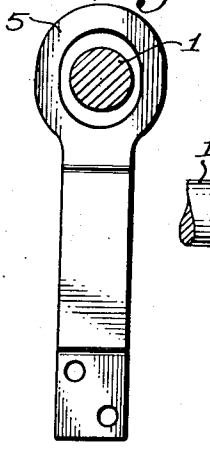
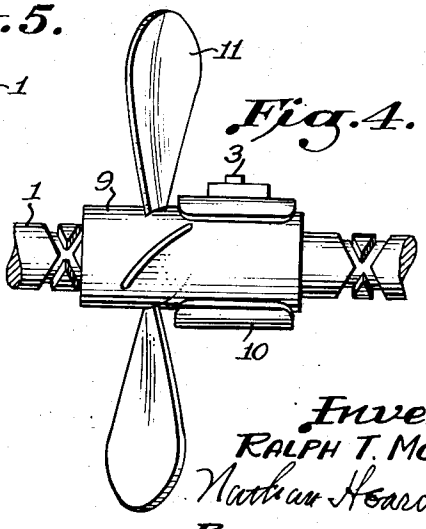


Fig. 4.



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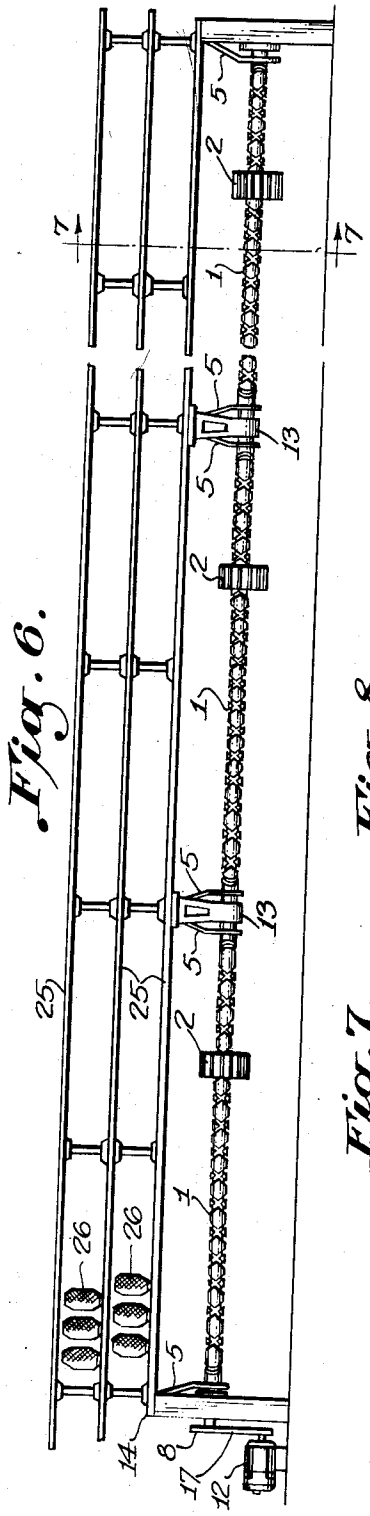


Fig. 6.

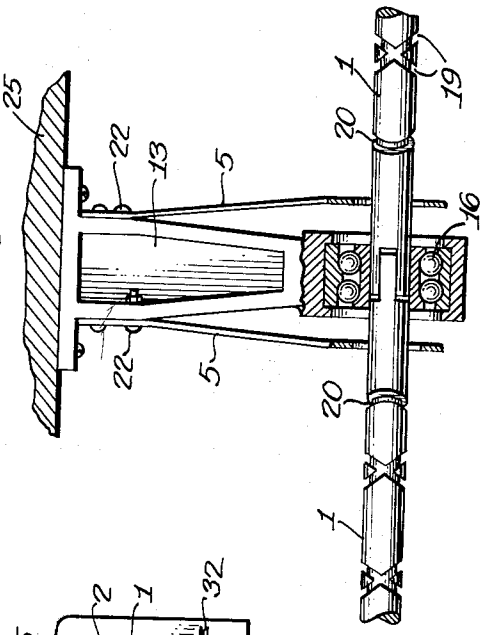


Fig. 9.

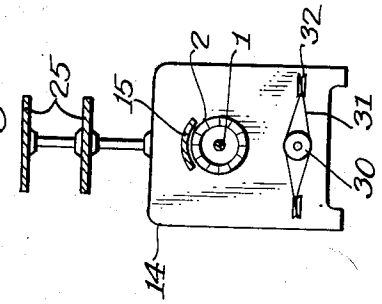


Fig. 8.

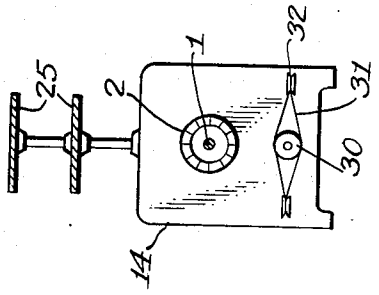


Fig. 7.



Fig. 10.

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TRAVELING FAN MECHANISM FOR THE LINT AND DUST CLEANING OF TEXTILE MACHINES

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8 Claims. (Cl. 15—312)

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This invention relates to apparatus for cleaning lint and dust from textile machines, and more particularly involves a fan which partakes of a reciprocatory as well as a rotary motion for this purpose and also acts to keep the air about the machine in a state of flux, thereby preventing the settling of dust and lint on the machine or material being worked. The invention has a very practical aspect with respect to textile machines, such as spinning frames, drawing frames, and the like, in which it is useful in preventing the settling of lint or the like on the machine and in cleaning it from the machine.

It is well known to those skilled in the art that it is necessary to keep certain textile machines, particularly those employed in the spinning and twisting of yarn, as free from dust and lint as is possible and in this connection it is desirable that the lower portions of the machine which may be shielded by overhead creel boards or the like shall be maintained free from the collection of dust and lint. My invention provides novel means for creating air currents beneath the machine with velocity and direction such that accumulations of dust and lint are prevented or greatly lessened.

The object of my invention is effected by a fan or series of fans which travel back and forth beneath the machine, driven both rotatively and longitudinally by a single shaft. This arrangement makes possible the removing of lint and dust with small fans which absorb relatively little power. In addition, each part of the machine will receive a draft of air varying in direction and force.

Still another advantage is realized; that due to the construction and operation, the mechanism is substantially self cleaning.

Spinning and twister frames are usually of great length and are constructed, or readily may be altered, to present an unobstructed space extending centrally and longitudinally of the frame, usually between the creel boards and the spindle drive. My invention enables advantage to be taken of this unobstructed space and to combine therewith an horizontal shaft extending longitudinally through this space with one or more fans journaled axially on the shaft and with the drive for the shaft located outside of the space. Since the diameter of the fan may be of any size desired it is readily adapted to the size of this unobstructed space. This enables the fan rotating and traveling longitudinally throughout the full length of the machine and directly within the machine to reach practically

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every portion of the under frame with a draft of air constantly changing in direction and intensity in its impact upon the various elements of the machine as it travels back and forth. And since the shaft is driven exteriorly no motor or electric current is carried into this long unobstructed space so that there is no danger from fire.

The nature and objects of the invention will appear more fully from the accompanying description and drawings and will be particularly pointed out in the claims.

In the drawings:

Fig. 1 is an elevation of the device in a simple embodiment;

Fig. 2 is an enlarged detailed view of the hub of an impeller with impeller and hub shown in section showing the thread follower;

Fig. 3 is a view taken at right angles to Fig. 2 with the hub shown in section showing details of the follower;

Fig. 4 is a plan view of a propeller type fan for use on the device;

Fig. 5 is an elevation of a shock absorbing spring divorced from its surroundings;

Fig. 5*a* is an edge view of the shock absorbing spring of Fig. 5;

Fig. 6 is an elevation of a multiple application of the device to a textile machine;

Fig. 7 is a sectional view along line 7—7 of Fig. 6;

Fig. 8 is a view similar to Fig. 7 showing a baffle in place;

Fig. 9 is a detailed view of one bearing hanger showing the bearing in section to show a method of joining the shafts of the device; and

Fig. 10 is a view of an alternative type of shock absorbing device.

My invention provides a fan or series of fans, which may be of a centrifugal or axial-flow nature, journalled on a single driven shaft, which drives the fan rotatably while, at the same time, imparting to the fans a translational movement along the shaft.

My fan mechanism is shown in its simplest form in Fig. 1 where the machine shown consists of a pair of bearing supports 6 carrying bearings 7 in which is journalled an horizontally disposed shaft 1, which may be driven through the pulley 8. The shaft 1 is formed with a set of traverse threads or grooves 19 both right-hand and left-hand with a guide thread 20 interconnecting the right and left-hand threads at each end of the shaft. The fan which may be either of the centrifugal impeller type 2 or of the axial-flow

or propeller type 11, is rotatably journalled on the shaft. A thread follower 3, is pivotally journalled in a bearing plate 4 fastened to the hub 9 of the fan provides the means whereby the fan is driven. In order to maintain proper balance of the fan, I provide a counterweight 10 on the hub opposite the bearing plate 4.

The follower may be of a general Y formation with the two forked legs 21 engaged in the threads 19 of the shaft. It can be seen that, if the follower engages the right hand thread, it will force the fan 2 in one direction along the shaft 1 as the fan rotates relative to the shaft, until the legs 21 reach the guide thread 20. At that point, the legs 21 are guided into engagement with the left hand thread and the direction of translation of the fan is reversed. It is apparent, therefore, that, as the fan 2 rotates relative to the shaft 1, it will reciprocate between ends of the shaft.

The rotation of the fan is also imparted to it primarily by the same follower 3. If there were no air load on the fan, it is apparent that, after the starting inertia of the fan is overcome, the fan would not traverse the shaft because of the friction between the fan and the shaft. It would, therefore, rotate only in a stationary longitudinal position. However, as the rotary speed of the fan increases, the air load on it increases, causing a drag which tends to hold the fan to a slower speed than that of the shaft. Therefore, the differential in rotational speed of the fan and shaft, caused by the air load on the fan, results in translational movement of the fan on the shaft. The pitch of the thread may be varied to adjust the proportioning of driving force between force tangential and axial of the shaft and, therefore, to proportion the relative slippage between shaft and fan.

The impact of changing direction of the fan at each end of the travel may be absorbed by spring means, which, for the purpose of illustration may be constituted as shown in Figs. 1, 5 and 9. This shock absorber comprises merely a leaf spring, one end of which encircles the shaft 1. The spring 5 may be fastened to the framework of the machine near the shaft by bolts or rivets as at 22. As the fan nears the end of the shaft, it is engaged at its hub by the spring and is slowed in its travel and, therefore, will start to move in the other direction with less shock than if it came abruptly to the guide thread and were reversed. It will be apparent that other types of spring shock absorber may be used; for instance, a coil spring 23 might be disposed about the ends of the shaft (see Fig. 10). As shown, the spring is enclosed at its ends by cups 24, one of which may have an anti-friction surface so that the rotational speed of the fan is not slowed objectionably. It will be appreciated that an arrangement such as this could be carried by the hub 9 of the fan as well as be disposed at the ends of the shaft. It is also envisioned that the spring could be mounted on the shaft and rotate therewith.

The invention may employ either the centrifugal or impeller type of fan 2 or an axial flow or propeller type of fan 11. In case of the use of the latter type fan, the speed of travel of the fan along the shaft may be influenced by the axial thrust and may be greater when the fan is traveling in the direction of thrust than when it is traveling in the opposite direction.

In Figs. 6, 7, and 8 there is illustrated an ordinary type of spinning frame, chiefly diagrammatically, and with many of the parts removed, but sufficient for the purposes of this invention. The end frames 14 are shown with creel boards 25 extending longitudinally therebetween and with a few of the spools 26 mounted on the creel boards. The yarn being spun is drawn from the spools and spun by the usual mechanism of which there is only illustrated the usual driving cylinder 30 driving the belts 31 which drive the spindle whirls 32 at opposite sides of the frame. It is apparent that in the spinning or twisting process much lint will be freed from the yarn. This lint, if it were allowed to collect, would become mixed with the main stream of yarn and cause lumps and irregularities in the thread being spun.

Since these machines may be quite long, I provide for a multiple installation as shown in order that no part of the machine may stand long without an air draft to blow the collected lint away. In this type of installation, the shaft is divided into sections, separated by bearing hangers 13, each of which carries a bearing 16, and is provided with springs 5. The traverse threads on the shaft are similarly divided by the guide threads 20 so that each fan travels over one section of the shaft. The shaft may be continuous through the bearing hangers but is preferably jointed at the hangers by some such joint as the tongue and groove connection shown in Fig. 9. The shorter shafts are preferred, both for ease of manufacture and replacement. In Fig. 6 the shaft 1 is shown driven by a separate motor 12 through a belt or chain 17, but it will be readily understood that it could be driven from the main power source for the machine through a belt and pulley or gearing arrangement or some other transmission.

As is best shown in Figs. 7 and 8, the fan rotates and travels in the central part of the machine where it will send a draft of air in all directions cleaning the lint from all the lower parts of the machine which may be shielded from overhead fans by the creel boards 25. In order to avoid counteracting the draft from overhead fans, it may be desirable to provide a baffle 15 (Fig. 8) to deflect the draft of the fan from an upward direction towards the sides or downward.

Having thus described my invention, in an embodiment thereof, I am aware that numerous and extensive departures may be made therefrom without departing from the spirit or scope of my invention.

I claim:

1. An apparatus for cleaning lint and dust from a textile machine comprising an horizontally disposed shaft having right-hand and left-hand traverse threads interconnected at each end, bearings for the ends of the shaft, a rotary fan having a hub journaled coaxially on and movable longitudinally of the shaft, and a follower on the hub cooperating with the shaft threads, the said elements co-acting upon rotation of the shaft to cause the fan, due to air resistance, to rotate slower than the shaft and thereby while thus rotating to be traversed back and forth along the shaft.

2. An apparatus for cleaning lint and dust from a textile machine comprising a series of spaced bearing hangers with the bearings thereof horizontally disposed and in longitudinal alinement, a shaft journaled in said bearings with each section thereof between adjacent hangers having right-hand and left-hand traverse threads interconnected at each end, a fan for each section having a hub journaled coaxially on the said

section, and a follower on each hub cooperating with the threads of the shaft section, the said elements co-acting upon rotation of the shaft to cause each fan, due to air resistance, to rotate slower than the shaft and thereby while thus rotating to be traversed back and forth along the shaft section.

3. An apparatus defined and operating as in claim 2 in which the shaft sections are separate elements removably coupled at their ends at each intermediate hanger.

4. An apparatus for cleaning lint and dust from a textile machine as defined in claim 1 together with an horizontally disposed baffle extending above the path traversed by the rotating fan acting to deflect the draft of the fan from an upward direction.

5. A textile spinning frame or the like having a series of longitudinally alined shaft bearings mounted on the frame in the lower part thereof and centrally thereof, an horizontally disposed shaft journaled in said bearings with each section thereof between adjacent bearings having right-hand and left-hand traverse threads interconnected at each end, a fan for each section having a hub coaxially journaled on the said section, and a follower on each hub cooperating with the threads of the shaft section, the said elements co-acting upon rotation of the shaft to cause each fan, due to air resistance, to rotate slower than the shaft and thereby while thus rotating to be traversed back and forth along the shaft section thereby to clean lint and dust from the lower part of the frame.

6. A textile spinning frame or the like having the construction and operation defined in claim 5 in which the shaft sections are separate elements removably coupled at their ends at each intermediate bearing.

7. An apparatus for cleaning lint and dust from a textile machine comprising, an horizontally disposed shaft mounted for rotary movement, a rotary fan journaled coaxially on the shaft and movable longitudinally of the shaft, and means operative, in response to relative rotation between the shaft and fan induced by air resistance to the rotation of the fan, to effect reciprocation of the rotating fan longitudinally of the shaft.

8. In a textile spinning or twisting machine of that type having a frame, a creel at the top of the frame, a spindle drive within at the bottom of the frame and an unobstructed space extending longitudinally and substantially centrally of the frame between the creel and the spindle drive, the provision of cleaning apparatus comprising an horizontally disposed shaft extending longitudinally through said space and having right hand and left hand traverse threads interconnected at each end, bearings for the ends of the shaft, means to rotate the shaft, a rotary fan journaled coaxially on the shaft, and a follower on the fan engaging the shaft threads, the said elements coacting upon rotation of the shaft to cause the fan, due to air resistance, to rotate slower than the shaft and thereby while thus rotating to be traversed back and forth along the shaft.

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