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(54) Method and device for singeing yarns

(57) Device and method for singeing yarns, wherein the device comprises a burner assembly (12) inside which a thread (11) is made to pass in order to burn the hairs, lumps or other impurities. The device comprises a blower device (14) arranged downstream of the burner assembly (12) in order to deliver a jet of forced air in the direction of the passing thread (11) in order to remove from the body of the thread (11) the residual ash (29) and other dirt.

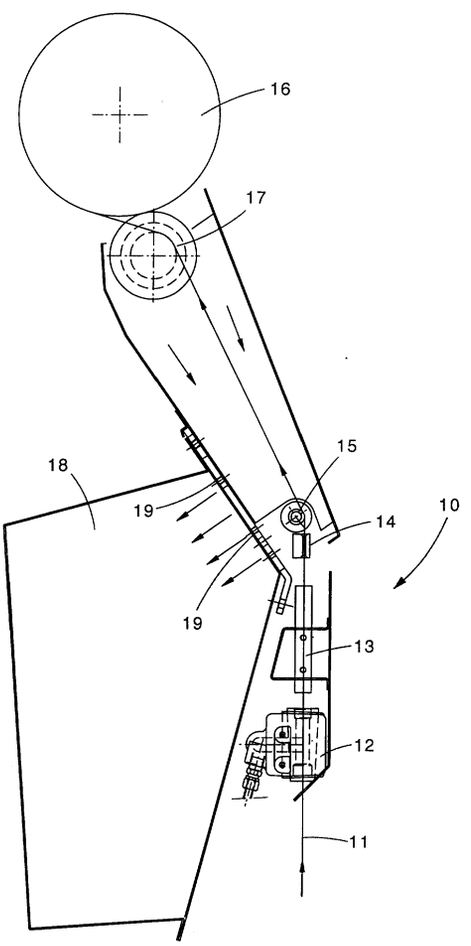

fig. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns a method and a device for singeing yarns.

[0002] To be more exact, the invention concerns a method and a device wherein the yarn emerging from the singeing burner is subjected to a treatment with air in order to eliminate, or at least reduce the quantity of, the residual ash, down and dirt which remain on the yarn after singeing.

BACKGROUND OF THE INVENTION

[0003] It is known that a yarn of cotton, wool, silk or other textile material has on its surface a widespread down, together with lumps or knots of fibers.

[0004] Before being wound into reels and sent to the dyeing processes, or other desired finishing treatment, it is known to subject the yarn to at least one pass through a singeing machine, by means of which a certain percentage of the hairs and lumps are burnt and then removed from the body of the yarn.

[0005] To be more exact, this treatment is performed in order to obtain quality yarns, characterized by a high effect of shininess and compact feel.

[0006] The singeing treatment is usually quantified by a so-called singeing index, which is calculated as the ratio between the weight of the yarn at inlet to the singeing machine and its weight at outlet therefrom. This index is usually set at the start of the treatment, normally at a value that is variable between 5 and 10%, and the operating parameters of the machine are adjusted accordingly, which are, mainly, quantity of gas and/or air fed, and speed of transit of the yarn. Obviously, the greater the speed of transit of the yarn through the machine, the smaller the quantity of hairs and lumps removed will be, and hence the smaller the singeing index; vice versa, if the speed of transit is lower, the singeing index rises in a correlated manner.

[0007] The quantity of gas and/or air fed to the burner of the singeing machine also directly influences the singeing index as defined above.

[0008] Traditional singeing machines consist of normal spoolers into which a small burner is inserted, equipped with a relative stack, inside which the yarn is made to pass. It is known, however, that a certain quantity of ash, deriving from the burning of the hairs, remains attached due to adherence to the body of the yarn, so that often the yarn emerging from the singeing process and wound onto the reels does not have the desired requisites of quality, which creates problems, for example, during the dyeing step.

[0009] It is therefore a purpose of the present invention to improve the efficiency of known singeing machines in order to obtain at outlet a yarn that has a much lower percentage of residual ash or other dirt with respect to traditional singeing machines.

[0010] It is another purpose of the present invention to obtain the above-mentioned result by using a simple and economical device, which can be installed in traditional singeing machines with a simple modification and reconfiguration.

[0011] It is another purpose of the invention to obtain, as another effect, an overall improvement of the performance of the machine, thus obtaining an increase in productivity given the same singeing index, or a reduction of the operating costs of the machine given the same productivity.

[0012] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain other advantages.

SUMMARY OF THE INVENTION

[0013] The present invention is set forth and characterized in the main claims, while the dependent claims describe other innovative characteristics of the invention.

[0014] In accordance with these purposes, a singeing device according to the invention comprises at least a blower device arranged downstream of the singeing burner and able to deliver a jet of forced air substantially in the direction of the yarn passing through, in order to remove from the body of the yarn the residual ash and other dirt before the yarn is wound onto the reel.

[0015] The blower device is associated with suction and discharge means able to collect the ash and dirt removed from the body of the yarn and to convey them to suitable collection means.

[0016] In a preferential embodiment of the invention, the blower device comprises a substantially closed chamber through which the yarn passes, associated with means to introduce pressurized air. Said introduction means are able to generate a turbulent flow of air, advantageously with a cyclonic development, which at least partly hits the yarn passing through and causes the ash and other dirt to be removed from the body of the yarn.

[0017] This flow of air with its cyclonic development also has the function of generating an effect of combing and compacting the residual hairs, for example the shorter ones, remaining attached to the body of the yarn after the singeing pass, so that at outlet from the air treatment said residual hairs adhere closely to the body of the yarn and oriented according to the orientation of the flow of cyclonic air.

[0018] A further effect generated by the flow of air delivered at outlet from the burner is to increase the head in the stack of the burner itself. Thanks to this, the flame of the burner is more oxygenated and this causes an improved efficiency of the singeing process and hence, in general, an improved overall efficiency of the machine. In fact, Applicant has found an increase in the singeing index with the same operating conditions of the

machine, that is, speed of passage and feed of fuel and comburent air to the burner.

[0019] This allows to obtain, with the same singeing index, a considerable increase in the productivity of the machine, since the speed of the yarn can be increased while still guaranteeing that the desired and pre-determined singeing conditions are maintained; or, with the value of the singeing index remaining the same, the quantity of fuel or comburent air supplied to the burner can be considerably reduced.

[0020] In a first embodiment, the means to generate the flow of air comprise means to feed the air and nozzles communicating with the transit chamber of the yarn, and oriented in a left-hand or right-hand direction, according to the orientation to be assumed by the cyclonic flow. In another embodiment, the means to generate the flow of air comprise nozzles oriented both in a right-hand direction and also in a left-hand direction, and able to be selectively activated so as to induce the desired direction of orientation of the cyclonic flow.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a schematic view of a singeing device according to the invention equipped with a blower device;
- fig. 2 shows in enlarged scale the blower device used in the singeing machine in fig. 1;
- fig. 2a shows an enlarged detail of fig. 2;
- figs. 3 and 4 show two variants of fig. 2.

DETAILED DESCRIPTION OF A PREFERENTIAL EMBODIMENT

[0022] With reference to the attached drawings, a singeing device according to the invention is denoted generally by the reference number 10 and is installed on a spooler machine of a known type and only shown partly.

[0023] A thread 11 is fed from one or more suitable supports, not shown, and made to pass through a burner 12 equipped with a stack 13, inside which, in known manner, a flame is generated which burns the hairs present on the body of the yarn, particularly the longer ones.

[0024] The thread 11 emerging from the stack 13 passes through the blower device 14 according to the invention, which will be described in detail hereafter, slides around a thread-guiding wheel 15, and is wound on a reel 16 by means of a guide pulley 17.

[0025] In a position of cooperation with the blower device 14 there is a suction assembly 18 including suction apertures 19.

[0026] Through these suction apertures 19 the burnt hairs, the ash, the dust and other dirt removed from the thread 11 during its passage through the burner 12, the stack 13 and the blower device 14, are sucked in and discharged to suitable collection means.

[0027] The blower device 14 consists of a metal block 20 including a longitudinal hole 21 defining a substantially closed chamber through which the thread 11 passes after it emerges from the stack 13. Said longitudinal hole 21 advantageously communicates with the outside through a slit 22 of extremely small size in order to facilitate the initial operations to thread the thread. Communicating with the longitudinal hole 21 there is at least a nozzle 23 to introduce air from the rear, connected to means to feed pressurized air, of a known type and not shown here.

[0028] The means to feed the air can be connected to the relative nozzle 23 by means of a metal connector 24 attached to the block 20 by means of screws 25. Between the connector 24 and the block 20 there is at least a rubber washer 26 with a sealing and stabilizing function. There are also pneumatic sealing means of the O-ring type 27 on the connector 24.

[0029] The nozzle 23 is oriented in a direction substantially tangential to the development of the longitudinal hole 21 through which the thread passes, so that the air introduced through it creates a turbulence with a cyclonic development, indicated by the arrows in fig. 2a, with a right-hand or left-hand orientation according to the direction in which the blower device 14 is mounted.

[0030] The turbulent flow with cyclonic development inside the longitudinal hole 21 through which the thread passes causes the removal of the ash 29, dust and other dirt still anchored to the body of the yarn after the singeing pass, and the discharge thereof through the suction aperture 19.

[0031] Moreover, this turbulent flow causes an action of combing and compacting of the shorter hairs 30, not burnt and still anchored to the body of the yarn after the singeing pass, so that the thread 11 emerging from the blower device 14 is smooth, shiny, compact and without surface down.

[0032] This turbulent and cyclonic flow also causes an increase in the head in the stack 13, which leads to an increase in the oxygenation of the flame in the burner 12 and hence a greater efficiency of combustion in the burner 12. As said before, the improved efficiency of combustion causes considerable improvements in terms of productivity of the machine and/or operating costs in terms of feed of fuel or comburent air with the same index of singeing to be obtained.

[0033] According to the variant shown in fig. 4, there are two nozzles, respectively 123a and 123b, oriented so as to create respectively a cyclonic flow with a right-hand and left-hand development. The two nozzles 123a and 123b are associated with respective means to feed the air which can be driven selectively, in alternating or

simultaneous manner, according to the desired effect of orientation and/or compacting that is to be obtained on the residual hairs anchored to the body of the thread 11. The simultaneous action of the two nozzles 123a and 123b can also amplify the effect of removing the ash, down and other dirt from the body of the thread 11.

[0034] According to the other variant shown in fig. 5, a nozzle 223 has a direction located on a plane inclined with respect to the plane on which the hole 22 lies, in order to be oriented tangentially both in a horizontal and also in a vertical direction with respect to the hole 22. This configuration allows both to further amplify the effect of removing the ash and dirt, and also to give the residual hairs a still more compacted orientation against the body of the thread 11.

Claims

1. Method for singeing yarns, comprising at least a step wherein a thread (11) is made to pass through a burner assembly (12) in order to burn the hairs, lumps or other impurities, **characterized in that**, downstream of said burning step, it provides to subject said thread (11) to at least a treatment with air in order to reduce or eliminate the residual ash (29), down or dirt that remain on the thread (11) after burning.

2. Method as in claim 1, **characterized in that** said treatment with air is performed by making the thread (11) pass through a substantially closed chamber wherein a turbulent flow of air is created with a cyclonic development.

3. Method as in claim 2, **characterized in that** said cyclonic flow has a right-hand and/or left-hand development.

4. Device for singeing yarns, comprising at least a burner assembly (12) inside which a thread (11) is made to pass in order to burn the hairs, lumps or other impurities, **characterized in that** it comprises at least a blower device (14) arranged downstream of said burner assembly (12) and able to deliver a jet of forced air substantially in the direction of the passing thread (11) in order to remove from the body of the thread (11) the residual ash (29) and other dirt.

5. Device as in claim 4, **characterized in that** said blower device (14) comprises a block (20) including a longitudinal hole (21) able to define a substantially closed chamber through which the thread passes, said substantially closed chamber being associated with means to introduce pressurized air able to generate a turbulent flow of air with a cyclonic development which hits the thread (11) passing through.

6. Device as in claim 5, **characterized in that** said means to introduce air comprise at least a nozzle (23; 123a, 123b; 223) communicating with said chamber through which the thread passes and associated with means to feed air.

7. Device as in claim 6, **characterized in that** said nozzle (23; 123a, 123b; 223) is oriented tangentially with respect to the longitudinal hole (21) defining the chamber through which the thread passes in order to create said cyclonic development of the flow of air.

8. Device as in claim 6, **characterized in that** it comprises at least a nozzle (123a) oriented in a left-hand direction and at least a nozzle (123b) oriented in a right-hand direction with respect to said longitudinal hole (21) defining said chamber through which the thread passes, said nozzles (123a, 123b) being associated with respective means to feed air able to be driven selectively.

9. Device as in claim 6, **characterized in that** it comprises at least a nozzle (223) oriented tangentially both in a vertical and also in a horizontal direction with respect to said longitudinal hole (21) defining the chamber through which the thread passes.

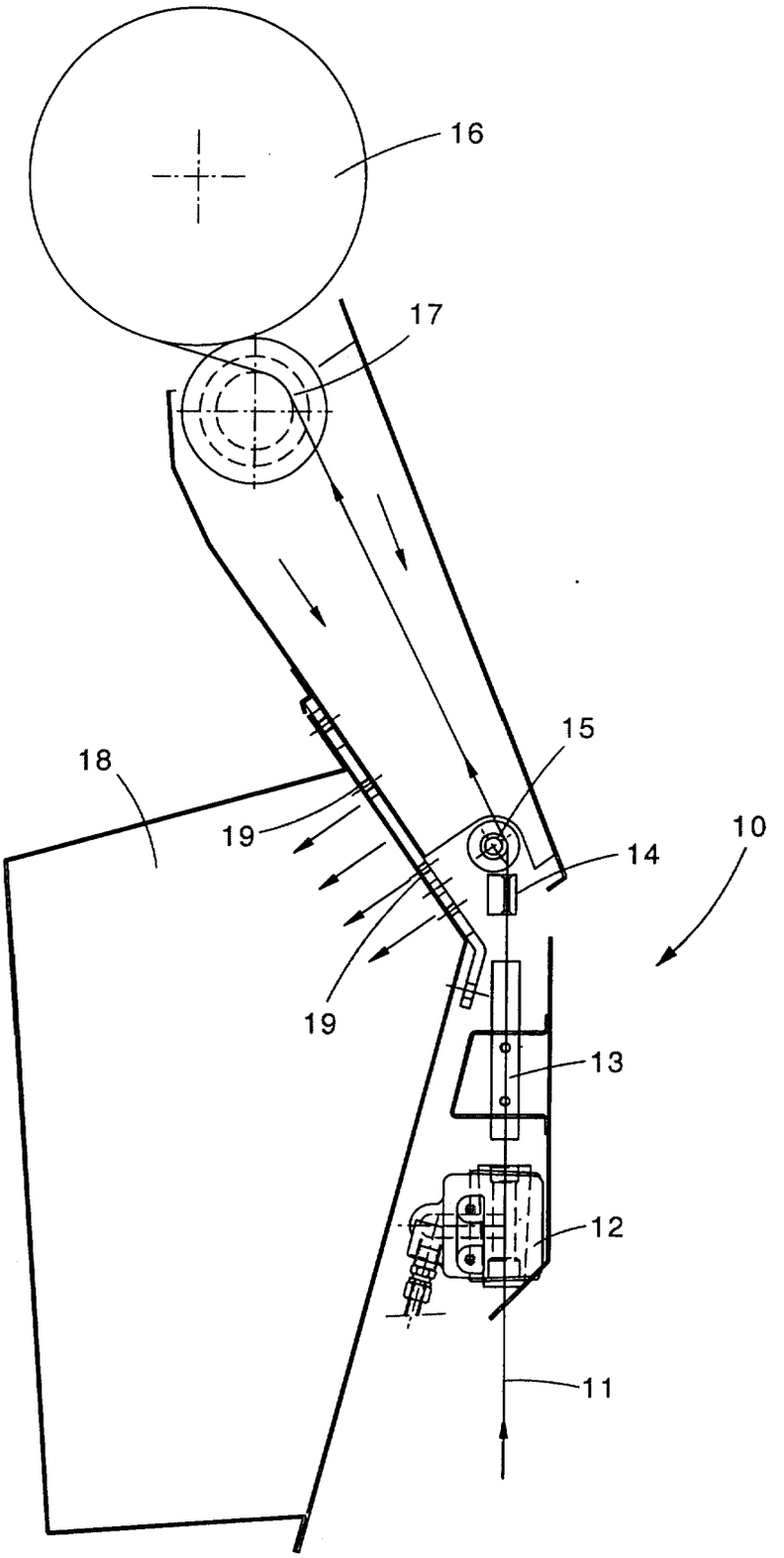

fig. 1

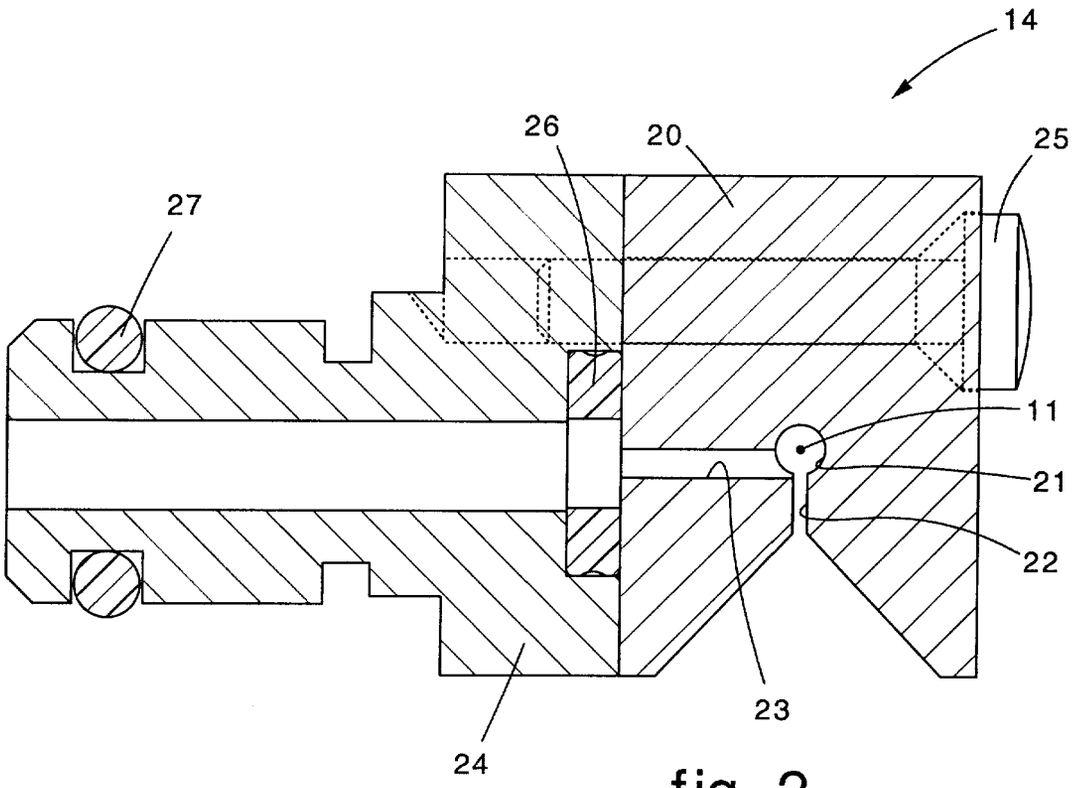

fig. 2

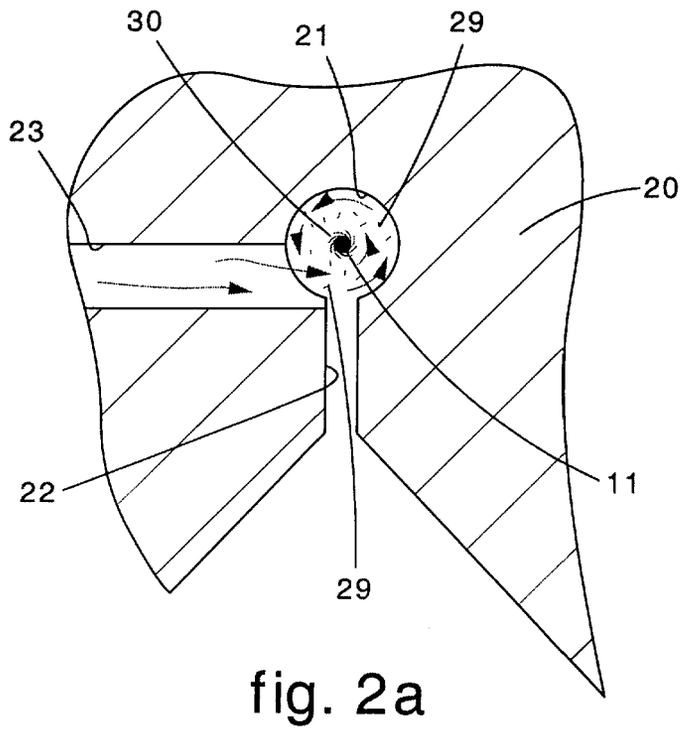

fig. 2a

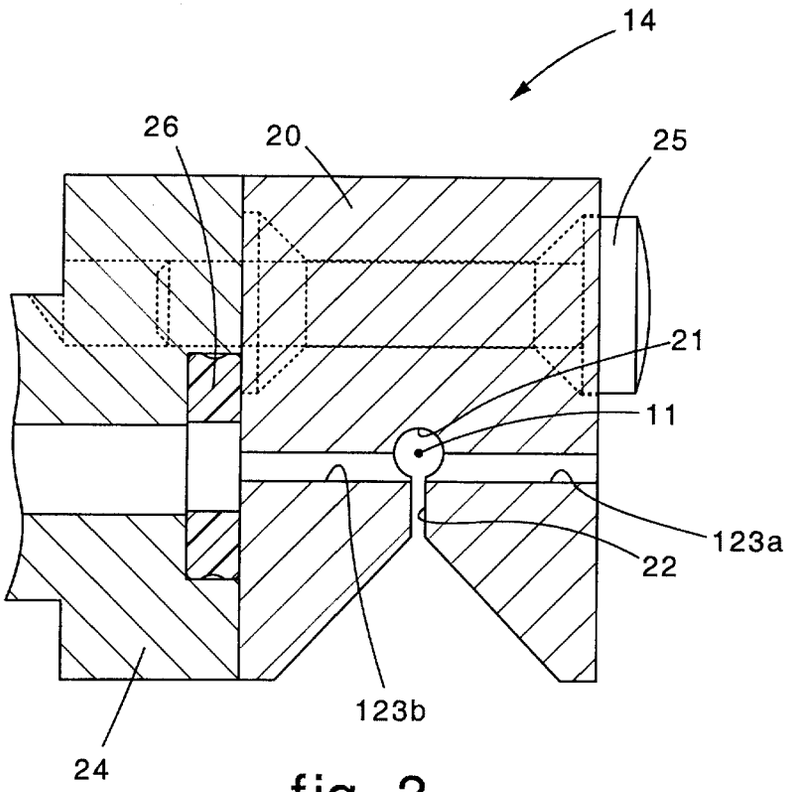

fig. 3

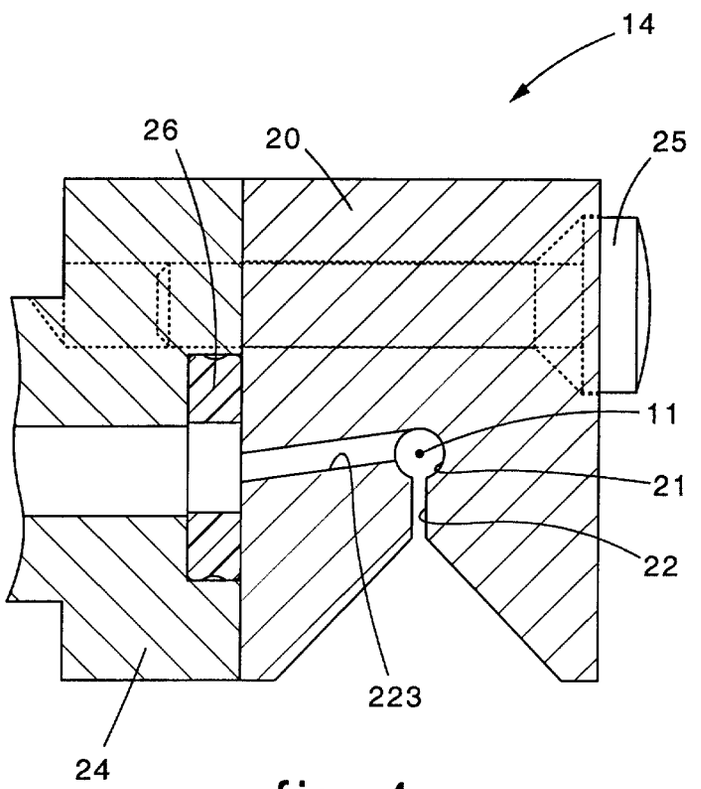

fig. 4