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SUCTION DUCT SYSTEM FOR VARIABLE DRAFTING HEADS

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2 Sheets-Sheet 1

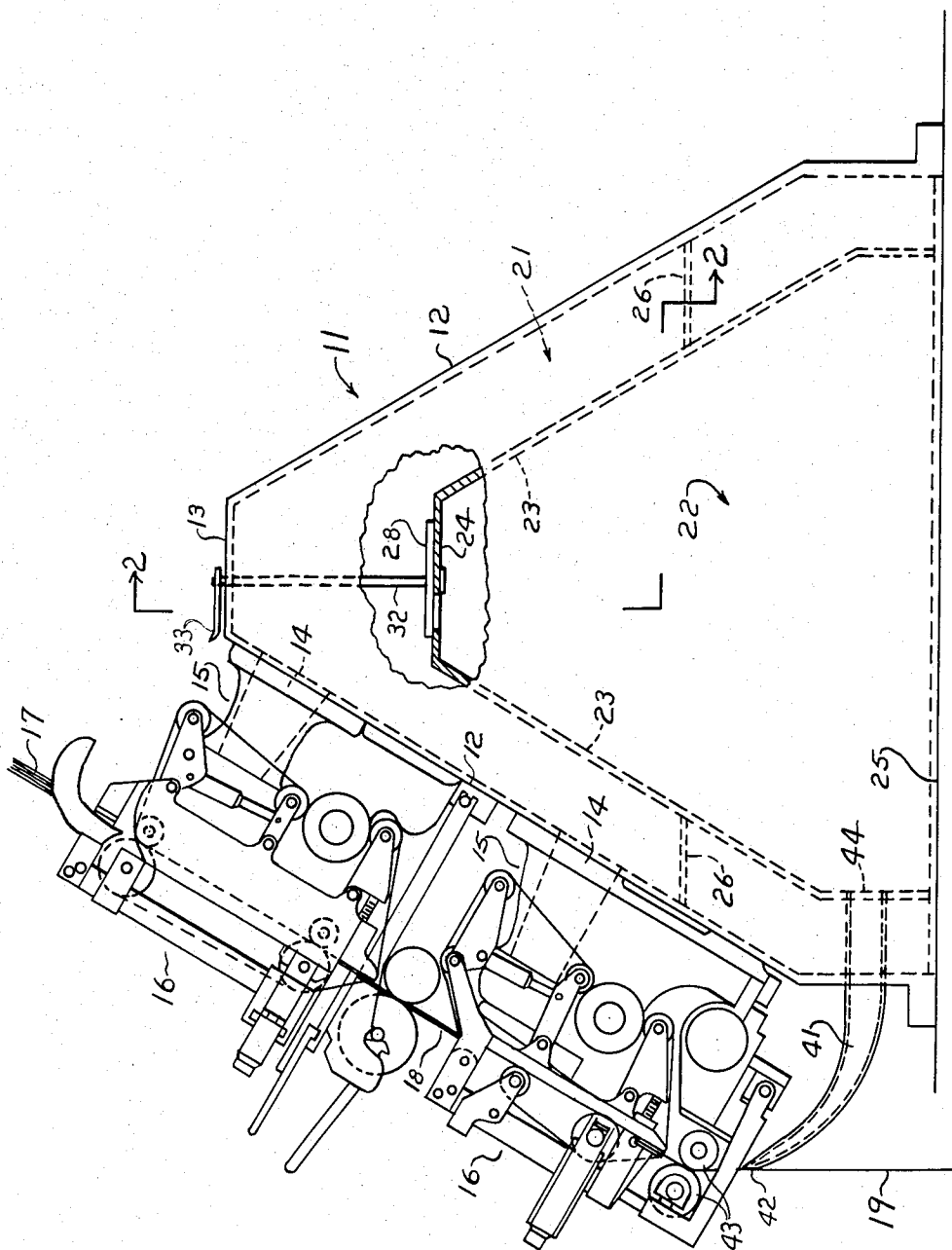


Fig. 1

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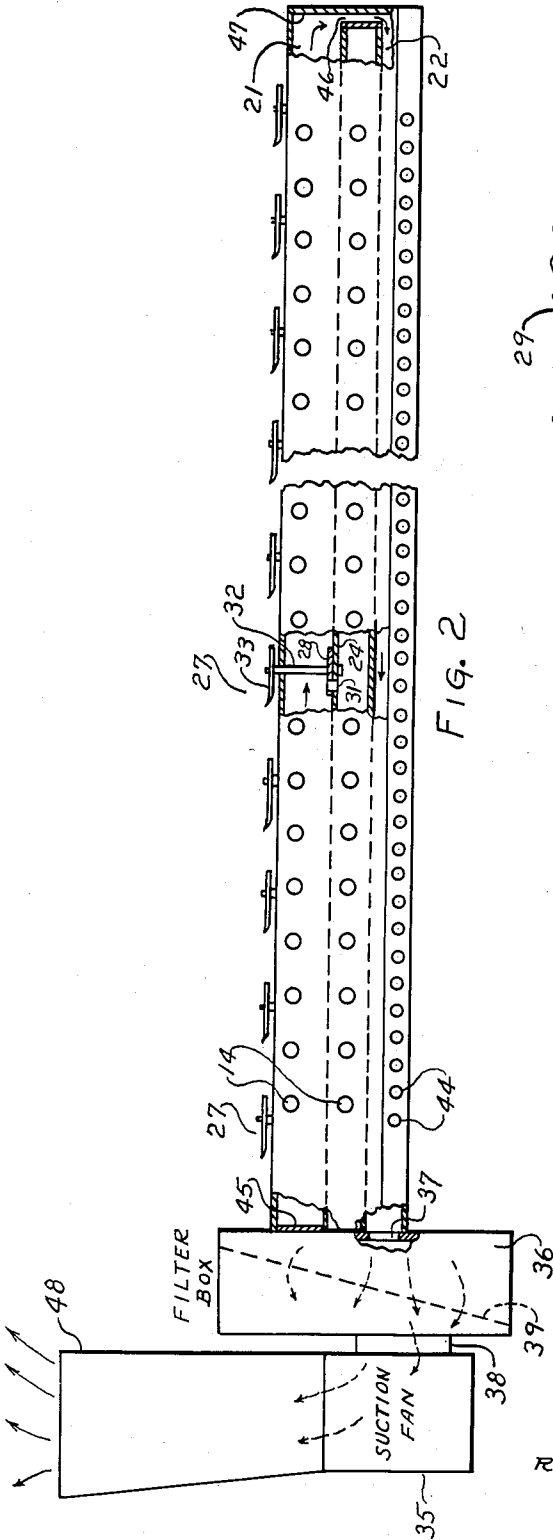


Fig. 2

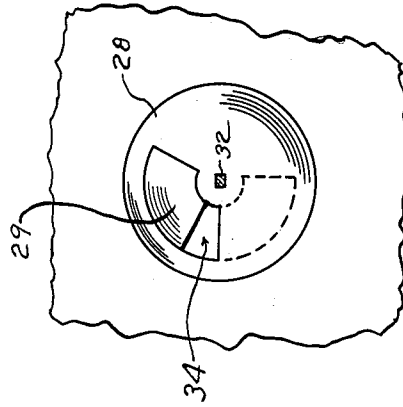


Fig. 3

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SUCTION DUCT SYSTEM FOR VARIABLE DRAFTING HEADS

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Application February 18, 1953, Serial No. 337,545

9 Claims. (Cl. 19—130)

The present invention relates to vacuum distribution and concerns also fiber processing, especially the processing of textile fibers. The invention has for its principal object the provision of accurately controlled pneumatic effect such as suction for use at a plurality of different points. A more specific object is the provision of such suction at various points in controlling the drafting of textile fibers in a bank of drafting heads in a spinning room.

A further object of the invention is to provide means for independently adjusting the suction applied to each of a plurality of different drafting heads or groups of drafting heads mounted in a row or a bank.

Still another object of the invention is to dispose of fly waste and waste fibers or broken ends without interfering with the accurate maintenance of the suction for fiber control.

Still another object of the invention is to keep the waste fiber in motion in the suction line and to separate waste fibers from the exhaust air in producing the suction.

An additional object is to distribute pneumatic effect uniformly along a line of considerable length.

Still another object is to provide a simple, inexpensive, easily assembled and maintained construction for suction ducts and for suction adjustment in the ducts.

Other and further objects, features and advantages of the invention will become apparent as the description proceeds.

In carrying out the invention in accordance with a preferred form thereof, a suction header is provided which may be of roughly triangular cross-section with two adjacent parallel ducts, one within the other. There is a primary duct in which suction is controlled, which is substantially of inverted V shape cross-section. Enclosed within the arms of the V, there is a secondary duct, in which a suction head is maintained higher than any needed in the primary duct.

The suction header is provided with ports in the sides of the primary suction duct for connection to draft control units of the type employing the conjoint action of aprons and suction for the control of fibers during drafting. The secondary suction duct is provided with scavenger ports for connection to scavenger tubes which remove fly waste and broken ends from the draft control units. A velocity slot is also provided for keeping the fly waste in motion in the secondary suction duct. Adjustable ports are provided in the wall between the primary and secondary suction ducts for maintaining substantially uniform suction along the length of the suction header at each of the draft control units, and a suction fan is connected to one end of the secondary suction duct through a filter box.

A better understanding of the invention will be afforded by the following detailed description considered in conjunction with the accompanying drawings, in which:

Fig. 1 is an end view, partially in cross-section of an embodiment of the invention;

Fig. 2 is a side elevation view of the apparatus of Fig. 1

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with portions broken away represented as cut by a broken plane 2—2 indicated in Fig. 1; and

Fig. 3 is a fragmentary detail view of a portion of the wall between the primary and secondary suction ducts illustrating the arrangement of the adjustable port or valve at the broken away portion of the center of the apparatus of Fig. 2.

Like reference characters are utilized throughout the drawings to designate like parts.

As illustrated in Fig. 1 there is a suction header 11 having sloping side walls 12 and a horizontal top wall 13. One or both of the sloping side walls 12 has ports 14 formed therein for connection to the openings of hollow pedestals 15 of draft control units 16. The draft control units 16 may be of any suitable type employing suction to effect control or assist in the control of the fibers of sliver 17 being reduced to successively finer forms 18 and 19 for supply to spinning head (not shown). The specific construction of the draft control units 16 does not constitute a part of the present invention but for the sake of illustration they are shown as being of the type illustrated in the co-pending application of Raymond O. Perrault and myself filed March 9, 1953, Serial No. 341,252. The walls 11 of the suction header are preferably composed of relatively inexpensive, easily fabricated material such as sheet metal, for example, sheet iron.

For dividing the suction header 11 into primary and secondary suction ducts 21 and 22, respectively, a partition wall is mounted within the suction header 11 comprising sloping side walls 23 parallel to the outer walls 12 and a horizontal top wall 24 parallel to the outer top wall 13. A lower sheet wall or plate 25 is provided for closing the bottom of the suction duct 22. In the arrangement illustrated strips 26 are provided for forming lower walls of the primary suction duct 21 so that the primary suction duct 21 has a cross-section of roughly inverted V form.

Referring to Fig. 2 it will be observed that both the primary suction duct 21 and the secondary suction duct 22 are of considerable length with a large number of pairs of inlet ports 14 being provided along the length of the primary suction duct 21 to permit a long row of draft control units to be mounted on the suction header. The invention is not limited to specific dimensions. By way of example, it may be explained, however, that successful operation has been obtained in a system over forty-seven feet long, providing suction for one hundred twenty drafting heads and associated broken end collectors, with a suction head of two inches of water in the primary duct 21 and three inches of water in the secondary duct 22. In order that substantially the same suction may be supplied to each of the draft control units regardless of the distance thereof from the end of the suction header, the arrangement is such that the suction is derived from the secondary suction duct 22 at one end thereof and adjustable bleed ports are provided along the length of the upper dividing walls 24 to supply suction to the primary suction duct 21. Both ends of the primary duct are sealed and the remaining end of the secondary duct is sealed except for a velocity slot, hereinafter explained. The sizes of the bleed ports are adjusted to compensate for the loss of head which might otherwise result from the length of the suction ducts. In this way the pneumatic effect is distributed uniformly along the line of ports 14.

As indicated in Fig. 2 a plurality of adjustable bleed ports or suction valves 27 are provided. As illustrated in Fig. 1 and in the portion of Fig. 2 broken away at the center, each suction valve 27 comprises a rotatable disc 28 having an open sector 29 therein adapted to cooperate with a sector shaped opening 31 cut in the

dividing wall 24. A valve stem 32 is secured to the disc 28 and pivoted in a suitable center opening in the dividing wall 24. There is a handle 33 serving also as an index of the degree of opening. As illustrated in Fig. 3 the angular position of the disc 28 indicated by the handle 33 determines the size of a sector shaped port 34.

In the arrangement illustrated, a suction fan 35 is connected to the secondary suction duct 22 at the left hand end thereof and it will be understood that the port openings 34 are made larger toward the right hand end of the apparatus as seen in Fig. 2 to compensate for the loss of head along the length of the apparatus. The adjustability of these ports permits the head applied to the draft control unit 16 along the length of the suction header to be maintained at a uniform value regardless of changes or adjustments which may be made in the speed and suction provided by the suction fan 35 in case adjustments in suction should be desired for different types of draft control units or different settings thereof in the handling of different types of fiber.

Preferably, a filter box 36 is interposed between an outlet port 37 formed at the left hand end of the secondary suction duct 22 and the inlet duct 38 of the suction fan 35. A filter screen 39 is mounted in the filter box 36 preferably diagonally and sloping toward the direction of the outlet port 37 of the secondary suction duct 22, so that any fly waste and broken ends collected in the suction duct 27 tend to come to rest and to fall to the bottom of the filter box 36 as the air stream is drawn through the screen 39 and upward. The fact that the cross-section of the filter 36 and the area of the screen 39 is considerably greater than the cross-section of the secondary suction duct 22 and especially than the area of the opening 37, results in such reduction of speed of the air velocity as to drop particles of fly waste in the bottom of the filter box 36.

In order to remove any fly waste remaining at the sliver 19 as it leaves the lowermost end of the draft control unit 16 and to avoid discharge of broken ends into the spinning room and to prevent the broken end from wrapping around the lower draft rolls 43 and building up, a scavenger tube 41 for collecting such broken ends is provided having an inlet orifice of reduced cross-section 42 close to the nip of draft rolls 43 of the unit 16 to provide a scavenger stream of high velocity drawn into the tube 41. The scavenger tube 41 is connected to a scavenger port 44 formed in the lower portion of the side wall 23 of the secondary suction duct 22. As illustrated in Fig. 2, a plurality of such scavenger ports 44 are provided along the length of the suction header 11, there being two for each pair of inlet ports 14 in case draft control units of the twin type are employed as illustrated in the aforesaid co-pending application of Perrault and Spisak, so that there may be a scavenger tube 41 for each sliver 19.

The left hand end of the primary air duct 21 as seen in the view of Fig. 2 is sealed by an end wall 45; and a velocity slot 46 is provided at the right hand end, where both ducts are sealed by an end wall 47, for supplying air from the primary suction duct 21 to the right hand end of the secondary suction duct 22 in order to maintain air movement along the length of the secondary suction duct 22 past the scavenger ports 44 for causing fly waste and broken ends to be kept in motion and carried into the filter box 36.

The suction fan 35 may be provided with a discharge opening 48 to the atmosphere. In case air conditioning is employed the discharge leads to the return duct of the air conditioning system, fly waste, lint and the like, having been removed by the filter screen 39.

While I have described my invention as embodied in concrete form and as operating in a specific manner in accordance with the provisions of the patent statutes, it should be understood that I do not limit my invention

thereto, since various modifications thereof will suggest themselves to those skilled in the art without departing from the spirit of my invention, the scope of which is set forth in the annexed claims.

What I claim is:

1. In combination a suction header including a primary suction duct and a secondary suction duct parallel thereto, fiber draft control units mounted on said suction header, spaced therealong with suction connections to said primary suction ducts for subjecting fibers in said control units to suction control, for compacting and promoting interfiber adhesion thereof, spaced adjustable valves between said ducts for causing substantially uniform suction head in said primary duct along the length thereof to equalize substantially the suction acting in said draft control units, and an exhaust fan connected to said secondary air duct for creating a suction head therein exceeding that required in any draft control unit.

2. Apparatus as in claim 1 wherein scavenger ports are provided in the secondary suction duct along the length thereof for collecting waste fibers from the draft control units.

3. Apparatus as in claim 2 wherein an exhaust fan is connected to the secondary duct at one end of the suction header, the primary suction duct is sealed at said end, and a velocity slot is provided between the ducts at the opposite end of the suction header for keeping waste fibers moving.

4. Apparatus as in claim 3 wherein a filter box with a filter screen is interposed between the secondary suction duct and the exhaust fan for stopping waste fibers.

5. Apparatus as in claim 4, wherein the filter screen is mounted diagonally in said filter box with the air motion upward thereagainst for slowing motion of the waste fibers and causing them to drop to the bottom of the filter box.

6. Apparatus as in claim 1, wherein the suction ducts have a common wall along their length and the adjustable valves comprise rotatable discs with open sector mating openings in said common wall.

7. A fiber draft control system comprising in combination first and second suction ducts lying parallel to each other, the first having inlet ports spaced therealong for applying vacuum at a plurality of spaced points, fiber draft control units mounted thereon at said inlet ports with suction connections to said inlet ports for subjecting fibers in said control units to suction control, both ends of the first duct being sealed, the second duct having an exhaust port at one end, the other end being sealed, bleed ports of progressively greater size between the two ducts extending from the exhaust-port end to the opposite end of the duct, scavenger ports spaced along the second duct for collecting waste fibers from the draft control units and a velocity slot between ducts near the end where both ducts are sealed for causing continued motion of waste fibers collected at the scavenger ports.

8. Apparatus for equalizing suction head in a plurality of suction type draft control units mounted in a long bank in a spinning room of a textile fiber processing plant which comprises a pair of ducts providing suction flow in two paths along such a bank of units, means for maintaining relatively high suction in the second path, means for diverting successively greater amounts of air from the second-path to the first path along the length thereof, control means for the diversion means adapted to regulate the flow from said second path to said first path, and connections for applying suction from the first path to the draft control units, whereby the tendency toward loss of suction along the length of the first path is compensated by exhausting regulated amounts of air along the length of the parallel paths.

9. A pneumatic distributing system for applying vacuum to a plurality of suction units at substantially uniform suction head comprising in combination first and second

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suction ducts aligned parallel to each other, the first having inlet ports spaced therealong for applying vacuum at a plurality of spaced points to suction units, both ends of the first duct being sealed, the second duct having an exhaust port at one end and the other end being sealed, a series of bleed ports of progressively greater size connecting the two ducts, said series extending from the exhaust port end to the opposite end of the second duct, and con-

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trol means for individually regulating the area of each of said bleed ports.

References Cited in the file of this patent**UNITED STATES PATENTS**

2,147,190	Cadden -----	Feb. 14, 1939
2,487,361	Nims -----	Nov. 8, 1949