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(54) **Machine for the surface treatment of textiles**

(57) Machine for the surface treatment of textiles, comprising: a base (18), a plurality of operating units (2) associated with said base (18), each unit being provided for carrying out in succession the treatment of the fabric (4), at least a pneumatic cooling device (1) which operates the cooling of the fabric (4) at an intermediate position between at least a pair of said operating units (2).

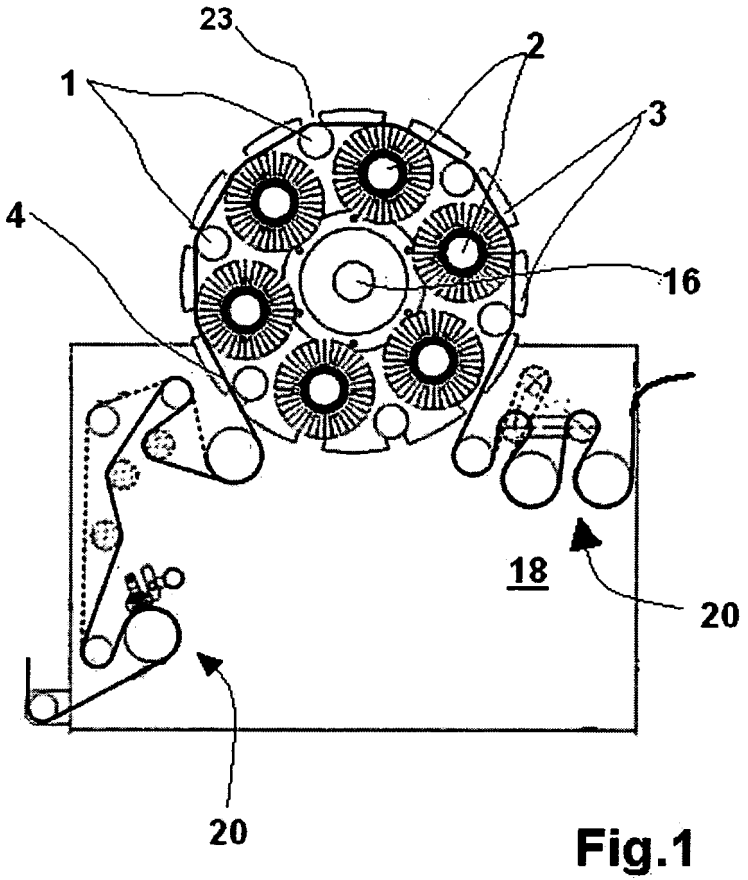

Fig.1

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Description

[0001] The object of the present invention is a machine for the surface treatment of textiles.

[0002] Usually, the operations carried out by the machines performing the surface treatment of textiles are: brushing, raising and grinding, said operations being performed by special finishing machines provided with operating units which carry out the work on the fabric in temporal and spatial succession.

[0003] The above described machines have some drawbacks.

[0004] One drawback is due to the fact that the operating units carry out a series of abrasive workings on the fabric which produce a significant heating on the same fabric.

[0005] This phenomenon may generate defects in the finished product and a considerable wear of the operating units, whether they are for brushing, or raising or grinding the fabric.

[0006] In particular, the temperature of the fabric going into the machine is usually about 20 °C, whereas the one at the exit therefrom is about 75-80 °C.

[0007] This drawback is significant also because a portion of the textiles apt to surface-finish treatments are polymeric fabrics, such as nylon or polyamide: these types of fabric having their melting temperature very low and being therefore more subject to a localized softening thereof.

[0008] The object of the present invention is to overcome the above mentioned drawbacks by providing a machine for surface finish of textiles which is capable of obtaining a finished product having its exit temperature close to that at its entry.

[0009] This object and further ones that will appear more clearly by the detailed description that follows, are achieved, according to the present invention, by means of a machine for the surface finishing of textiles, which has structural and functional characteristics according to the attached independent claims. Moreover, further embodiments of the invention are specified in the corresponding dependent claims.

[0010] The invention is illustrated in greater detail with reference to the accompanying drawings which depict one exemplary and non-limiting embodiment thereof. In the drawings:

Fig. 1 shows a machine according to the invention,
Fig. 2 is a side view of the machine of Fig. 1,
Fig. 3 shows a detail of the central drum of the machine in Figs. 1 and 2,
Fig. 4 shows a side view of the cooling device and of the brushes mounted on a machine according to the invention,
Fig. 5 is a detail of the cooling device mounted on the machine shown on the preceding figures,
Fig. 6 shows the driving system of a machine provided with the cooling devices according to the invention, and
Fig. 7 shows a further solution of the machine according to the present invention.

[0011] Described with reference to the attached figures is a preferred embodiment of the invention wherein the finish machine according to the present invention is a brushing machine.

[0012] Fig. 1 shows a finish machine whose operating units 2 are brushes mounted on a central drum 3 which is, in turn, provided with a plurality of devices 1 for cooling the treated fabric 4, each of said devices being interposed between a pair of operating units 2.

[0013] Fig. 2 shows, in side view, a brushing unit comprising the cooling devices 1.

[0014] The cooling devices 1 are made up of a rotary cylinder 14 having two ends and, on the outer face 11, a plurality of microperforations 15 through which a flow of air is blown from a source of compressed air 12 to the fabric 4 in order to cool the latter.

[0015] The rotary cylinder 14 is connected with the first end of the compressed-air source 12 via a first rotary joint 8 which is in turn connected, via rigid ducts 7, with the central duct 6 of a second rotary joint 5, if any, solid to one end of the shaft 16 of drum 3.

[0016] The central cylinder 14 has a pulley 9, keyed on the opposite end, which allows to drive the cylinder into rotation through, preferably, an elastic, transmission means 13 such as a belt, for example.

[0017] The transmission means 13 is connected to the central drum 3 in order to keep the tangential speed of cylinder 14 equal to the advancement speed of the fabric 4 onto the brushes 2, in such a way as to not create mutual slippages between the fabric 4 and the cylinder 14.

[0018] The central drum 3 comprises a shaft 16 exhibiting, on end, a rotary joint 5 and on the opposite side, a driving means 10, in order to supply both the cooling devices 1 and brushes 2 with the power necessary to rotate and perform the working operation on the fabric 4.

[0019] As shown in Fig. 6, the rotational motion is transmitted to both the components via respective elastic, transmission means 13, 19 and power sources 21, 22.

[0020] It will be appreciated, however, that the driving means for the drum, the devices 1 and the units 2 can be dependent or independent of each other, according to the preferred technical solution.

[0021] Shown in detail in Fig. 3, is the shaft 16 of central drum 3.

[0022] Formed inside the shaft 16 is a central duct 6 for the passage of air, said duct being connected by one end to at least a rigid duct 7, preferably made of copper, and by the opposite end to the rotary joint 5.

[0023] The shaft 16 is supported by at least two bearings 25 fixed at a given region of the central drum 3.

[0024] Figs. 4 and 5 show detailed schematic representations of the cooling device 1 and brush 2.

[0025] Both these components are supported by the

central drum 3 by means of respective bearings 24, 17, preferably ball bearings.

[0026] The cooling device 1 exhibits, between the two ends, a hollow cylinder 14 microperforated on the outer face 11 to allow the exit of the flow of air arriving from the source 12 via the rotary joint 8.

[0027] The flow outgoing from the microperforations 15 is preferably directed towards the worked surface of fabric 4.

[0028] Shown in Fig. 6 is the system for feeding the fabric onto a brushing unit provided with the cooling devices 1, the same figure indicating the path of the elastic, transmission elements 13, 19 and the disposition of the rigid ducts 7 for the passage of air inside the central drum 3.

[0029] In use, the finish machine, which in this non-limiting example is a brushing machine, the central drum 3 rotates on its axis.

[0030] From the power sources 21 and 22 there is transmitted a given rotational speed to the cooling devices 1 via the belt 13, and to the brushes 2 via the belt 19, respectively.

[0031] The fabric 4 is drawn along by transmission elements 20, known per se, and is made to slide onto the brushes 2 by compressing them of about 20 mm in order to obtain the brushing treatment.

[0032] The heat generated by such brushing is cooled down by the devices 1 which produce, between adjacent brushes, a flow of air directed onto the surface of the fabric 4 under treatment.

[0033] Upon completion of the brushing operation, the fabric 4 can be stored by winding it on a reel or by disposing it on successive layers.

[0034] Fig. 7 shows a further embodiment of a brushing machine according to the present invention, wherein a plurality of operating units 2 (brushes, in this case) and of cooling devices 1, are mounted directly on a base 18 in linear succession. As for the rest, the structure and function of this embodiment are similar to those already described.

[0035] The invention offers important advantages.

[0036] First of all, using cooling devices 1 interposed between a pair of operating units 2 makes it possible to cool the surface of the fabric 4 under treatment and obtain therefore a finished textile of better surface quality.

[0037] A second advantage is given by the fact that by cooling the fabric 4, it is possible to maintain the latter at the same temperature during the whole operating cycle, thereby allowing the individual units to work under the same conditions.

[0038] A further advantage lies in the fact that, by lowering the temperature of fabric 4 the wear of the operating units 2 results greatly reduced.

[0039] In particular, when the finish machine makes use of brushes, these are usually manufactured from silicon carbide within a matrix of nylon, these being materials on which an increase of temperature results a decisive factor as for the preservation of abrasive characteristics is concerned.

[0040] The invention has been described with reference to a preferred embodiment thereof. However, it is intended that equivalent modifications could possibly be made without departing from the scope of protection granted to the present industrial invention.

Claims

1. Machine for the surface treatment of textiles, comprising:

   a base (18),
   a plurality of operating units (2) associated with said base (18), each unit being provided for carrying out in succession the treatment of the fabric (4),
   at least a pneumatic cooling device (1) operating the cooling of the fabric (4) at an intermediate position between at least a pair of said operating units (2).

2. Machine according to claim 1, wherein said operating units (2) are brushing units.

3. Machine according to claim 1, wherein said operating units (2) are raising units.

4. Machine according to claim 1, wherein said operating units (2) are grinding units.

5. Machine according to any of the preceding claims, wherein said operating units (2) are mounted along a peripheral crown of a central rotary drum (3).

6. Machine according to claim 5, wherein said cooling devices (1) are mounted on said drum (3) at an intermediate position with respect to a pair of units (2).

7. Machine according to any of the preceding claims, wherein said cooling device (1) consists of a hollow cylinder (14) with perforated wall (11).

8. Machine according to any of the preceding claims, wherein said cooling device (1) is connected at one end to a source of compressed air (12).

9. Machine according to claim 7, wherein the cylinder (14) is a rotary cylinder and the connection of said cylinder (14) with said source of compressed air (12). is by means of rigid ducts (7) and at least a rotary joint (8).

10. Machine according to any of the preceding claims, wherein said cylinder (14) is a rotary cylinder driven pneumatically by a flow of compressed air produced by said source (12) and made to exit from said per-

forations (15).

11. Machine according to any of claims 5 to 10, wherein said central drum (3) is provided with a motorization (10) and said cooling device (1) is a rotary cylinder driven by a transmission member (13) connected to said motorization (10) of the central drum (3).

12. Machine according to any of claims 5 to 11, wherein said central drum (3) is provided with a motorization (10), and said operating units (2) are driven by a transmission member (19) connected to said motorization (10) of the central drum (3).

13. Machine according to any of claims 5 to 12, wherein said cooling device (1) is motorized by a transmission member (13, 21) motorized independently of said central drum (3).

14. Machine according to any of claims 5 to 13, wherein said operating units (2) are motorized by a transmission member (15, 22) motorized independently of said central drum (3).

15. Machine according to any of claims 5 to 14, wherein said cooling device (1) is movable radially upon seats (23) of said central drum (3).

16. Machine according to any of claims 5 to 15, wherein said operating units (2) are movable radially upon seats (24) of said central drum (3).

17. Machine according to any of the preceding claims, wherein said cooling system (1) has a tangential speed equal to the advancement speed of the fabric (4) onto said operating units (2).

18. Machine according to any of claims 1 to 4, wherein said operating units (2) and said cooling devices (1) are mounted in linear succession on the base (18).

19. Apparatus for cooling a fabric subjected to surface treatment, said apparatus having a first end and a second end and comprising:

a rotary cylinder (14) interposed between said ends and having a plurality of microperforations (15) formed on its outer jacket (11),
a first rotary joint (5) keyed on said first end,
a pulley (9) keyed on said second pulley to drive said cylinder (14) into rotation.

20. Apparatus according to claim 19 wherein said first rotary joint (5) is connected via a rigid duct (7) (6) to a second rotary joint (8) fixed on a shaft (16) of said central drum (3).

21. Apparatus according to claim 20 wherein said second rotary joint (5) is connected to a source of compressed air (12).

22. Apparatus according to any of claims 19 to 21, wherein said pulley (9) is driven by a flexible transmission means (13) connected to a central drum (3).

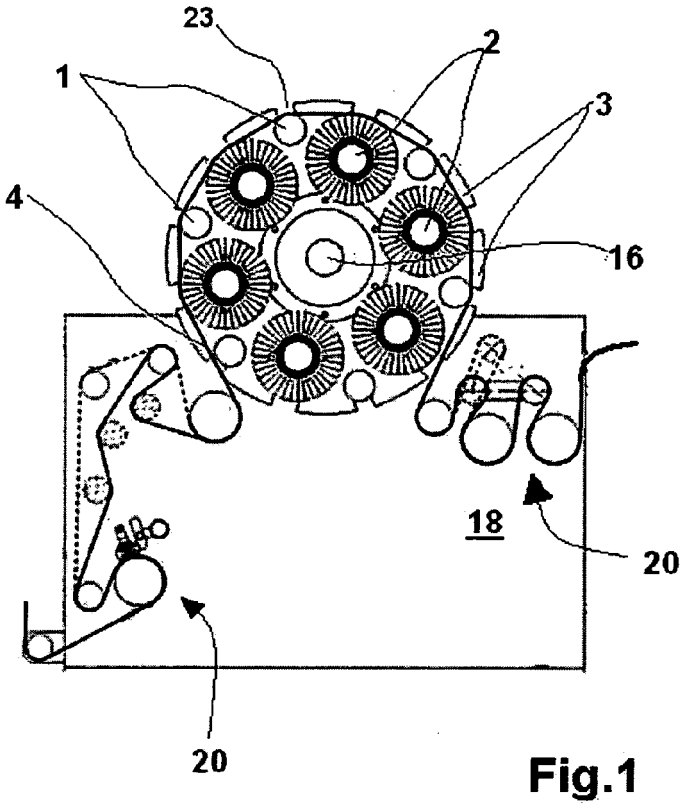

Fig.1

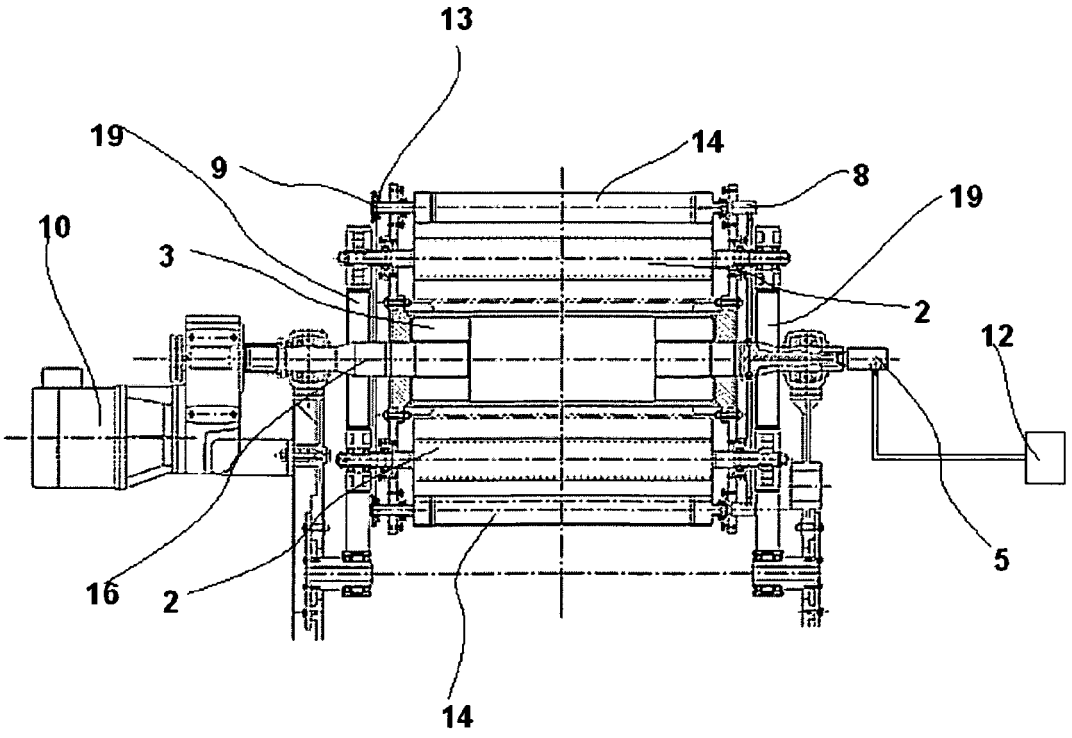

Fig.2

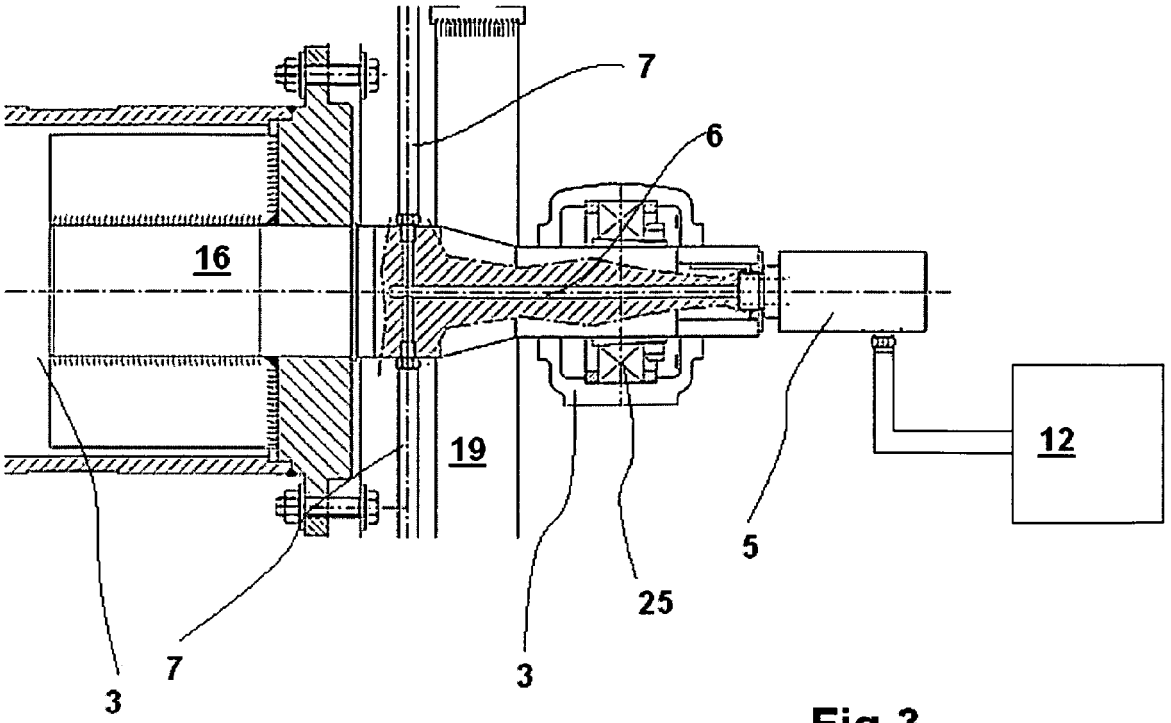

Fig.3

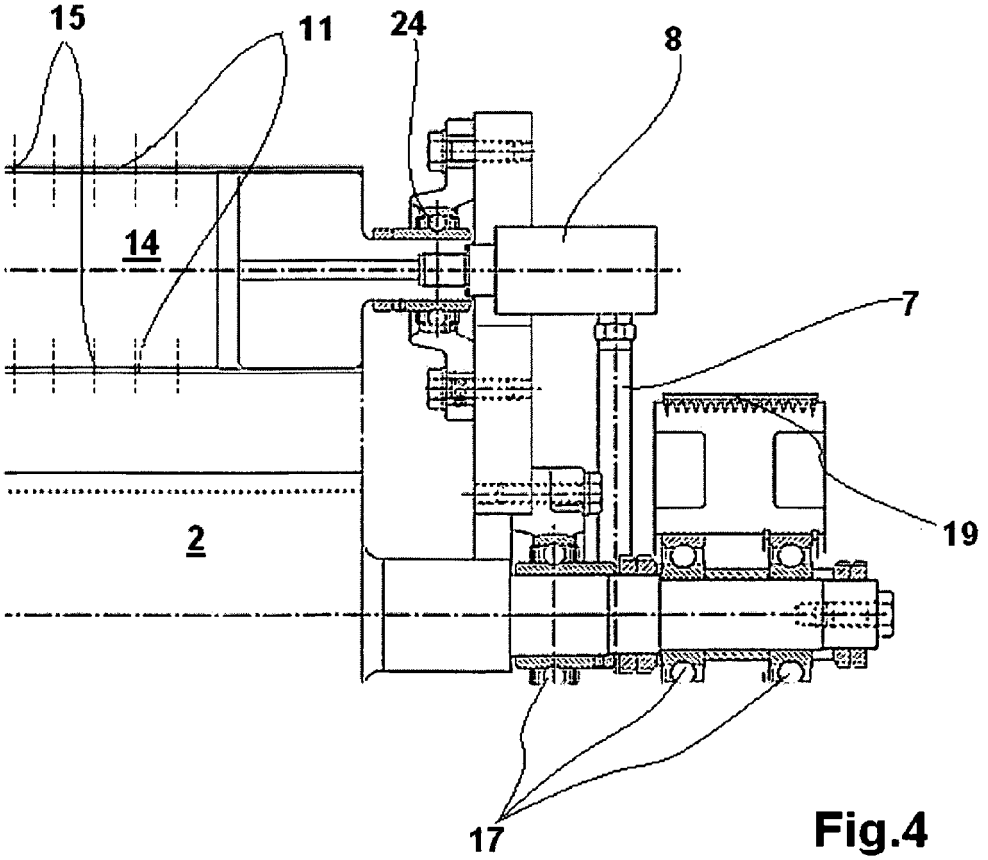

Fig.4

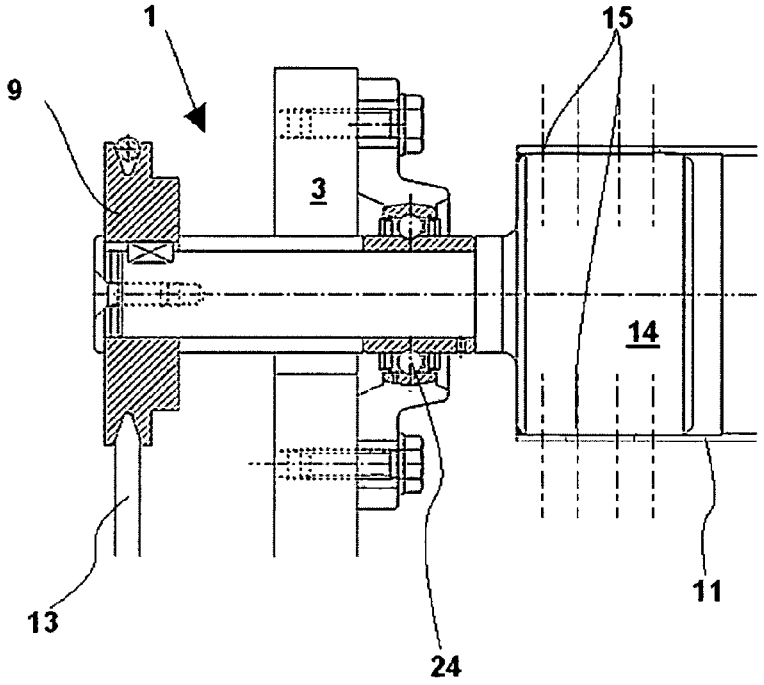

Fig.5

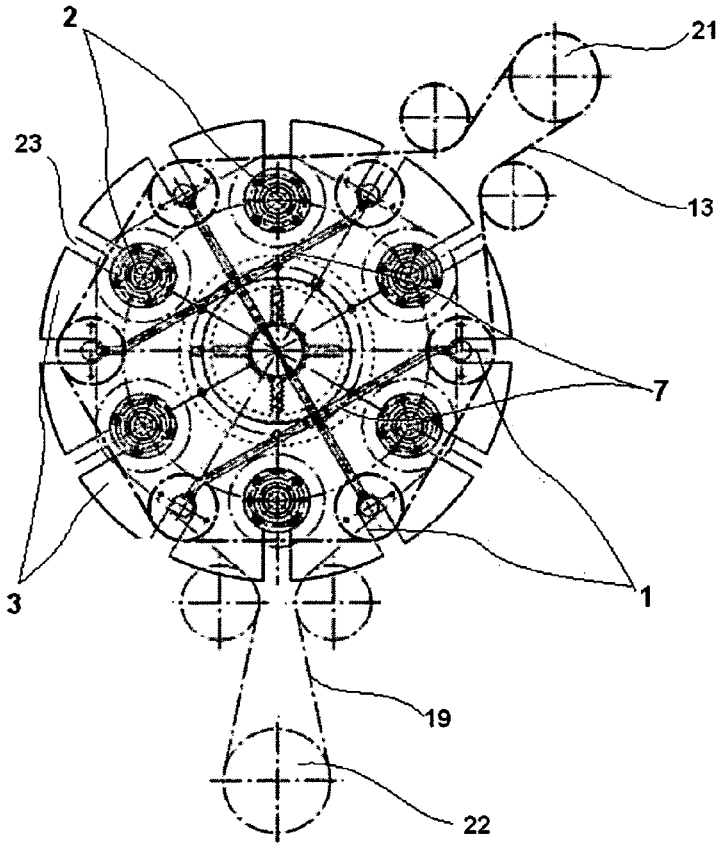

Fig.6

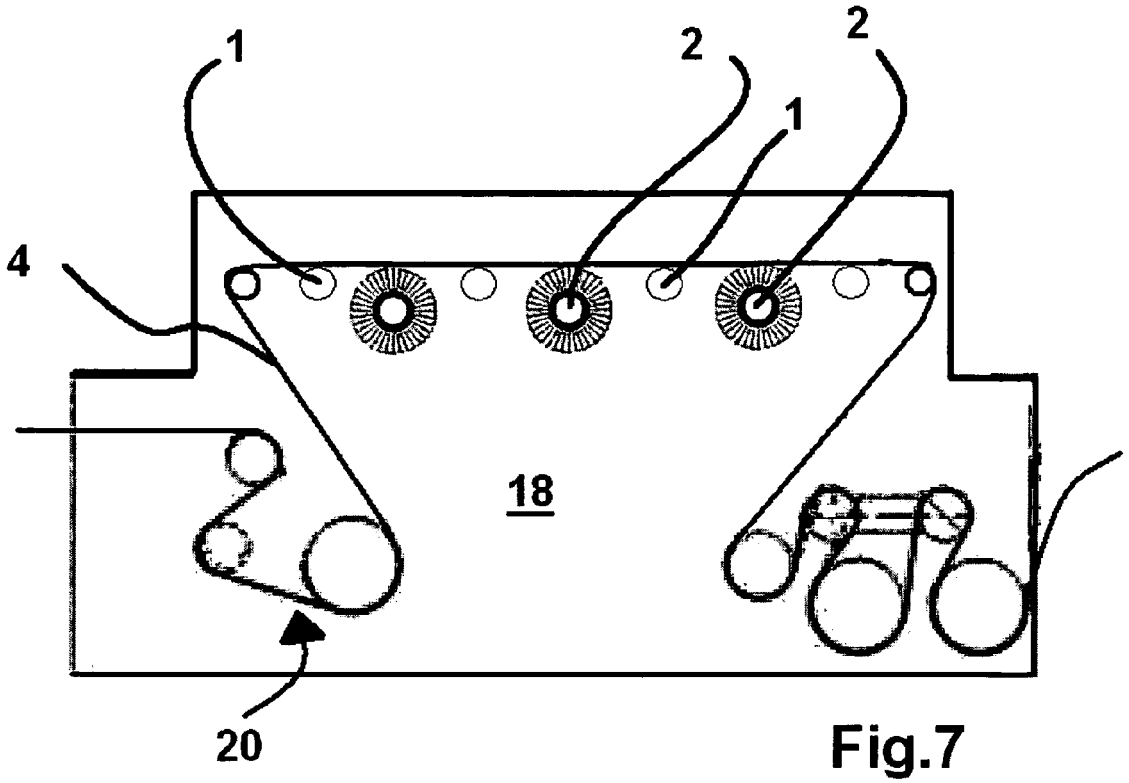

Fig.7