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(54) **CARDING MACHINE.**

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Description

This invention relates to a carding machine, and is concerned with providing improved removal of dust and other waste materials which are inevitably generated during operation of the machine.

One of the main problems in operating carding machines is efficient collection of the very large quantities of dust and waste material that are thrown from the cooperating rollers during operation. Pollution of the atmosphere in the card room by such material must be avoided as much as possible, and many attempts have been made in the past to improve the efficiency of waste material collection. It is known to locate plenum chambers in regions of the card where dust or other waste is generated or collected, and to apply negative pressure to the interior of those chambers so that the dust or other waste is sucked to a waste collection unit. However, problems are experienced with the plenum chambers becoming blocked, due to the deposit of waste material on the sides of them, and this deposited material becomes cumulative over a long period of time. Furthermore, the waste material often includes waxes derived from cotton, and this is sticky, and tends to adhere to wall surfaces of the plenum chamber and any outlet passages leading to waste collection units, and this of course further aggravates the problem of build-up of waste material, rather than being discharged to the waste collection unit.

The invention therefore seeks to provide improved means for effecting discharge of dust and other waste materials from sites at which such material is generated or collected.

According to one aspect of the invention there is provided a carding machine having a feed means, a taker-in, a main carding cylinder, a doffer, a stripper arrangement, a plenum chamber located at a region of the machine where waste material is generated or collected during operation of the machine, an outlet duct leading from the plenum chamber, and means for generating negative pressure within the duct and the plenum chamber in order to discharge waste material from the plenum chamber:

characterised in that an impeller is mounted for rotation at high speed within the chamber to cause turbulent air flow within the chamber to mix with the waste material;

and in that a striker is arranged adjacent to the circular path of travel defined by the outermost part of the impeller during rotation so as to co-operate therewith in order to prevent build-up of waste material on the impeller.

Preferably, the carding machine has an endless conveyor belt arranged to extend below at least the taker-in, the main carding cylinder and the

doffer, and means for driving the conveyor belt so that an upper run thereof travels from the stripper end towards the feed end of the carding machine, in which the plenum chamber is arranged around the conveyor at the feed end of the carding machine.

It will be appreciated that waste is generated or collected in the plenum chamber, from where it may be extracted through the outlet duct. The impeller generates turbulent flow in the plenum chamber, and accordingly the waste material in the chamber is kept suspended in the air and so can efficiently be extracted therefrom. The fact that the waste material is kept in constant movement means that there is little or no tendency for it to collect on the surface of the plenum chamber, and accordingly the chamber can remain clean for much longer periods than has hitherto been the case. Down time of the carding machine for cleaning purposes is thus reduced.

The impeller preferably comprises a circular cylindrical body having at least one radially extending blade mounted rigidly thereon, and preferably two or more blades are provided, distributed so that the body runs in balance. The blade or blades may have any suitable cross sectional shape, and should have a suitably smooth external surface.

When the impeller is mounted in the vicinity of the conveyor belt, it is desirably located such that the cylinder generated by rotation of the radially outermost part of the element shows a clearance of not more than 1.0cm from the surface of the conveyor belt.

In order that build-up of waste material on the impeller is mitigated, the striker blade is set to cooperate with the impeller, desirably so that there is a clearance of from 1.5 to 6.5mm between the cylinder generated by the radially outermost part of the impeller during rotation thereof and the edge of the striker blade.

It is possible to mount more than one impeller for rotation at high speed within the plenum chamber in order to increase the turbulence and cleaning effect. In one particularly desirable arrangement, a first impeller is mounted in the vicinity of the conveyor belt of the carding machine and a second impeller is mounted in the vicinity of the duct, particularly so that part thereof rotates close to the junction region between the plenum chamber and the duct.

In a particularly advantageous and preferred development of the invention, means is provided to monitor the operation of the impeller in the plenum chamber, so as to give advance warning of any tendency of the plenum chamber, and / or the output duct communicating therewith (the waste material discharge system), to become blocked or unduly restricted with waste material which accu-

mulates in either or both location over a period of time.

This monitoring means may comprise a rotation sensor to monitor the speed of rotation of the impeller, and evidently slowing down of the impeller to a speed below its normal design speed will be an indication of at least partial clogging-up of the discharge system.

The monitoring means may comprise any suitable type of sensor arrangement which is responsive to change of speed of the impeller, for example a monitor to detect the change in speed of a drive belt or other drive arrangement coupled with the impeller.

The monitoring means is particularly advantageously used in the management of the operation of a carding machine. Thus, it is present practice for routine cleaning to take place at regular intervals of all sites on the machine where waste is liable to accumulate, or to be collected. This routine maintenance work involves regular labour costs, and also down time of the machine, with current designs of carding machine, and which can be avoided by adoption of the preferred monitoring means to monitor the speed of rotation of the impeller(s) in the plenum chamber(s).

Thus, monitoring means for the / each plenum chamber can enable advance warning to be given of a potential build-up of waste material when the impeller first slows down by a small amount from its design speed. Warning signals may then be given to personnel supervising the operation of the carding machine, or a batch of carding machines, that a particular plenum chamber (and associated discharge duct) may require maintenance work i.e. cleaning out waste material fairly soon.

It will be important to ensure that waste material is removed before the build-up becomes too heavy, because if excessive waste material is allowed to clog up the system, this can result in plenum chamber waste coming into contact with the taker-in, which is a potentially dangerous condition, with fire risk.

The monitoring means therefore provides in simple manner a very useful machine management facility for use with carding machines, in which material accumulation, and disposal, represents a problem.

With a view to providing warning of potentially hazardous build-up of waste material in carding machines, it is already known to provide optical detection systems which monitor the presence of waste material at inspection sites in the waste material discharge system. However, in practice many spurious warning signals are given in these known systems, since the air flow in the discharge system will from time to time move waste material into the path of the optical detection system when

there is not a problem of excessive waste material, and this will cause the carding machine to be shut down when it is not necessary.

The invention, therefore, in a further aspect provides an improved management of the operation of a carding machine using simple and more reliable monitoring of the build-up of waste material in the discharge system.

Accordingly, in a further aspect, the invention provides a carding machine having a feed means, a taker-in, a main carding cylinder, a doffer, a stripper arrangement, a plenum chamber located at a region of the machine where waste material is collected or generated during operation of the machine, an outlet duct leading from the plenum chamber, to a waste collection device, and means for generating negative pressure within the duct and the plenum chamber in order to discharge waste material:

characterised in that an impeller is mounted for rotation within the plenum chamber in order to generate turbulent air flow within the chamber to mix with the waste material, and in that means is provided to monitor the operation of the impeller and to detect when the speed of the impeller falls below a design speed so as to be indicative of a build-up of waste material in the waste material discharge system, and to provide an advance warning signal that cleaning and / or maintenance of the waste material discharge system will be required in the future.

Preferred embodiments of carding machine will now be described in detail with reference to the accompanying drawings, in which:

Figure 1 is a schematic side elevation of a carding engine in accordance with one embodiment of the invention;

Figure 2 is a schematic section through a plenum chamber at the feed end of the carding machine of Figure 1;

Figure 3 is a cross section on the line III-III of Figure 2;

Figure 4 is a view, similar to Figure 2 of an alternative arrangement according to the invention;

Figure 5 is an end view of one example of a drive train to a rotatable element in a plenum chamber at one preferred site of a carding machine according to the invention;

Figure 6 is a side view of the drive train shown in Figure 5;

Figure 7 is a schematic illustration of a plenum chamber and associated turbulence generating rotatable impeller housed within the envelope of the path of travel of the flats of the carding engine; and,

Figure 8 is a schematic illustration of the impeller mounted in a plenum chamber adjacent one

of the return ends of the movable flats of the carding machine, and near to the taker-in.

Referring to Figure 1 this shows a carding machine designated generally by reference 100 and comprising a feed plate 1, a feed roller 2, a takerin 3, a main carding cylinder 4, a set of flats 5, a doffer 6, a stripper roll 7, and a condenser and calender roll arrangement 8. The detailed construction of the carding machine may, of course, be capable of considerable variation, as is well known in the art.

An endless conveyor belt 9 is arranged to extend below the takerin, main carding cylinder, doffer and stripper roll, and it is driven so that an upper run 10 thereof travels from the stripper end towards the feed end of the carding machine. A plenum chamber 11 is arranged at the feed end of the carding machine to enclose the end of the conveyor belt, and a duct 12 leads from the plenum chamber. The duct is connected to an extraction system so that waste material is sucked from the plenum chamber through the duct.

Figures 2 and 3 show the plenum chamber 11 in more detail. Mounted within the chamber are plates 13 which extend the full width of the chamber, an edge 14 of one of the plates lying closely adjacent to the surface of the conveyor 9. The plates are disposed so that waste falling from the conveyor is guided to the lower part of the plenum chamber. A rotatable element or impeller 14 is mounted for rotation within the plenum chamber. The element comprises a circular cylindrical body 15 mounted on a shaft 16 that extends through the chamber and is supported by bearings 17, 18 externally of the chamber. The shaft 16 carries a drive wheel 19 and may be driven from any part of the drive system of the carding machine. The shaft also carries a rotation sensor 19a. The body 15 has two rigid blades 20, 21 extending radially therefrom. The body and blades may be formed as an integral casting from a suitable plastics material, or as a smooth surfaced aluminium extrusion. The body is mounted in a position such that the cylindrical surface 22 generated by the blade tips during rotation thereof is spaced from the surface of the conveyor belt by a distance x which is desirably no more than 1.0cm.

A striker blade 23 extends between two mounts such as 24, one at each side of the plenum chamber. Thus, even if the impeller should become ringed with lapping of waste material this will become broken down as it grows and rubs against the striker plate, and eventually will separate in pieces from the impeller and will pass to the waste collection unit in the turbulent air flow. Each mount is pivotally mounted to the chamber wall about a pivot 25 and can be locked in a range of required positions by a locking bolt cooperating with an

elongate adjustment slot 26. The striker blade can thus be set so that its tip 27 lies at a required distance from the surface 22 generated by the blade tip during rotation thereof, that clearance desirably being from 1.5 to 6.5mm. If there should be any tendency of waste fibres to become wrapped around the element 30, or its drive shaft, in the form of a formed ring of fibres and waste, this will be stripped off by the leading end of the striker plate 31.

In use, waste material removed from the rotating members of the carding machine will fall to the conveyor belt 10 and will be conveyed thereby into the plenum chamber 11. The material falls from the belt in the plenum chamber and is sucked from that chamber by vacuum applied to the duct 12. Rotating the impeller 14 at high speed within the plenum chamber will generate turbulent air flow in the plenum chamber and maintain the waste material suspended in the air within that chamber so that it can efficiently be extracted therefrom. If any blockage does occur then the resultant deceleration of impeller 14 will be sensed by the detector and the carding machine may be stopped for the blockage to be cleared.

It will be appreciated that more than one impeller may be mounted within the plenum chamber, and Figure 2 shows a possible location for an additional rotatable element 30 having the same form as element 14 and having an associated striker blade 31. The element 30 is located immediately beneath the duct 12 to assist movement of the waste from the plenum chamber into the duct, and prevent blocking in the shoulder region 32 (Figure 3) where the duct meets the plenum chamber. If desired, the rotatable element 30 may be raised from the position shown in Figure 2 so that it lies closer to the shoulder 32 and indeed the element 30 may have one axial section of greater diameter than the other, the section of greater diameter actually projecting into the entrance to the duct. Element 30 may be the same as or different from, element 14, and may be rotated at a speed that is the same as, or different from, that of the element 14.

Figure 4 shows an alternative arrangement wherein parts similar to those in Figure 2 are given the same reference numerals with the suffix "a". In this case the rotatable element 14a is mounted in the plenum chamber towards the bottom thereof and in an intermediate position between the conveyor 9a and the duct 12a, so that the single element may create sufficient turbulence throughout the chamber.

Although the invention has been particularly described in relation to a plenum chamber at the delivery end of a conveyor belt for waste collection, it will be understood that carding machines often

have plenum chambers in other locations where waste is generated or collected. Any or all of these may also be kept clean by mounting a high speed impeller element for rotation therein.

Figure 1 shows a plenum chamber at the feed end of the carding machine, namely at the delivery end of conveyor belt 9, but there are other sites at which dust / waste material may be generated, or be collected, and which would benefit from provision of a plenum chamber and associated rotatable element mounted therein.

Two such sites are shown schematically in Figure 1, and are designated by references 3a and 7a, located respectively adjacent to taker-in 3 and stripper roll 7.

Figures 5 and 6 show a drive train for driving a rotatable element which is housed within a plenum chamber located within the endless path followed by the travelling flats 5. Conveniently, the drive to the rotatable element is taken from the drive to a drive pulley / sprocket which drives the flats 5 along their path of travel.

Figure 5 is an end view of a drive arrangement for driving both the flats 5 and the rotatable element, and includes a drive motor 32. As shown in Figure 6, rotatable element 33 is mounted on shaft 34 for rotation therewith, shaft 34 being arranged to be driven by motor 32. In addition, a drive train (not shown) moves the flats 5 (see Figure 1) along their endless path, and a so-called nug wheel 35 mounted freely on shaft 34 forms an idler mechanism to guide the movement of the flats. Conveniently, the plenum chamber (not shown) and the associated rotatable element are housed within either one of the return ends 36 or 37 (see Figure 1) of the endless path of the flats 5.

Figure 7 is a schematic illustration of a plenum chamber 38 and associated rotatable element 39 associated with return end 36 of the endless path of travel of the flats 5. Although not shown, a discharge duct will communicate with the plenum chamber 38, to discharge dust / waste material generated and collected at this region within the envelope of the path of travel of the flats 5.

Figure 8 shows schematically the provision of plenum chamber 11 over taker-in 3 and adjacent to one of the return ends of the endless path of the moving flats 5. Plenum chamber 11 has a door 11a on which impeller 14 is mounted via a support 14a, and opening of the door allows the impeller to swing out of the chamber 11 to facilitate cleaning or maintenance when required.

The provision of some form of monitoring means to monitor the operation of the rotatable element in the or each plenum chamber is particularly advantageous, both in management of the operation of a carding engine, or a batch of carding engines. As described above with reference to Fig-

ure 3, a rotation sensor 19a monitors the speed of rotation of a drive shaft 16 on which rotatable element or impeller 14 is mounted. It should be understood that this is merely one example of means for monitoring the operation of the rotatable element, and any other convenient means may be adopted e.g. some means to monitor the speed of a drive belt, chain or the like transmitting rotary drive to the rotatable element.

By monitoring the speed of rotation of the rotatable element, any slowing down of the element to a speed below its design speed will be an indication of at least partial clogging-up of the discharge system, (the plenum chamber, the discharge duct or the outlet to a waste collection unit), and this may enable warning signals to be triggered well in advance of any dangerous or hazardous situation developing. This will enable remedial action to be taken in good time, and therefore this monitoring of the speed of the rotatable element will provide early warning of this potentially hazardous condition.

With current designs of carding engines, it is present practice for routine cleaning to take place at regular intervals of all sites on the machine where waste is liable to accumulate, or to be collected. This routine maintenance work involves regular labour costs, and will usually involve down time of the machine.

The provision therefore of monitoring means for monitoring the operation of the rotatable element in the plenum chamber, as disclosed herein, enables significantly improved management of the operation of a carding engine, or batch of carding engines. Thus, instead of carrying out routine cleaning, the engine(s) can be operated and cleaning carried out only when necessary, of which early warning will be given of need for future cleaning e.g. in ten minutes time or so, by monitoring slow down in the speed of rotation of the rotatable element from its design speed.

Claims

1. A carding machine (100) having a feed means (2), a taker-in (3), a main carding cylinder (4), a doffer (6), a stripper arrangement (7), a plenum chamber (11) located at a region of the machine where waste material is generated or collected during operation of the machine, an outlet duct (12) leading from the plenum chamber (11), and means for generating negative pressure within the duct (12) and the plenum chamber (11) in order to discharge waste material from the plenum chamber (11):

characterised in that an impeller (14) is mounted for rotation at high speed within the chamber to cause turbulent air flow within the

chamber to mix with the waste material;

and in that a striker (23) is arranged adjacent to the circular path of travel defined by the outermost part of the impeller during rotation so as to co-operate therewith in order to prevent build-up of waste material on the impeller.

2. A machine according to Claim 1, in which an endless conveyor belt (9) is arranged to extend below at least the taker-in (3), the main carding cylinder (4) and the doffer (6), and the upper run (10) of the conveyor belt (9) is arranged to travel from the stripper end towards the feed end of the carding machine, and in which the plenum chamber (11) is arranged around the conveyor (9) at the feed end of the carding machine. 10
3. A machine according to Claim 1 or 2, in which the impeller (14) comprises a circular cylindrical body (15) having at least one radially extending blade (20, 21) mounted rigidly thereon. 15
4. A machine according to Claim 3, in which the cylindrical body (15) has at least two blades (20, 21) mounted thereon so that the body runs in balance, and having a smooth external surface. 20
5. A machine according to Claim 2, in which the clearance between the radially outermost part of the impeller (14) is not more than 1cm from the surface of the conveyor belt (9). 25
6. A machine according to any one of Claims 1 to 5, in which a first impeller is mounted in the plenum chamber (11), and a second impeller is mounted in the vicinity of the entrance to the duct (12). 30
7. A machine according to any one of Claims 1 to 6, including monitoring means (19a) to monitor the operation of the impeller (14) in the plenum chamber (11). 35
8. A machine according to Claim 7, including a warning device coupled with the monitoring means (19a) and operable to provide warning of reduction in speed of the impeller (14). 40
9. A machine according to any one of Claims 1 to 8, in which the plenum chamber (11), or a respective plenum chamber is arranged in the region of one or more of: the taker-in (3); the stripper arrangement (7); within the envelope of the path of travel of the flats (5); or within 45

one of the return ends (36, 37) around which the flats (5) are movable.

10. A machine according to Claim 9, in which the plenum chamber is arranged within one of the return ends (36, 37), and the impeller (14) therein is arranged to be driven by the same drive means utilised to impart driving motion to the flats (5) along the closed path. 50

11. A carding machine (100) having a feed means (2), a taker-in (3), a main carding cylinder (4), a doffer (6), a stripper arrangement (7), a plenum chamber (11) located at a region of the machine where waste material is collected or generated during operation of the machine, an outlet duct (12) leading from the plenum chamber (11) to a waste collection device, and means for generating negative pressure within the duct (12) and the plenum chamber (11) in order to discharge waste material: 55

characterised in that an impeller (14) is mounted for rotation at high speed within the plenum chamber (11) in order to generate turbulent air flow within the chamber to mix with the waste material, and in that means (19a) is provided to monitor the operation of the impeller (14) and to detect when the speed of the impeller (14) falls below a design speed so as to be indicative of a build-up of waste material in the waste material discharge system (14,12), and to provide an advance warning signal that cleaning and / or maintenance of the waste material discharge system will be required in the future.

Patentansprüche

1. Karde (100) mit einer Speiseeinrichtung (2), einem Vorreißer (3), einem Hauptkardierzylinder (4) einem Doffer (6), einer Abnehmeranordnung (7), einer Saugkammer (11), welche bei dem Bereich der Karde angeordnet ist, bei welchem Abfallmaterial erzeugt wird oder während des Betriebs der Karde gesammelt wird, einer Auslaßleitung (12), die von der Saugkammer (11) wegführt, und einer Einrichtung zum Erzeugen eines Unterdruckes im Inneren der Leitung (12) und der Saugkammer, um Abfallmaterial aus der Saugkammer (11) abzuführen, dadurch gekennzeichnet, daß ein Flügelrotor (14) mit hoher Geschwindigkeit drehbar im Inneren der Kammer angeordnet ist, der im Inneren der Kammer eine turbulente Strömung erzeugt, welche sich mit dem Abfallmaterial vermischt, und daß ein Abstreichteil (23) der Nachbarschaft der kreisförmigen Bewegungsbahn angeordnet ist, welche durch den am 60

weitesten außenliegenden Abschnitt des Flügelrotors bei der Drehung durchlaufen wird, so daß er mit dem letzteren zusammenarbeitet, um ein Sichaufbauen von Abfallmaterial auf dem Flügelrotor zu verhindern.

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2. Karde nach Anspruch 1, bei welcher ein endloses Förderband (9) so angeordnet ist, daß es sich zumindest unter dem Vorreißer (3), dem Hauptkardierzylinder (4) und dem Doffer (6) erstreckt, und das obere Trum (10) des Förderbandes (9) so angeordnet ist, daß es von dem Abnehmende zum Beschickungsende der Karde hin läuft, und bei welcher die Saugkammer (11) beim Beschickungsende der Karde um den Förderer (9) herum angeordnet ist. 10
3. Karde nach Anspruch 1 oder 2, bei welcher der Flügelrotor (14) einen kreisförmigen zylindrischen Körper (15) aufweist, welcher mindestens eine in radialer Richtung verlaufende Schaufel (20, 21) trägt, die starr auf ihm angeordnet ist. 20
4. Maschine nach Anspruch 3, bei welcher der zylindrische Körper (15) zumindest zwei Schaufeln (20, 21) trägt, die auf ihm so angeordnet sind, daß der Körper ausgewuchtet läuft, und welche eine glatte außenliegende Oberfläche haben. 25 30
5. Karde nach Anspruch 2, bei welcher der Abstand zwischen dem in radialer Richtung am weitestens außenliegenden Teil des Flügelrotors (14) von der Oberfläche des Förderbandes (9) nicht mehr als 1 am beträgt. 35
6. Karde nach einem der Ansprüche 1 bis 5, bei welchem ein erster Flügelrotor in der Saugkammer (11) angeordnet ist und zweiter Flügelrotor in der Nachbarschaft des Einlasses zu der Leitung (12) angeordnet ist. 40
7. Karde nach einem der Ansprüche 1 bis 6, mit einer Überwachungseinrichtung (19a), welche das Arbeiten des Flügelrotors (14) in der Saugkammer (11) überwacht. 45
8. Karde nach Anspruch 7 mit einer Warnvorrichtung, welche mit der Überwachungseinrichtung (19a) gekoppelt ist und so arbeitet, daß sie eine Warnung für eine Drehzahlverminderung des Flügelrotors (14) erzeugt. 50
9. Karde nach einem der Ansprüche 1 bis 8, bei welcher die Saugkammer (11) oder eine betrachtete Saugkammer in dem Bereich eines oder mehrerer der nachgenannten Teile ange-

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ordnet ist: der Vorreißer (3); die Abnehanordnung (7); das Innere der Hüllfläche der Bewegungsbahn der Flachbänder (5); oder das Innere der Umlenkenden (36, 37), um welche die Flachbänder (5) umlaufen.

10. Karde nach Anspruch 9, bei welcher die Saugkammer im Inneren eines der Umlenkenden (36, 37) angeordnet ist und der in ihr angeordnete Flügelrotor (14) so angeordnet ist, daß er durch dieselbe Antriebsanordnung angetrieben wird, durch welche die Flachbänder (5) längs des geschlossenen Weges in Bewegung gesetzt werden.
11. Karde (100) mit einer Speiseeinrichtung (2), einem Vorreißer (3), einem Hauptkardierzylinder (4), einem Doffer (6), einer Abnehanordnung (7), einer Saugkammer (11), welche in einem Bereich der Maschine angeordnet ist, wo Abfallmaterial während des Betriebes der Maschine gesammelt wird oder erzeugt wird, einer Auslaßleitung (12), die von der Saugkammer (11) zu einer Abfall-Sammelvorrichtung führt, und einer Einrichtung zum Erzeugen eines Unterdruckes in der Leitung (12) und der Saugkammer (11), um Abfallmaterial abzutransportieren, dadurch gekennzeichnet, daß in der Saugkammer (11) ein Flügelrotor (14) zum Umlauf mit hoher Drehzahl angeordnet ist, welcher im Inneren der Kammer eine turbulente Luftströmung erzeugt, welche sich mit dem Abfallmaterial vermischt, und daß eine Einrichtung (19a) vorgesehen ist, welche das Arbeiten des Flügelrotors (14) überwacht und anspricht, wenn die Drehzahl des Flügelrotors (14) unter eine Solldrehzahl abfällt, so daß eine Anzeige dafür erhalten wird, daß sich Abfallmaterial in dem Abfallmaterial-Abführsystem (14, 12) aufbaut, und daß ein Vorwarnsignal dafür erhalten wird, daß ein Reinigen und/oder Warten des Abfallmaterial-Abführsystems in der Zukunft benötigt wird.

Revendications

1. Machine de cardage (100) comprenant un moyen d'alimentation (2), un dispositif preneur (3), un cylindre principal de cardage (4), un dispositif de sortie (6), un dispositif séparateur (7), une chambre de distribution (11) placée en une région de la machine dans laquelle les déchets sont formés ou collectés pendant le fonctionnement de la machine, une conduite de sortie (12) partant de la chambre de distribution (11), et un moyen pour créer une dépression à l'intérieur de la conduite (12) et de la chambre de distribution (11) afin de dégager

- les déchets de la chambre de distribution (11) :
- caractérisée en ce qu'une hélice (14) est montée rotative à grande vitesse à l'intérieur de la chambre pour créer un flux d'air turbulent à l'intérieur de la chambre et le mélanger avec les déchets ;
- et en ce qu'un déflecteur (23) est disposé adjacent au trajet circulaire de déplacement défini par la partie la plus extérieure de l'hélice pendant sa rotation afin de coopérer avec l'hélice pour empêcher l'accumulation de déchets sur l'hélice.
2. Machine selon la revendication 1, dans laquelle est montée une bande transporteuse sans fin (9) qui s'étend au moins sous le dispositif preneur (3), le cylindre principal de cardage (4) et le dispositif de sortie (6), et dans laquelle le plateau supérieur (10) de la bande transporteuse (9) est agencé pour se déplacer depuis l'extrémité du séparateur en direction de l'extrémité d'alimentation de la machine de cardage, et dans laquelle la chambre de distribution (11) est disposée autour de la bande transporteuse (9) à l'extrémité d'alimentation de la machine de cardage.
 3. Machine selon la revendication 1 ou 2, dans laquelle l'hélice (14) comprend une âme cylindrique circulaire (15) sur laquelle est rigidement fixée au moins une pale orientée radialement (20, 21).
 4. Machine selon la revendication 3, dans laquelle l'âme cylindrique (15) porte au moins deux pales (20, 21) montées sur l'âme de manière que cette dernière soit équilibrée en rotation et possède une surface extérieure lisse.
 5. Machine selon la revendication 2, dans laquelle l'écart entre la partie radialement la plus extérieure de l'hélice (14) et la surface de la bande transporteuse (9) n'est pas supérieur à 1 cm.
 6. Machine selon l'une quelconque des revendications 1 à 5, dans laquelle une première hélice est montée dans la chambre de distribution (11), et une seconde hélice est montée au voisinage de l'entrée de la conduite (12).
 7. Machine selon l'une quelconque des revendications 1 à 6, comprenant un moyen de surveillance (19a) pour surveiller le mouvement de l'hélice (14) dans la chambre de distribution (11).
 8. Machine selon la revendication 7, comprenant un dispositif avertisseur couplé au moyen de surveillance (19a) et ayant pour fonction d'avertir en cas de réduction de la vitesse de l'hélice (14).
 9. Machine selon l'une quelconque des revendications 1 à 8, dans laquelle la chambre de distribution (11), ou une chambre de distribution respective est disposée dans la région d'un ou plusieurs des éléments suivants : le dispositif preneur (3) ; le dispositif séparateur (7) ; à l'intérieur de l'enveloppe de la trajectoire de déplacement des cylindres lisses (5) ; ou à l'intérieur de l'une des extrémités de retour (36, 37) autour desquelles les méplats (5) sont mobiles.
 10. Machine selon la revendication 9, dans laquelle la chambre de distribution est placée dans l'une des extrémités de retour (36, 37) et dans laquelle l'hélice (14) contenue dans cette chambre est disposée pour être entraînée par le même moyen d'entraînement que celui qui communique le mouvement d'entraînement aux cylindres lisses (5) le long du trajet fermé.
 11. Machine de cardage (100) ayant un moyen d'alimentation (2), un dispositif preneur (3), un cylindre principal de cardage (4) un dispositif de sortie (6), un dispositif séparateur (7), une chambre de distribution (11) placée dans une zone de la machine dans laquelle les déchets sont collectés ou formés pendant le fonctionnement de la machine, une conduite de sortie (12) partant de la chambre de distribution (11) vers un dispositif de collecte des déchets, et un moyen pour créer une dépression à l'intérieur de la conduite (12) et de la chambre de distribution (11) afin de dégager les déchets : caractérisée en ce qu'une hélice (14) est montée en rotation à grande vitesse à l'intérieur de la chambre de distribution (11) pour créer un courant d'air turbulent à l'intérieur de la chambre et le mélanger avec les déchets, et en ce qu'un moyen (19a) est prévu pour surveiller le fonctionnement de l'hélice (14) et pour détecter à quel moment la vitesse de l'hélice (14) descend en-dessous d'une vitesse nominale de façon à pouvoir signaler une accumulation de déchets dans le système de dégagement des déchets (14, 12), et à former d'avance un signal avertissant que le nettoyage et/ou la maintenance du système de dégagement des déchets seront nécessaires dans l'avenir.

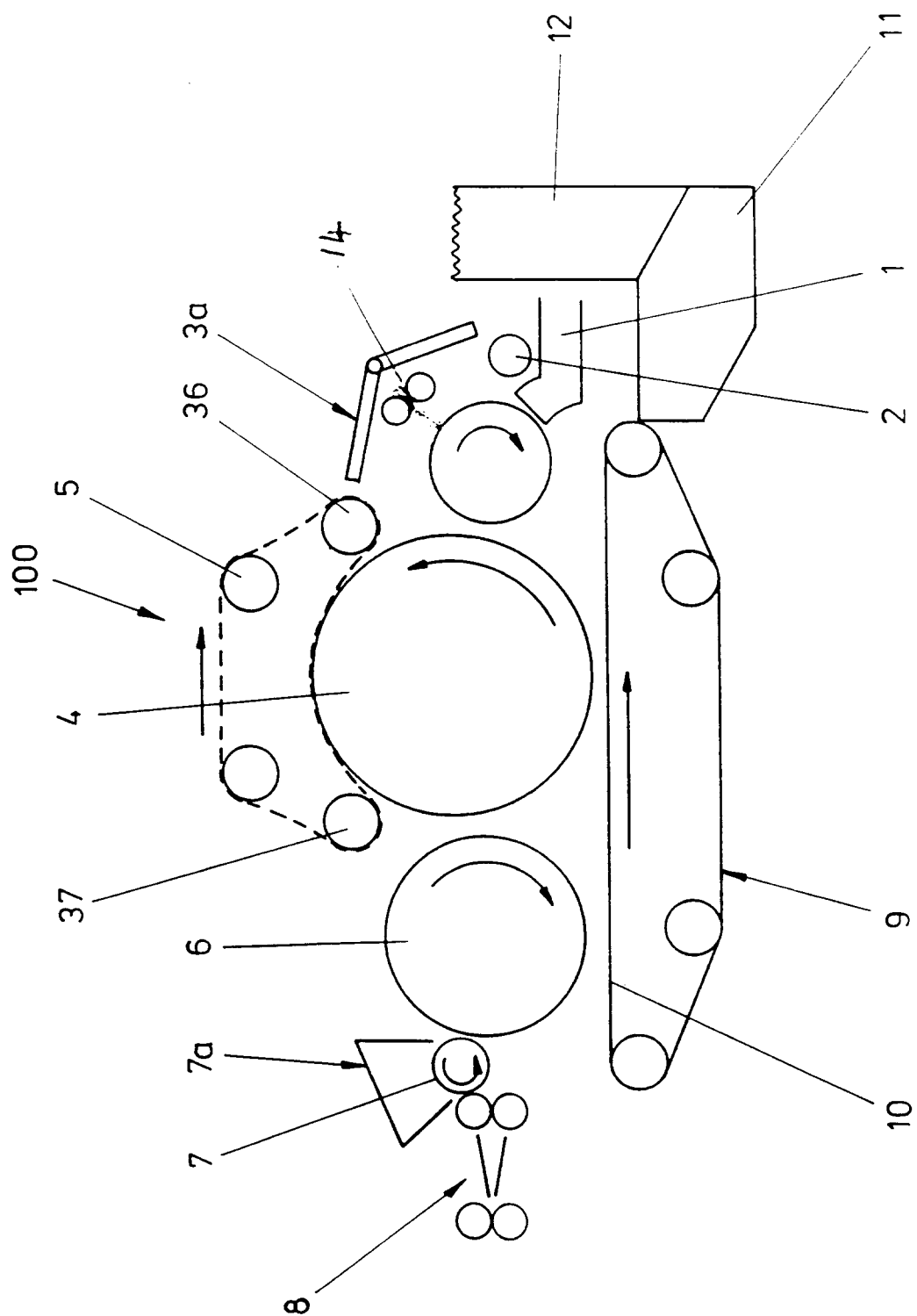


FIG. 1

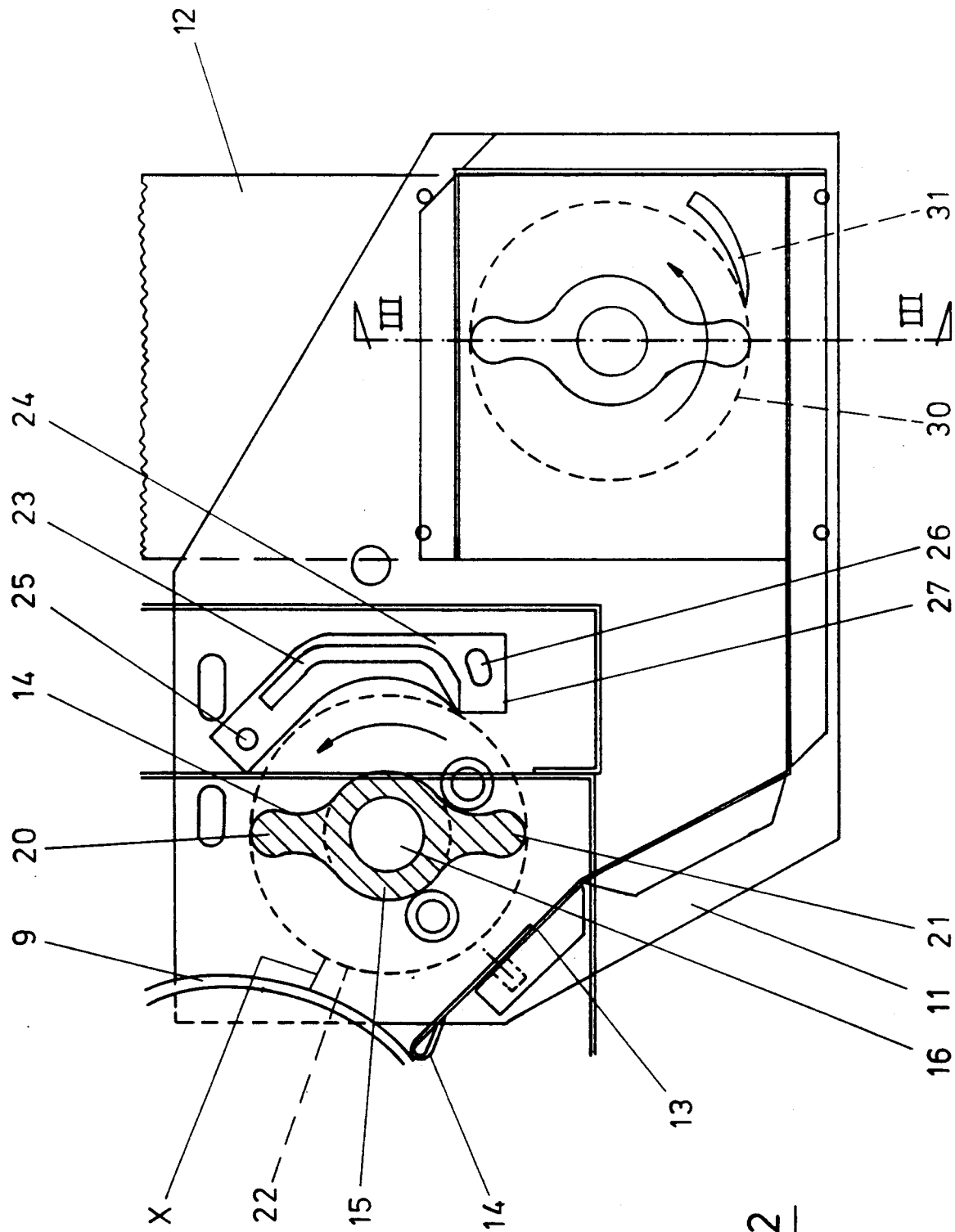


FIG. 2

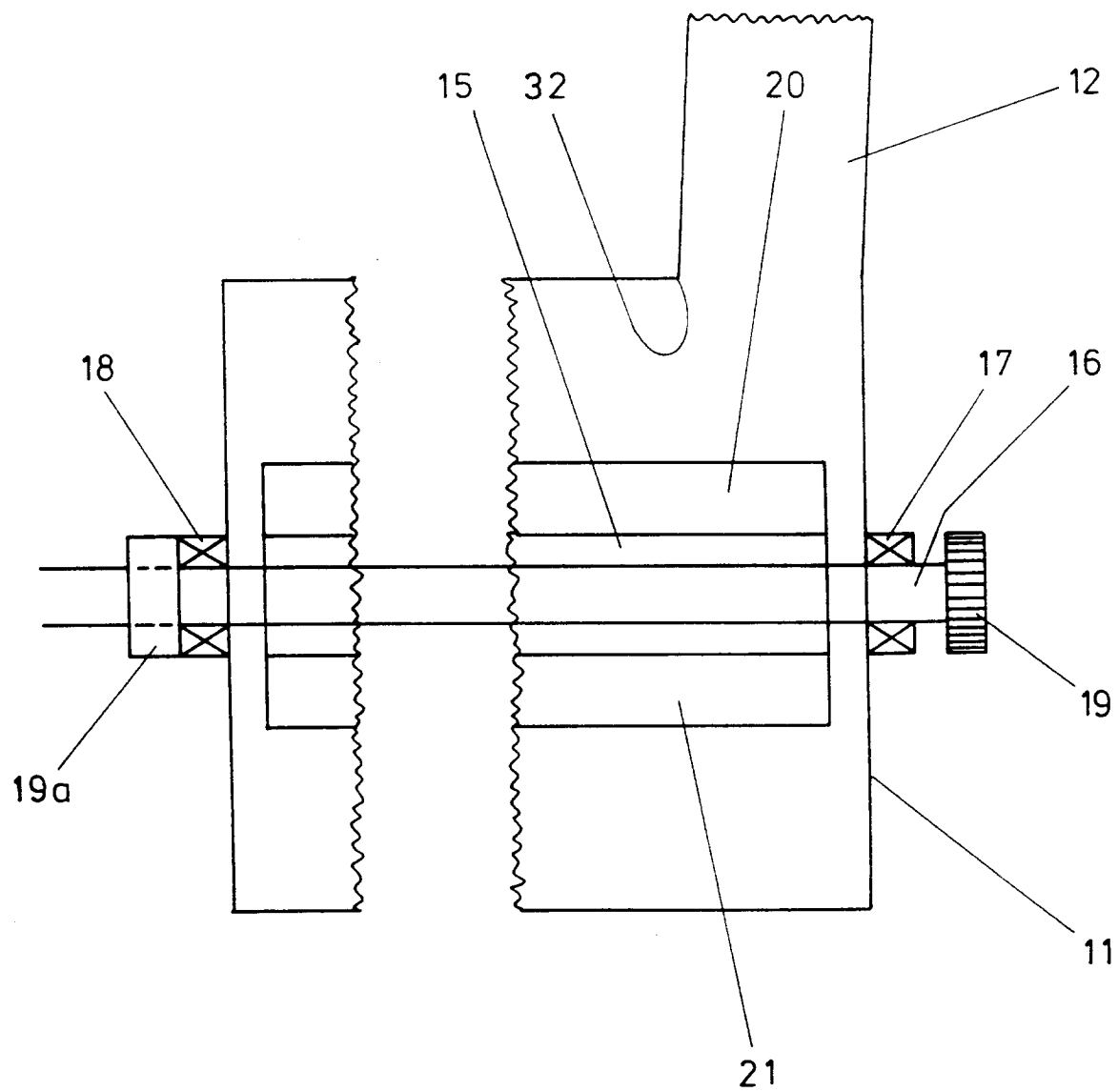
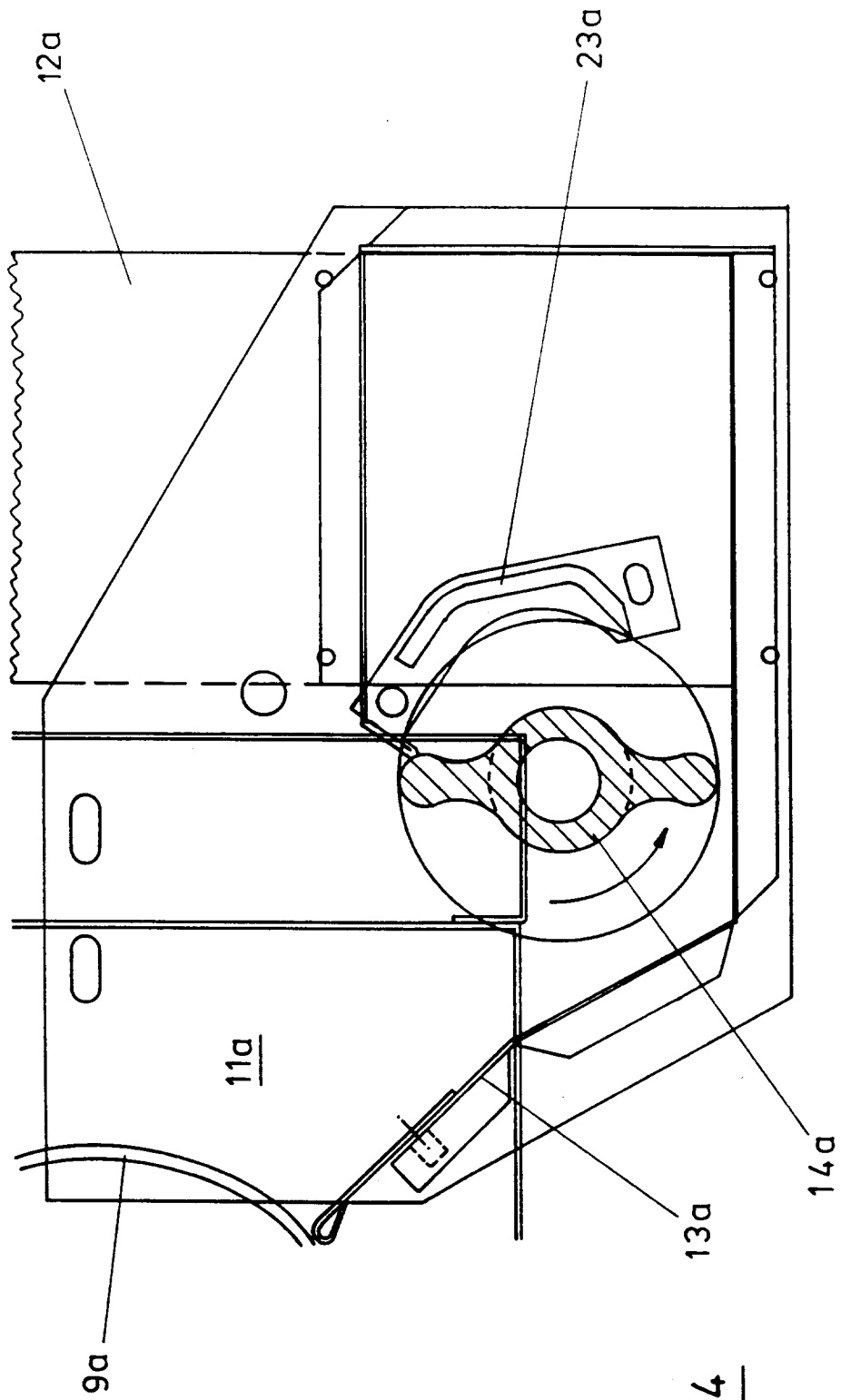


FIG. 3



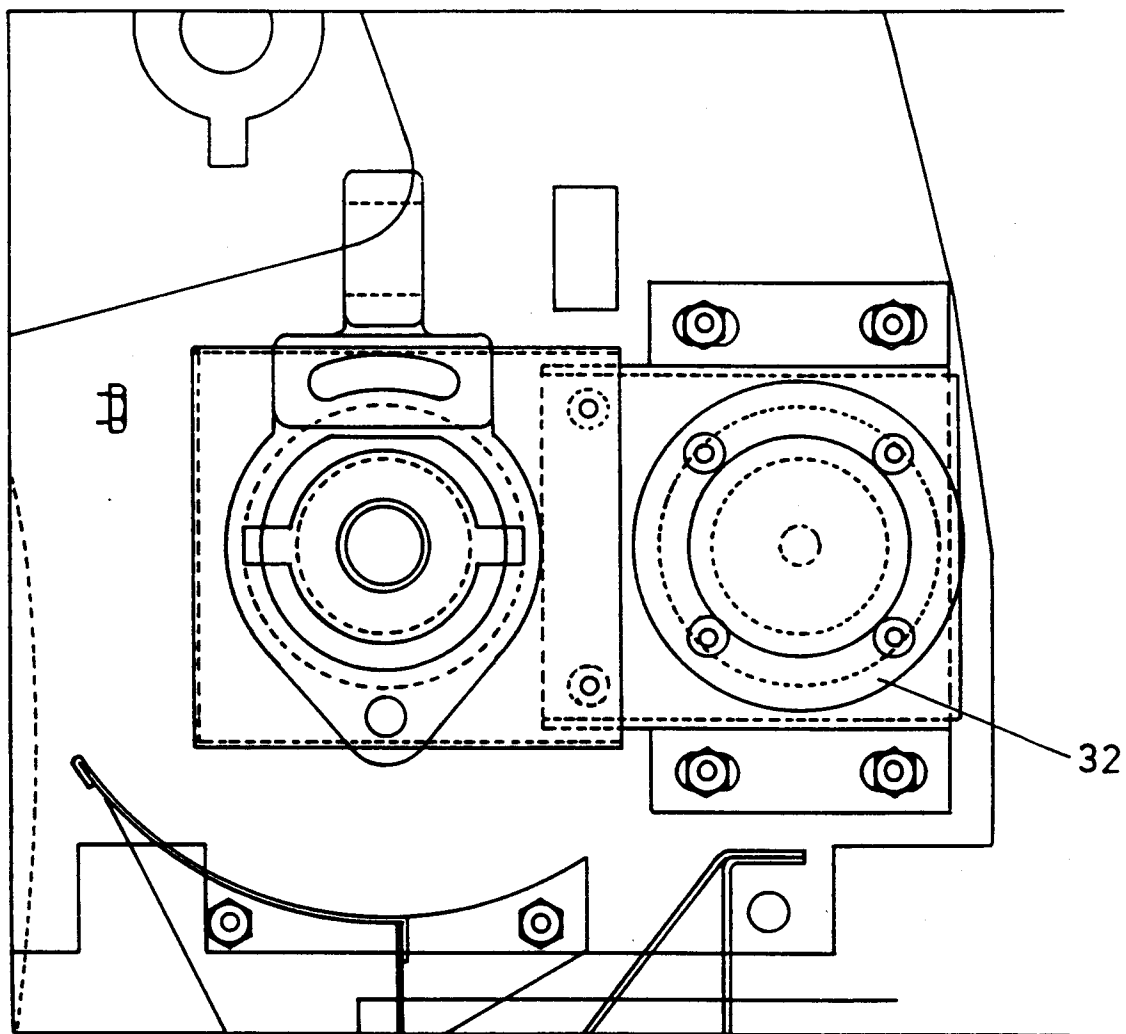
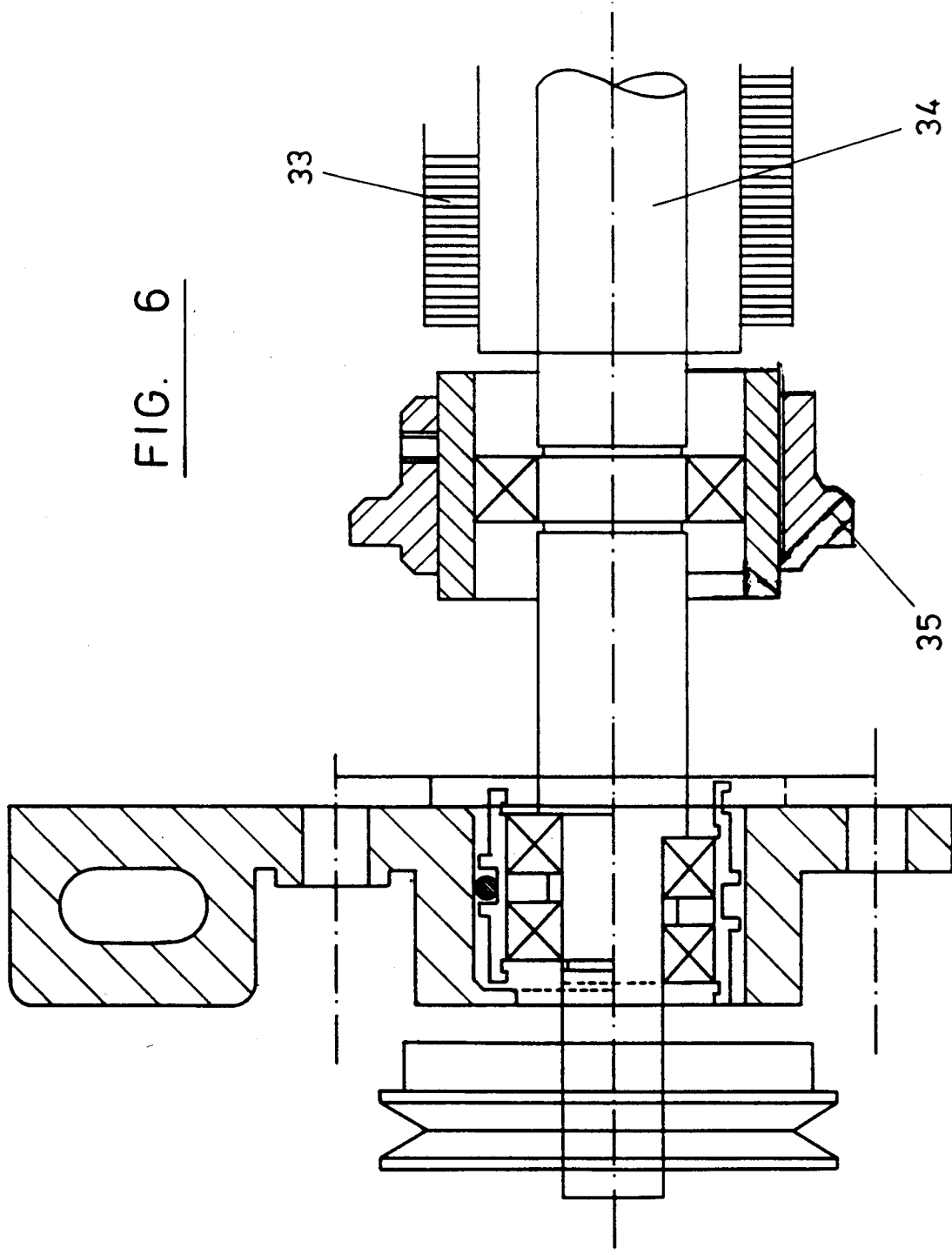


FIG. 5

FIG. 6



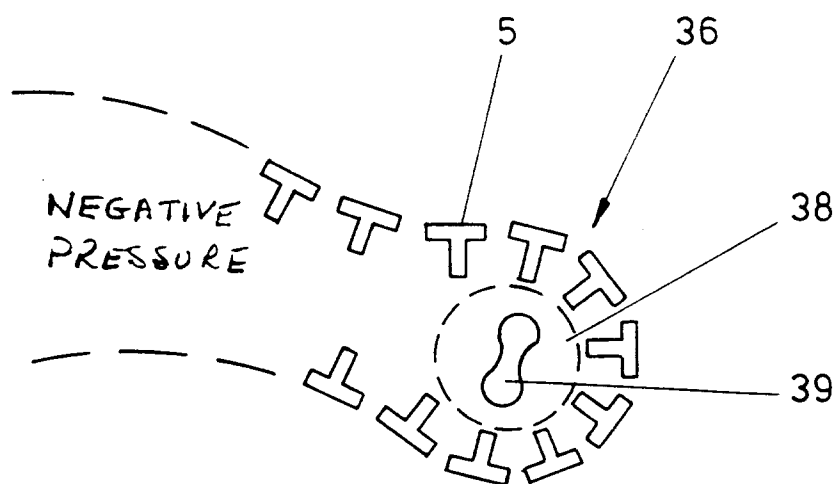


FIG. 7

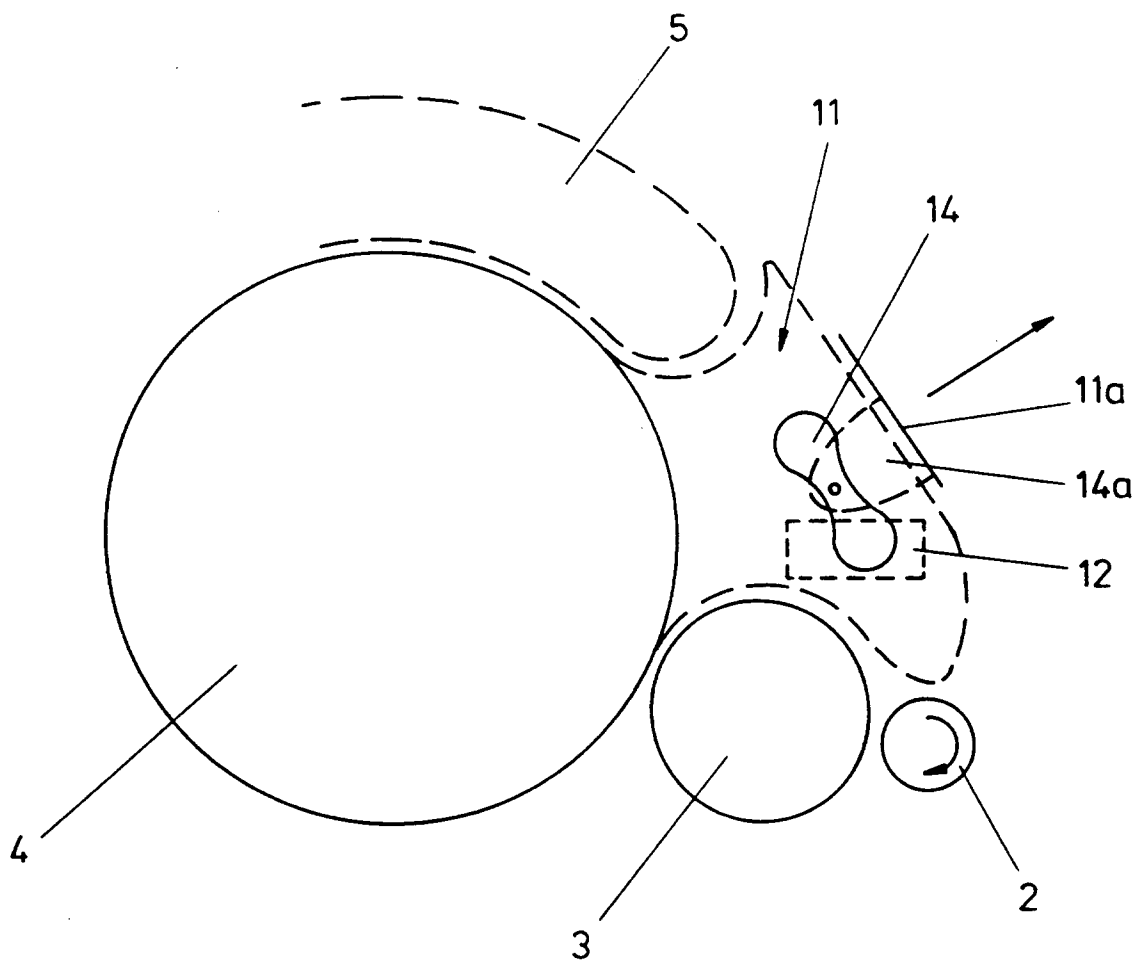


FIG. 8