

Sept. 16, 1958

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2,851,738

AUTOMATIC VACUUM CLEANERS FOR DRAWING FRAMES AND THE LIKE

Filed May 24, 1956

3 Sheets-Sheet 1

Fig. 1.

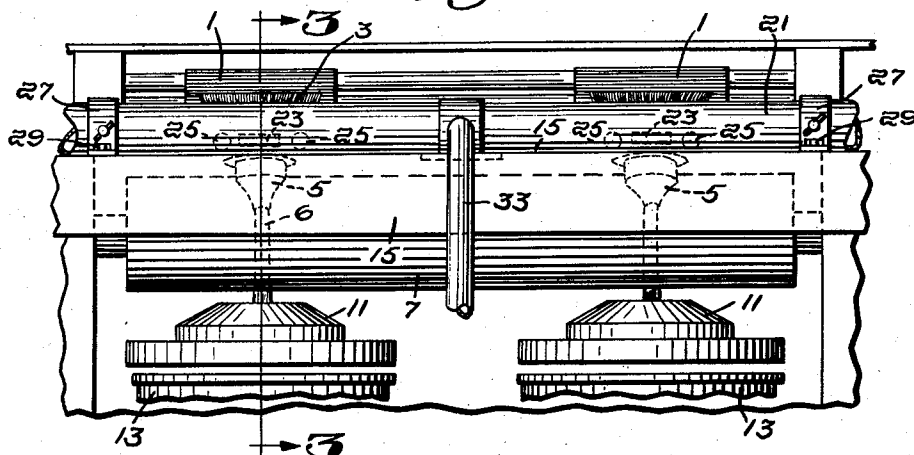


Fig. 2.

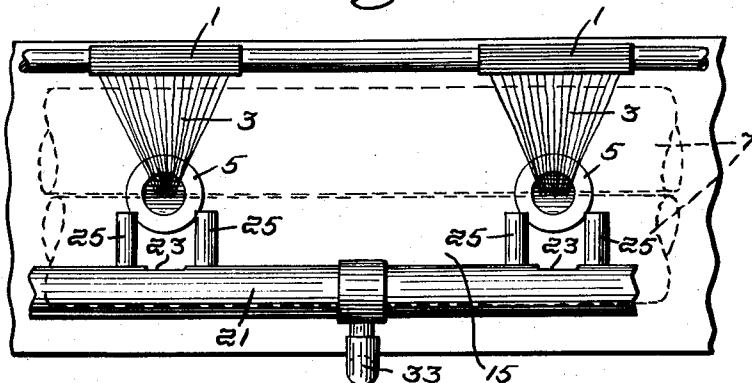
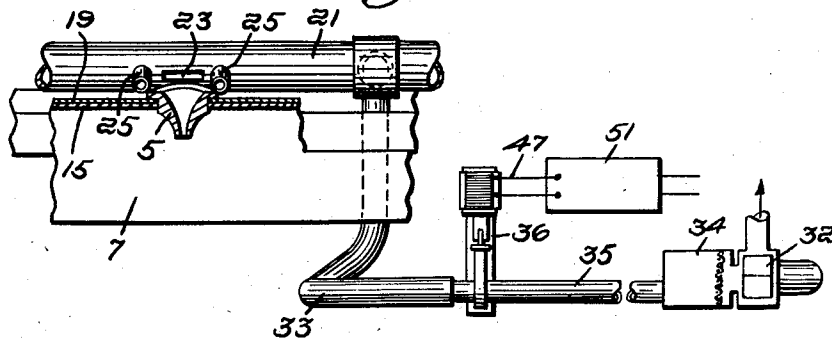


Fig. 4.



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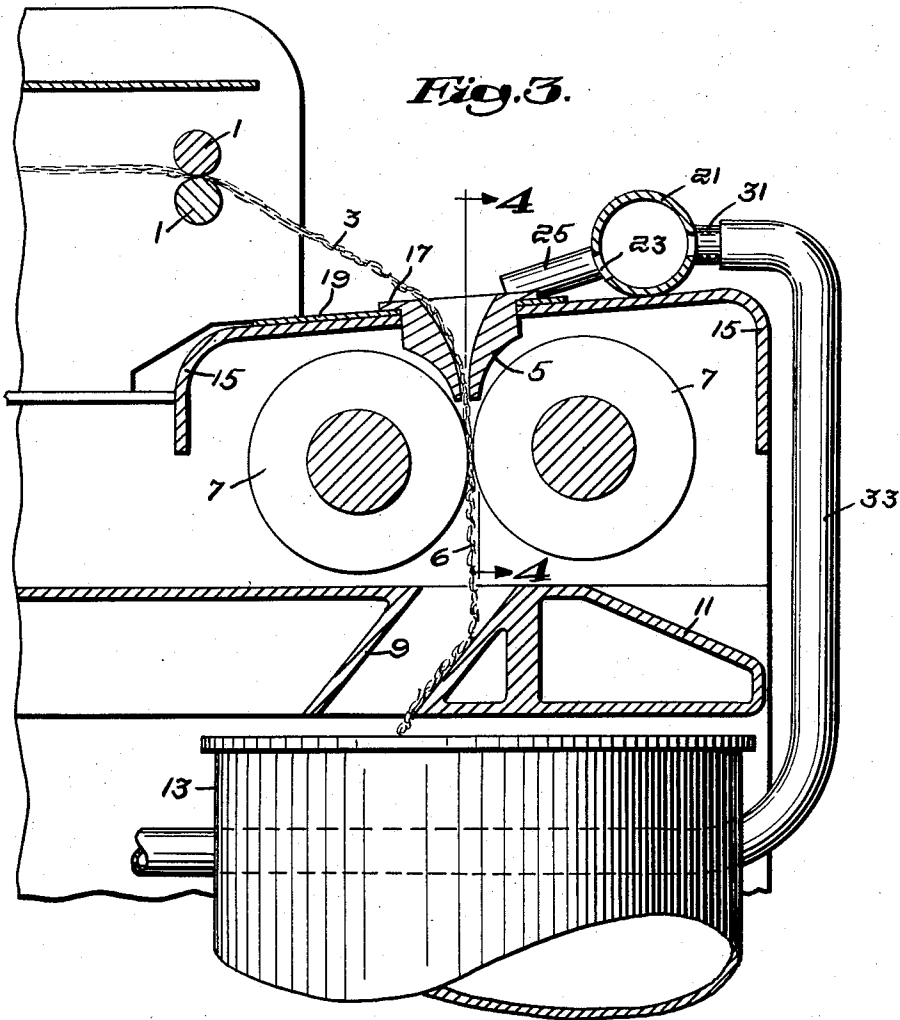
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Fig. 5.

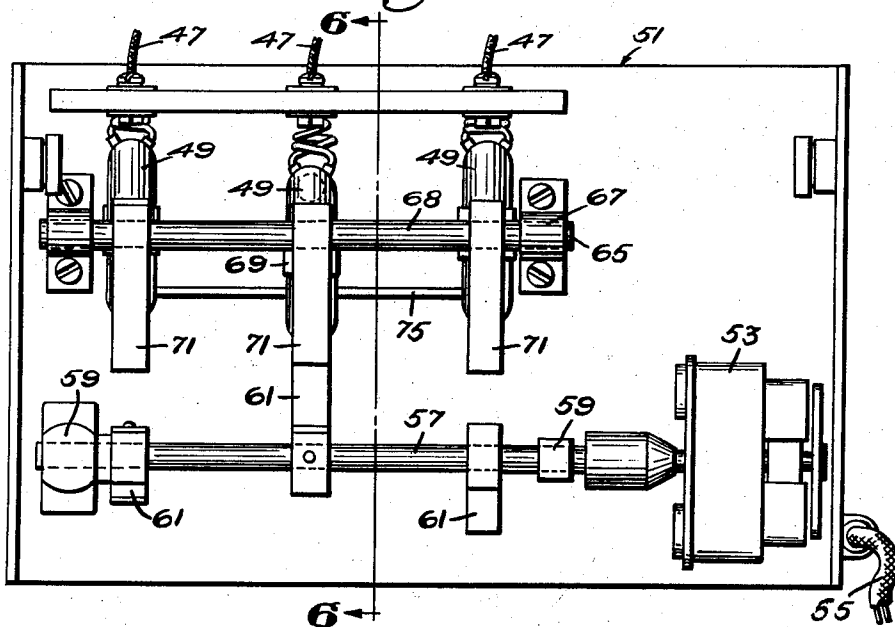


Fig. 6.

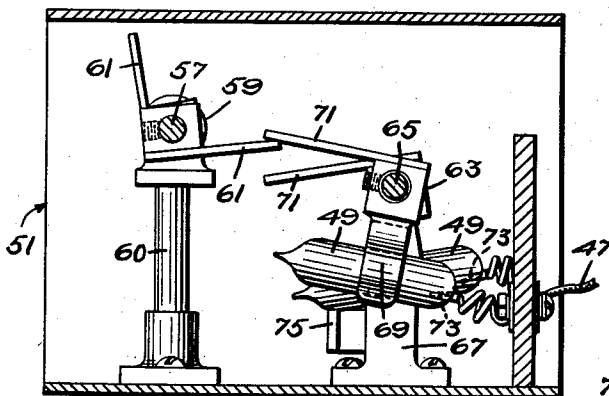
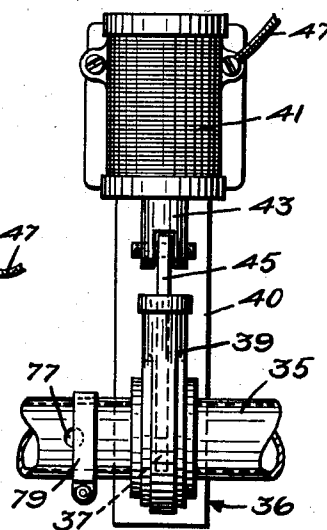


Fig. 7.



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AUTOMATIC VACUUM CLEARERS FOR DRAWING FRAMES AND THE LIKE

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Application May 24, 1956, Serial No. 587,000

7 Claims. (Cl. 19—157)

This invention relates to clearers or scavengers for textile machines, and has as its object the provision of a novel and improved system and apparatus for the automatic removal of loose fibers such as lint and fly, as well as dirt and loose leaf, which gather upon the covers, beams, and other parts of such textile machines, particularly in drawing frames, adjacent the trumpets and other guides for the slivers, rovings, and yarns in operations performed for the conversion of fibrous materials into yarns and the like.

During the operation of a drawing frame loose fibers separate from the slivers which are operated upon in such machine, and settle upon various exposed portions of the machine. In particular these flying fibers are floated forward by the air-currents generated by the advancing sliver, so that they land upon the beam or calender roll cover in front of the trumpet, where they accumulate in a small pile, some of the fly landing upon the beam or cover at both sides of the trumpet. The accumulations are increased by other like material which floats through the air from adjoining machines. If left undisturbed, the accumulation before long becomes two or more inches thick, and sooner or later portions of this material that is piled up at the sides and front of the trumpet topple over upon the trumpet, or are wafted by moving air over upon it, in which case some or all of the waste adheres to the moving sliver and is carried by the latter through the trumpet. The portion of waste thus becoming attached to the sliver becomes incorporated in the sliver as a bunch which remains a part of the sliver in all the succeeding stages and operations of the procedure, and is present in the resulting roving and yarn. Fly collecting upon the beam or cover usually becomes more or less charged with oil, so that the portion which becomes added to the sliver produces a streak of discoloration. The bunch and discoloration will show up in the cloth into which the yarn is woven. Consequently, the yarn and cloth will be classed as seconds, with loss of value.

In general practice it is usual for workers around drawing frames and the like to wipe off deposits of lint and fly from time to time, with a view to the avoidance of what has just been described, but unless faithful attention is paid at short intervals to the portions of a beam or cover adjoining a trumpet or the like, such deposits will form to an extent resulting as stated in bunches being taken up by the sliver and becoming incorporated therewith. Hence, if through inattention or indifference the workers neglect to perform the wiping at comparatively frequent intervals the result is the production of defective rovings, and the yarns made from the latter will likewise be defective.

In addition to causing production of defective yarns, the fly from the sliver may be disturbed by air currents in the area and remain suspended in the air to be breathed by workers nearby. Under certain conditions this has become very irritating to the attendants and detrimental to their health, and has resulted in lost man-hours.

The main object of the invention is to provide an auto-

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matic system which will prevent the accumulation of lint, fly and dirt at these locations in a drawing frame or other textile machine, so as to obviate injury to the quality of the yarn therefrom.

A particular object of the invention is to provide such a clearer system which is capable of being installed on existing machines without disturbance or change of the original parts of such machines, and without impeding the functions of such machines or the work of the attendant in running them; as well as being able to be built into new machines.

Another object is to attain economy of installation and operation, and to this end the invention provides a vacuum or suction type clearer system which takes advantage of the fact that however essential it is to prevent accumulation of lint, fly and dirt at these critical points, the need for clearing is periodic and not continuous. Thus the improved system provides a combination of vacuum clearer elements or suction nozzles with means effecting intermittent or recurring flow of air thereinto at automatically timed intervals, so as to effect economy of air-flow or suction. This discontinuous timed operation saves power and makes a single continuous-running suction-producing device of modest capacity able to serve a plurality of the machines to be cleaned.

Other objects of the invention and the manner of their attainment are as will be made plain hereinafter.

An illustrative embodiment of the invention is shown applied to a drawing frame, in which,

Fig. 1 is a front view and Fig. 2 a plan view of a portion of such frame including two deliveries, with a portion of the novel clearer serving such deliveries in place thereon.

Fig. 3 is an enlarged vertical transverse section on line 3—3 of Fig. 1.

Fig. 4 is a rear view of one of the deliveries of Figs. 1 and 2, partly in section on line 4—4 of Fig. 3.

Fig. 5 is a plan view of the timing mechanism.

Fig. 6 is a vertical section on line 6—6 of Fig. 5.

Fig. 7 is a front view of the solenoid air valve controlled by the timing mechanism.

The invention is shown as an attachment applied to a conventional drawing frame of the Whitin high speed type, in which the front drawing rolls 1 deliver the drawn fleece 3 to a trumpet 5 from which it emerges as a condensed sliver 6, passes through calender rolls 7, and enters the spout 9 of the coiler head 11 which coils it in can 13. The trumpet 5 is mounted in an aperture formed for its reception in cover 15 of the calender rolls, being supported by its flange 17 resting on plate 19 forming a part of the cover. It is on the areas of this cover plate 15 and its part 19 in front of and alongside the trumpet that the troublesome accumulation of lint, fly, dirt and trash occurs.

In accordance with the invention, to clear these areas periodically a suction conduit or manifold 21 is mounted on the top surface of the cover 15. This manifold is provided with a slot 23 directly in front of each trumpet 5, such slot serving as an intake port or nozzle drawing in air over the front portion of the trumpet's rim and over the area of the cover intervening between the rim and the manifold.

On each side of every slot 23 is provided a short nozzle 25 fixed in a hole in manifold 21 and with its bore in communication with the interior of the manifold. These offset nozzles extend rearward beyond the front edge of the trumpet's rim and are ordinarily spaced apart a little less than the width of the rim, so as to take in air over the side portions and to a lesser extent over the rear portion of the rim and also over the areas of cover 15 at each side of the trumpet and to the rear thereof.

As is obvious, lint, fly, dirt and trash accumulating on

these portions of the cover and trumpet are entrained by the air sucked into intake ports or nozzles 23 and 25 and swept off of such portions and carried away through manifold 21.

The manifold 21 is mounted on the top surface of the cover 15 forward of the trumpets 5, by means of clamps 27 attached by bolts 29 to the cover 15. No change in the original parts of the frame is needed to effect this installation. If desired, U-shaped cradles open at the top will replace the clamps 27 to hold the manifold so that it may be lifted from the cover 15, to facilitate cleaning under it. Both ends of the pipe forming the manifold 21 are capped and closed.

The manifold is connected by nipple 31, at midlength thereof, to a flexible suction hose 33 which is connected to any suitable type of power-driven vacuum-producer 32, which may be that serving the ceiling condensers, the vacuum card strippers, or other devices, if available. Since the clearing action of the device is periodic and intermittent, the demand on the vacuum-producer is light, and hence where used alone for these scavengers a single vacuum-producer of relatively low capacity is able to serve a number of drawing frames cleared successively. Hence vacuum pipe lines 35 from the individual drawing frames, where the suction hoses 33 are attached thereto, are permanently installed leading to a trunk line running to the waste bin, condenser, or other waste collector 34 and the vacuum-producer.

In order to clear the desired areas periodically, each frame has its own shut-off valve 36, Fig. 7, installed in the pipe 35 serving each frame at any suitable point in the length thereof. This valve is of the type using a gravitating sliding shutter 37 closing the passage through its housing 39 into the hubs of which the meeting ends of two lengths of the pipe 35 are screwed. A solenoid 41 on a plate 40 mounted on the housing has its armature 43 attached to the shank 45, which opens the valve when the windings of the solenoid are energized.

Each solenoid is connected by twin leads 47 with a source of low-voltage current through a circuit which includes one of a plurality of mercury switches 49 in a timer or distributor 51 comprising a lint-proof closed housing mounted in any convenient location as for example within the framing of one of the drawing frames of the group to be cleared.

The timer illustrated herewith is of very simple construction, comprising controls for the clearers of three drawing frames. A 1 R. P. M. synchronous motor 53 supplied with A. C. current through leads 55 turns a shaft 57 mounted in bearings 59 on standards 60 and equipped with strikers 61 set at angles of 120° apart. Opposite each striker is a rocker 63 pivoting on a fixed shaft 65 mounted in uprights 67, spacers 68 holding the rockers in proper relation. Each rocker has fixed thereon a yoke 69 in which is fixed one of the mercury switches 49. A finger 71 fixed on rocker 63 extends into the path of rotation of striker 61. The operation is obvious: every 20 seconds, one of the strikers 61, rotating counterclockwise in Fig. 6, engages the finger 71 of its associated rocker, lifting it and holding the mercury switch 49 tilted to close the circuit between its two electrodes 73, energizing the solenoid connected thereto and opening the gate 37 of the valve of one drawing frame, producing a rush of air lasting for 4 or 5 seconds in through the nozzles 23, 25 at each trumpet of such frame, which sucks in the accumulated lint and other material within its range in the vicinity of the trumpet, thus clearing these areas once every minute.

The use of the mercury switches prevents a fire hazard incident to sparking with other types of switching devices utilizing make-and-break contacts.

A stop rail 75 supports the mercury cell rockers, overbalanced by their fingers 71, in open-circuit position while awaiting actuation.

Means for equalizing the suction to the several frames

is provided in simple manner by making an inlet 77 in pipe 35 and providing a sliding sleeve 79 to close as much of the area of the inlet 77 as may be needed to adjust the suction at the nozzles of the clearer served by such pipe 35.

While I have illustrated and described a certain form in which my invention may be embodied, I am aware that many modifications may be made therein by any person skilled in the art, without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to the particular form shown, or to the details of construction thereof, but what I do claim is:

1. A loose fiber clearer for drawing frames and the like having trumpets and supports therefor, comprising in combination a vacuum-producer, a conduit in communication therewith having intake nozzles in front of and alongside a trumpet, and means automatically permitting and arresting the flow of air through the nozzles to the vacuum-producer at timed intervals.

2. A loose fiber clearer for drawing frames and the like having trumpets and supports therefor, comprising in combination a vacuum-producer, a manifold in communication therewith mounted in front of the trumpets having intake nozzles drawing in air over and across the trumpets, a pipe connecting the manifold with the vacuum-producer, a valve preventing air flow through the pipe, and means periodically opening and shutting the valve automatically.

3. A loose fiber clearer for drawing frames and the like having trumpets and supports therefor, comprising in combination a vacuum-producer, a manifold in communication therewith mounted on the trumpet support in front of the trumpets having intake ports in front of and beside the trumpets, and means automatically permitting and arresting the flow of air through the intake ports at timed intervals and for predetermined periods of time.

4. A loose fiber clearer for drawing frames and the like having roll covers and trumpets therein, comprising in combination a vacuum-producer, a manifold in communication therewith mounted on a roll cover in front of the trumpet and having an intake nozzle in front of each trumpet and intake nozzles at each side thereof, a valve permitting and arresting the flow of air through the intake nozzles to the vacuum-producer, and valve controlling means automatically opening and closing the valve at timed intervals and for predetermined intervals of time.

5. A loose fiber clearer for drawing frames and the like having trumpets and roll covers, comprising in combination a vacuum-producer, a manifold on each frame in communication with the vacuum-producer, intake nozzles in the manifold adjacent the trumpets, and means automatically arresting the flow of air through the intake nozzles of each frame and permitting the flow through the nozzles of another frame, in succession.

6. A loose fiber clearer for drawing frames and the like having guides for the strands being processed therein and adjacent lint-collecting surfaces, comprising in combination a manifold having intake ports adjacent the respective guides extending transversely of the path of the strands and intake nozzles extending out from the manifold at each side of each intake port over the said surfaces, a vacuum-producer in communication with the manifold, and means automatically restricting the air flow through the manifold to the vacuum-producer to predetermined intervals and duration.

7. A loose fiber clearer for drawing frames and the like having a roll cover and trumpets thereon, comprising a manifold mounted on the roll cover forward of the trumpets and in spaced and parallel relation to the series of such trumpets, the manifold having an intake port opposite each trumpet and an intake nozzle reach-

ing rearward alongside each trumpet beyond the front part of the latter, a vacuum-producer, a conduit connecting the manifold with the vacuum-producer, a valve closing the conduit, and a timer opening the valve periodically for a predetermined duration.

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