(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 939 156 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
01.09.1999 Bulletin 1999/35

(51) Int. Cl.[6]: **D03D 47/34**, B65H 51/22

(21) Application number: **99102773.1**

(22) Date of filing: **23.02.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **26.02.1998 IT TO980152**

(71) Applicant:
L.G.L. Electronics S.p.A.
24024 Gandino (Bergamo) (IT)

(72) Inventor: **Zenoni, Pietro**
24026 Leffe (IT)

(74) Representative:
Modiano, Guido, Dr.-Ing. et al
Spandonari & Modiano S.r.l.,
Corso Duca degli Abruzzi, 16
10129 Torino (IT)

(54) Method and device for the pneumatic threading of textile machine weft feeders

(57) A method for the pneumatic threading of weft feeders (10) comprising a fixed drum (11), a hollow driving shaft (13), a hollow windmilling arm (12) which winds the thread onto the drum, braking means (14) and a final thread guiding ring (15). The method comprises the steps of: providing the feeder (10) with a first pneumatic element (18) and with a second pneumatic element (20) which are located at the infeed of the driving shaft (13) and at the output (15) of the feeder, respectively, and selectively activating the pneumatic elements in order to obtain the partial threading of the front part of the feeder (10) only, by guiding the thread (F) through the braking means (14) and the final thread guiding ring (15), or the partial threading of the rear part of the feeder (10) only, by activating the first pneumatic element (20) in order to guide the thread from the infeed of the driving shaft (13) to the base of the drum (11) through the windmilling arm (12).

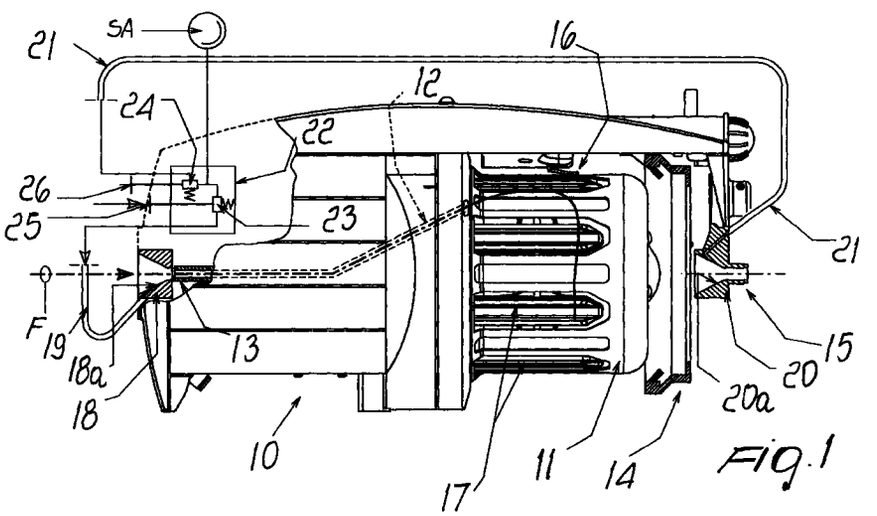

Fig.1

EP 0 939 156 A2

Description

[0001] The present invention relates to a method and a device for the pneumatic threading of textile machine weft feeders, particularly high-speed weaving looms.

[0002] It is known that weft feeders are devices designed to be interposed between the spool and the loom or, more generally, the textile machine in order to allow the correct unwinding of the weft thread from the spool and its correct feeding to the loom, regardless of the stresses to which the thread is subjected by the loom.

[0003] For this purpose, weft feeders typically comprise a fixed drum on which a windmilling arm, located at the base of the drum, winds a reserve of thread. When requested by the loom, at each beat, the thread unwinds from the drum of the feeder, and during unwinding its mechanical tension is controlled by a braking means which is arranged at the front end of the drum. A monitoring element is provided in order to control the extent of the turn reserve and to activate the windmilling arm in order to restore the reserve, and an advancement means is provided in order to move the turns of the reserve from the base to the front end of the drum.

[0004] Typically, the thread that arrives from the spool is guided inside the driving shaft and the windmilling arm of the feeder, both of which are hollow, and after forming the weft reserve on the drum it passes through the braking means and reaches a thread guiding ring, by which it is guided to the loom. This path of the thread inside the weft feeder generally makes it troublesome to thread the feeder; the threading is a frequent operation which must be performed at the beginning of each working cycle or if the thread breaks during production.

[0005] In order to obviate this drawback, systems and devices for automatic threading have already been devised. These are typically pneumatic threading systems based on the suction and conveyance of the thread produced by an air stream which is guided at least along part of the path followed by the thread in the weft feeder.

[0006] Conventional pneumatic threading systems are substantially divided into two categories: partial threading systems, which cause the guided passage of the thread only in the rear side of the feeder, upstream of the reserve accumulation drum; and full threading systems, which provide for the guided automatic passage of the thread from the infeed to the output of the feeder, where the term "output" designates the final thread guiding ring that guides said thread to the loom.

[0007] Systems of the first type have been known and used for many years and substantially employ a controlled pneumatic element which is provided with a thread guiding bush which is arranged at the infeed of the driving shaft of the feeder and has a tapering cross-section which acts like a Venturi tube and into which a stream of pressurized air is injected by means of a suitable duct. The air stream, by producing a partial vacuum at the infeed of said bush, draws the thread, which is then propelled by the stream into the driving shaft and the windmilling arm. The pneumatic element is controlled by an electric valve which is operated by an actuation button and activates or blocks the air stream fed into the bush. The system entails the drawback that it only partially facilitates feeder threading, which is in fact completed manually by passing the thread through the braking means and the final thread guiding ring, which are located in front of the drum of the feeder.

[0008] Systems of the second type, which are more recent and fully automated, use a first pneumatic element and a second pneumatic element which are respectively associated with the input of the driving shaft and with the final thread guiding ring and are actuated simultaneously by corresponding electric control valves.

[0009] Systems of this type are disclosed for example in prior European patents no. 0 355 281 and 0 446 447.

[0010] Another known solution, disclosed in European patent no. 0 370 066, also guides the thread, in the intermediate part between the two infeed and output pneumatic elements, by means of a directional air jet which flows along a rigid guide having a channel-shaped cross-section.

[0011] The greatest drawback of these full threading systems is the need, in case of thread breakage, to fully eliminate the residual thread that is present in the feeder.

[0012] Both conventional threading systems, the partial one and the full one, therefore do not fully meet operating requirements.

[0013] The aim of the present invention is substantially to eliminate the drawbacks of conventional systems, by combining their respective advantages and therefore by providing a threading method and device which allow the partial threading of the feeder, substantially the threading of the front end part of the feeder, in order to allow, in case of breakage, to tie the thread without having to first remove the residual thread from the drum of the feeder, and likewise allow full threading, which is useful particularly at the beginning of each working cycle or in case of thread replacement and the like.

[0014] According to the present invention, this aim and other important objects which will become apparent from the following detailed description are achieved by a threading method and device having the specific characteristics stated in the appended claims.

[0015] Substantially, the invention is based on the concept of providing the feeder with a first pneumatic threading element and with a second pneumatic threading element which are operatively separate and are located at the infeed and at the output of the feeder, respectively. The pneumatic elements are then selectively activated in order to selectively obtain the threading of the front and end feeder parts only, which is

achieved by activating the second pneumatic element and by guiding the thread through the braking means and the final output thread guiding ring, or the partial threading of the rear feeder part only, which is achieved by activating the first pneumatic element and by guiding the thread from the infeed of the driving shaft to the base of the drum through the windmilling arm, or the full threading of the feeder, which is obtained by activating the second element after the first one.

[0016] Further characteristics and advantages of the method and of the device according to the invention will become apparent from the following detailed description and with reference to the accompanying drawings, given by way of non-limitative example, wherein:

Figure 1 is a partially sectional schematic view of a weft feeder with the threading device according to the invention, illustrating the threading of the rear part of the feeder;
Figure 2 is a view, similar to Figure 1, of the threading of the front part of the feeder of Figure 1.

[0017] In the drawings, the reference numeral 10 generally designates a conventional weft feeder which comprises a fixed drum 11 on which a windmilling arm 12, associated with a driving shaft 13 and arranged at the base of the drum 11, winds a plurality of turns of thread F which constitute a thread reserve RF (Figure 2).

[0018] At the front face of the drum 11 there are provided braking means 14 of a per se known type which are suitable to control the tension of the thread F that unwinds from the drum by passing through a final thread guiding ring 15 which is arranged in front of the drum (relative to the travel of the thread) and is generally designated by the reference numeral 15.

[0019] A feeler 16, which can be mechanical and/or electric, is arranged at the drum 11 in order to monitor the extent of the reserve of turns RS and to activate the windmilling arm 12 in order to replenish the reserve. A plurality of rods 17, which protrude periodically from corresponding openings of the drum 11, is also provided in order to move the turns of the reserve from the base to the front end of the drum 11.

[0020] The windmilling arm 12 and the driving shaft 13 are both hollow, in order to receive the thread F that arrives from the spool (not shown) and deposit it on the drum 11 in the form of reserve turns. From the drum, the thread unwinds, when requested by the loom (not shown), by passing through the braking means 14 and the thread guiding ring 15.

[0021] According to the present invention, a first pneumatic threading element 18 is arranged at the infeed section of the driving shaft 13 in order to suck up the thread and guide it through the cavities of the driving shaft and of the windmilling arm 12 to the base of the drum 11. The pneumatic element 18, which is of a per se known type, is substantially constituted by a bush which has a central channel 18a with a funnel-shaped profile which acts like a Venturi tube into which a duct 19 opens which is inclined in the direction in which the thread travels (shown by the arrow in the figure); the duct 19 feeds a stream of pressurized air into the bush.

[0022] A second pneumatic threading element 20 is associated with the final thread guiding ring 15 and allows to complete the threading of the front part of the feeder 10, sucking up the end of the thread F that is present on the drum 11 and guiding it through the braking means 14, which are released beforehand (i.e., moved away from the drum 11), and through said thread guiding ring 15.

[0023] The pneumatic threading element 20 too is provided with a funnel-shaped cavity 20a into which a respective duct 21 opens which feeds a stream of pressurized air. The pressurized air stream, which arrives from a source SA, is fed separately to the ducts 19 and 21 by a distribution unit 22 which is provided with electric valves 23 and 24 which control the corresponding ducts and are respectively controlled by a first button 25 and by a second button 26 for selectively activating the duct 19 or the duct 21.

[0024] Accordingly, with the above-described device it is possible, in accordance with the stated aim, to selectively achieve the threading of the front part of the feeder 10 only, by pressing the second button 26 for activating the electric valve 24 in order to send the air stream into the duct 21 (Figure 2); or to achieve full threading, by pressing the second button 26 after the first one 25 in order to send the air stream first into the duct 19, to produce the threading of the rear part or infeed of the feeder 10 and then into the duct 21 in order to complete the threading of the front part or output of the feeder 10.

[0025] In order to facilitate the threading of the front part or output of the feeder 10, the button 26 and the respective electric valve 24 can be separate from the distribution unit 22 and can be arranged on the duct 21, for example at the front side of the feeder 10, in order to directly control said duct, which in this case branches off from the pressurized air source SA instead of from the distribution unit 22.

[0026] Without altering the concept of the invention, the details of execution and the embodiments may of course be altered extensively with respect to what has been described and illustrated by way of non-limitative example, without thereby abandoning the scope of the invention.

[0027] The disclosures in Italian Patent Application No. TO98A000152 from which this application claims priority are incorporated herein by reference.

[0028] 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. A method for the pneumatic threading of weft feeders (10) which comprise a fixed drum (11), a hollow driving shaft (13), a hollow windmilling arm (12) which winds the thread (F) onto said drum, braking means (14) and a final thread guiding ring (15), characterized in that it comprises the steps of: providing said feeder (10) with a first pneumatic element (18) and with a second pneumatic element (20) which are located at the infeed of the driving shaft (13) and at the output (15) of said feeder, respectively, and selectively activating said pneumatic elements in order to obtain a partial threading of the front part of the feeder (10) only, by guiding the thread (F) through the braking means (14) and the final thread guiding ring (15), or the partial threading of the rear part of the feeder (10) only, by activating the first pneumatic element (20) in order to guide the thread from the infeed of the driving shaft (13) to the base of the drum (11) through the windmilling arm (12).

2. The threading method according to claim 1, characterized in that the partial threading of the rear part or of the front part of the feeder (10) is achieved by selectively and respectively activating the first or second pneumatic elements (18-20), and in that the full threading of the feeder is achieved by activating the second pneumatic element (20) after the first one (18).

3. A pneumatic threading device for performing the method for threading weft feeders (10) according to claim 1, characterized in that it comprises a first pneumatic threading element (18), which is arranged at the infeed section of the driving shaft (13) of the feeder (10), and a second pneumatic threading element (20), which is associated with the final thread guiding ring (15) of the feeder (10), said first and second pneumatic threading elements (18-20) being provided with respective ducts (19-21) which supply a stream of pressurized air; and at least one distribution unit (22) provided with electric valves (23-24) which control the ducts (19-21) of the corresponding pneumatic threading elements; said electric valves being controlled by respective buttons (25-26) for selectively activating said ducts (19-21) which supply the pressurized air to the corresponding first and second pneumatic threading elements.

4. The threading device according to claim 3, characterized in that each one of said pneumatic threading elements (18-20) comprises a bush with an axial cavity which tapers in a funnel-like manner and into which the respective duct (19-21) that supplies the pressurized air stream opens.

5. The pneumatic threading device according to claim 3, characterized in that it further comprises braking means (14) associated with said drum.

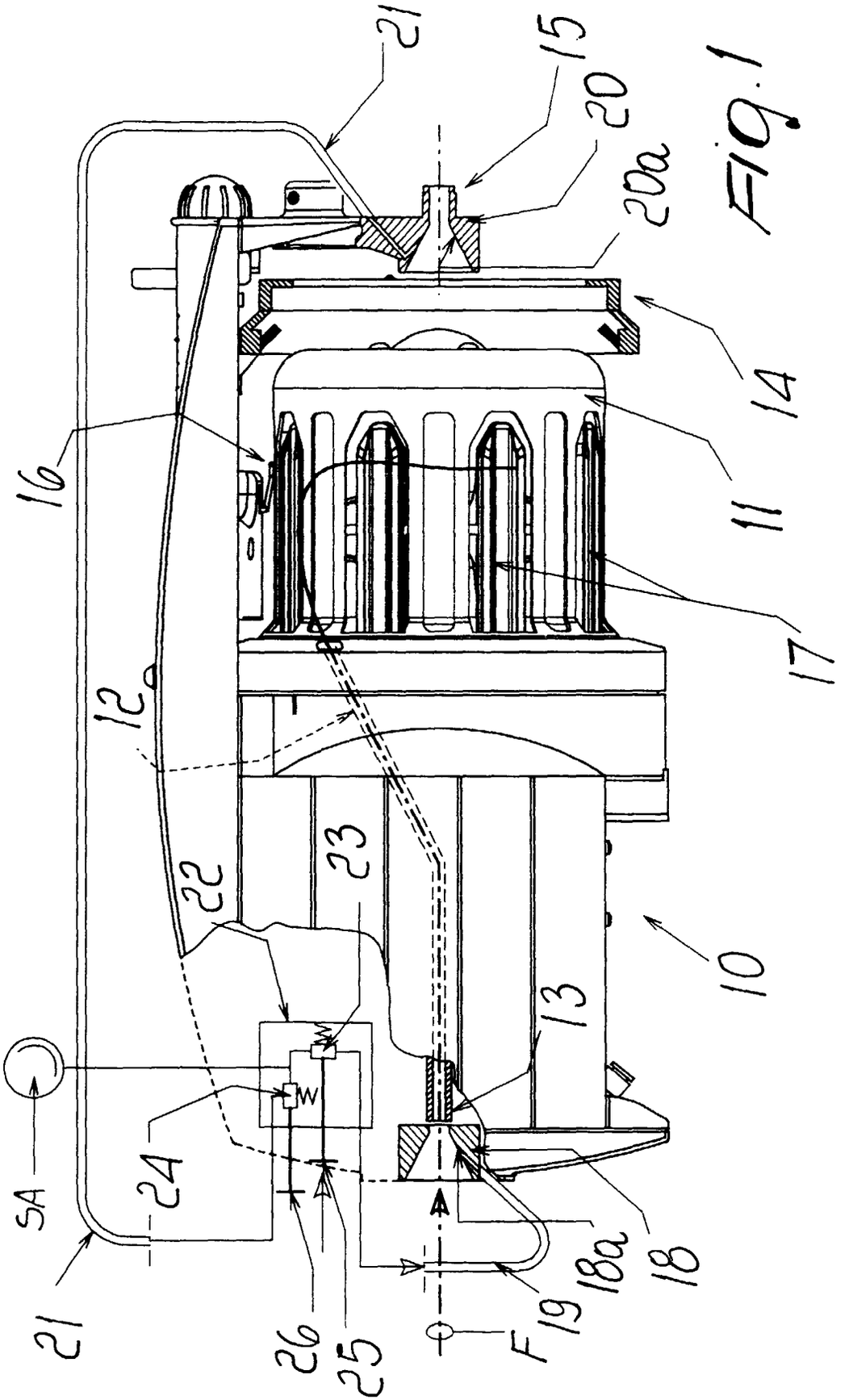

Fig. 1

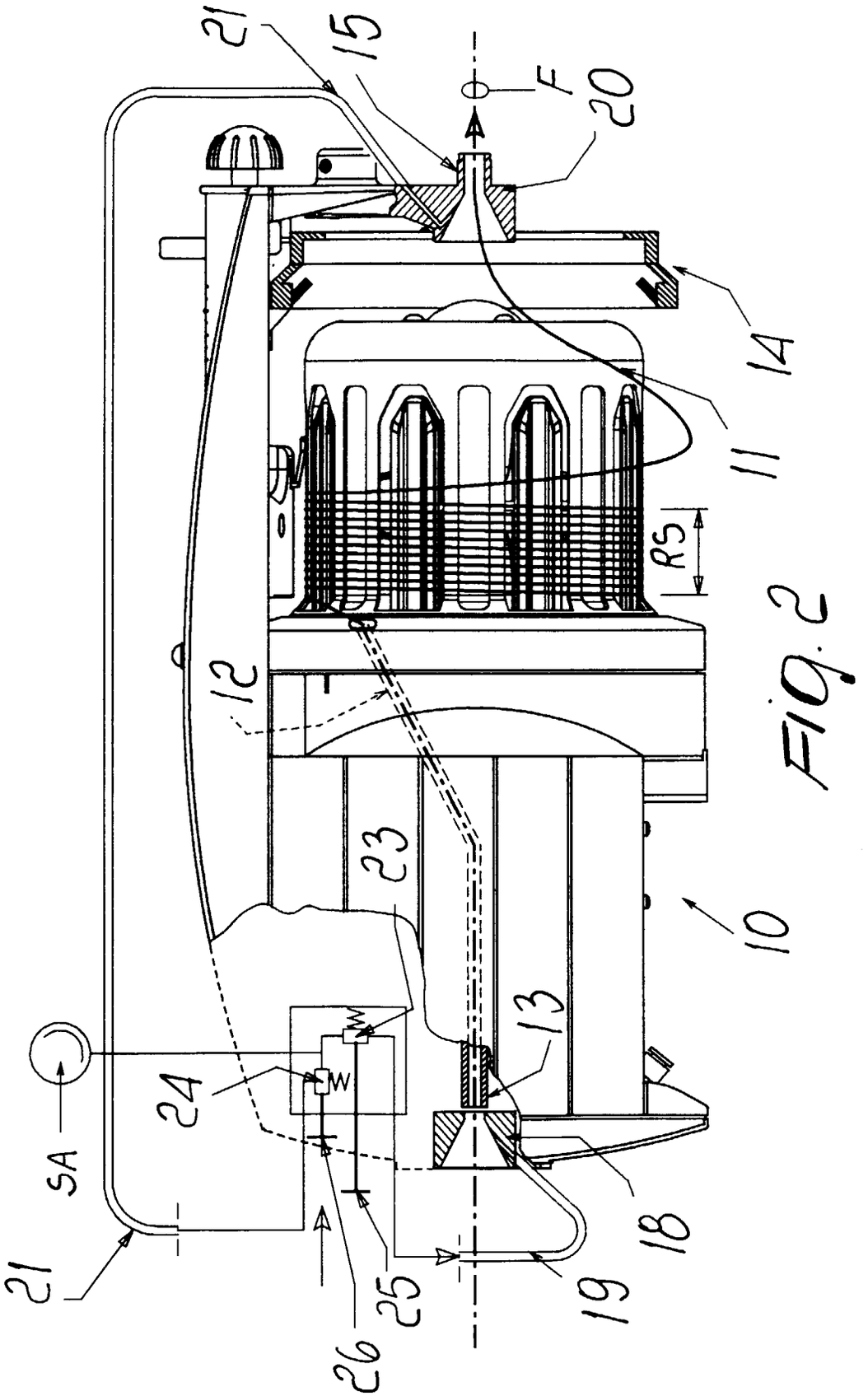

FIG. 2