

**Device for blowing fluff or the like away from a circular knitting machine
and a circular knitting machine fitted with such a device**

This invention relates to a device of the type defined in the pre-
5 characterizing part of claim 1 and a circular knitting machine fitted with this device.

Circular knitting machines with devices for blowing fluff or the like away
are known in numerous forms.

A first group of these devices comprises a plurality of substantially radially
arranged tubes, mounted on a central rod and provided at their ends with blowing
10 openings; the tubes are either driven by a rotating needle cylinder, dial or take-
down device (DE-AS 1 113 786, DE 3 628 851 A1), possible with interposition of a
gearbox (DE 3 636 327 A1, DE 3 734 252 A1, DD-PS 34 664) or have a separate
drive motor (DE 79 26 865 U1). Devices of this kind require comparatively
expensive air distribution arrangements and high capacity compressed air sources.

15 A second group of devices of a kind not of interest here actually serves to
cool the cam systems of a circular knitting machine but is basically and at least
partially suitable also for blowing off fluff or the like (DE 76 38 042 U1). In this
device the cam system carriers of the needle cylinder and the dial are provided with
annular tubes having tubular blower openings and coaxially surrounding the machine
20 axis. Unfavourable pressure conditions arise in these machines also, insofar as a
clear view of the various operating regions is not to be impeded, even when the
annular tube is divided into a plurality of sections and the air is fed intermittently to
the different sections (DE 3 219 467 A1).

Finally devices of a third kind and of the type initially defined are known,
25 which have closed, circularly curved annular lines provided with blower openings,
which are rotatably mounted with the aid of rollers arranged at their periphery and
in contrast to the devices of the kind first referred to, move to and fro, i.e. are
driven with oscillating movement (DE 2 815 052 A1, US-PS 3 422 640). The
compressed air is fed in each case to the annular line through a flexible hose, the
30 annular line itself consisting of a rigid material. Unfavourable pressure conditions
arise in these devices also, which can only be improved by an expensive overall
construction.

In contrast to this the object of the invention is so to form the device of the

kind initially referred to or a circular knitting machine fitted therewith that a high cleaning or keeping clean effect is obtained with little constructional expense, without the operation of the circular knitting machine or a clear view of the various operating locations being significantly restricted.

5 The characterizing features of claims 1 and 12 serve to meet this object.

The invention will now be explained in detail in conjunction with the accompanying drawings of an embodiment, in which:

Figure 1 is a schematic front view of a circular knitting machine with a device according to the invention;

10 Figure 2 is partial vertical section through the circular knitting machine according to Figure 1;

Figure 3 is a section along the III-III of Figure 2;

Figure 4 is a highly schematic plan view like Figure 3 of the device according to Figures 1 to 3 in conjunction with a control device;

15 Figure 5 is a vertical section through a second embodiment of the device according to the invention;

Figure 6 is a schematic plan view of the device according to Figure 5; and

Figure 7 is a section along the line VII-VII of Figure 5.

A circular knitting machine is shown schematically in Figures 1 and 2 and includes a needle cylinder 3 with a vertical axis 2 rotatably mounted in a frame 1, knitting needles 4 being mounted to move up and down in the needle cylinder. The needle cylinder 3 is surrounded by a cam box ring 5 which has cams 6 for controlling the up and down movement of the knitting needles 4. A take-down and winding up device 7 is arranged below the needle cylinder 3 for the finished
25 knitwear.

A plurality of vertical supports 9 are supported on a baseplate 8 (Figure 1) of the circular knitting machine and carry a support ring 10, on which there are arranged yarn feed devices 11 for feeding yarns 12 shown in broken lines. The yarns 12 are fed from supply spools, not shown, through the yarn feed devices 11
30 to yarn guides 13, which project vertically downwards from a yarn guide ring 14 (Figure 2), which is supported on brackets 15 mounted on the baseplate 8 and is arranged below the support ring 10. Four such brackets 15 are provided in the

embodiment and are distributed round the needle cylinder 3 at angular intervals of about 90°.

Circular knitting machines of the kind described are generally known to the man skilled in the art (e.g. from DE 79 26 865 U1, DE 3 628 851 A1) and therefore do not need to be explained in more detail here.

A rod 17 coaxial with the axis 2 is suspended from radial arms connected to the support ring 10 but not shown in detail and projects into the needle cylinder 3, is arranged stationary and is preferably formed as a hollow shaft. A hollow cylindrical housing 19 is fixed on this rod 17 by means of a screw 18, as Figure 2 in particular shows, and has a lower, flange-like projection 20. A hub 21 is rotatably and coaxially supported on this projection 20 and a coaxial, e.g. circular disc 22 is formed thereon. The hub 21 supports a holder 23 which also fits coaxially and rotatably on the housing 19 and is secured axially thereon by a circlip 24. The holder 23 is moreover connected rotationally fast with the hub 21 by means of a pin 25, so that it can only rotate in common therewith.

The holder 23 has a plurality of threaded bores 27, four in the embodiment, which are distributed at angular intervals of about 90° on its outer periphery. A tube 28 or 29 provided at its corresponding end with an external thread is screwed into each threaded bore 27 and secured by means of a lock nut 30. A further, e.g. vertically formed threaded bore 31 moreover opens into each threaded bore 27 and a threaded bush 32 is screwed therein in corresponding manner, serving as a connection for a connecting line, preferably a flexible hose 33. Alternatively the tubes 28, 29 and the threaded bush 32 could have flange-like projections on their ends and be fixed on to corresponding threaded sections of the holder 23 by means of back nuts. The hoses 33 are preferably led through the hollow rod 17 to its upper end and from thence through one of the support arms of the support ring 10 and one support 9, to respective connections of a distribution device 34, as in indicated schematically in Figure 1 by a broken line. It is thus possible to feed each tube 28, 29 individually with compressed air through the associated hose 33 and associated threaded bores 31, 27.

The holder 23 carrying the tubes 28, 29 can according to Figures 2 and 3 rotate together with the disc 22 in oscillating, i.e. to and fro manner. To this end

the disc 22 is connected to a crank drive 36. This comprises a rotary drive 37 which is fixed in a support plate 38, which is connected fast to the projection 20 by a screw 39. A crank 41 is fixed on a drive shaft 40 of the rotary drive 37, parallel to and spaced from the axis 2, the crank having its free end connected at a pivot point 42 to one end of a connecting rod 43. The other end of the connecting rod 43 is pivoted to a further pivot point 44 on the edge section of the disc 22. Accordingly, when the drive shaft 40 is put in rotation by the rotary drive 37, on the one hand the pivot point 42 of the crank 41 executes a circulating movement round a circular track and on the other hand the disc 22 and the holder 23 therewith carry out a to and fro oscillating movement in the direction of a double arrow v (Figure 3) about the axis 2, dependent on the dimensions of the crank drive 36. Two possible positions of the crank drive 36 and the holder 23 are shown in Figure 3 in broken and full lines respectively.

The dimensions of the crank drive 36 are so selected in the embodiment that the holder 23 is rotated to and fro by so much less than 90° that a tube 28, 29 fixed thereon cannot itself strike against one of the brackets 15 when it, as is shown in Figure 2, projects radially outside the yarn guide ring 14 from above into the space between two brackets 15.

The rotary drive 37 is preferably an electric motor, which is supplied with current through an electric cable 45 (Figure 2), which is preferably laid through the hollow rod 17 like the hoses 33.

According to Figures 2 and 4 the tubes 28, 29 are preferably provided at their radially outer ends with nozzle-form blower openings 47, 48 and 49. The tube 28 initially extending substantially horizontally and radially from the holder 23 at a small distance above the yarn guide ring 14 is so bent down at its outer end through e.g. 90° that it engages over the yarn guide ring 14 from the outside and projects into the space between two brackets 15. The yarns 12 are preferably so guided that the outer end of each tube 28 including the blower opening 47 can oscillate to and fro in the space which is bounded by the yarn 12 and the yarn guides 13 and is bounded in the circumferential direction by two brackets 15, as appears in particular from Figure 2. It will be understood that in an angular sector of e.g. about 90° bounded by two brackets 15 there will be a plurality of e.g. up to twenty-four yarns

12 leading to twenty-four knitting systems distributed round the periphery of the needle cylinder 3, of which only one is shown in Figure 2. The device according to the invention thus facilitates, as Figure 2 clearly shows, leading the blower openings 47 radially from the outside up close to those places where the yarns 12 are laid into the knitting needles 4 and where as a rule a lot of fluff occurs.

Alternatively, it is naturally possible to arrange the tubes 29 and the blower openings 47 differently. In Figure 2 two possible positions 28a, 47a and 28b, 47b respectively are shown in full and broken lines respectively, where the blower openings 47a, 47b are at different levels and are each arranged at the backs of the knitting needles 4, in order to blow on to these from positions lying radially inside.

The blower openings 48, 49 on the tube 29 (Figures 2 and 4) differ from the blower openings 47 in that they are disposed on the tubes 29 in pairs in the manner of a double nozzle and point in opposite directions as seen in the circumferential direction of the needle cylinder 3. It is possible in this way to reach such regions as lie directly under the brackets 15. Corresponding pairs of blower openings 50, 51 can also be provided on the tubes 28c (Figure 4) in order to blow on to the needle ring in pairs from the outside.

As is schematically shown in Figures 1, 3 and 4, the flexible hoses 33 (Figure 2), which are shown essentially in Figure 4 by the broken lines 35 also used in Figure 1, are each connected to an output of the distribution device 34, which e.g. has a connecting line 52 for each hose 33 connected to a source 56 of compressed air through a controllable valve 53, a compressed air indicator 54, e.g. a conventional manometer and a pressure regulator 55, e.g. a throttle, the source being for example a compressed air outlet at a few bar customarily present in knitting sheds. The distribution device 34 further comprises a switch panel 58 connected through control lines 57, which is supplied with current by a line 59 and has e.g. a switch 60 with which the selected state can be set (e.g. automatic or manual control of the distribution device 34). The control program for the distribution device 34 can be entered by keys 61 of the switch panel 58, in order to establish how frequently the rotary drive 37 (Figure 2) is switched on and at what pressure or how frequently and with what turn on time the compressed air is to be fed to the various tubes 28, 29. The latter is effected for example in that the

controllable valves 53 are connected to a sequence controller containing a time-switch or the like and which determines the turn-on and turn-off times and in that the pressure regulators 55 are individually adjusted to a preselected pressure. The distribution device 34 is preferably so designed that the tubes 28, 29 are connected
5 to the compressed air source 56 individually one after the other or possibly in a predetermined time sequence, so that only one tube 28, 29 is connected to the compressed air source 56 at any one time and the maximum air pressure is applied to each tube 28, 29, although it would also be possible to connect e.g. two of the tubes 28, 29 to the compressed air source 56 at the same time, if the capacity the
10 latter is sufficiently large. The switch panel 58 can also have other switches which e.g. facilitate stopping automatic control or making other manual adjustments.

The described design and arrangement of the tubes 28, 29 and blower openings 47 to 51 makes it possible to direct the latter to practically any desired location in the circular knitting machine, where the oscillating movement limited to
15 a predetermined angular range ensures at the same time that blowing on to the knitting needles 4 from the front, i.e. radially from the outside is possible, in spite of the presence of the yarn guide ring 14 and the support 15, without impeding the yarn feed. Moreover the flexible hoses 33 on the one hand directly, given adequate length, allow the limited oscillating movement while on the other hand they
20 facilitate in a simple manner individual application of compressed air to the tubes 28, 29, so that a compressed air source 56 with a comparatively small capacity can be provided.

The described blowing device is preferably automatically switched on before starting the circular knitting machine and automatically switched off with a small
25 delay when the circular knitting machine is stopped. An additional control valve can be fitted between the distribution device 34 and the compressed air source 56 for example and be automatically turned on and off when starting and stopping the circular knitting machine respectively.

In the embodiment according to Figures 5 to 7 there is a hollow cylindrical
30 housing 69 like in Figure 1, having an axis 70 and an upper, flange-like projection 71, fixed on the rod 17. A distribution device comprises in particular a distribution bush 72 with a suitable inner cross-section, which is mounted rotatably and

coaxially on the housing 69, between the projection 71 and a support ring 73 fitted on to the housing 69 from below and is thus secured against axial movement on the housing 69. The support ring 73 is for its part secured against axial displacement by means of a circlip 74 engaging thereunder and fixed to the housing 69.

5 The distribution bush 72 has a lower, flange-like projection 75, on which a coaxially fitted holder 76 is supported rotatably and moreover fixed axially relative to the distribution bush 72 between this projection 75 and the projection 71 of the housing 69. The holder 76 has a plurality of hollow chambers 77 as in the embodiment of Figures 1 to 4 and one of the tubes 28, 29 is connected to each
10 hollow chamber 77 in that it is screwed into a passage leading into the corresponding hollow chamber 77, or is fixed by a back-nut to the holder 76.

 The holder 76 carrying the tubes 28, 29 can, like the holder 23 according to Figures 1 to 4, be oscillated to and fro about the axis 70 by a crank drive 78. The crank drive 78 includes the rotary drive 37, which is fixed on a support plate 79
15 fitted to the underside of the housing 69, and a crank disc 80 fixed coaxially on its drive shaft 40, which disc has an eccentrically mounted pin 82 pivoted to one end of a connecting rod 81. The other end of the connecting rod 81 is pivoted at an eccentrically disposed pivot point on the underside of the holder 76, so that rotation of the crank disc 80 about an axis parallel to the axis 70 results in an oscillating to
20 and fro movement of the holder 76 about the axis 70. The arrangement and design of the tubes 28, 29 are analogous to the embodiment of Figures 1 to 4.

 The control of the air feed to the tubes 28, 29 is effected in the embodiment according to Figures 5 to 7 with the aid of the distribution bush 72. This has at least one distribution channel 83, which in the embodiment consists of a groove formed
25 in the outer surface of the distribution bush 72 and extending in the circumferential direction over a region of less than 360°, here 90° for example, and in communication through an opening passing through the distribution bush 72 with an annular channel 85, which is formed in the inner surface of the distribution bush 72 and/or in the outer surface of the housing 69 and runs round the axis 70. This
30 annular channel 85 is on the one hand in permanent communication with a connecting union 87 through a channel 86 parallel to the axis and preferably formed in the positionally fixed housing 69. On the other hand, the annular channel 85 can

be connected selectively with any of the hollow chambers 77. To this end the holder 76 has wherever there is a hollow chamber 77 a passage 88, through which each hollow chamber 77 can be connected to the distribution channel 83, which is in permanent communication with the annular channel 85, depending on the rotational position of the holder 75 and the distribution bush 72.

The holder 76 is provided on its underside with a drive pawl 89, which can pivot about an axis parallel to the axis 70 and cooperates with a plurality of teeth 90 which are provided at a suitable axial height on the outer periphery of the distribution bush 72. The arrangement is such that, in each forward stroke of the holder 76 effected by the crank drive 78 in the direction of an arrow u (Figure 7), the distribution bush 72 is turned through a corresponding angle of rotation in the direction of an arrow x, whereas the distribution bush 72 stays stationary when the holder 76 executes its backwards movement in the direction of an arrow w. Inadvertent reverse rotation of the distribution bush 72 can be prevented with the aid of a blocking pawl 91 shown only schematically, which cooperates with corresponding toothing on the distribution bush 72.

The connecting union 87 is connected by a connecting line 92, e.g. a flexible hose or the like, to the compressed air source 56, where as in Figure 4 a controllable valve 53, a pressure indicator 54 and a pressure regulator 55 can be additionally provided. The other parts shown in Figure 4, including the switch panel 58 can however be omitted.

The device described with reference to Figures 5 to 7 operates as follows:

With the rotary drive 37 switched on the crank disc 80 rotates in the direction of the indicated arrow, while the connecting rod 81 and the holder 76 therewith are moved to and fro in the direction of the arrows u and w, whereby the oscillating movement of the holder 76 is indicated in Figure 7 by an arrow 93 and amounts to about 90° in the embodiment. The dimensions of the various parts are so selected that the passage 88 of the hollow chamber 77 for example is in constant communication with the distribution channel 83 and thereby with the annular channel 85 during this movement of the holder 76, even when the distribution channel 83 is turned through a step in the direction of the arrow u together with the holder 76 in the forward stroke. With the valve 53 open, compressed air therefore

flows during the whole of the oscillating motion in the tube 28 connected to the hollow chamber 77. At the same time the other hollow chambers 77, e.g. a hollow chamber 77a shown on the left in Figure 5, are not connected to the compressed air source 56, because their rear passage 88a is not connected to any distribution channel 83 and to no wall section of the distribution bush 72 having an opening 84.

In the next stroke of the crank drive 78, the distribution bush 72 together with the holder is turned through a further step of e.g. 90° in the direction of the arrow u. Accordingly, the distribution channel 83 comes into the region of a passage 88 which pertains to a tube 28a (Figure 6) which follows in the direction of rotation, so that compressed air is now fed to this tube 28a. Further tubes 28b and 28c are fed one after the other in corresponding manner in the following steps, until in the fifth step the tube 28 is again connected to the compressed air source 56.

One selected tube is always connected in the manner described to the compressed air source 56, while the passage of the compressed air to the other tubes 28 or 29 is blocked. Accordingly the parts 35, 52, 53, 54 and 55 need only be provided singly, in contrast to Figure 4.

In the embodiment the distribution bush 72 is rotatably arranged between the fixed housing 69 and the oscillating holder 76. The length of the distribution channel 83 regarded in the direction of the arrow u can be chosen quite differently, depending on the number of tubes 28 or 29 as well as in dependence on the size of the crank stroke in a particular case and correspond for example with the provision of six tubes at a spacing of 60° to an angle of rotation of 60° or with provision of three tubes 28 spaced at 120° to an angle of rotation of 120° . The spacing of the teeth 90 round the periphery of the distribution bush 72 has to be selected correspondingly.

If it is desired that the cleaning operation shall always take place through a plurality of tubes 28 or 29, the distribution channel 83 in Figure 7 could be of e.g. double length. Alternatively it would also be possible to provide a further distribution channel at a location on the distribution bush 72 diametrically opposite the distribution channel 83, so that two diametrically opposite tubes 28, 29 are always connected at the same time to the compressed air source 56. In corresponding manner, the length of the distribution channel 83 can also be made

shorter, so that the tubes 28, 29 are only connected to the compressed air source 56 during a part of the forward or return stroke of the holder 76. Thus the blowing duration 83 for the individual tubes 28 can also be adjusted by the length of the distribution channel.

5 It will further be understood that suitable sealing means are provided to prevent the escape of compressed air in the region of the butt joints between the housing 69, the distribution bush 72 and the hollow chambers 77. Thus, sealing rings 94 are shown in the right part in Figure 5 and labyrinth seals 95 in the left part.

10 The invention is not limited to the described embodiments, which can be modified in many ways. This applies in particular to the design and arrangement of the tubes 28, 29 or the blower openings 47 to 51, which can be varied within wide limits, even if a double arrangement (48, 49 or 50, 51) has so far been seen as the best solution. A particularly preferred embodiment consists moreover e.g. in that
15 the blower openings are formed on blower nozzles which are connected to the tubes 28, 29 pivotally and adjustably and therefore can each be so adjusted as is desired in the particular case. Alternatively it would be possible also to this end to provide the device with a plurality of sets of differently shaped tubes and/or differently shaped blower nozzles, in order that these may be interchanged as required, e.g. as
20 is indicated by the different tubes 28 to 28c and 29.

Furthermore, it is possible to provide instead of the four brackets 15 more or less such brackets and to form the crank drives 36 and 78 correspondingly so that each tube 28, 29 is moved over an angular range of less than or more than about 90° in the oscillating movement. It would also be possible to make the hub 21 and
25 the holder 23 in one piece, in which case the pin 25 would be obviated, and/or to make the disc 22 merely as a lever or arm, which leads to the pivot point 44. Oscillating drives other than the crank drive shown could be provided.

Apart from this, the design and the control of the distribution device 34 of the embodiment first described are entirely at the will of the man skilled in the art and can be so selected to suit the practical requirements in a particular case.
30 Overall the invention offers the advantage that the particular parameters can be freely selected other than is the case in known blowing devices. It is moreover an

advantage that the device according to the invention can also be retro-fitted to circular knitting machines which have already been installed or be offered as an accessory for circular knitting machines, since it is merely necessary for this to mount the rod 17 in the centre of the circular knitting machine, should it not already
5 be present for other reasons (e.g. as a lamp holder). The distribution device 34 can for example be fitted in an already existing or additionally fitted switch cabinet provided beside the machine or in the frame 1. Moreover it will be understood that the device according to the invention can also be used with circular knitting machines which have a stationary needle cylinder and a rotatable cam box ring.

10 With reference to the embodiment according to Figures 5 to 7, it is possible to arrange the distribution bush 72 or a corresponding distribution device above or below the housing 69 and the holder 76, instead of between these and to advance it in a different way than with the crank drive 78. In particular it is possible to form the various channels and openings other than as shown, since this is largely
15 unimportant to the desired function. This applies for example in that the distribution channel 83 of the distribution device could also be formed in the holder 76 and be combined with a simple aperture in the distribution bush 72. The described individual parts could in addition naturally be used in other than the combinations shown.

20 Finally the device according to the invention is not restricted to fixing thereof to the rod 17 arranged in the middle of the needle cylinder. In principle the rod 17 could also be replaced by a different structure, which further does not have to be arranged exactly coaxial with the axis 2 of the needle cylinder, insofar as such deviations from the central position can be compensated for the suitably formed
25 tubes 28, 29. Such constructions could be desirable above all if applied to circular knitting machines which also have a dial or the like outside the needle cylinder, in which case the rod 17 can be replaced by a dial carrier.

CLAIMS



1. A device for a circular knitting machine for blowing away fluff or the like, with a plurality of blower openings (47 - 51) each arranged to move to and fro on a circular path section, and with a source of compressed air (56) connected to the blower openings (47 - 51), characterized in that it comprises a holder (23, 76) mounted to rotate to and fro, with a plurality of tubes (28, 29) extending substantially radially and leading to the blower openings (47 - 51) and a distribution device (34, 72) connectible to the source of compressed air (56), by means of which the tubes (28 29) can be connected to the source of compressed air (56) in a predetermined sequence individually or in groups.
2. A device according to claim 1, characterized in that the to and fro movement is created by a crank drive (36) which is connected between the holder (23) and a rotary drive (37).
3. A device according to claim 2, characterized in that it is fixed to a rod (17).
4. A device according to any of claims 1 to 3, characterized in that the blower openings (47 - 51) are formed in blower nozzles which are arranged on the tubes (28, 29) capable of being individually tilted and adjusted.
5. A device according to any of claims 1 to 4, characterized in that it has a plurality of sets of different tubes (28a-c, 29) and/or nozzles with the blower openings (47 - 51).
6. A device according to any of claims 1 to 5, characterized in that means (55) are associated with the distribution device (34, 72) for adjusting the air pressure individually in each tube (28, 29).
7. A device according to any of claims 1 to 6, characterized in that means (53, 83) are associated with the distribution device (34, 72) for adjusting the duration of



the compressed air feed to the individual tubes (28, 29).

8. A device according to any of claims 3 to 7, characterized in that the rod (17) is hollow and the tubes (28, 29) are connected to the distribution device (34) with the aid of flexible hoses (33) arranged at least partially in the rod (17).

9. A device according to any of claims 1 to 8, characterized in that the distribution device comprises a distribution bush (72) movable stepwise, which is rotatably mounted between a housing (69) and the holder (76) and is provided with at least one means (83) which connects at least one selected tube (28) to the source of compressed air (56) in dependence on its rotary position.

10. A device according to claim 9, characterized in that the means has a distribution channel (83) of predetermined length extending in the direction of rotation.

11. A device according to claim 9 or 10, characterized in that the holder (76) is provided with a drive pawl (89) which cooperates with teeth (90) on the distribution bush (72) for stepwise rotation thereof.

12. A device according to any of claims 9 to 11, characterized in that sealing means (94, 95) are provided to prevent the escape of compressed air in the region of butt joints between the housing (69), the distribution bush (72) and/or hollow chambers (77) leading to the tubes (28, 29).

13. A circular knitting machine with a needle cylinder (3) and device for blowing away fluff or the like, characterized in that the device is formed according to one or more of claims 1 to 11.

14. A circular knitting machine according to claim 13, characterized in that it comprises a yarn guide ring (14) supported in fixed position on brackets (15) above the needle cylinder (3) and the stroke of the to and fro movement of the blower



openings (47 to 51) corresponds to the spacing of the brackets (15).

15. A circular knitting machine according to claim 14, characterized in that a plurality of knitting systems are arranged along the periphery of the needle cylinder (3), to each of which at least one yarn (12) is fed from a location disposed radially outside the yarn guide ring (14), and in that the blower openings (47) are arranged in an annular space which is formed by the yarn guide ring (14) and the yarns (12).

16. A circular knitting machine according to claim 14 or 15, characterized in that a double nozzle is associated with at least one tube (29) and has two blower openings (48, 49) oppositely directed in the circumferential direction of the needle cylinder (3).

17. A circular knitting machine according to any of claims 13 to 16, characterized in that it has a rod (17) and the device is mounted on the rod (17).