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

(11) Publication number: **0 246 686**
B1

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **01.08.90**

(51) Int. Cl.[5]: **B 65 H 69/06,** D 01 H 15/00

(21) Application number: **87200748.9**

(22) Date of filing: **18.04.87**

(54) **Device to piece-up rovings of textile fibres.**

(30) Priority: **16.05.86 IT 8335886**

(43) Date of publication of application:
25.11.87 Bulletin 87/48

(45) Publication of the grant of the patent:
01.08.90 Bulletin 90/31

(84) Designated Contracting States:
AT BE CH DE ES FR GB GR LI LU NL SE

(56) References cited:
DE-A-3 004 721
DE-A-3 247 687
US-A-3 339 362

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EP 0 246 686 B1

Courier Press, Leamington Spa, England.

Description

This invention concerns a device suitable for the piecing-up of rovings of textile fibres. The device is satisfactorily employed in piecing-up rovings on spinning machines and, in particular, on machines equipped with automatic devices to change rolls or packages or rovings being fed. Such spinning machines can process roving of carded or combed yarns.

Methods and devices employed on spinning machines for piecing-up the roving are already known in the art (US—A—3,339,362).

According to one of these systems employed on spinning machines for carded yarns the heads or tails of the rovings are positioned on an aspiration grill and the fibres of the two ends of the rovings are intermingled by the aspiration action, the bonding and piecing-up of the rovings being thus created.

This cited embodiment obtains a splice which often possesses not enough strength, thus leading to breakage of the roving and interruption of the spinning process.

DE—A—3 247 687 discloses the piecing-up of two superimposed rovings by means two concurrent jets of air which intermingle the fibres of the two. rovings. This embodiment creates a weak bond between the rovings and a thickened zone, and this bond will be satisfactory only in cooperation with further processing by drawing and tearing machines but will not be satisfactory on spinning machines and even less satisfactory on spinning machines comprising an automatic change of the rolls of roving.

DE—A—3.004.721 discloses a splicer device for textile yarns working with air pressure. This device consists of two twin turbulence chambers cooperating with intermediate mechanical clamping means. The splicer device provides mechanical means for gripping the tail ends of the yarns and mechanical means for clamping together the textile yarns. This system is excellent when applied to textile yarns but cannot be used to splice rovings owing to the dimensions and weakness, namely lack of consistency, of the rovings.

The present invention eliminates these shortcomings and enables a stronger and more stable splice of the rovings in the feed of the roving to be obtained, at the same time improving the application of automatic systems to change the rolls and/or packages of roving being fed to the spinning machine. The invention therefore tends to make the operations of the spinning machine more reliable.

This is obtained by a device having the features defined in claim 1.

The dependent claims describe advantageous embodiments of the invention.

According to the invention a grill device subjected to an aspiration action is subjected to the action of a nozzle fed with fluid under pressure that substantially acts tangentially with respect to the roving.

Such tangential action together with the aspiration action sets the roving in rotation.

Where two rovings are positioned side by side, the combined actions of aspiration and of tangential thrust causes rotation of the rovings and their rolling-up or knotting together.

In a preferred embodiment two nozzles are provided and fed with fluid under pressure, the fluid emitted by the nozzles acting in a rotary manner.

The V-shaped conformation of the grill is advantageous for the invention since the ejector nozzles provide a tangentially stream of fluid to the opposed surfaces of the grill.

The inclusion of two nozzles in positions offset in relation to each other has been found to be advantageous and to enhance the knotting effect at both ends of the rovings.

According to another embodiment the device comprises more than two nozzles.

The invention therefore concerns a device for piecing-up the roving of textile fibres which are fed to spinning machines, the ends of the rovings to be pieced-up being positioned, by hand or automatically, superimposed on each other or side by side on the aspiration grill of the device.

The rovings are pieced-up by twisting together the end of the rovings being fed with the ends of the rovings, coming from a replacement roll or from full package; such twisting in conjunction with the intermingling of the fibres provides the piecing-up action of the rovings.

The attached figures show, as a non-restrictive example, a preferred embodiment of the invention, in which:

Figs. 1a and 1b give a plan view and a cross section along A—A respectively of a preferred form of embodiment;

Figs. 2a and 2b show cross sections along B—B and C—C respectively of the form of embodiment of Fig. 1a;

Figs. 3 to 7 show the procedure;

Figs. 8 and 9 show two splices made with different counts of yarn.

A perforated grill 10 of suitable dimensions is provided in cooperation with a conduit 16 subject to an aspiration action 13. The diameter of the holes in the grill may range from 0.4 to 1.5 mm., but the present applicant has found that a diameter of 0.6—0.7 mm. of the holes is best.

The grill will advantageously have an elongated V-shaped conformation. The angle "alpha" of the "V" may vary between 160° and 60°. The present applicant has found that an angle between 75° and 120° is the best.

In a preferred embodiment two nozzles 11 and 12 respectively cooperate with the grill 10 and are fed by fluid under pressure 19 through conduits 17 and 18 respectively. The fluid under pressure 19 may be fed at a temperature deemed most suitable and may contain treatment substances.

As can be seen clearly in Figs. 2a—2b the nozzles 11—12 deliver the fluid under pressure 19 to the grill 10 near the upper surface of the

grill and in cooperation with the corresponding sloped, perforated surfaces 20—21.

The fluid 19 runs along the corresponding sloped surface and ascends, if the pressure is sufficient, the opposite surface, its action and rate of flow diminishing progressively owing to the aspiration action 13.

Owing to the position of the nozzles 11—12 the action of the fluid 19 creates a twisting effect on the rovings, this effect causing the rovings to wind around each other, as is indicated hereinafter.

One single nozzle 11 or 12 may be provided instead of the two nozzles 11, 12. A plurality of nozzles may alternatively be included and be arranged in a systematic manner on the grill 10; all of the nozzles may have the same capacity, or else the nozzles may have differentiated capacities.

The action of the nozzles may be simultaneous or partially overlapping or may take place at different times.

The pressure of the fluid 19 may be constant, pulsating or variable during the piecing-up operation on the grill 10.

The aspirating action 13, too, may be constant or variable or pulsating or may be lacking during a part or the whole of the piecing-up operation on the grill 10.

Moreover, the aspirating section 13 xay be restricted to a precise area of the grill 10, whereas the remaining area may undergo either a different aspiration action or no aspiration action at all.

The tail of the roving 14 being currently fed is stationary on the perforated grill 10 in relation to the grill and is kept adhering thereto by aerodynamic actions created by aspiration.

The head 15 of the new roving to be pieced-up is positioned by hand or automatically on the same grill 10 and, being drawn by aspiration, is superimposed on or positioned at the side of the previously positioned roving 14.

The jets of fluid 19 created by the nozzles 11, 12 provide the required actions, which in conjunction with the actions generated by aspiration 13 acting on the perforated grill 10 determine the forces which set in rotation the ends 14—15 of the rovings, thus causing the twisting of the ends 14—15 of the rovings and the intermingling of their fibres.

The nozzle or nozzles is/are fed from an outside source the pressure of which may be regulated as required.

Feed rollers located downstream of the grill 10 may be actuated or not during the action of the fluid so as to draw onto the grill 10 the tail of the roving being fed and therewith the splice which is being produced. The feed rollers are not shown in the figures.

The final piecing-up takes place at the moment when the spindle applies the twist to the fibres, since the piecing-up carried out on the grill 10 is only a provisional splice, which however is enough to provide the roving with continuity.

When the rolls or packages of roving being fed are changed by automatic devices, suitable known means are provided to arrange the replacement of the exhausted roll with a full roll and the shearing of the previous roving 14 at a position immediately upstream of the grill 10 of the device so as to leave only a few millimetres of roving upstream of the first nozzle 11; in the same way the head of the new roving 15 has to extend by a few millimetres beyond the second nozzle 12. In this way the ends of the rovings 14, 15 are twisted around each other in an adequate manner.

The perforated grill 10 may have a variable radius of its rounded union at its centre, the radius depending on the specific application. In different embodiments the geometry of the union may be circular or curved.

The grill may be perforated with holes having various diameters; the distribution of the holes in the grill may be differentiated.

The nozzles to feed compressed air may be one, two or more in number and may be located in diverse positions; they may also lie tangentially with respect to the surfaces of the grill or at any angle thereto.

The dimensions of the grill may be varied to obtain the best piecing-up results in account of the roving in question and in account of the type of material of the fibres.

Claims

1. Device to piece-up rovings of textile fibres for spinning machines for carded and combed yarns, the device being suitable for employment in cooperation with an on such spinning machines, said device comprising an aspiration grill (10) on which are positioned the two ends of the rovings to be joined, characterised in that said aspiration grill (10) comprises two surfaces (20, 21) joined to each other and mutually positioned at an angle comprised between 60° and 120° to each other, in that at least one of said two surfaces (20, 21) comprises at least one nozzle (11, 12) for emitting fluid (19) under pressure, said at least one nozzle (11, 12) being disposed near the upper surface of the grill (10) said fluid (19) running tangentially with respect to said surfaces (20, 21) of the grill and thereby creating a twisting effect on the rovings causing said rovings to wind around each other.

2. Device as claimed in Claim 1, in which the two surfaces (20—21) are positioned at an angle between 75° and 120° to each other.

3. Device as claimed in Claim 1 or 2, in which at least two nozzles (11, 12) are provided.

4. Device as claimed in any claim hereinbefore, in which said surfaces (20, 21) are joined by means of a joint having a predetermined bending radius.

5. Device as claimed in any claim hereinbefore, in which the diameters of the holes in the grill (10) range from 0.4 to 1.5 mm.

6. Device as claimed in Claim 5, in which the diameters of the holes in the grill (10) range from 0.6 to 0.7 mm.

7. Device as claimed in any claim hereinbefore, in which the density of the holes in the grill (10) is constant.

8. Device as claimed in any of Claims 1 to 6, in

which the density of the holes in the grill (10) is variable.

9. Device as claimed in any claim hereinbefore, in which the dimension of the holes in the grill (10) is constant.

10. Device as claimed in any of Claims 1 to 8 inclusive, in which the dimension of the holes in the grill (10) is variable.

11. Device as claimed in any claim hereinbefore, in which the surfaces (20, 21) of the grill (10) are straight.

12. Device as claimed in any of Claims 1 to 10 inclusive, in which the surfaces (20, 21) of the grill (10) are curved.

13. Device as claimed in any claim hereinbefore, in which the nozzles (11, 12) are tangentially positioned with respect to their corresponding surfaces (20, 21) of the grill.

14. Device as claimed in any of Claims 1 to 12, in which the nozzles (11, 12) are positioned at an angle to their respective surface (20, 21) of the grill.

15. Device as claimed in any claim hereinbefore, in which the force created by the aspiration means may be constant, variable or pulsating, or may be interrupted during a part or the whole of the piecing-up operation on the grill (10).

16. Device as claimed in any Claim hereinbefore, in which the aspiration force is restricted to predetermined areas of said surfaces (20, 21) and to predetermined values.

Patentansprüche

1. Verbindungsvorrichtung für Faserstoffvorgarne, für Spinnmaschinen für Kammgarn, die zur Benutzung auf oder mit den obengenannten Spinnmaschinen geeignet ist, indem die obengennante Vorrichtung ein Absaugsgitter (10), auf das die zwei Enden der zu verbindenden Vorgarne gelegt werden, aufweist, dadurch gekennzeichnet, daß das Absaugsgitter (10) zwei miteinander verbundene und nach einem Winkel zwischen 60° und 120° zueinander posizionierte Flächen (20, 21) aufweist, daß mindestens eine der obengenannten Flächen (20, 21) mindestens eine Spritzdüse (11, 12) für Druckflüssigkeit (19) enthält, indem die Spritzdüse (11, 12) bei der Oberfläche des Gitters (10) angeordnet ist, so daß die Druckflüssigkeit (19) tangential zur Gitterflächen (20, 21) fließt und an den Vorgarnen eine Drehung bewirkt und daher die gegenseitige Aufwicklung der Vorgarne verursacht wird.

2. Verbindungsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die zwei Flächen (20, 21) nach einem Winkel zwischen 75° und 120° zueinander positioniert sind.

3. Verbindungsvorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß mindestens zwei Spritzdüsen (11, 12) vorhanden sind.

4. Verbindungsvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Flächen (20, 21) durch eine Verbindung, die einen vorher bestimmten Krümmungsradius hat, verbunden sind.

5. Verbindungsvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Durchmesser der Löcher des Gitters (10) zwischen 0,4 und 1,5 mm liegen.

6. Verbindungsvorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß die Durchmesser der Löcher des Gitters (10) zwischen 0,6 und 0,7 mm liegen.

7. Verbindungsvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Dichtigkeit der Löcher des Gitters (10) konstant ist.

8. Verbindungsvorrichtung nach einem der Ansprüche 1—6, dadurch gekennzeichnet, daß die Dichtigkeit der Löcher des Gitters (10) wechselnd ist.

9. Verbindungsvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Abmessung der Löcher des Gitters (10) konstant ist.

10. Verbindungsvorrichtung nach einem der Ansprüche 1—8, dadurch gekennzeichnet, daß die Abmessung der Löcher des Gitters (10) wechselnd ist.

11. Verbindungsvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Flächen des Gitters (10) linear laufen.

12. Verbindungsvorrichtung nach einem der Ansprüche 1—10 dadurch gekennzeichnet, daß die Flächen des Gitters (10) gekrümmt laufen.

13. Verbindungsvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Spritzdüsen (11—12) tantential zur den entsprechenden Flächen (20, 21) des Gitters (10) positioniert sind.

14. Verbindungsvorrichtung nach einem der vorhergehenden Ansprüche 1—12, dadurch gekennzeichnet, daß die Spritzdüsen (11, 12) winkelig zu der entsprechenden Flächen (22, 21) des Gitters (10) positioniert sind.

15. Verbindungsvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die von den Absaugsmitteln erzeugte Wirkung konstant, wechselnd oder pulsierend sein kann oder über einen Teil oder das ganze Verbindungsverfahren auf dem Gitter (10) eingestellt werden kann.

16. Verbindungsvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Absaugswirkung auf vorher bestimmte Bereiche der Flächen (20, 21) und auf vorher bestimmte Werte beschränkt ist.

Revendications

1. Appareil destiné à rattacher des mèches en fibres textiles pour machines à filer pour fils cardés ou peignés, appareil convenant pour une utilisation conjointe avec et sur des machines à filer, ledit appareil comprenant une grille d'aspiration (10) sur laquelle se placent les deux extrémités des mèches à rattacher, caractérisé en ce que ladite grille d'aspiration (10) comporte deux surfaces (20, 21) reliées entre elles et disposées

en formant entre elles un angle compris entre 60° et 120°, en ce qu'au moins une des deux dites surfaces (20, 21) comprend au moins un ajutage (11, 12) émettant un liquide (19) sous pression, ledit ajutage (11, 12) étant disposé à proximité de la surface supérieure de la grille (10), ledit liquide (19) frappant tangentiellement lesdites surfaces (20, 21) de la grille et créant ainsi un effet de torsion sur les mèches, provoquant l'enroulement desdites mèches l'une autour de l'autre.

2. Appareil selon la revendication 1, dans lequel les deux surfaces (20—21) sont situées dans un angle variant entre 75° et 120° l'une de l'autre.

3. Appareil selon la revendication 1 ou 2, équipé d'au moins deux ajutages (11—12).

4. Appareil selon l'une quelconque des revendications précédentes, dont lesdites surfaces (20, 21) sont reliées par un raccord avec un rayon de courbure prédéterminé.

5. Appareil selon l'une quelconque des revendications précédentes, dans lequel les diamètres des trous dans la grille (10) varient dans l'intervalle de 0,4 à 1,5 mm.

6. Appareil selon la revendication 5, dans lequel les diamètres des trous dans la grille (10) varient dans l'intervalle de 0,6 à 0,7 mm.

7. Appareil selon l'une quelconque des revendications précédentes, dont la densité des trous dans la grille (10) reste constante.

8. Appareil selon l'une quelconque des revendications 1 à 6, dont la densité des trous dans la grille (10) est variable.

9. Appareil selon l'une quelconque des revendications précédentes, dont la dimension des trous dans la grille (10) est constante.

10. Appareil selon l'une quelconque des revendications 1 à 8 incluse, dont lequel la dimension des trous dans la grille (10) est variable.

11. Appareil selon l'une quelconque des revendications précédentes, dont les surfaces (20—21) de la grille (10) sont planes.

12. Appareil selon l'une quelconque des revendications 1 à 10 incluse, dont les surfaces (20—21) de la grille (10) sont courbes.

13. Appareil selon l'une quelconque des revendications précédentes, dont les ajutages (11—12) sont placés tangentiellement aux surfaces correspondantes (20—21) de la grille.

14. Appareil selon l'une quelconque des revendications 1 à 12, dont les ajutages (11—12) sont placés de manière à former un angle avec les surfaces respectives (20—21) de la grille.

15. Appareil selon l'une quelconque des revendications précédentes, dans lequel la force créée par l'aspiration peut être constante, variable on saccadée, ou même interrompue durant une partie ou l'ensemble de l'opération de rattachage sur la grille (10).

16. Appareil selon l'une quelconque des revendications précédentes, dont la force d'aspiration est limitée à des points prédéterminés desdites surfaces (20—21) ainsi qu'à des valeurs prédéterminées.

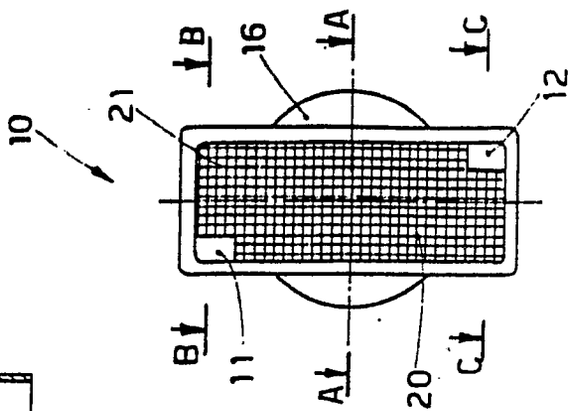

fig.1a

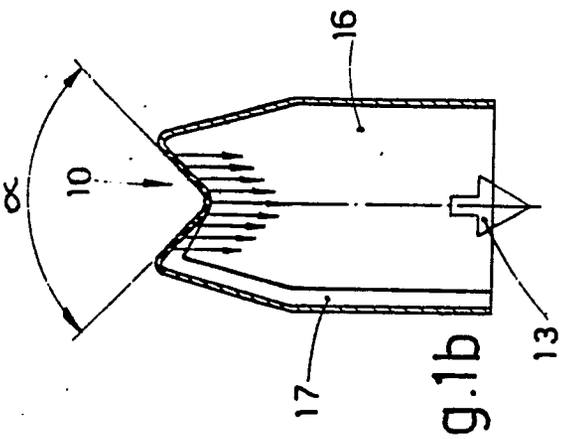

fig.1b

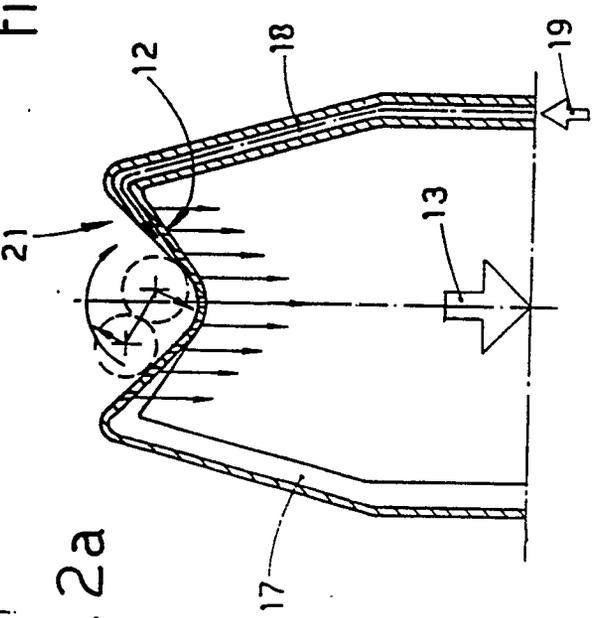

fig.2a

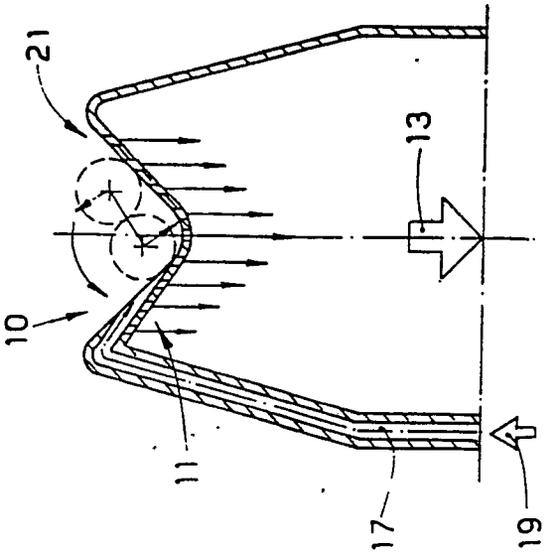

fig.2b

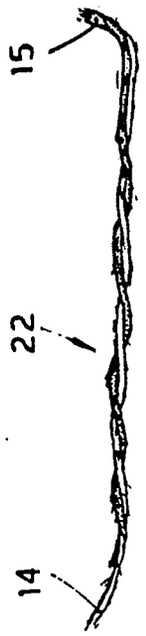

fig.9

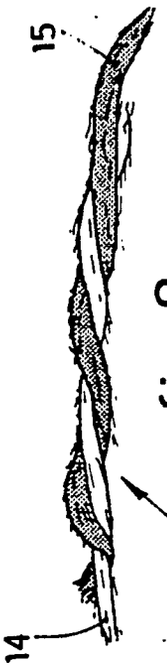

fig.8

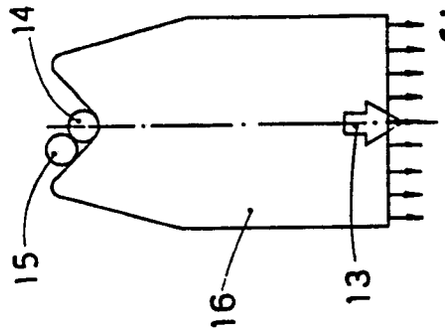

fig.6

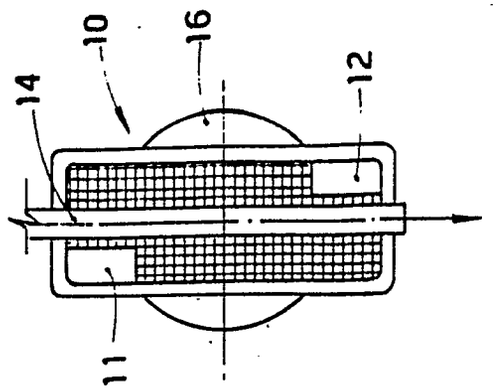

fig.7

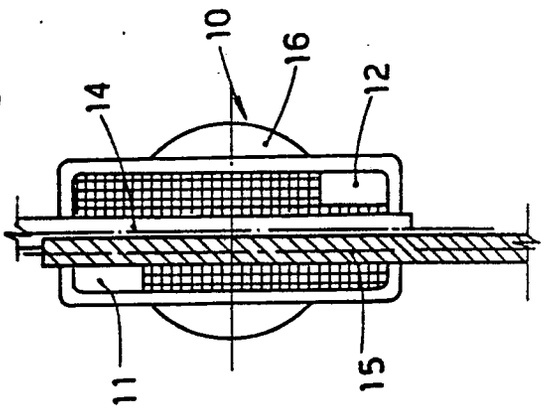

fig.5

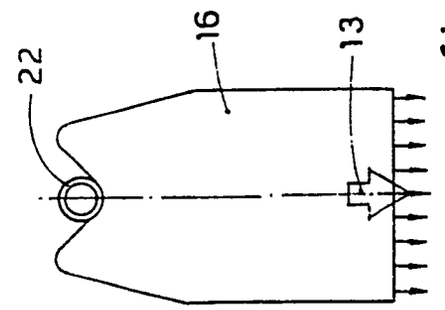

fig.4

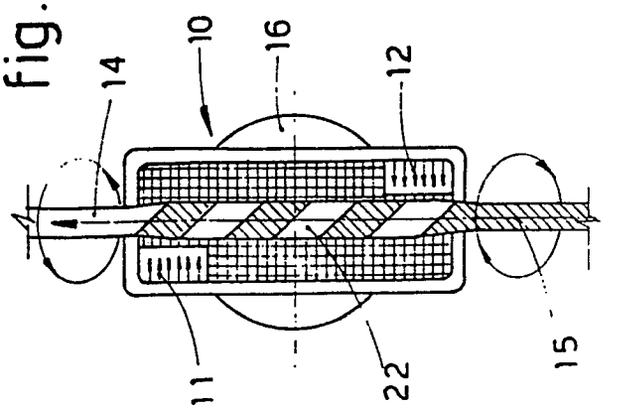

fig.3