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TEXTILE MACHINE FEEDER MECHANISM

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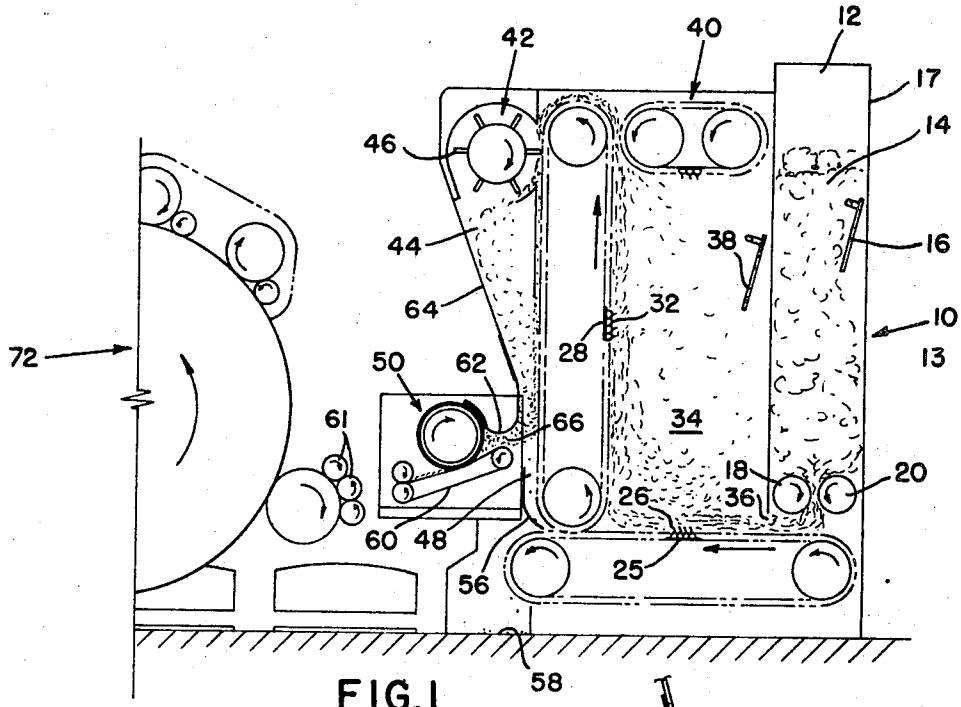


FIG. 1

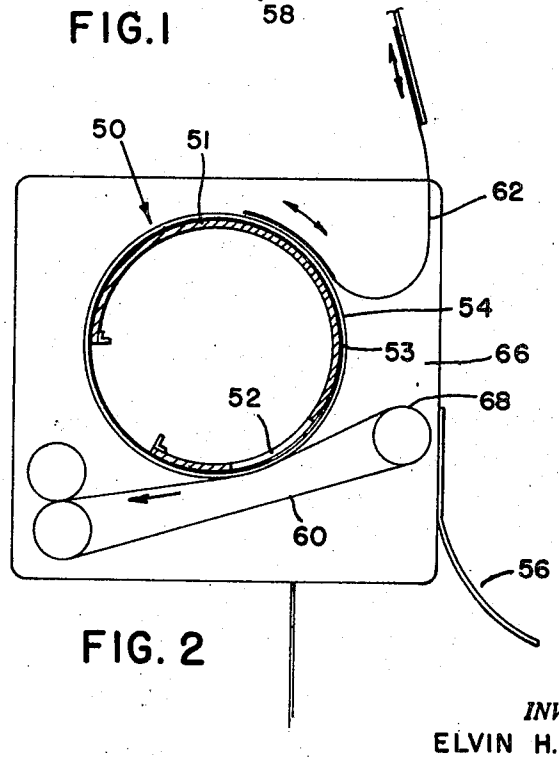


FIG. 2

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TEXTILE MACHINE FEEDER MECHANISM

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ABSTRACT OF THE DISCLOSURE

The present invention relates to a feeding device and method for preparing and feeding fibrous material to textile machines such as carding machines and the like which involves elevating the material so that it may fall freely through an induced suction and subsequently form a fibrous web of a desired thickness according to the degree of the induced suction.

Background, brief summary and objectives of the invention

In feeding textile machine such as carding machines and related devices, it is desirable to feed to the machine a web of fibrous material having an even thickness and consistent tuft characteristics so as to insure that the subsequently formed product will be uniform in cross section and possess consistent characteristics.

It is equally important that the web of fibrous material fed to a carding machine have no metallic particles or other foreign substances since these materials would be deleterious to the machinery and result in inconsistent product characteristics.

The present invention has been developed to meet these conventional requirements and the apparatus and method disclosed herein insures a consistent even collection of fibrous material in web form which is free from foreign materials and which can be varied in thickness by varying the degree of induced suction inherent in the apparatus.

Generally, the present invention comprises a hopper for receiving fibrous material and a lifting apron inside the hopper which is substantially vertically positioned and operable to enage and lift the material within the hopper upwardly for a predetermined distance. At the upper end of the lifting apron is a cooperating stripping apron which removes a portion of the fibers engaged along the lifting apron, particularly those that are lumped or accumulated in unopened masses, so that these removed clusters will fall back within the hopper for subsequent opening. The material remaining on the lifting apron continues out of the hopper until it is engaged cooperatively by a doff roll which strips substantially all fiber from the lifting apron so that the fibers fall freely downwardly through a chute outside the hopper. The freely falling fibers then pass downwardly adjacent a suction device which draws material having consistent fiber tuft characteristics against a screen to form a web of uniform thickness, the thickness of the web depending upon the degree of the induced suction. The suction device has a variable opening to permit a variation in the degree of suction induced.

Accordingly, it is an object of the present invention to provide a feeding mechanism and method for textile machines of the type described for feeding fibrous material into a machine at an even and consistent rate.

Another object of the invention is to provide a feeding mechanism and method for textile machines for feeding fibrous material to a subsequent machine in a lap of uniform thickness.

Yet another object of the invention is to provide a feed mechanism and method for fibrous material of the type described for opening and partially separating the fibers and thus dislodging the trash and foreign materials from the fibers during that operation.

Still another object of the present invention is to provide a feed mechanism for fibrous material which will elevate the material, separate and release the material to fall freely proximate an induced suction so that a web of consistent texture and uniform thickness will be formed by an induced vacuum.

These and other objects of the present invention will become more apparent after a consideration of the following detailed specification taken in conjunction with the accompanying drawings wherein like characters of reference designate like parts throughout the several views.

Figure description

FIG. 1 is a side elevational sectional view of the feeder mechanism showing the receiving hopper, the lifting apron, the stripping apron and cooperating doff roll and their positioning with respect to the collecting chamber wherein freely falling fibrous material is collected by means of an induced suction to form a web of continuous thickness

FIG. 2 is an enlarged side elevational sectional view of the variable suction means of the mechanism of FIG. 1 where the freely falling fibrous materials are collected and web-formed by the suction induced.

Detailed description

Referring now to the drawing and particularly to FIG. 1, a feed unit generally designated **10** for forming a fibrous web has an opening **12** at its top through which fibrous material **13** may be delivered directly from the plant pneumatic conveyor system.

The opening **12** has a downwardly extending passageway **14** which permits fibrous material to pass through cooperating feed rollers **18** and **20** and onto a lower horizontally positioned apron **25** to advance fibrous material positioned thereon by the feed rollers **18** and **20**.

As apron **25** moves deposited material in a preselected direction (see arrow), an apron **28** which carries a plurality of pins **32** secures and elevates the fibrous material carried by the lower horizontal apron **25** by impaling that material on the pins and moving it upwardly (see arrow). The area **34** adjacent apron **28** constitutes a receiving hopper for the fibrous materials introduced in opening **12** through passageway **14** and along apron **25** through the communicating opening **36**.

A first feeler gauge **16** is positioned within pasageway **14** and is normally biased as shown in FIG. 1. When fibrous material **13** accumulates in pasageway **14** to the extent that it rises above the feeler gauge **16**, that gauge will be displaced in a parallel position along the wall **17** of the passageway and will control the operation of the plant supply system to preclude any additional fibrous material **13** from accumulating in the passageway. Once the material has been used to the extent that it no longer biases feler gauge **16**, that gauge will return to its original position and allow the operation of the plant system to provide additional material through the opening **12**.

A second feeler gauge **38** is positioned within the receiving hopper **34** in the manner shown in FIG. 1, and that gauge will be deflected when the level of fibrous material collected within the hopper rises to the level of the gauge position. The gauge **38** is operably wired with the drive means of feed rollers **18** and **20**, and when deflected, these rollers will cease to operate thus pre-

cluding the introduction of any additional fibrous material within the hopper **34** from the passageway **14** until the hopper level is diminished to the extent that feeler gauge **38** is exposed and biased to its original position. The provision of feeler gauges **16** and **38** insures a consistent web formation through a constant level of fibrous material.

A stripping apron **40** is horizontally positioned at the upper portion of apron **28** so that large clusters of fibers are removed from the lifting apron and redirected to the hopper **34**. Thus some initial steps taken to control the web thickness and consistency through the action of the stripping apron **40**.

The fibers retained on the pins **32** of lifting apron **28** (not removed by apron stripper **40**) move with the apron **28** until they are stripped by the doff roll **42** whereupon the stripped fibers fall freely downwardly through a chute **44** in a random manner. The doff roll has a plurality of stripping members **46** which are disposed to shed the fibrous material from the pins **32**. Thus the material removed from the apron by the doff roll falls freely through the chute **44**.

Situated near the bottom **48** of chute **44** is a web-forming suction device generally designated **50** which comprises a housing **51** having an orifice **52** which is surrounded by a movable shell **53** and a perforated screen **54** in the manner particularly shown in FIG. 2. Some air displacing means (not shown) such as a fan or other vacuum creating device is positioned at one end of the housing **51** so that air flow will be induced across chute **44** through orifice **52** and through the air inducing means at the end of the housing.

Further adjustment in the induced suction air velocity is achieved by means of a flexible adjustable baffle **62** extending downwardly from the exterior wall **64** of chute **44** and turning upwardly and partially along the circumference of the suction device screen **54** as particularly shown in FIG. 2. Baffle **62** may be suitably adjusted by retracting or extending the ends, either of which may be movable, so as to diminish or enlarge the general opening **66** formed by the baffle **62** and the end **68** of the apron **60**. By suitable operation of the movable baffle **53** and the flexible shell **62**, the desired air flow velocity and web thickness for a given capacity may be obtained to compensate for any size or texture of fibrous material which is introduced into the feeding apparatus.

Thus as fibrous material falls freely through chute **44** and near opening **52**, it is drawn onto the screen **54** until the density of the web formed on the screen is such that the velocity of air flow induced through the screen is reduced to the extent that no more fibers will be attracted.

Thus the fibers which were stripped from the lifting apron **30** by the doff roll **42** fall freely under the influence of gravity, down the chute **44** and proximate the opening **66**. If large clusters of fibers are not removed by the stripping apron **40** and are removed by the doff roll **42**, they will accelerate at a faster rate than the open and air-retarded fibers and have such momentum as not to be drawn onto the screen by the suction through the opening **66**. Thus a web of even thickness and consistent fiber-cluster characteristics is produced. Obviously, any metallic contents of the freely falling clusters through chute **44** will cause the fibers to accelerate and pass the opening **66** and not be drawn therein. The freely falling fibers which are unopened and of greater density and which fall past the opening **66** are directed by a baffle **56** against the lifting apron **28** for recycling. Metallic particles or trash will pass to the apron **25**. These materials will not be carried back into the hopper **34** by the pins **32** of the lifting apron but will be discharged to the floor level **58** or a collecting tray.

A feeding apron **60** is contiguous with and drives the rotating screen **54**. The web of material drawn to the screen is carried partially around the screen between it and the apron **60**, and this web is then fed into the feed rolls **61** of, for example, a carding machine **72**, subsequently taken in by the lickerin and eventually placed on the main cylinder of that machine.

The adjustability feature of the present invention lies in the opening **66** associated with the air inducing means located at an end of the housing **51**. If a fan is drawing air at a given capacity, the velocity of the air will depend upon the dimensions of the orifice through which the air is drawn. If a large orifice is exposed, the air will flow slowly through the orifice whereas if a smaller orifice is exposed, the air will flow at a considerably higher rate. Thus the variation in web thickness is achieved by the provision of a flexible baffle **62** which can be positioned to restrict or enlarge the opening **66** through which the air is drawn (see FIG. 2). Thus if the opening **66** is increased in size by movement of baffle **62**, the velocity of air through the opening is reduced to the extent that fibers are not accumulated beyond certain limits. On the other hand, if the opening is reduced in size by repositioning of baffle **62**, the velocity of the air passing through the opening is increased and a thicker web is formed on the screen **54**.

While only a single embodiment of the present invention has been described, it is to be understood that the invention is capable of further modifications and is intended to cover any variation, use, or adaptation of the invention, including the hopper, the lifting apron, the suction device and other elements of the disclosure described, without departing from the real spirit and purpose of this invention. Such modifications as well as the use of mechanical equivalents are contemplated.

What is claimed is:

1. An apparatus for feeding fibrous material to textile machines, comprising: a hopper receiving the fibrous material; means elevating the fibrous material within said hopper; means removing the elevated fibrous material from said elevating means so that the material falls from an elevated position; suction means inducing at least some of the fallen fibrous material to flow in a direct path of collection, said suction means including an independently rotatable web-forming foraminous surface positioned so that the suction-induced flowing fibrous material is collected thereagainst, said suction means also including a housing, an orifice in said housing, variable closure means associated with said orifice including an adjustable, flexible, baffle forming a generally U-shaped loop extending partially around the circumference of said rotatable foraminous surface for controlling air distribution and the flow of fibrous material against said foraminous surface, air displacing means for inducing air flow through said orifice, and an apron contiguous with said suction means web-forming foraminous surface and adapted to rotate with said surface as the fallen fibrous material forms a web between said apron and said surface for subsequent feeding to a textile machine.

2. The feeder mechanism as claimed in claim **1**, said removing means including a stripping apron removing a portion of the elevated fibrous material from the elevating apron before the removed materials have been extracted from said hopper so that the removed material is returned to said hopper, and a doff roll operative with said lift apron outside said hopper removing the elevated fibrous material so that the material will fall freely outside said hopper.

3. The feeder mechanism as claimed in claim **2**, said hopper having a lower conveyor horizontally positioned to urge fibrous material against said lifting apron for subsequent elevation.

4. The feeder mechanism as claimed in claim **3**, said aprons and conveyors having a plurality of pins adapted to pick and secure fibrous material for handling during movement and elevation of the material, said means re-

moving the elevated fibrous material from said elevating means including a plurality of stripping members co-operating with said lifting apron pins to strip the fibrous material therefrom.

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