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(54) Apparatus for automatically transporting and storing cops of yarn.

(57) The apparatus for automatically transporting and storing cops of yarn comprises means (2) for transferring the cops from a machine (8) adapted to spin or spool the cops to a conveyor element (3), which allows to move the cops into collection means (4) to subsequently allow the routing of the cops to a machine adapted to sort them.

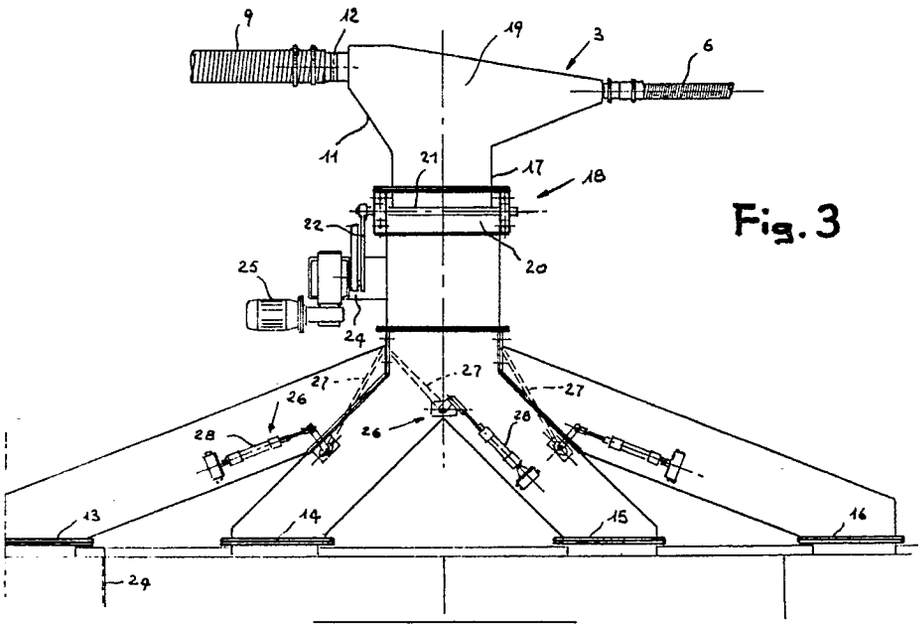

Fig. 3

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APPARATUS FOR AUTOMATICALLY TRANSPORTING AND STORING COPS OF YARN

The present invention relates to an apparatus for automatically transporting and storing cops of yarn.

After the spinning or spooling of the thread overlying the cop, which is normally performed by an automatic machine or spooler, said cops, before being sent to a subsequent apparatus for sorting them, are gathered in wheel-mounted collecting containers which are generally first moved manually and then lifted and transported, for example by means of fork-lift trucks, so as to place the cops inside large-size containers or to stack said containers on top of one another according to the color of the cop which normally, as occurs in practice, characterizes the yarn supported by said cops, for example in terms of its diameter.

The cops are subsequently extracted from the containers and again transported manually to the machines for sorting them, which stack them and possibly remove the residual yarns therefrom and subsequently recover said yarns or, if they are unrecoverable, eliminate them.

As is understandable, the constant presence of at least one person is required to transfer the cops from the spinners or spoolers to the containers and from said containers to the sorting machines, also in view of the operating speed of spinners or spoolers and of sorting machines.

The above described problem becomes more severe if one considers that said machines sometimes operate in three daily shifts according to the requirements.

What has been described above leads to an increase in the industrial costs for the use of labor assigned to the transfer of the cops as well as to the use of lifting and transporting means which hinder work and occupy spaces which can be used for other processes.

The technical aim of the present invention is to obviate the above described disadvantages of the known art.

Within the scope of this aim, an important object of the invention is to provide an apparatus for automatically transporting and storing cops of yarn which allows to transfer said cops from a spinner or spooler to a machine for sorting said cops with automatic handling for selection and storage without using labor for this purpose.

Another object of the invention is to provide an apparatus for automatically transporting and storing cops of yarn which can be simultaneously connected to a plurality of spinners or spoolers and to a plurality of cop sorting machines in a short time and without modifying said machines for its installation.

A further object of the present invention is to provide an apparatus for automatically transporting and storing cops of yarn which also integrally replaces, besides the use of labor, the use of mechanical means for lifting and transporting the cop-collecting containers.

Not least object of the present invention is to provide an apparatus for automatically transporting and storing cops of yarn which is extremely efficient, simple to manufacture and compact, so as to not interfere with the operation of the other machines.

This aim, these objects and others are achieved by an apparatus for automatically transporting and storing cops of yarn, characterized in that it comprises means for transferring said cops from a spinner or spooler of said cops to an element for conveying said cops inside cop-collecting means, means being furthermore provided to route said cops to a machine for sorting them.

Further characteristics and advantages of the invention will become apparent from the description of a preferred but not exclusive embodiment of the apparatus for automatically transporting and storing cops of thread according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic perspective view of the apparatus according to the invention;

figure 2 is a lateral elevation view of the apparatus illustrated in figure 1;

figure 3 is a lateral elevation view of the conveyor element of the apparatus according to the invention;

figure 4 is an enlarged view of the shutter according to the invention;

figure 5 is a sectional view taken along the line V-V of figure 4;

figure 6 is a plan view of the cam according to the invention; and

figure 7 is a sectional view taken along the line VII-VII of figure 6.

With reference to the above described figures, the apparatus for automatically transporting and storing cops of yarn according to the invention, generally indicated by the reference numeral 1, comprises transfer means, generally indicated by 2, for the cops 10 which are taken from a spinner or spooler 8 and are moved therefrom to a cop conveyor element, generally indicated by 3, and are subsequently placed in gathering and routing means, respectively indicated by 4 and 5, as will be described in greater detail hereinafter; according to the requirements, said means subsequently

convey the cops to a machine for sorting them.

Said transfer means comprise at least one first tube 6 which has one end associated with the conveyor element 3 and its other end associated proximate to an opening 7 for the exit of the cops from the spinner or spooler 8.

At least one second tube 9 extends from the conveyor element 3 on the opposite side with respect to the first tube 6; its free end is associated with suction means and more precisely with a compressor 40.

The diameter of the first tube 6 is conveniently substantially smaller than that of the second tube 9 and than the sum of the maximum and minimum diameters of the cops 10 so that said cops cannot overlap or wedge inside the tube 6 during their transfer.

The conveyor element 3 has an inclined wall 11 proximate to the second tube 9, on the opposite side with respect to the first tube 6, so that when the cops 10 enter the conveyor element 3 at high speed, due to the negative pressure created inside the first tube 6 and the second tube 9, and collide against the inclined wall 11, which is covered with fabric-finished rubber to cushion the impact, they do not rebound and return into the first tube 6, jamming with one another and thus halting the apparatus's production.

For the same reason, i.e. to prevent the cops arriving from the first tube 6 from being sucked by the second tube 9, said second tube has a retainer grid 12 proximate to the conveyor element.

Said conveyor element is furthermore provided, below said first tube 6 and said second tube 9, with at least one opening for the exit of the cops and more precisely, in the example being considered, it has four exit openings, respectively indicated by the numerals 13, 14, 15 and 16.

Valve means, generally indicated by 18, are furthermore provided in the duct 17, which is located in the conveyor element between the first tube, the second tube and the exit openings; said valve means are adapted to alternately open and close the conveyor element so as to alternately allow the cops to drop towards the exit openings 13, 14, 15 and 16 or provide the negative pressure inside the chamber 19 for transferring the cops along the first tube 6.

The valve means 18 are defined by a shutter 20 which is rotatable about its pivoting shaft 21, which has an opening and closure lever 22 on one of its ends which protrudes from the duct 17.

Said opening and closure lever 22 engages a cam 24 which is rotated by a motor-reducer 25 connected to the conveyor element 3.

The rotation of the cam 24 allows to oscillate the shutter element 20 by means of the opening and closure lever 22 so as to drop a certain amount of cops towards the exit openings and immediately thereafter close the duct 17 again, so as to define a seal thereon and restore the negative pressure inside the chamber 19 required to suck further cops through the first tube 6.

Each of the exit openings 13, 14, 15 and 16 furthermore has means for selectively opening and closing it, generally indicated by 26, comprising a baffle 27 activated by a fluidodynamic piston 28 so that only one of the exit openings opens and the others remain closed according to the requirements.

The collection means 4 comprise at least one container 29 arranged below each of the exit openings 13, 14, 15 and 16 and adapted to receive the cops arriving from the conveyor element 3.

The routing means 5 are associated inside each container 29; each of said means comprises a conveyor belt 30 which has raised side walls 31 so as to prevent the fall of the cops 10.

A shutter 33, adapted to open or close the passage of the cops from the containers 29 to the conveyor belts 30, is furthermore provided.

Said shutter 33 conveniently rises simultaneously with the actuation of the chosen conveyor belt by means of a single activation motor 34.

The conveyor belts 30 subsequently merge onto a main conveyor belt 37 which moves the cops to the sorting machine 38.

The operation of the apparatus for automatically transporting and storing yarn cops according to the present invention is evident from what has been described and illustrated; with reference in particular to figure 1, the cops exiting from the spinner or spooler are sucked by means of the tube 6 and sent in succession into the conveyor element and more precisely into its chamber 19 to drop onto the shutter element 20.

At preset time intervals, the shutter element 20 is opened by means of the motor-reducer 25 to drop the cops, through one of the exit openings 13, 14, 15 and 16, into one of the containers 29 depending on which of the baffles 27 is open.

During the opening of the shutter element 20, the negative pressure inside the chamber 19 decreases sharply and the suction of the cops through the first tube 6 slows down.

Once the shutter element is closed, the negative pressure sufficient to again allow the suction of the cops is immediately restored in the chamber 19.

In practice it has been observed that the apparatus according to the invention is particularly advantageous in that it allows to automatically transfer the cops from a spinner or spooler into containers, dividing them according to their color.

The exit openings 13, 14, 15 and 16 are opened according to the kind of color of the cops

present on the spinner or spooler, so as to convey the new cops of the same color into another container, subsequently to those of a different color which have already been conveyed into a preceding container, simply by opening or closing the automatic baffles with an electric activation on the control panel 27.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may furthermore be replaced with technically equivalent elements.

In practice the materials employed, as well as the dimensions, may be any according to the requirements and to the state of the art.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1.- Apparatus for automatically transporting and storing cops of yarn, characterized in that it comprises means (2) for transferring said cops (10) from a machine (8) for spinning or spooling said cops to an element (3) for conveying said cops into means (4) for collecting said cops, means (5) for routing said cops to a machine for sorting them being furthermore provided.

2.- Apparatus according to claim 1, characterized in that said transfer means comprise: at least one first tube (6) associated, with one of its ends, with said conveyor element and with its other end proximate to the opening (7) for the exit of said cops from said spinner or spooler, and at least one second tube (9) associated, with one of its ends, with said conveyor element and, with its opposite end, with suction means (40).

3.- Apparatus according to claim 2, characterized in that the diameter of said first tube (6) is substantially smaller than the diameter of said second tube (9).

4.- Apparatus according to one or more of the preceding claims, characterized in that said conveyor element has at least one inclined wall (11) arranged facing said first tube proximate to said second tube.

5.- Apparatus according to one or more of the preceding claims, characterized in that said conveyor element has, below said first tube and said second tube, at least one opening (13,14,15,16) for the exit of said cops.

6.- Apparatus according to one or more of the preceding claims, characterized in that it comprises, between said first tube, said second tube and said opening, valve means (18) for alternately opening and closing said conveyor element.

7.- Apparatus according to one or more of the preceding claims, characterized in that said valve elements comprise a shutter (20) which is rotatable about its own pivoting shaft (21) and has, at one end, an opening and closure lever (22).

8.- Apparatus according to one or more of the preceding claims, characterized in that said opening and closure lever alternately engages a cam (24) rotated by a motor-reducer (25) connected to said conveyor element.

9.- Apparatus according to one or more of the preceding claims, characterized in that it comprises a plurality of openings, (13,14,15 and 16) each having means (26) for selectively opening or closing said openings.

10.- Apparatus according to one or more of the preceding claims, characterized in that each of said opening and closure means comprises a baffle (27) activated by a fluidodynamic piston (28).

11.- Apparatus according to one or more of the preceding claims, characterized in that said gathering means comprise at least one container (29) associated below each of said openings.

12.- Apparatus according to one or more of the preceding claims, characterized in that said routing means comprise a conveyor belt (30) for each of said openings, said belt having raised side walls (31) and an opening shutter (33) actuated by a motor (34) for activating said belt.

13.- Apparatus according to one or more of the preceding claims, characterized in that said second tube has, proximate to said conveyor element, a grid (12) for stopping said cops.

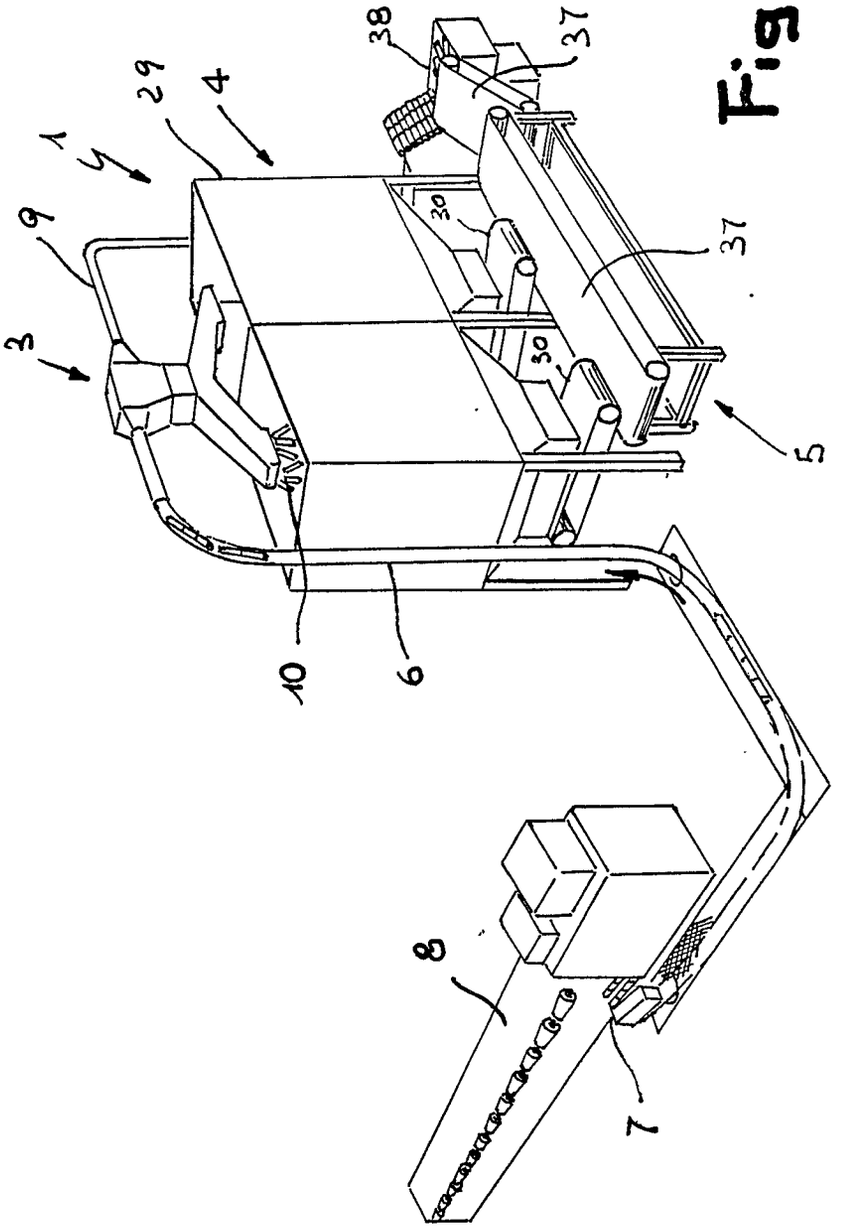


Fig. 1

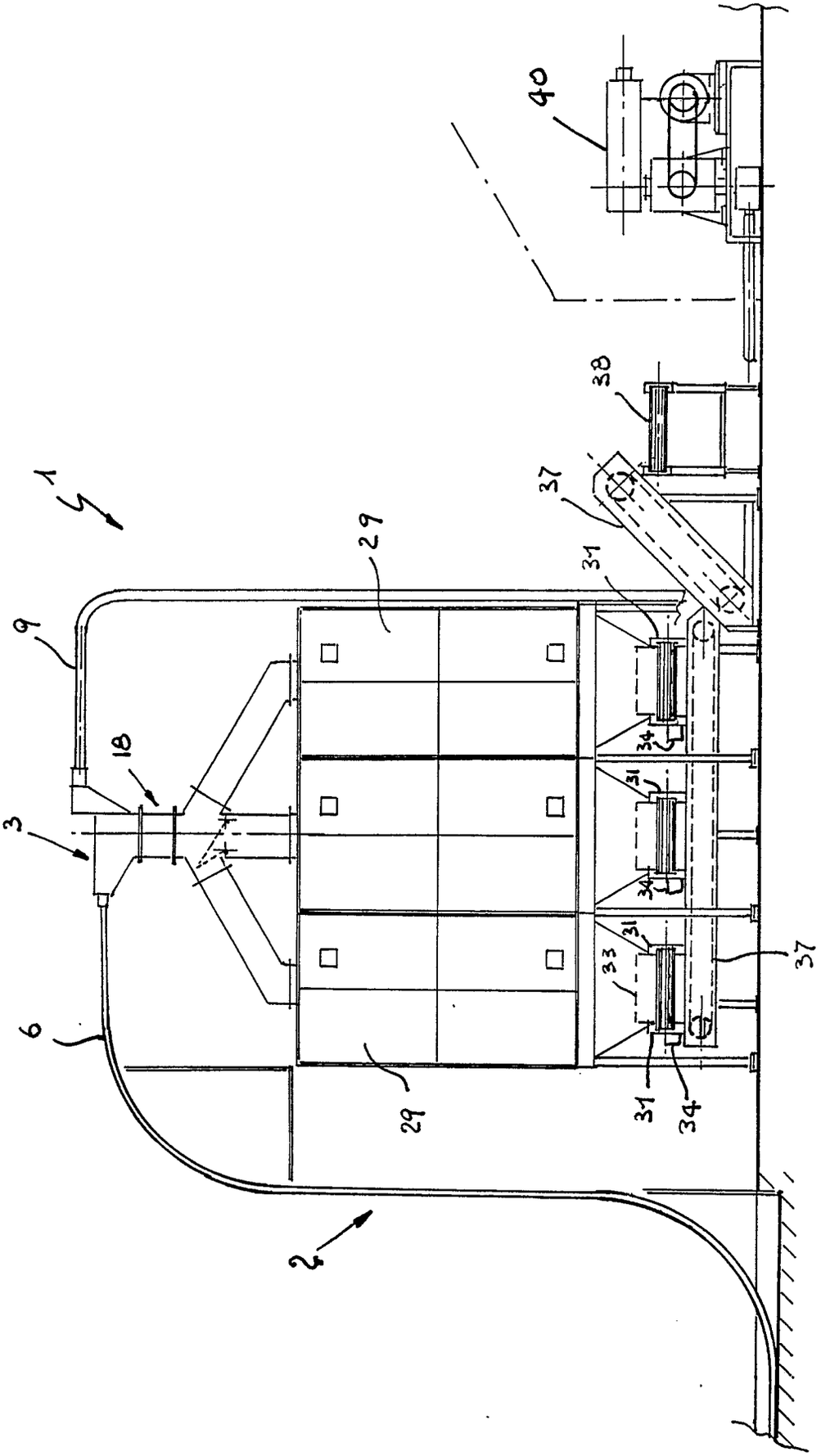
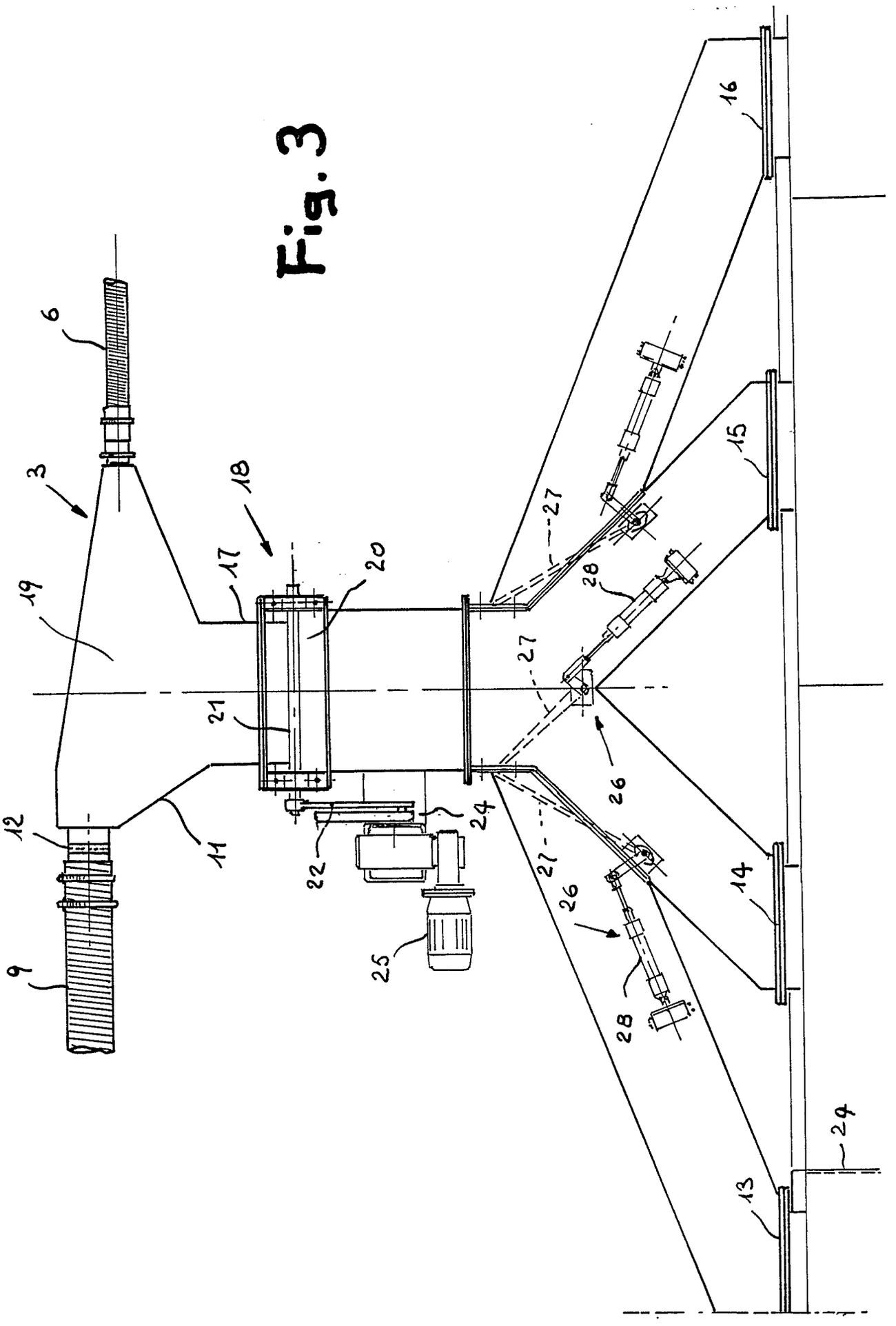


Fig. 2

Fig. 3



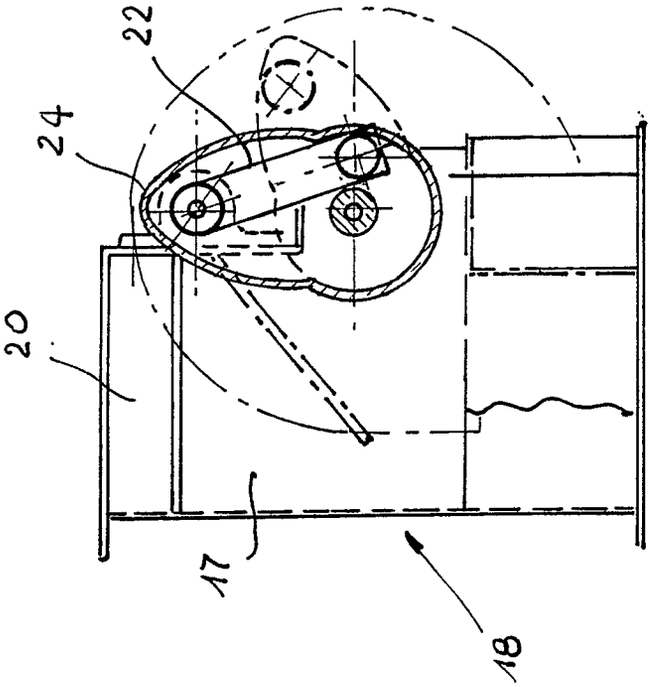


Fig. 5

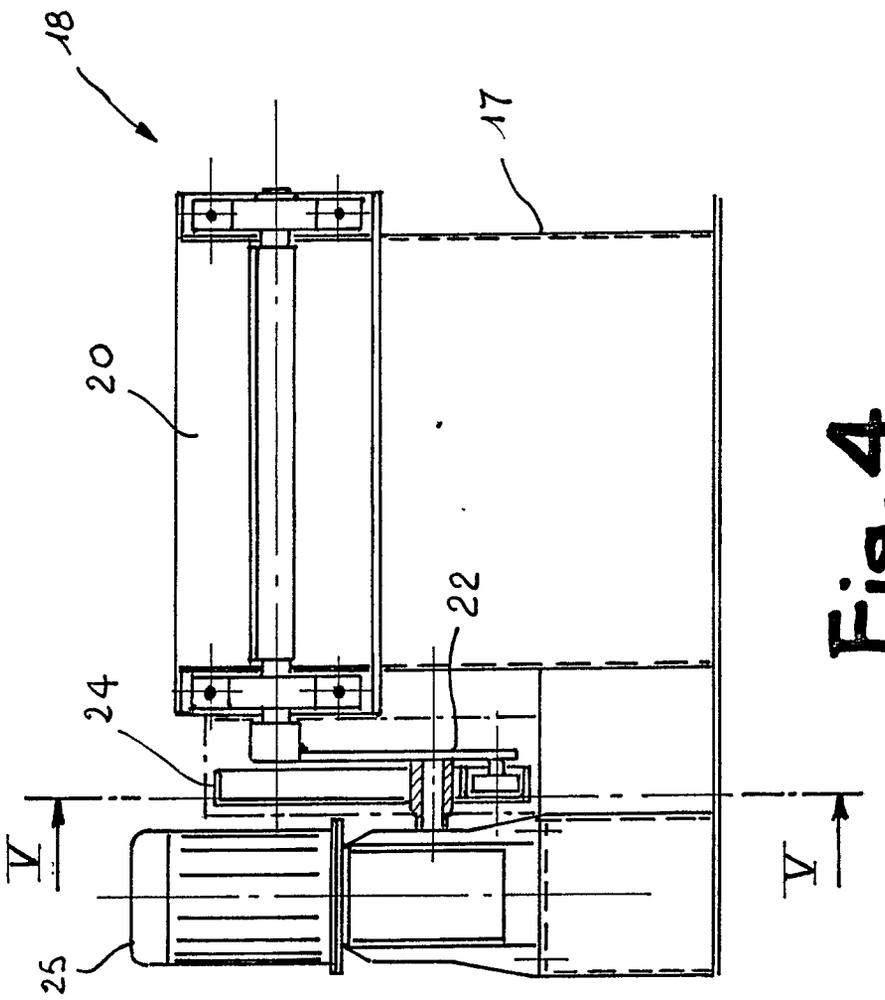
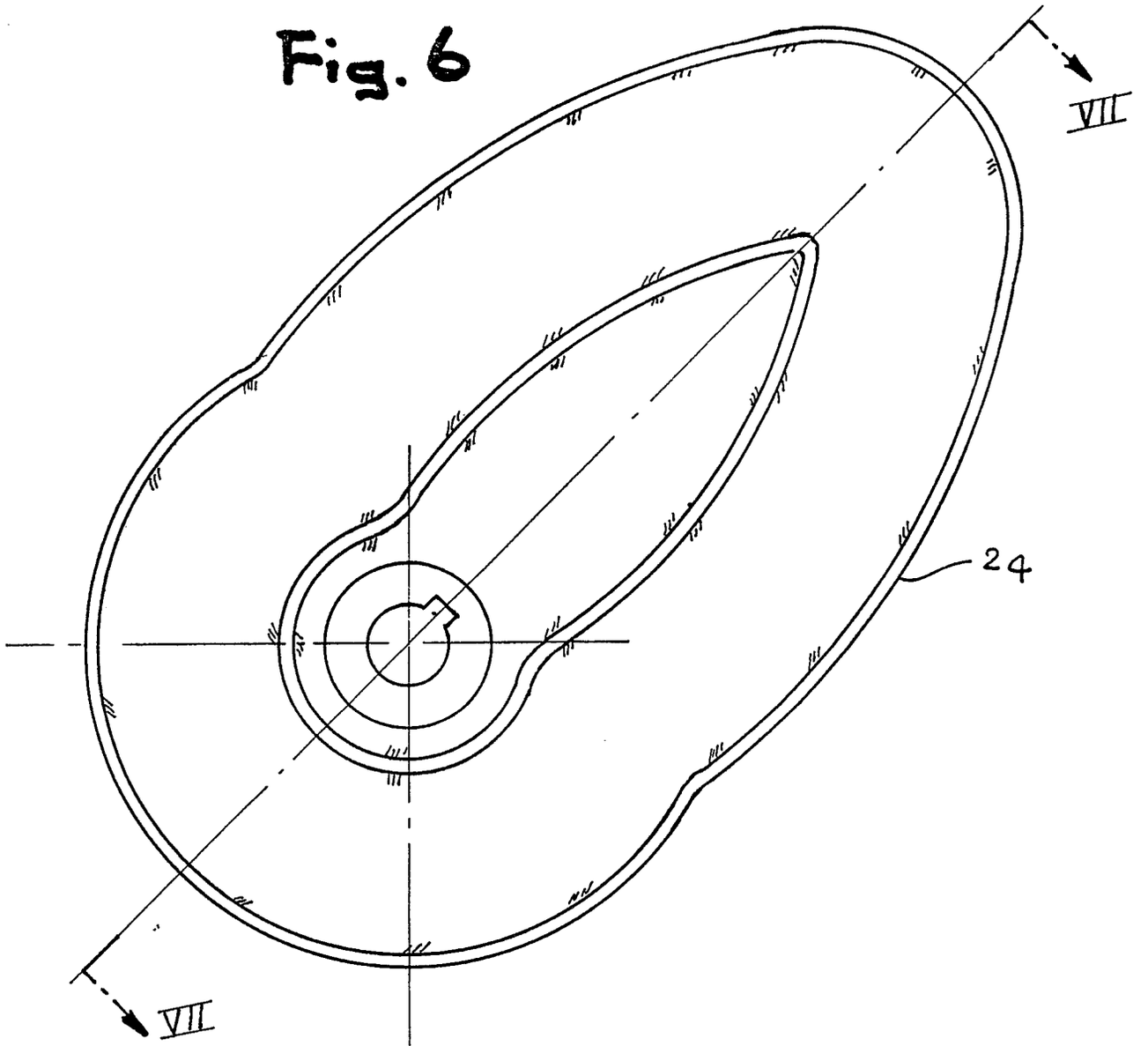


Fig. 4

Fig. 6



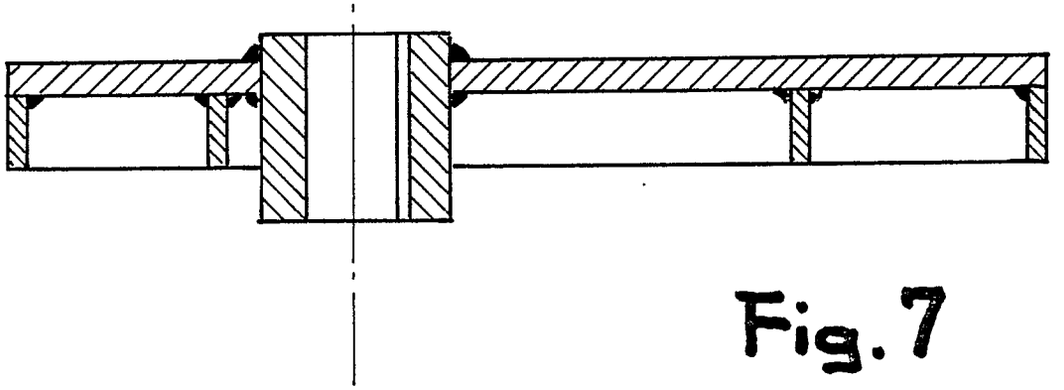


Fig. 7