United States Patent [19]

Beukert

[11] **3,896,523**

[45] **July 29, 1975**

[54] **DEVICE FOR FEEDING FIBROUS MATERIAL, ESPECIALLY SPINNING MATERIAL, TO A PROCESSING MACHINE**

[75] Inventor: **Guntram Beukert,** Dulmen, Germany

[73] Assignee: **Hergeth KG Maschinenfabrik und Apparatebau,** Dulmen, Germany

[22] Filed: **May 22, 1973**

[21] Appl. No.: **362,686**

[30] **Foreign Application Priority Data**

June 16, 1972 Germany 2229438

[52] **U.S. Cl.** **19/105;** 19/240

[51] **Int. Cl.** **D01g 15/40**

[58] **Field of Search** 19/105, 240, 241

[56] **References Cited**

UNITED STATES PATENTS

3,377,664	4/1968	Keramas et al.	19/105
3,548,461	12/1970	Reiterer	19/105
3,728,759	4/1973	Hergeth	19/105

FOREIGN PATENTS OR APPLICATIONS

886,397	1/1962	United Kingdom	19/105
6,901	1887	United Kingdom	19/105

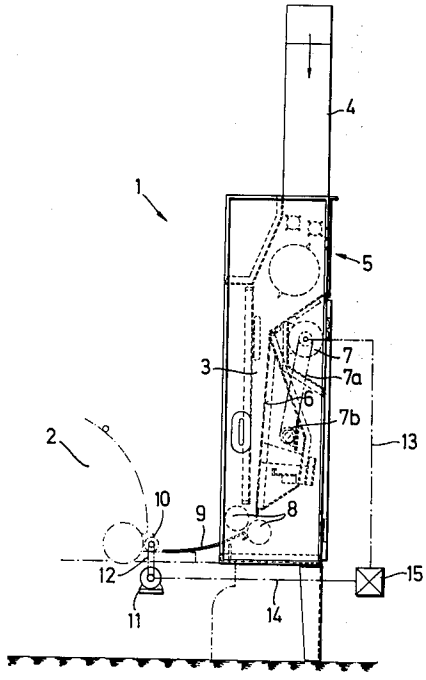
Primary Examiner—Dorsey Newton

Attorney, Agent, or Firm—Diller, Brown, Ramik & Wight

[57] **ABSTRACT**

This disclosure relates to a novel device for feeding material to a processing machine including means for defining a path of travel for the material to be treated between upstream and downstream portions of the device, means at the downstream portion for feeding the material from the device, means for shaking the material as it moves along the path between the upstream and downstream portions thereof, and means for controlling the speed of operation of the shaking means proportionately to and in dependence upon the speed of operation of the feeding means, preferably the controlling means are mechanical transmission means between the shaking means and the feeding means in the form of sprocket and drive means, and the shaking means includes a wall mounted for swinging motion with respect to and in part defining the path of travel for the material.

3 Claims, 4 Drawing Figures



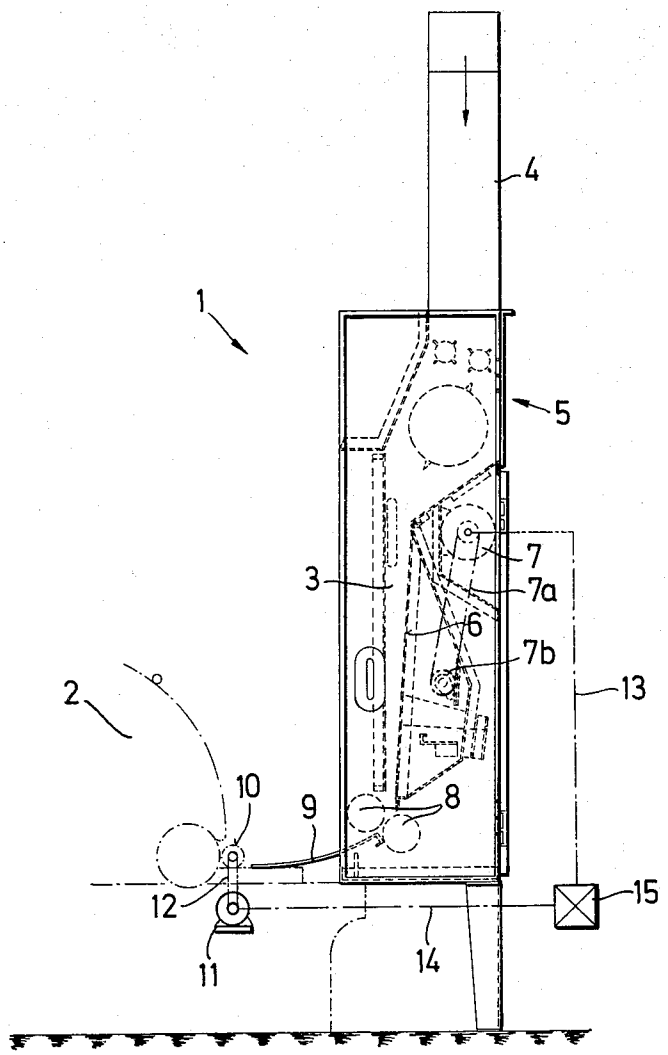


FIG. 1

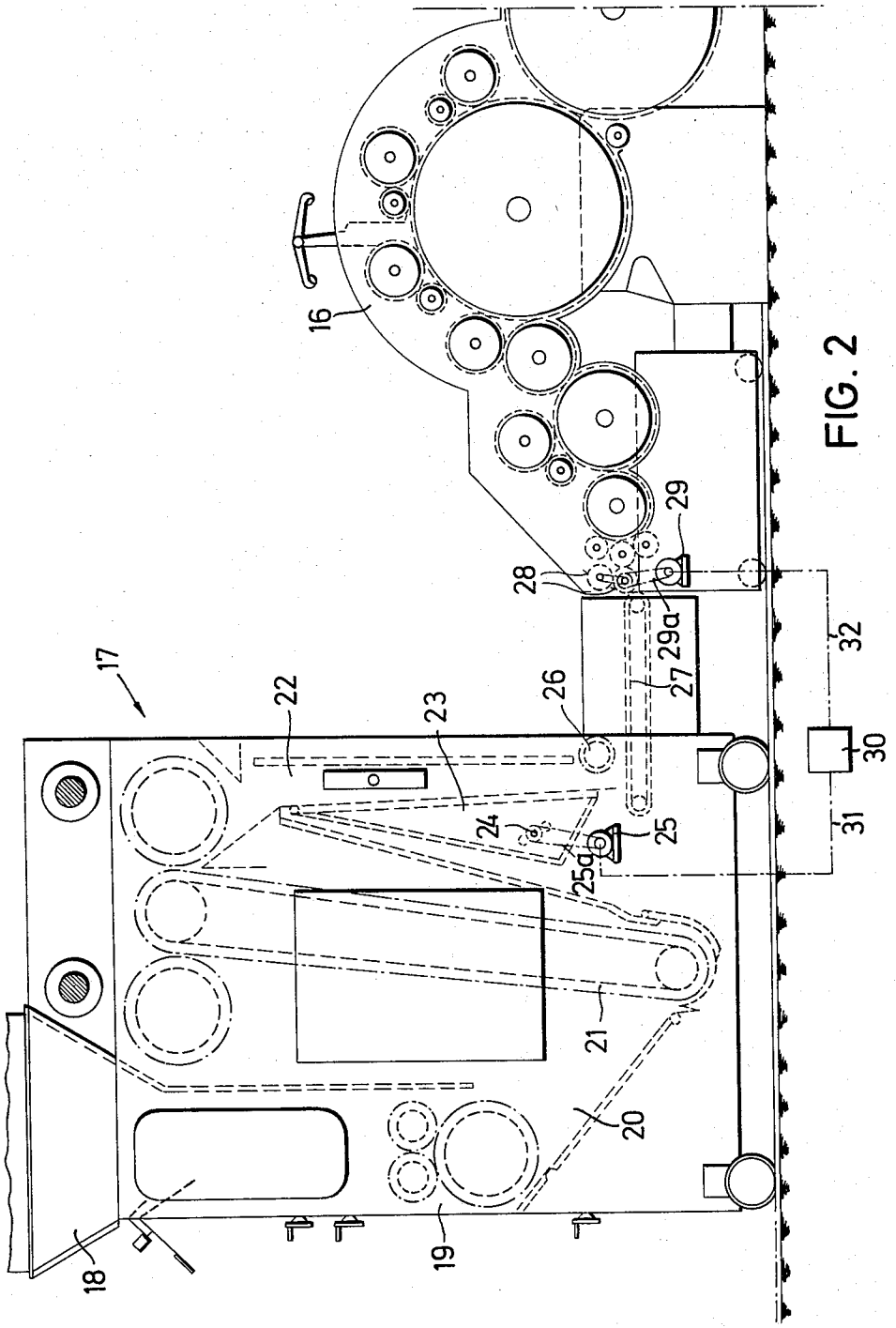
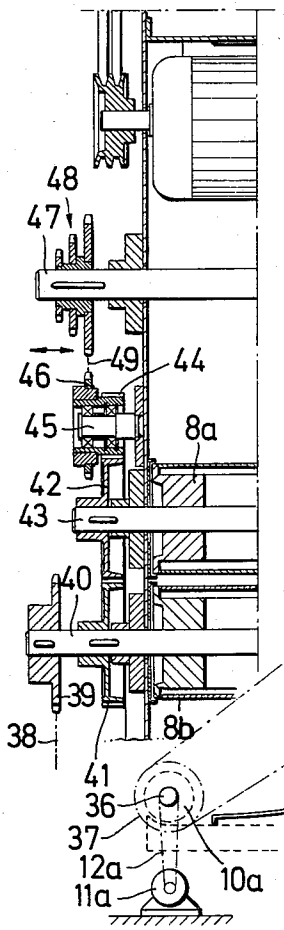


FIG. 2

FIG. 4


48
47
49
44
46
45
8a
42
43
40
39
38
8b
41
36
37
12a
11a
10a

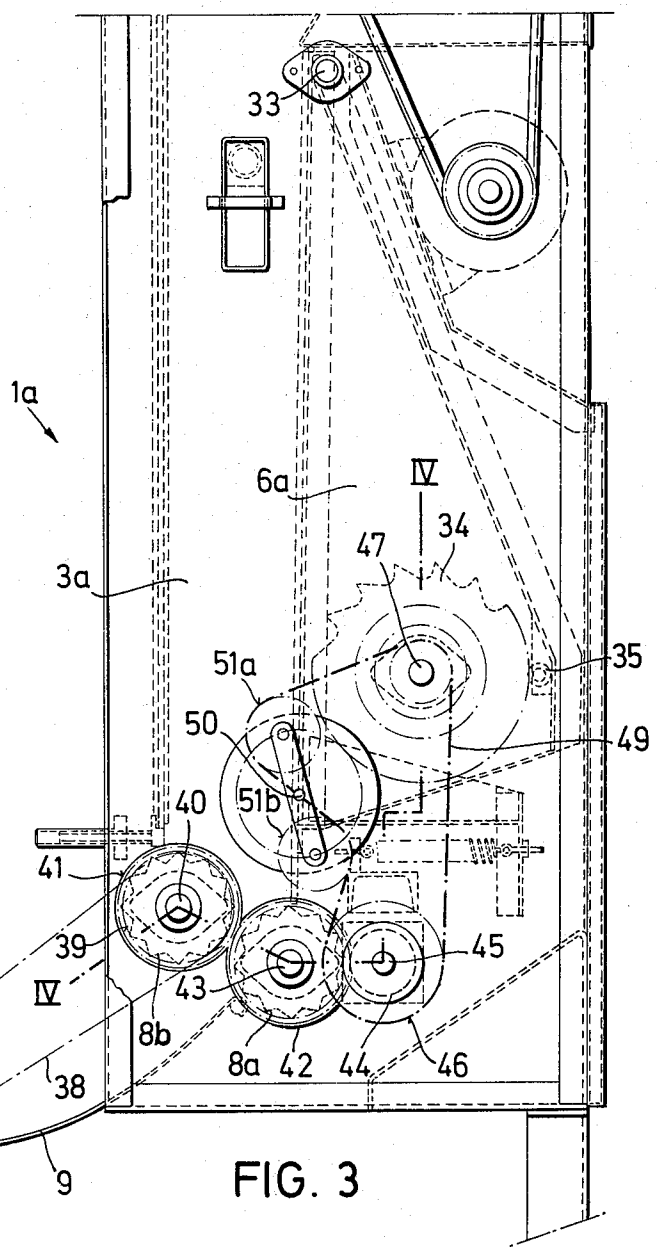

1a
33
6a
IV
34
47
3a
35
51a
50
49
51b
40
41
39
45
IV
43
8b
8a
42
44
46
38
9

FIG. 3

DEVICE FOR FEEDING FIBROUS MATERIAL, ESPECIALLY SPINNING MATERIAL, TO A PROCESSING MACHINE

The present invention relates to a novel device for feeding fibrous or similar material, particularly spinning material, to a processing machine as, for example, a carding machine.

It is conventional to arrange in the path of travel of fibrous material moving toward a processing machine a shaking device which acts upon such moving material. The purpose of the shaking device is to shake or vibrate the material so that it will agglomorate or become as uniform in mass as possible in order to be most properly presented to the process machine which, again, may be a card, card master, carding or similar conventional structure.

In conventional mechanisms the fibrous feeding device and its associated processing machine are driven at a constant speed and an appropriate amount of the fibrous material is automatically fed to the processing machine. If, however, the speed of the processing machine is altered upwardly or downwardly the constant speed of the shaker device will result in fluctuations in the quality or property of the fibrous material emerging therefrom, and such fluctuations undesirably effect subsequent processing of the material in the processing machine.

In accordance with the foregoing, it is a primary object of the present invention to provide a coordinated feed between the shaking device and the processing machine to obtain a uniform amount of the fibrous material.

In accordance with the present invention a device is provided for feeding material to a processing machine and includes means for defining a path of travel for the material between upstream and downstream portions thereof, means at the downstream portion for feeding the material from the device to the processing machine, means for shaking the material as it moves along the predetermined path between the upstream and downstream portions thereof, and means for controlling the speed of operation of the shaking means proportionately to and in dependence upon the speed of operation of the feeding means.

Preferably the feeding means are driven feed rolls but the same may equally be in the form of a conveyor belt, but in either case by controlling the shaking means in dependence upon the speed of the rollers or conveyor the fibrous material, fleece, or the like is maintained in a generally uniform band which is highly desirable for subsequent processing purposes.

In keeping with the latter advantage the processing machine, irrespective of its operational speed, will receive material of the same density and amount because as the feed roller or conveyor runs more slowly the shaking means produce a slower shaking whereas if the opposite occurs the shaking becomes more rapid. Thus, the coordination of the device and the process machine is such that the density and quality of the material remains uniform, and this occurs independently of the operational speed of the processing machine, and thus all further processing remains uniform insofar as the condition of the material to be processed is concerned.

If desired independent controllability may be suitably effected by coupling a drive motor for the feed roller or conveyor which through electrical circuitry and an

associated motor can actuate the shaking means. Drive systems for the rollers and/or conveyor belts, following the shaking means, may also be regulated in accordance with the speed of the rollers or conveyor belt. If, with a certain type of material, the proportionality of working conditions is insufficient to maintain a uniform quality of the material presented to the processing machine, control can also be effected by making the operation of the shaking means dependent not only upon the feed roller and/or conveyor but also on the density and nature of the material being delivered to and beyond the shaking means. This additional control means can be, for example, an associated scanning device forming a portion of the control system to regulate speed of the feed roller and/or conveyor belt, and the speed of operation of the shaking means.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claimed subject matter, and the several views illustrated in the accompanying drawings.

IN THE DRAWINGS

FIG. 1 is a schematic side elevational view of the novel device for feeding material to a processing machine in keeping with the present invention, and illustrates a path of travel for material between upstream and downstream portions thereof with the latter including a pair of feed rolls, and control means for controlling the speed of operation of shaking means within the device proportionately to and in dependence upon the speed of operation of the downstream feed rollers.

FIG. 2 is a side elevational view of another device for feeding material to a processing machine in accordance with this invention, and illustrates a conveyor belt in lieu of the feed rolls of the device of FIG. 1.

FIG. 3 is a side elevational view similar to FIG. 1, and illustrates mechanical control means for regulating the speed of the feed rolls and the shaing means.

FIG. 4 is a cross sectional view taken generally along line IV—IV of FIG. 3, and illustrates details of chains and sprockets which form transmission mechanisms of the control means.

A novel device for feeding material to a processing machine is shown in FIG. 1 of the drawings and is generally designated by the reference numeral 1 with the processing machine being schematically illustrated in phantom outline and being identified by the reference numeral 2. Preferably fibrous, fleece or similar material is fed from the device 1 to the processing machine 2 which may be, for example, a card, a card master, a carding, or a similar machine.

Means generally represented by the reference numeral 3 define a path of travel or passage for the material between an upper upstream portion 4 and a lower downstream portion 9 with the in-feed of the material being controlled by a suitable conventional roll arrangement 5. A wall 6 which in part defines the passage 3 defines shaking means as it is moved by a rotary cam 7*b* driven from a motor 7 by a belt 7*a*.

At a lower end of the passage 3 there are located means in the form of withdrawal rolls or rollers for feeding the material from the device 1 through the dowwnstream end portion 9 which may simply be a slide feeding the material to another feed roller 10 driven by a motor 11 through a belt 12 or similar drive.

It is to be particularly noted that the drive motors 7, 11 are controlled by means 15 which is a conventional regulating device, preferably of an electrical or electronic nature, which couples the motors to each other via conductors 13, 14 to effect the appropriate proportional control of the speed of the drives of the roll 10

FIG. 4 is a cross sectional view taken generally along line IV—IV of FIG. 3, and illustrates details of chains and sprockets which form transmission mechanisms of the control means.

A novel device for feeding material to a processing machine is shown in FIG. 1 of the drawings and is generally designated by the reference numeral 1 with the processing machine being schematically illustrated in phantom outline and being identified by the reference numeral 2. Preferably fibrous, fleece or similar material is fed from the device 1 to the processing machine 2 which may be, for example, a card, a card master, a carding, or a similar machine.

Means generally represented by the reference numeral 3 define a path of travel or passage for the material between an upper upstream portion 4 and a lower downstream portion 9 with the in-feed of the material being controlled by a suitable conventional roll arrangement 5. A wall 6 which in part defines the passage 3 defines shaking means as it is moved by a rotary cam 7*b* driven from a motor 7 by a belt 7*a*.

At a lower end of the passage 3 there are located means in the form of withdrawal rolls or rollers for feeding the material from the device 1 through the downstream end portion 9 which may simply be a slide feeding the material to another feed roller 10 driven by a motor 11 through a belt 12 or similar drive. It is to be particularly noted that the drive motors 7, 11 are controlled by means 15 which is a conventional regulating device, preferably of an electrical or electronic nature, which couples the motors to each other via conductors 13, 14 to effect the appropriate proportional control of the speed of the drives of the roll 10 and the cam 7b to regulate proportionately the shaking action of the wall 6 and the movement of the material by the roll 10.

Reference is now made to FIG. 2 of the drawings which more fully illustrates a conventional carding machine 16 preceded by a novel feed device 17 of this invention which may include a hopper 18 into which material is suitably conveyed and from which material departs by a roller assembly 19 to and into a chamber 20 from which it is transferred by an elevator 21 into a feed passage 22. The passage 22 includes, as much in the case of the device 1 of FIG. 1, a shaker wall 23 having a driving member 24 driven by a motor 25 by means of V-belts 25*a*. Material will therefore be vibrated or shaken as it moves through the passage 22 and is subsequently withdrawn by a withdrawal roller 26 suitably driven in conjunction with a conveyor belt 27 from which the material is passed to a pair of feed rollers 28.

The pair of feed rollers 28 is driven through a belt 29a from a motor 29. Here again the shaking movements of the shaker wall 23 are regulated in dependence upon the speed of the pair of feed rollers 28 by an electrical controlling or regulating means 30 from which conduits 31, 32 lead to the respective motors 25, 29.

The drive for the withdrawal roller 26 and the conveyor belt 27 may also be coupled in a suitable fashion to the pair of feed or withdrawal rollers 28. When the feed rollers 28 of the processing or carding machine 16 rotates slowly the shaking movement of the drive member 24 for the shaker wall 23 is controlled by the means 30 in such a way that the shaking is also operated slowly with the roller 26 and the conveyor 27 also being proportionately slowed down in their speed. When the feed rollers 28 rotate at a higher speed the shaking movement imparted to the shaking wall 23 becomes more rapid as does the speed of the roller 26 and the conveyor 27 so as to insure that the material, fleece, band or the like is maintained uniform as it passes from the feed device 17 to the processing machine 16.

Reference is now made to FIGS. 3 and 4 of the drawings wherein another feeding device 1*a* is shown for the direct feeding of fibers (spinning) or similar material to a processing machine which includes a shaker wall (unnumbered) swingably mounted at 33 in a passage 3*a* defining a path of travel from top to bottom, as viewed in FIG. 3 of the machine 1*a*. A cam disc 34 cooperating with a roller 35 suitably mounted for rotation on a wall 6*a* affects the shaking motion of the shaker wall. The drive for the cam disc 34 is in this instance derived from a motor 11a for a feed roller 10*a* (FIG. 3). The shaft 36 of the feed roller 10*a* carries a sprocket 37 which via a chain 38 (FIG. 4) drives a sprocket 39 coupled to a shaft 40 carrying a withdrawal roller 8*a* (FIG. 3). Another withdrawal roller 8*b* is driven by gears 41, 42 of which the gear 41 is keyed to a shaft 40 while the gear 42 is keyed to a shaft 43. The gear 42 meshes with a gear 44 keyed to a shaft 45 which in turn carries a sprocket 46. A set of sprockets 48 are carried by a shaft 47 carrying the cam 34 with a chain 49 connecting the sprocket 46 with one of the sprockets 48. The chain 49 is entrained over appropriate tension sprockets or rollers 51*a* and 51*b* which are pivoted in a conventional manner at an axis 50 of an arm (unnumbered).

The sprockets 37, 39 and 46 can be, of course, changed for achieving different speeds as might be found necessary or desirable. The set of sprockets 48 are mounted on a shaft 47 so as to be axially movable relative to the sprocket 46 so that the middle sprocket can be aligned with the sprocket 46. If a change is made such that the smallest sprocket of the set 48 is to cooperate with the sprocket 46 the set 48 of the sprockets can be drawn off the shaft 47 and then placed back thereupon in the reverse order. The interchangeable sprockets make it possible to associate the rotary speed of the feed roller 10*a* and that of the withdrawal rollers 8*a* with the rotary speed of the cam disc 34 which, as was described hereinbefore, affects the speed of the shaking motion imparted to the shaker wall 6. In this manner the shaking movement can be changed, within a predetermined range, to the rotary speed of the feed roller of the processing machine. Instead of chains and sprockets, toothed belts and complementary toothed wheels may, of course, be employed in keeping with this invention.

While preferred forms and arrangement of parts have been shown in illustrating the invention, it is to be clearly understood that various changes in details and arrangement of parts may be made without departing from the scope and spirit of this invention.

I claim:

1. The combination of a feeding device and a processing machine comprising first means defining a first path of travel for material between input and output ends of said feeding device, second means defining a second path of travel for material from said feeding de-

vice output end to an input end of said processing machine, conveying means at said processing machine input end for feeding material into said processing machine, first motor means for driving said conveying means, means beyond said processing machine input end for processing material therein, means for shaking said material as it moves along said first path, second motor means for driving said shaking means, means for directly controlling the speed of operation of said shaking means proportionally to the speed of operation of said conveying means, and said controlling means include electrical regulating means coupled between said first and second motor means for increasing and decreasing the speed of said second motor means in response to respective increasing and decreasing speed of said first motor means.

2. The device as defined in claim **1** wherein said controlling means include mechanical transmission means between said shaking means and said second motor means.

3. The device as defined in claim **2** wherein said mechanical transmission means includes a cam means for imparting motion to said shaking means, and drive means coupled between said second motor means and said cam means for rotating the latter.

* * * * *