

March 31, 1970

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3,503,532

APPARATUS FOR MIXING AND AUTOMATICALLY EMPTYING CASES
OF FIBERS OR TEXTILE MATERIALS

Filed Feb. 20, 1968

4 Sheets-Sheet 1

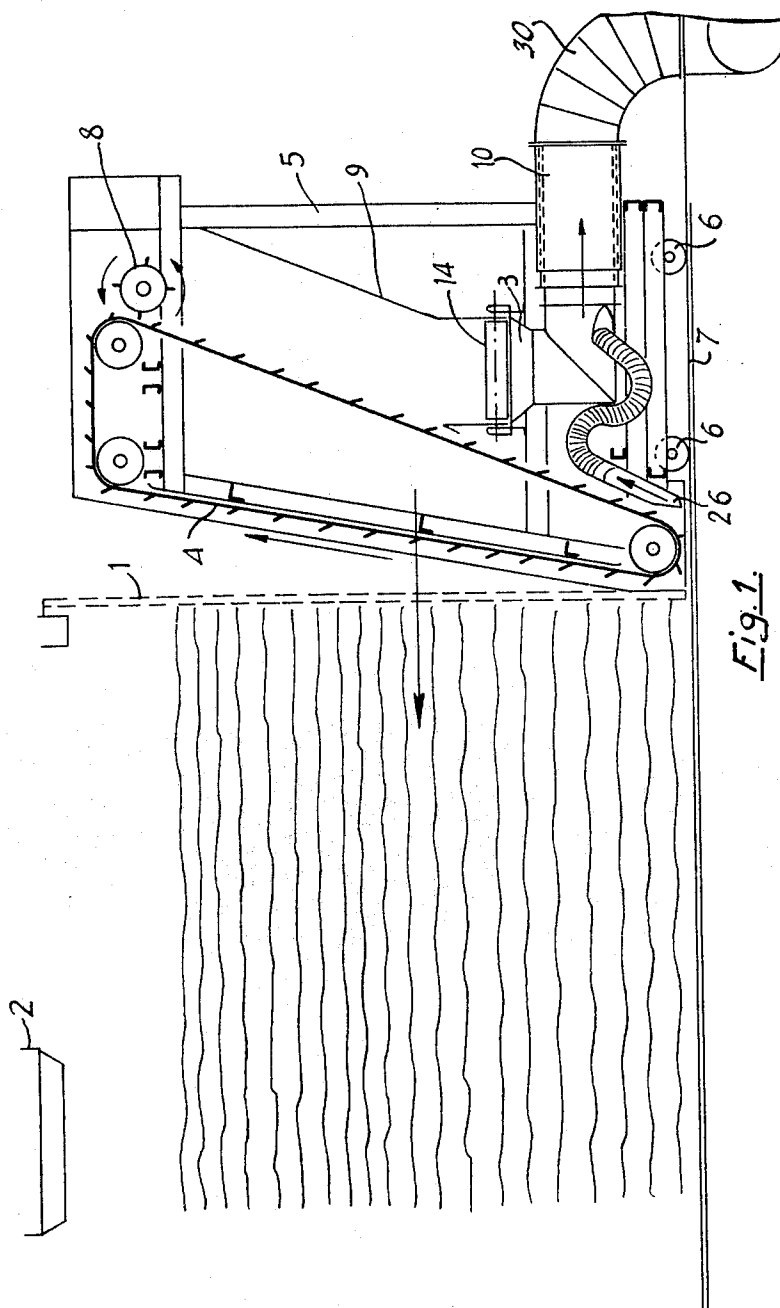


Fig. 1.

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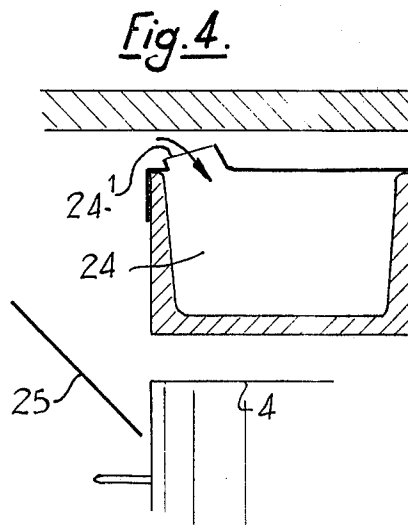
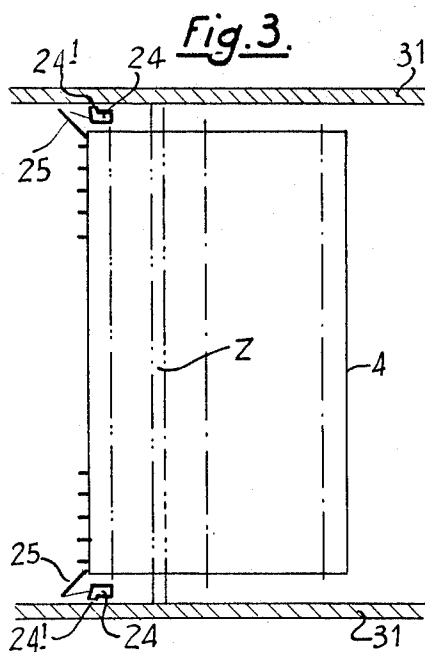
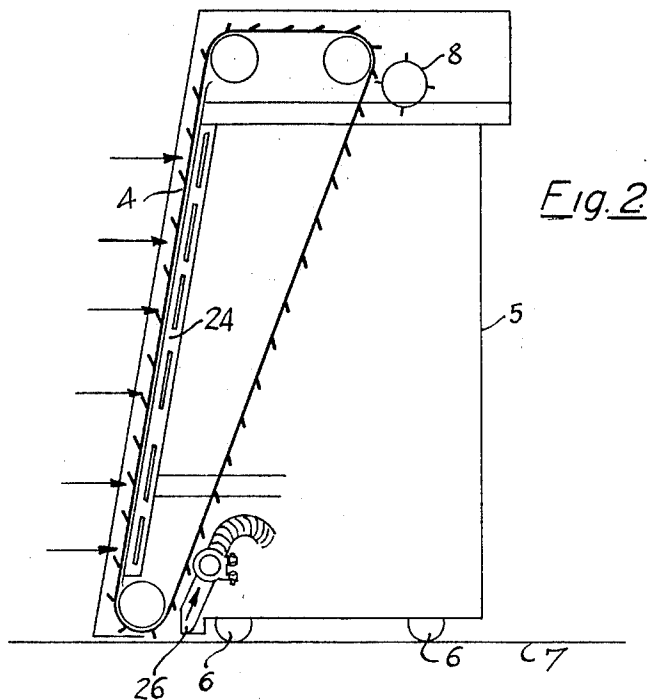
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Fig. 5.

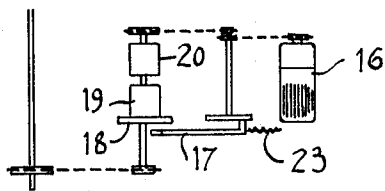
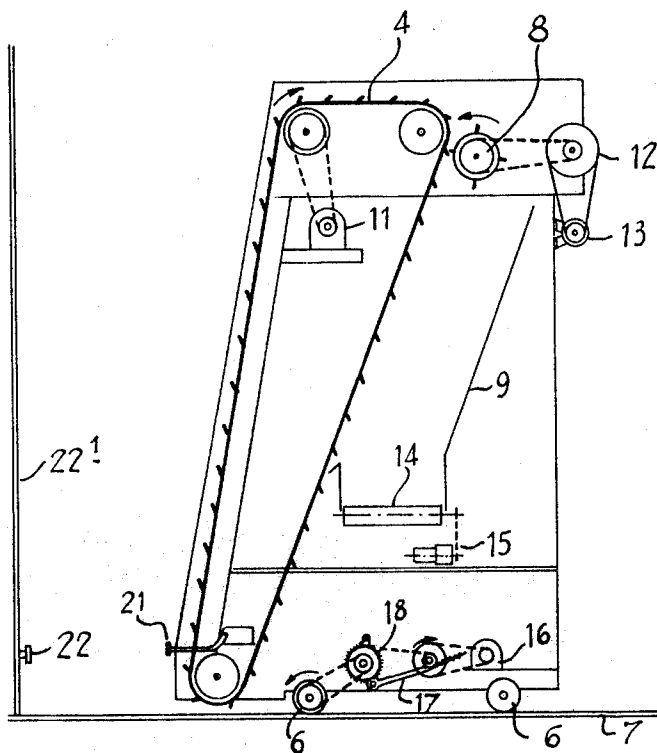


Fig. 6.

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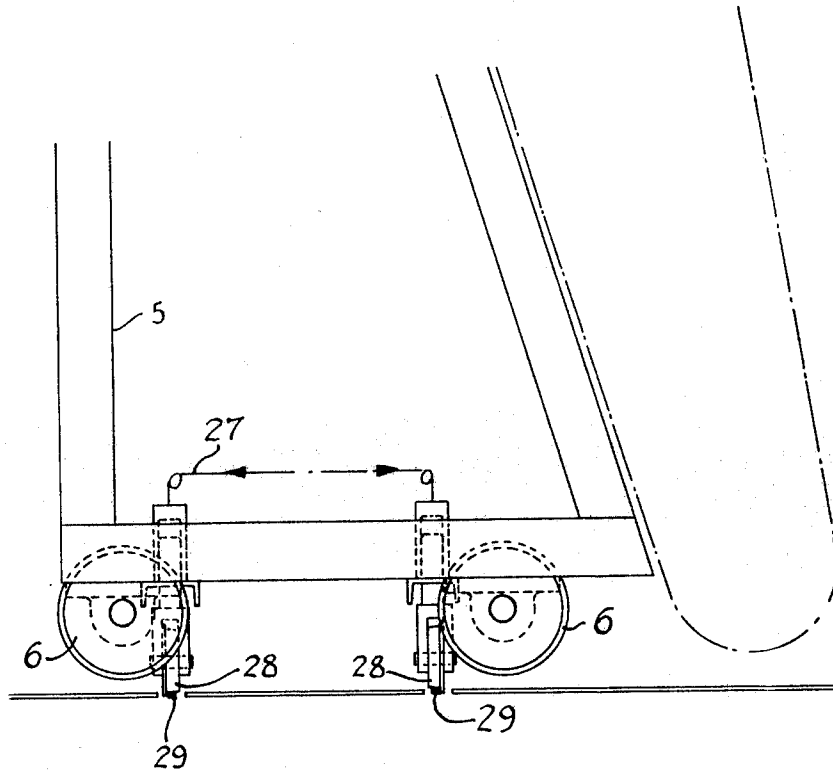
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Fig. 7.



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APPARATUS FOR MIXING AND AUTOMATICALLY EMPTYING CASES OF FIBERS OR TEXTILE MATERIALS

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Filed Feb. 20, 1968, Ser. No. 706,862

Claims priority, application Belgium, Feb. 20, 1967, 694,327

Int. Cl. B65b 69/00

U.S. Cl. 214—309

4 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus for mixing and automatically emptying cases of fibers or textile materials comprising a substantially vertical spiked apron and a detaching comb cylinder both mounted on a frame or carriage which moves into the case as it is emptied and a suction device disposed at each end of the apron and preceded by a scraper coming close to the side walls of the case.

This invention relates to an apparatus for mixing and automatically emptying cases of fibers or textile materials.

Before being sent to the braker or card, textile materials are of course stored together in cases into which they are usually introduced by a pneumatic conveying device terminating in a simple pipe, such as a cyclone, an auger or other dispersing devices.

The purpose of the cases is either to obtain a homogeneous mixture of various constituents of a lot by transference of materials from one case to another, or to store the materials while awaiting the next operation. Since the material is originally deposited on the case in horizontal layers, in order for the material to be intimately mixed it is important that they be removed in vertical layers.

According to the prior art method, the emptying is often carried out by operating personnel. They use a fork to empty the case and throw the material into a suction inlet; the material is conveyed to the required place via an assembly comprising a tube and a fan.

Another apparatus is also used in which for emptying the material, the apron forming the bottom of the case moves synchronously with the rear back wall so as to push the material against a vertical spiked apron. The apron is driven upwards, so that it can remove the material vertically; disposed above the apron is a detaching roller or comb which takes the material off the spikes and sends it on its way to the pneumatic conveying system.

The known apparatus therefore satisfactorily achieves its aim—i.e., to remove the material in vertical layers—but it has the disadvantage of being extremely expensive, since the whole construction of the case must be subordinated to this aim.

It is an object of the apparatus according to the present invention to enable a normal case to be used which is made of masonry or of any other material and which has no moving wall or apron at the bottom.

To this end, the apparatus according to the invention is mainly characterized in that it is formed by a vertical or substantially vertical spiked apron with which a comb or detaching cylinder cooperates, and the assembly is mounted on a carriage or moving frame which moves forward into the case as the case is emptied by the apron.

For a better understanding of the invention, a non-limitative exemplary embodiment thereof will now be described with reference to the drawings, wherein:

FIG. 1 is a diagrammatic elevation view showing the whole apparatus;

FIGS. 2 and 3 are a diagrammatic elevation and plan

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views respectively showing an apparatus for removing material from between the apron and the side walls of the case;

FIG. 4 is a section on an enlarged scale of the front right-hand corner of FIG. 3;

FIGS. 5 and 6 are diagrammatic views showing various mechanical drives, inter alia for driving the apron and moving the carriage, and

FIG. 7 shows a variant in which the carriage can move laterally.

The apparatus according to the invention is formed by a spiked endless apron 4 which is slightly inclined from the vertical and is mounted on a mobile frame 5 moving by means of wheels 6 over rails 7 (FIG. 1).

The apron 4, which is slightly narrower than the case to be emptied, is driven upwardly at the side of the material via a step-down gearing 11 (FIG. 5). The speed of the apron can if necessary be altered by changing the chain wheel on the step-down gearing 11.

When it is brought into operation, the apparatus moves slowly into the case with its front to meet the material. As the machine moves forward, the spiked apron removes the material in vertical layers, thus mixing the various components together.

The carriage is moved forward via a step-down gearing 16 (FIGS. 5 and 6), which controls via a crank and rod device 17 a pawl wheel 18 connected via a chain to the train of wheels 6 of the carriage 5 or mobile frame. The number of teeth engaging with the pawl wheel 18 determines the speed of forward movement of the carriage. A double clutch 19 (forward travel)—20 (backward travel) (FIG. 6) automatically reverses the direction of movement of the carriage to return it at increased speed to its starting position.

The reversal of the double clutch, when the spiked apron 4 arrives at the end of its run—i.e., at the end of the case—is performed via feeler 21 (FIG. 5) disposed at the front of the carriage which comes into contact with an end-of-run stop 22 (FIG. 5) disposed for this purpose on the end wall 22¹ of the case.

The forward travel pawl wheel is then disengaged, while the rapid return drive (2 meters per minute) of the carriage is engaged.

The direction of movement of the carriage can be reversed at any time during its movement through the case, by means of a manual control button disposed on the rear of the carriage.

Moreover, a regulatable spring device 23 (FIG. 6) mounted in the pawl rod 17 of the device for forward movement acts as a mechanical safeguard in case the material should exert abnormal pressure on the rising apron. At such a time, the pawl for forward movement would remain in place and cause no displacement; the drive rod would be lengthened to compress the spring.

The material is removed from the apron by a comb or detaching cylinder 8 (FIG. 2) driven via a pulley-belt-chain system and a chain wheel 12 (FIG. 6) from a separate motor 13 (FIG. 5); the material drops through a funnel 9 onto a transverse collecting apron 14 driven via a step-down gearing 15; the speed of the apron can be varied by changing the chain wheel on the step-down gearing 15. The apron 14 conveys the material to a suction inlet 3 (FIG. 1) connected via telescopic or resilient and flexible passage 10 (FIG. 1) to the conduit 30 for evacuating the material.

To collect any material which might get caught between the edges of the spiked apron 4 (FIG. 4) and the side walls of the case 31 (FIG. 4), a sheet metal plate 25 (FIGS. 3 and 4) which is inclined like the apron 4 and disposed along its two edges acts as a scraper which brings the maximum material from the walls 31 (FIG. 4) to the spikes of the apron 4 (FIG. 4).

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Behind each sheet metal scraper, and parallel therewith, is a passage 24 (FIG. 4) formed with suction slot 24¹ and connected to the suction mouth 3 and thence via the telescopic tube 10 to the evacuation conduit 30 (FIG. 1). The last fibers sticking to the side walls are removed by this lateral suction.

Any material resting on the bottom of the case 1 which has not been removed by the spiked apron is sucked in by suction pipe 26 transversely reciprocating (FIG. 2) over the entire width of the case and which is connected to the suction inlet 3 (FIG. 1).

The apparatus therefore has the advantage of satisfactorily cleaning the walls and bottom of the case, thus obviating any manual cleaning. FIG. 3 shows the resulting transverse sweeping zone Z.

A further feature of the apparatus according to the invention which affords corresponding advantages is that the apparatus can move laterally and thus be used for emptying a number of cases. Thus the cases are closed by a wall which is removed or opened when the emptying apparatus is to go into action.

Movement is performed as follows: (FIG. 7)

Four wheels 28 (FIG. 7) perpendicular to the wheels 6 by which the apparatus moves into a case are lowered by a hydraulic device 27, endless chains, or any other means, onto two rails 29 disposed along the front of the cases, so as to raise the whole carriage enough to enable it to readily undergo lateral movement, either driven by a motor, or manually pushed.

Since the use of a case includes a filling period, during which the emptying apparatus is inoperative, and an emptying period, it is clearly a great advantage to enable the apparatus to be moved laterally, thus increasing its utilization.

What I claim is:

1. An apparatus for mechanically emptying a stationary case containing textile materials which are stored therein, in horizontal layers, said apparatus comprising a movable carriage positioned to advance into said case and to be withdrawn therefrom, a spiked endless apron occupying a substantially vertical position mounted on said

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carriage for penetrating into the textile materials and removing vertical layers thereof, a detaching member mounted on said carriage at the upper portion of said apron for cooperating with the apron to remove the material therefrom, evacuating means on said carriage beneath the detaching member for receiving the textile materials therefrom, means for progressively moving the carriage into the case, clutching means for reversing the direction of movement of the carriage, and means carried on said carriage proximate said apron for removing material between the apron and the side walls of the case during advance of the carriage into the case.

2. An apparatus according to claim 1 in which the reversal of the carriage movement is produced by cooperating means arranged respectively on the front of the carriage and on the end wall of the case.

3. Apparatus as claimed in claim 1, wherein said means for removing material between the apron and the side walls of the case comprises a pair of plates which are inclined in the same plane as the apron and disposed between the side walls and the apron to constitute scrapers to bring material from the walls of the case to the spikes of the apron, and a suction channel behind each scraper and parallel therewith and having slots for pneumatically evacuating textile material sticking to the sides of the case.

4. An apparatus according to claim 3 comprising a suction pipe behind the spiked inclined apron and adapted for transverse reciprocal movement for removing the material remaining on the bottom of the case.

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U.S. Cl. X.R.

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