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Marzoli

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[54] **PNEUMATIC CLEANING PLANT FOR DRAWING SYSTEMS IN SPINNING PREPARATION MACHINES AND SPINNING MACHINES**


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[30] **Foreign Application Priority Data**

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[51] **Int. Cl.** ..... **D01h 5/66**

[58] **Field of Search** ..... 19/263, 245, 107; 57/56; 15/300 R, 306 A



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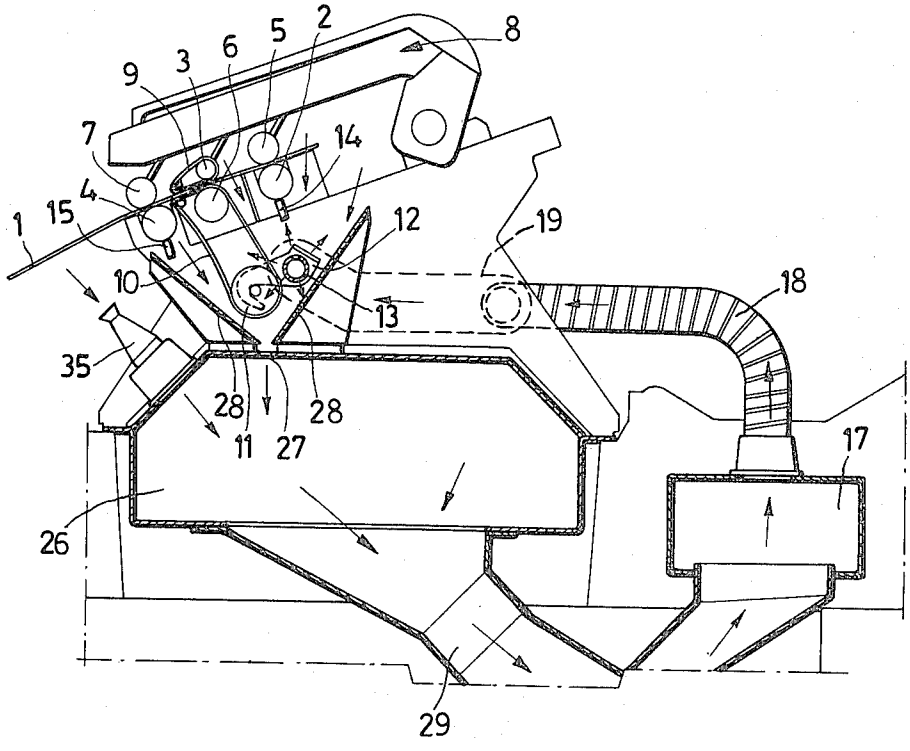
*Primary Examiner*—Dorsey Newton



[57] **ABSTRACT**

A pneumatic cleaning plant for drawing systems in spinning preparation machines and spinning machines is disclosed comprising suction means and means adapted to dispense puffs of air acting on the parts of the machine to be cleaned, so as to cause the dust and foreign particles adhering to these parts to be suspended in the surrounding air space, whereby said suspension is easily removed by suction.


**3 Claims, 5 Drawing Figures**



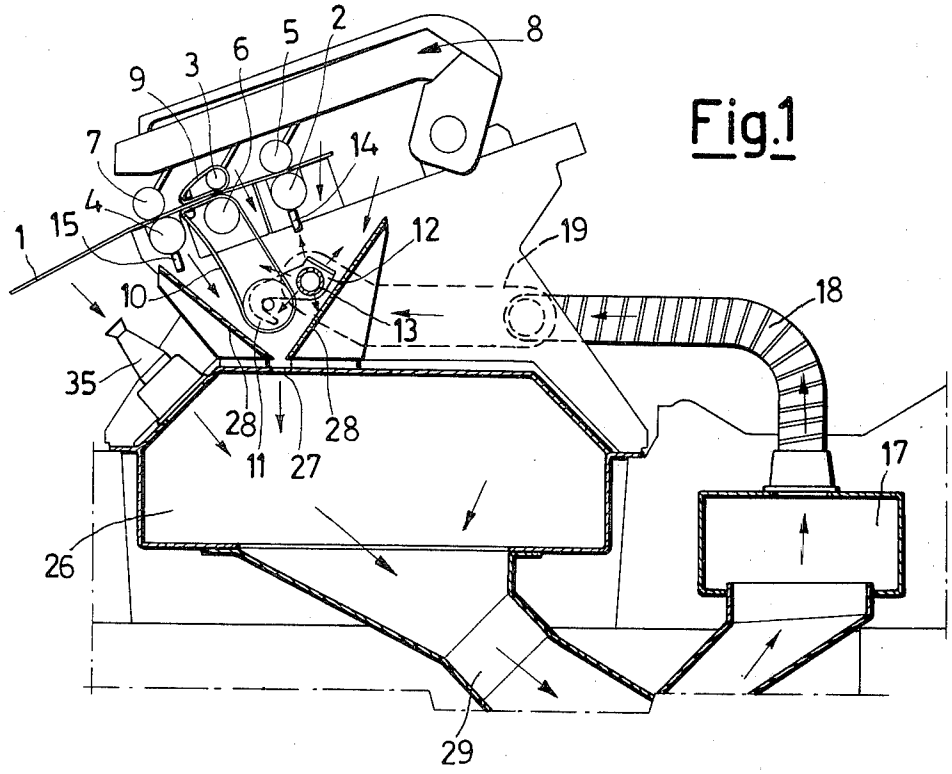

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Fig.1

Fig.2

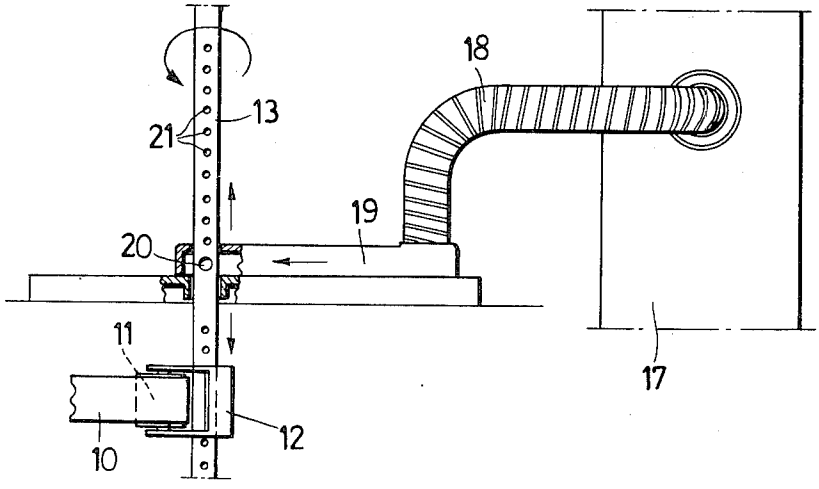
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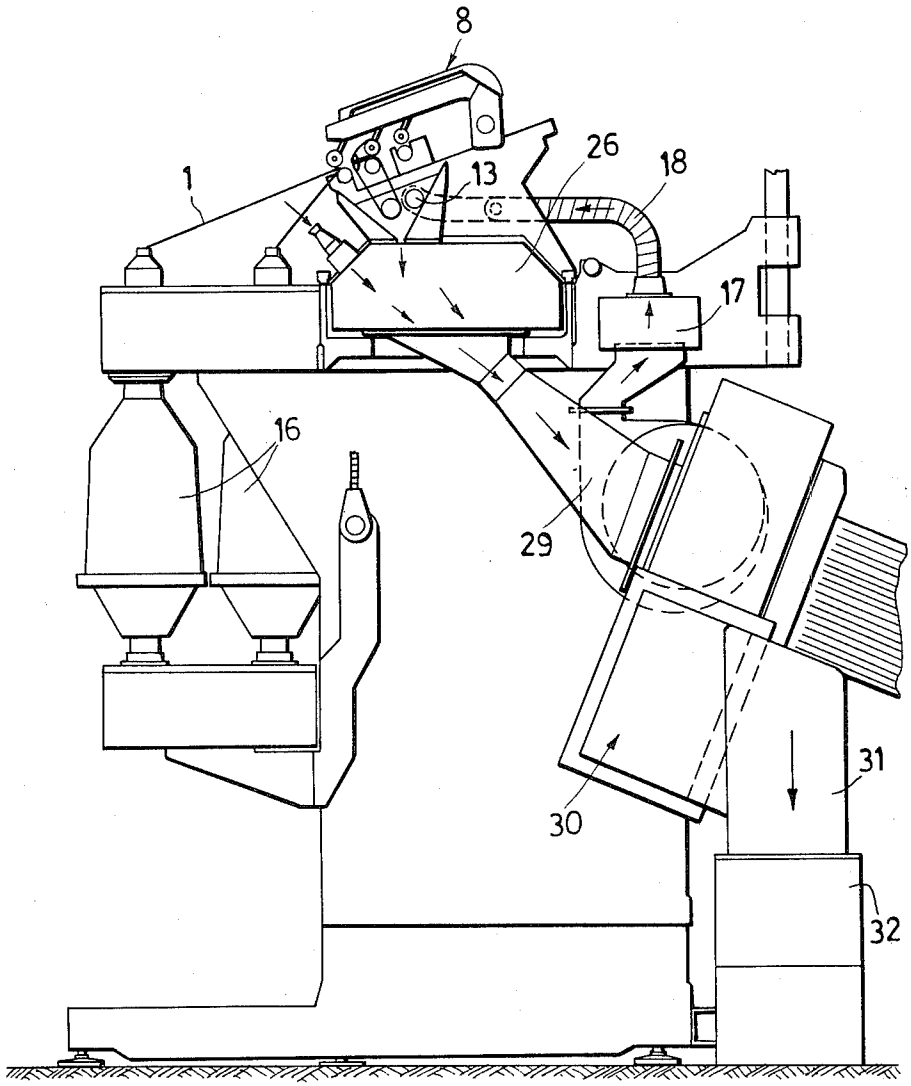
Fig.3



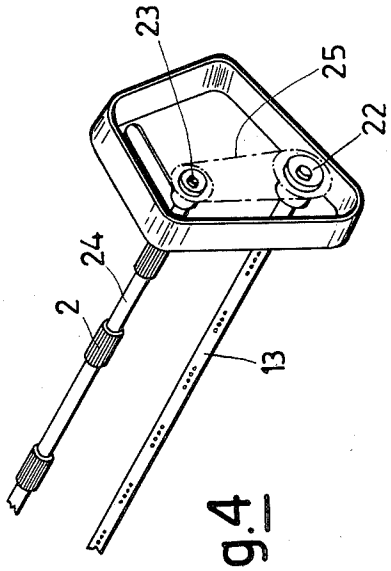



Fig.4

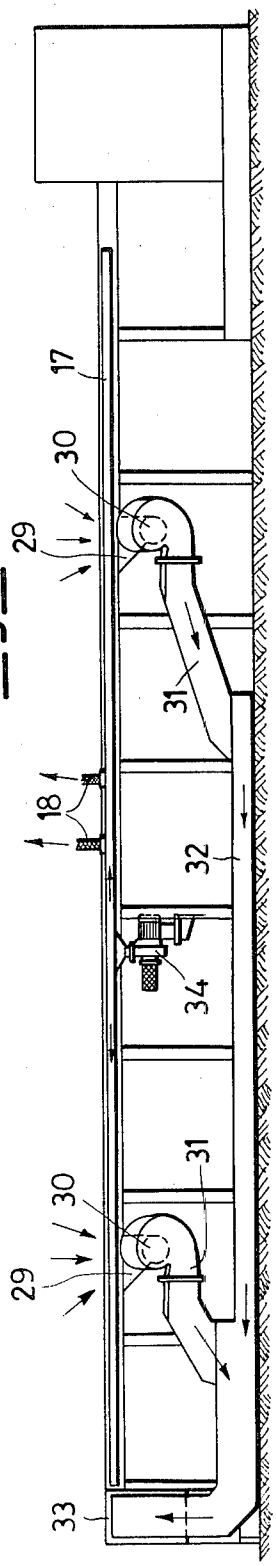



Fig.5

# PNEUMATIC CLEANING PLANT FOR DRAWING SYSTEMS IN SPINNING PREPARATION MACHINES AND SPINNING MACHINES

This invention relates to a pneumatic cleaning plant for drawing systems in spinning preparation machines and spinning machines.

In drawing systems of spinning preparation machines and spinning machines, the yarn consisting of an assembly of different length fibres is notably subjected to strong tensile stresses because of which a certain amount of fibre, especially the short fibre, becomes separated and dust forms. It is thus necessary to provide for cleaning the drawing members and removing the suspended fibres and fibrils and the dust.

Pneumatic cleaning devices are known consisting of suction nozzles fixed to the outlet of the grooved cylinders of the drawing system or close to said cylinders and the lower belts, with the purpose of sucking in and removing the suspended fibres and fibrils, the dust and any broken yarn. Sometimes these known pneumatic devices are completed by mechanical cleaning members, for example rubber bars, disposed in contact with the cylinders and belts.

The cleaning devices presently known and commonly applied are not completely satisfactory and give rise to various disadvantages. In the first place it should be noted that all known pneumatic devices limit their action to the localised suction and removal of the free fibres and fibrils and the dust in suspension in the air, whereas they are not able to efficiently remove the fibrils and dust which become deposited on the fixed members of the drawing system.

In the second place the suction nozzles which have small cross sections become easily and frequently blocked, because of which their suction efficiently is greatly reduced after a few working hours and frequent maintenance and cleaning of the nozzles are necessary.

Mechanical cleaners, in their turn, have the disadvantage of making the motion of the belts with which they are in contact irregular and to cause their rapid wear.

The object of this invention is to provide a pneumatic cleaning plant free from the aforementioned disadvantages and able to carry out its function with greater efficiency and durability without requiring frequent maintenance operations.

This object is attained by forcedly provoking the suspension in air of all the fibres, fibrils and dust which form in the zone of the drawing system and then sucking and removing said suspension from this zone.

Contrary to known devices which are limited to carrying out a pure and simple suction operation, according to the present invention puffs of preferably mobile air are made to act in the space so as to also raise those particles which may have been deposited on the members of the drawing system and to mix them with the suspended particles, so forming with them a suspension in air which can be easily sucked in and removed.

The pneumatic cleaning plant according to the invention for carrying out the aforementioned concept comprises means for placing the zone of the drawing system under suction, and mobile means for feeding air jets into said zone for striking the members of the drawing system.

The mobile means for feeding air jets may be provided with traverse reciprocating or rotational motion



and are connected by suitable tubes to at least one motorised fan. In an advantageous embodiment the means for feeding the air jets may consist of a component element of the drawing system. Thus for example in drawing systems which control the fibres by belts, the means for feeding the air jets may be the hollow bar, suitably bored, which supports the brackets for the tensioning devices of the lower belts; in this case the rotary motion may be derived from one of the lower drawing cylinders by means of a suitable drive.

For putting the drawing system under suction it is convenient to dispose below it a header in the form of a funnel extending over the entire length of the machine and connected at its base by way of a slot with a channel connected in its turn to at least one motor driven suction fan. Said channel may be provided with openings for drawing in any broken yarn or roving.

The invention will be further described and illustrated by way of an embodiment given by way of non-limiting example, with reference to the accompanying figures.

FIG. **1** is a diagrammatic cross section through the assembly of drawing devices in a spinning machine to which the plant according to the invention is applied.

FIG. **2** is a detailed view from above of the system for feeding air under pressure;

FIG. **3** is a diagrammatic section analogous to that of FIG. **1** in which the plant according to the invention is applied to a spindle frame;

FIG. **4** is a perspective view of the derivation of motion for the rotating air feed member;

FIG. **5** is a rear view of the cleaning plant according to the invention applied over the entire length of the spindle frame.

FIGS. **1** and **3** show a drawing system in which the yarn **1** passes between pairs of drawing rollers **2** and **4** mounted in a lower support and respective pressure rollers **5** and **7** rotatably mounted in a swinging arm **8.** The fibres of the yarn are controlled between these pairs of rollers by an upper belt **9** guided above a roller **3** and a lower belt **10** guided above a roller **6** and kept taut by a tensioning device **11** which is supported by a bracket **12** carried by a hollow bar **13.**

Bars **14** and **15** driven with straight line reciprocating motion are brought intermittently into contact with the surfaces of the drawing rollers **2** and **4** respectively. The yarn **1** leaving the drawing device is fed to the winding devices **16** (FIG. **3**).

After this summary description of the constituent elements of the drawing system, the zones in which it is necessary or opportune to carry out the cleaning action can be indicated.

As heretofore described the yarn is drawn in the zone between the drawing rollers **2** and **4** by the effect of the pressure exerted by the corresponding pressure rollers **5** and **7.** Because of the increasing speed of rotation between the drawing rollers **2** and **4** the yarn undergoes elongation and is strongly stressed. Because of these stresses, short fibres and fibrils become separated from the yarn (and dust is created), partly staying suspended and partly depositing especially on the fixed members.

The purpose of the belts **9** and **10** is to guide and control the yarn, and fibres, fibrils etc. also deposited on it.

The purpose of the bars **14** and **15** is to mechanically remove the fibrils adhering to the surfaces of the drawing rollers **2** and **4.** These are driven with reciprocating

motion so that they become intermittently removed from the rollers and create a compulsory passage for the agitated air as will be explained hereinafter.

At the outlet of the drawing device there may be broken yarn or roving, especially at the time of starting the machine.

The cleaning plant according to the invention firstly provides means for feeding jets of air at pressure into the drawing system zone in order to agitate and suspend in the air all the impurities including those which may have deposited on the members of the drawing system.

For this purpose a header channel **17** is provided which extends over the entire length of the machine and is supplied with air under pressure from a motor driven fan **34.** Flexible pipes **18** lead from this channel **17.**

In the case illustrated by way of example, one of said pipes **18** is provided for every four spindles. Each pipe opens into a closed box **19** traversed by the hollow bar **13,** which within the box comprises holes **20** so that the air under pressure can pass into the bar. As shown in FIG. **2,** the hollow bar **13** is provided with a plurality of holes **21** through which the air under pressure can leave in the form of jets (see the arrows in FIGS. **1** and **3**) so as to strike the members of the drawing system. By means of gears **22** and **23** (FIG. **4**) mounted respectively on the hollow bar **13** and axle **24** of the drawing roller **2** together with the connection between them by means of a chain **25,** the drawing roller **2** transmits its rotational motion to the bar **13** which consequently expels the air jets with turbulent motion. It is also evident that the air jets leaving the holes **21** of the hollow bar **13** carry out a "brushing" action on the various members of the drawing system so that existing impurities cannot be deposited on them and they are instead effectively placed in suspension.

In order to remove this aeriform suspension of impurities from the drawing system zone, below it there is disposed a funnel intake header **28** the open mouth of which faces the members of the drawing system and which extends over the entire length of the machine. This intake header is connected by way of a bottom slot **27** to a channel **26** which also extends over the entire length of the machine.

Two channel headers **29** extend from the channel **26** and are connected to the suction ports of two motor driven suction fans **30,** the delivery ports **31** of which convey the indrawn air and impurities to a channel **32** and finally to a filter box **33,** where the impurities are retained while the air is expelled into the room or to the outside. From the description it is clear that with the suction means the entire drawing system zone is placed under suction because of which the suspension of impurities formed by the air jets leaving the holes **21** in the hollow bar **13** is drawn in and removed.

The channel **26** is also provided with suction ports **35** facing the direction of the yarn or roving leaving the drawing systems, through which any broken yarn or roving is sucked and removed.

The advantages of the plant according to the invention are evident from the foregoing description. With the mixing and suspension in air of all the impurities (fibres, fibrils, dust etc.) by means of the rotating air jets, the impurities are prevented from coming to rest and depositing on the members of the drawing systems and because the entire drawing system zone is placed under suction, the impurities can be totally removed. Moreover, as there are no suction passages of small cross section the danger of frequent blockages is avoided.

Naturally the plant described and illustrated by way of example is susceptible to numerous modifications without leaving the scope of the present invention.

Thus it is possible to use further motor driven fans and further motor driven suction fans according to the specific requirements of the machine to which the plant is applied.

The feeding of air under pressure could also take place by other rotating or otherwise mobile members situated in the zone close to the drawing systems.

Instead of a single header channel for the air under pressure, a number of individual channels could be included.

The intake header instead of extending along the entire machine could be divided into a number of compartments.

What I claim is:

**1.** A pneumatic cleaning plant for drawing systems in spinning preparation machines and spinning machines having drawing and belt drive rollers comprising, in combination, means for placing a drawing system zone under suction and comprising: a suction fan with outlet communicating with the atmosphere outside said drawing system zone, and a funnel-shaped intake member connected to said suction fan; and blowing means having at least one movable member separated from said drawing and belt drive rollers for feeding jets of air into said zone, said blowing means comprising at least one rotating movable member, with a plurality of holes, and motor driven fan means connected to said rotating movable member; said blowing means being a component of the drawing system; a lower belt for the drawing system; and a tensioning device for said lower belt, said component comprising a support bar for said tensioning device.

**2.** A plant as claimed in claim **1** wherein said funnel-shaped intake member is below said drawing system, and channel means for connecting said intake member to said suction fan.

**3.** A plant as claimed in claim **1** including lower rollers of the drawing system, one of said lower rollers being linked to said rotating movable member for applying rotary motion to said rotating movable member in which the rotary motion of the member for feeding jets of air is derived from the movement of one of the lower rollers of the drawing system.

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