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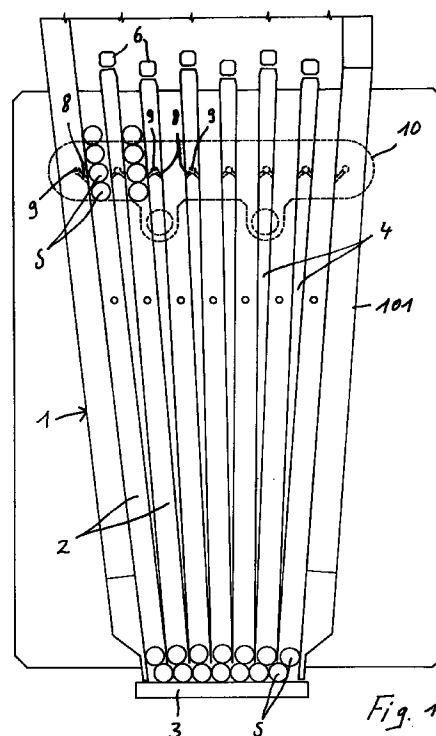
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(54) **Feed hopper for delicate cylindrical objects, particularly for cigarettes, or similar, and especially in cigarette packing machines**

(57) A feed hopper for delicate cylindrical objects, particularly like cigarettes, or similar, and especially intended for use in cigarette packing machines, comprises a compartment for a disordered mass of cigarettes, orientated so as to be parallel to one another and has at its bottom at least one discharge opening (1), with at least one discharge duct (2), particularly several discharge ducts (2) for the cigarettes (S), extending one next to the other and in the same substantially vertical direction, each of these ducts (2) being meant to seat one vertical row of single cigarettes (S) with a substantially vertical arrangement, one over the other. According to the invention, inside the duct or ducts (2) for the discharge of the cigarettes (S), or at least in part of it/them there is fed (8, 9) an air flow in the direction of discharge of the cigarettes (S).



EP 0 784 012 A1

Description

The invention relates to a feed hopper for delicate cylindrical objects, particularly cigarettes, or similar, and especially intended for use in cigarette packing machines, which comprises a compartment for a disordered mass of cigarettes, orientated so as to be parallel to one another, and has at its bottom at least one discharge opening, with at least one discharge duct, particularly several discharge ducts extending one next to the other and in the same substantially vertical direction, each of these ducts being meant to seat one vertical row of single cigarettes with a substantially vertical arrangement, one over the other.

Particularly in cigarette packing machines, the said feed hoppers have at least three adjacent discharge openings, each of which has a certain number of descending channels whose orientation is substantially vertical. Each channel seats a vertical line of single cigarettes. These cigarettes fall by gravity onto a supporting surface to form substantially horizontal arrays of adjacent cigarettes, the number of the latter being defined by the number of channels of the corresponding opening. The said arrays of cigarettes sequentially form the lines of cigarettes in the packs.

These hoppers, which are widely used in prior art packing machines, do not ensure a sufficiently safe and rapid descent of the cigarettes and for this reason are an obstacle to the possibility of increasing the operational speed of the packing machines.

The object of the invention is thus to produce a hopper of the type described initially, in such a way that, by means of easy and cheap expedients, the above drawbacks can be obviated, allowing a safe and rapid descent of the cigarettes into the feed station, so as to lead to a considerable increase of the operational speed of the packing machines, with no malfunctioning risks due to a wrong or faulty feeding of cigarettes.

The invention achieves the above objects thanks to a hopper of the type described initially, in which inside the duct/s for the discharge of cigarettes, or at least inside a portion of it/them, there is fed a descending air flow, that is air flowing in the direction of discharge of the cigarettes.

The said flow can be created either by blowing air under pressure from a point located before the discharge aperture of the duct/s, in the direction of the said discharge aperture, or by creating suction in the end of the duct/s on the discharge aperture side.

There can be further provided a combination of what described above, so that, through some lengths of the duct/s the air flow is blown, and through some other lengths, it is generated by suction.

According to a preferred embodiment, each opening has a plurality of discharge ducts into which the cigarettes fall by gravity, in a substantially vertical position, and the descending air flow is created by blowing air or other gas, separately into each duct from a predetermined point of the upper end of the ducts, on the cigarette inlet side, to the end for the discharge of the cigarettes themselves.

rette inlet side, to the end for the discharge of the cigarettes themselves.

In particular, when the cigarettes are fed through movements transverse to their axis, the air flow is produced by means of a plurality of jets distributed along the axial length of the cigarettes and orientated so as to be inclined with respect to the sliding direction of the cigarettes themselves inside the ducts. Advantages may be drawn from the air flow being created by jets branching off to the lateral walls which delimit the discharge ducts, and being parallel to the axis of the cigarettes, those jets being inclined with respect to the sliding direction and converging in the direction of the outlet end of the ducts.

A hopper according to what disclosed above has, on the facing lateral walls delimiting the ducts, opposed lines of blowing nozzles, whose axis is inclined with respect to the sliding direction of the cigarettes, in the direction of the opposed wall, each of those lines of nozzles coming out from a distribution chamber.

In the case of a plurality of ducts being associated to each opening for the discharge of the cigarettes, there is provided a common distribution chamber for the blowing nozzles coming out into the two adjacent ducts, this distribution chamber being provided in the corresponding separating wall between the two adjacent discharge ducts.

By the above expedients, the advantages of the present invention are evident. The air flow, beside exerting a certain pushing action on the cigarettes inside the single ducts, has the additional function to limit friction between the cigarettes and the lateral walls of the ducts. Therefore, the descent of the cigarettes inside the ducts is uniform, that is without delay, jamming, and takes place with the necessary speed, consequently allowing for an increase of the operational speed of the machine downstream.

An air flow usually obtained through blowing, can be also modulated and/or controlled as regards flow rate, speed and power, with a consequent possible control on the action exerted on the cigarettes to the best extent and according to current needs.

According to a further improvement of the invention there is provided a station for the formation of at least one coplanar row of cigarettes, named array of cigarettes, in which the latter are disposed orderly side-by-side, the said station comprising a supporting surface for the said array, beneath the outlet of the hopper.

The supporting surface for the array of cigarettes is made to be at least partially suction operating.

The suction means can act on all the cigarettes of the array, or only on some of them, for example the ones which are disposed at the end of the array itself.

According to a preferred embodiment, the supporting surface is provided with several rows of holes, the said rows being orientated and spaced in such a way that at least some of the cigarettes falling from the outlet of the hopper, may be arranged each on its corresponding row of holes, the latter being connected, through

manifolds, to suction means.

The holes are relatively small with respect to the dimensions, particularly to the diameter of the cigarettes. The single row of suction holes can extend over the whole length of the corresponding cigarette, or only over part of it.

The above mentioned suction means allow both to facilitate the fall acceleration of the cigarettes in the last portion of descent into the channels of the hopper (4 millimeters) onto the supporting surface and to prevent their rebounding, still keeping the correct arrangement of the array of cigarettes on the said surface. The whole can be obtained with no mechanical guidance or with a considerably feeblar lateral restraining action by mechanical guidances, in order to prevent damage to cigarettes due to compression.

Further, the suction means keep the supporting surface perfectly clean of residual material, whose accumulation may create, with time, obstacles to the free sliding of the cigarettes on the supporting surface.

Alternatively to what disclosed above, the supporting surface can be made to be, at least partially, suction operating, at least partially blowing, and at least partially balanced with atmospheric pressure, or at least partially variable with respect to the suction action provided.

This achievement can be obtained in several manners. Particularly, thanks to switching means, a connection can be made between some or all of the holes on the supporting surface alternatively to a vacuum source and to atmospheric pressure or to a source of air or gas under pressure, otherwise it is even possible to modulate the suction action that the holes are to exert within a range between predetermined maximum and minimum values. The whole can be synchronized with the phase of fall of the cigarettes onto the supporting surface, with the waiting phase, and with the phase of transfer from the surface itself to the pan conveyor, as well as with eventual phases corresponding to dead times, in which the supporting surface is idle and with the blowing and suction phases in the ducts of the hopper. In particular, the air under pressure can be discharged from the holes during one dead time, in which the supporting surface is idle, in order to blow out the waste material, instead of sucking them. Moreover, the suction action may be increased during the fall of the cigarettes onto the supporting surface, and decreased in a discontinuous or progressive way or even stopped during the phase in which the cigarettes are moved from the supporting surface to the subsequent conveyor.

In combination with the descending air flow and with the suction action exerted in the ducts of the hopper at their lower level, the suction exerted by the supporting surface helps to hold the cigarette in their correct position against a possible rest of descending flow which has not been compensated by the suction means in the lower part of the ducts.

Further improvements of the invention form the subject of the dependent claims.

The characteristics of the invention and the advan-

tages derived therefrom will be better evidenced by the following description of an embodiment illustrated by way of not limiting example in the annexed drawings, in which:

Fig. 1 is a sectional view with respect to a vertical plane, transverse to the axis of the cigarettes, of a discharge opening of a hopper according to the invention.

Fig. 2 is a sectional view with respect to a vertical plane, parallel to the axis of the cigarettes, of the discharge opening according to fig. 1.

Fig. 3 is a magnified detail of the discharge area included in the discharge opening according to a variant embodiment of the invention.

Fig. 4 is a frontal view of a forming-feeding station for cigarettes arrays provided in combination with the hopper according to the preceding figures.

Fig. 5 is a corresponding top plan view of the said station according to fig. 4.

Fig. 6 is a cross section view of the station according to the preceding figures 4 and 5.

With reference to the figures 1 to 3, a feed hopper for cigarettes, particularly for feeding a unit of a packing machine, with the function of forming a sequence of orderly groups of cigarettes, comprises at least one, usually three cigarette discharge openings 1, supplied with a predetermined number of descending ducts 2. The cigarettes S are disposed with their axis orientated horizontally and are parallel to one another, whereas the descending ducts 2 are orientated so as to be substantially vertical. In particular, the latter converge with a slight angle in the direction of the bottom outlet of the cigarettes. Each descending duct 2 is slightly wider than or, within tolerance limits, substantially identical to the diameter of the cigarettes S, so that in each descending duct 2, there is formed a substantially vertical line of single cigarettes S, falling by gravity onto a transfer plate 3, placed at the bottom of the discharge opening 1.

The descending ducts 2 of each opening are separated by intermediate wedge-shaped apertures 4, which taper up to the point of forming thin foils from the upper inlet end of the ducts 2 to the lower outlet end of the ducts themselves. By this arrangement a horizontal array SC of adjacent cigarettes S is formed on the transfer plate 3, for further transfer into means for forming orderly groups of cigarettes, not shown, such as, for example, what is known as pan conveyor, or similar.

Directly above each upper end of the said lateral walls 4 of the ducts 2, there are provided means 6, particularly rolls, preferably with a rounded or polygonal, especially quadrangular, profile, which are driven into a reciprocating and rotating motion about their axis. The rolls 6 are orientated with their axis parallel, while they are alternately disposed on two different levels. They are driven by a rack 7, driven into a reciprocating motion in the direction of its longitudinal axis. The rack 7 is supported to be sliding behind the rear wall of the hopper

and engages axial rear toothed extensions 106 of the rolls 6.

In the lateral walls 4, 101, delimiting the ducts 2, substantially at their upper ends, there are provided nozzles for feeding jets of air under pressure. The nozzles referred to with numeral 8 are, for example, transverse holes in the lateral walls 4, 101, delimiting the ducts 2, which come out towards the inner part of the corresponding duct 2, and branch off from a chamber 9 for feeding of air under pressure. The nozzles, that is the holes 8 are orientated with their axes corresponding to the direction that they impose to the air flow, slightly inclined convergingly in a V shape with respect to the nozzles on the opposed lateral wall 4, 101 of the same duct 2 and in the direction of the outlet end of the duct itself.

Advantageously, on each lateral wall of each duct, it is preferable to provide a row of holes or nozzles 8 extending for the whole axial length of the cigarettes or at least for part of it. The nozzles or holes 8 of each line can be arranged so as to be equidistant or more or less concentrated in different areas.

The distribution chambers 9 in the walls 4, separating two adjacent ducts, advantageously comprise notches which extend in the axial sense of the cigarettes, through the thickness of the walls 4 separating the ducts 2. By this arrangement, a distribution chamber can feed air simultaneously to the nozzles or holes 8 of any one of the two adjacent ducts 2.

On the rear side transverse to the axis of the cigarettes of the hopper 1, that is of the discharge opening 1, in a position which axially coincides with the corresponding end of the distribution chambers 9, there is provided an additional feeding chamber 10, with the compressed air duct coming out from its free rear side.

In the compressed air feeding circuit, there can be provided means for adjusting pressure and/or flow rate, as well as means for disabling the feeding operation, in such a way as to alternate blowing phases and rest phases.

The blow generated by the rows of nozzles, in this case by each lateral pair of holes 8, generates a descending air flow inside each duct 2. The said air flow, beside exerting a force in the same descending sense of the cigarettes in the ducts 2, also allows for a decrease of friction between the cigarettes S and the walls and prevents the occurrence of slightly inclined arrangements of the cigarettes, leading either to their catch in the duct or at least to a slower descent. By this arrangement, the air penetrates between the cigarette S and the lateral wall of the duct 2, retaining the cigarette itself in position.

According to a variant embodiment, shown in fig. 3, the air flow descending in the ducts 2 can be created through vacuum, that is suction. In this case, in an area situated in the substantial lower end of the ducts 2, that is the discharge area of the ducts themselves, there are provided suction nozzles 12, thus generating the descending air flow by also directly attracting the ciga-

rettes S downwards.

The two expedients shown in figs. 1 and 2 and in fig. 3 can be provided as combining and operating, either simultaneously in the same area of the ducts 2 or alternately in different areas, etc.

Any combination and configuration of suction and/or blowing nozzles is obviously possible to ensure the best and fastest fall of the cigarettes. The suction nozzles can be exactly conformed to the above description with regards to the blowing nozzles 9. In the figure, each wall of each descending duct 2 has a pair of blowing 9 and/or suction 8 nozzles, and the pairs of nozzles and the corresponding distribution chambers for the outer lateral walls 101 of the end ducts of the opening 1, being made in the said end lateral walls of the discharge opening 1.

The eventual possibility to adjust the pressure or the flow rate of the blowing and/or suction jets, allows for a control of the main features of the descending air flow, and hence the action exerted by the latter on the cigarettes. Therefore, the operating conditions of the device can be easily adapted to the running conditions of the operating, that is packing machines.

With reference to the figures 4 to 6, according to a further improvement of the invention, the hopper 15 at its bottom three discharge outlets 102, properly spaced and disposed on a common vertical plane.

Below the discharge outlets 102, and correspondingly to them, there are provided as many supporting surfaces 20, disposed at different heights, there being laid on each of them, one at a time, an orderly array SC of cigarettes S, one beside the other.

In a laterally staggered position, with the cigarettes in an axial direction with respect to the supporting surface 20, there is provided a straight conveyor belt 17, supplied with stepping advance means and with a plurality of box-type housings 18, with both ends open and orientated with their axis parallel to the one of the cigarettes laying on the supporting surfaces 20.

Next to the supporting surfaces 20, coaxially to them and opposite to the conveyor belt 17, there are provided as many pushing plates 19, moving with a reciprocating motion. Each of the said pushing plates 19 moves its corresponding array SC of cigarettes from the associated supporting surface 20 to the corresponding housing 18 of the conveyor belt 17.

The height of the housings 18 and the vertical staggering of the supporting surfaces 20 are such as to allow, during the three successive steps of the conveyor, the introduction of three overlapped arrays SC of cigarettes in the single housing 18, in such a way as to form orderly groups of cigarettes which are fed to packaging means (not shown) which are meant to enclose them in a wrapping.

Each of the supporting surfaces 20 is provided with suction means for the cigarettes which are seated onto it. Those suction means can be of any type and, particularly, comprise a plurality of parallel rows 21 of suction holes 121. The holes 121 are relatively small with

respect to the diameter of the cigarettes S, while the rows are made on the surface, each one corresponding to one of the cigarettes lined up on the surface.

The suction holes 121 of each row 21 on each supporting surface 20 communicate with a manifold 22, whereas all the manifolds 22 communicate with a main manifold 23, connected to a duct for connection to suction means 24.

Each row 21 of suction holes 121 can extend over the whole length of the corresponding cigarette, or part of it. The rows 21 of suction holes 121 on the supporting surfaces 20 provide for a number of functional benefits, among which:

- control and acceleration of the fall of the cigarettes S from the discharge openings 102 of the hopper 15 onto the corresponding supporting surfaces 20;
- perfect line up and accurate alignment of the cigarettes S on the supporting surfaces 20, even when a rest flow of descending air in the ducts of the hopper reach them and exercises an bow away action;
- best restrained guidance of the arrays SC of cigarettes S during their transfer from the supporting surfaces 20 to their housings 18 in the conveyor belt 17;
- cleanout of the supporting surfaces 20.

The said benefits are achieved by means of highly reliable pneumatic means. In this way, there is no need to use mechanical devices, such as oscillating approaching means, guides or similar, which are not suitable for the very high working speeds of the cigarette packing machines.

Obviously, the apparatus according to the invention is not limited to the embodiment described herein, but may be greatly varied, especially as regards construction. So, for instance, there may be provided that the rows 21 of suction holes 121 be only combined to some of the cigarettes of the array SC on the single supporting surface, preferably the ones at the ends of the array itself, so that the suction means may be greatly simplified, without substantially losing the above benefits.

Moreover, the main manifolds may be alternately connected to suction means, to atmospheric pressure or to means for generation of air or gas under pressure. By this arrangement, thanks to simple multiple-way switching valves, the suction effect may be reduced, for example while moving the cigarettes from the supporting surface 20 into the conveyor, or a cleaning blow out may be generated through the holes, during the dead times in which the surface is idle. As a further alternative, there may be also provided means for control of suction flow or power, which might be controlled in such a way as to modulate, synchronizing with the phases of fall and transfer of the cigarettes, with the phases of blowing and suctioning the descendent air flow in the ducts and with eventual dead times, the suction action within a range between predetermined maximum and minimum values, in a discontinuous or progressive

manner. In this way, there might be provided, for instance, a suction increase in the phase of fall and a progressive decrease in the phase of transfer of the cigarettes. The above without departing from the guiding principle disclosed above and claimed below.

Naturally, the invention is not limited to the embodiments described and illustrated herein, but may be varied, particularly as regards construction, without departure from the guiding principle disclosed above and claimed below.

Claims

1. Feed hopper for delicate cylindrical objects, particularly cigarettes, or similar, and especially intended for use in cigarette packing machines, comprises a compartment for a disordered mass of cigarettes, orientated so as to be parallel to one another, and has at its bottom at least one discharge opening (1), with at least one discharge duct (2), particularly several discharge ducts (2) extending one next to the other and in the same substantially vertical direction, each of these ducts (2) being meant to seat one vertical line of single cigarettes (S) with a substantially vertical arrangement, one over the other, characterized in that, inside the duct or ducts (2) for the discharge of the cigarettes (S), or at least inside part of it/them, there is fed (8, 9) an air flow in the direction of discharge of the cigarettes (S).
2. Hopper as claimed in claim 1, characterized in that the said flow can be created either by blowing air under pressure from a point located before the discharge aperture of the duct/s (2), in the direction of the said discharge aperture, or by creating suction in the terminal portion of the duct/s on the discharge aperture side.
3. Hopper as claimed in claims 1 or 2, characterized in that there can also be provided a combination of blown air and suction in the whole ducts (2) or in part of them, and even alternately in some lengths of the duct/s (2) so that, through some lengths of the duct/s the air flow is blown, and through some other lengths, it is generated by suction.
4. Hopper as claimed in one or more of the preceding claims, characterized in that each discharge opening (1) has a plurality of discharge ducts (2) into which the cigarettes fall by gravity, in a substantially vertical position, and the descending air flow is created by blowing air or other gas, separately into each duct (2) from a predetermined point of the upper end of the ducts (2), on the cigarette (S) inlet side to the discharge area for the cigarettes (S) themselves.
5. Hopper as claimed in one or more of the preceding claims, characterized in that the cigarettes (S) are

fed through movements transverse to their axis, whereas the air flow is produced by means of a plurality of jets distributed along the axial length of the cigarettes and orientated so as to be inclined with respect to the sliding direction of the cigarettes themselves inside the ducts.

6. Hopper as claimed in claim 6 characterized in that the air flow is created by jets coming out from the lateral walls delimiting the discharge ducts (2), parallel to the axis of the cigarettes (S), those jets being orientated so as to be inclined with respect to the sliding direction and converging in a V-shape in the direction of the outlet end of the ducts (2) themselves.
7. Hopper as claimed in one or more of the preceding claims, which has, on the facing lateral walls delimiting the ducts (2), opposed rows of blowing nozzles (8), whose axis is inclined with respect to the sliding direction of the cigarettes (S), in the direction of the opposed wall (4, 101), each of those rows of nozzles (8) coming out from a distribution chamber (9).
8. Hopper as claimed in claim 7, characterized in that in the case of a plurality of descending ducts (2) being associated to each opening (1) for the discharge of the cigarettes (S) there is provided a common distribution chamber (9) for the blowing nozzles (8) coming out into the two adjacent ducts (2), this distribution chamber (9) being situated in the corresponding separating wall (4) between the two adjacent discharge descending ducts (2).
9. Hopper as claimed in one or more of the preceding claims, characterized in that the distribution chambers (9) are formed by recesses extending parallel to the axis of the cigarettes (S) in the corresponding walls (4, 101), which delimit the descending discharge ducts (2) and come out on the rear side into a common feeding chamber (10), which can be connected to a pressure source.
10. Hopper as claimed in one or more of the preceding claims, characterized in that the compressed air feeding circuit, can include means disabling the compressed air feeding operation at the nozzles and/or means for adjusting their pressure and/or flow rate.
11. Hopper as claimed in one or more of the preceding claims, characterized in that in the lower end of the walls delimiting the descending ducts (1), there are provided one or more suction nozzles (12), which can be arranged and connected to the suction source in a way similar to the blowing nozzles (8), according to one or more of the preceding claims.
12. Hopper according to one or more of the preceding

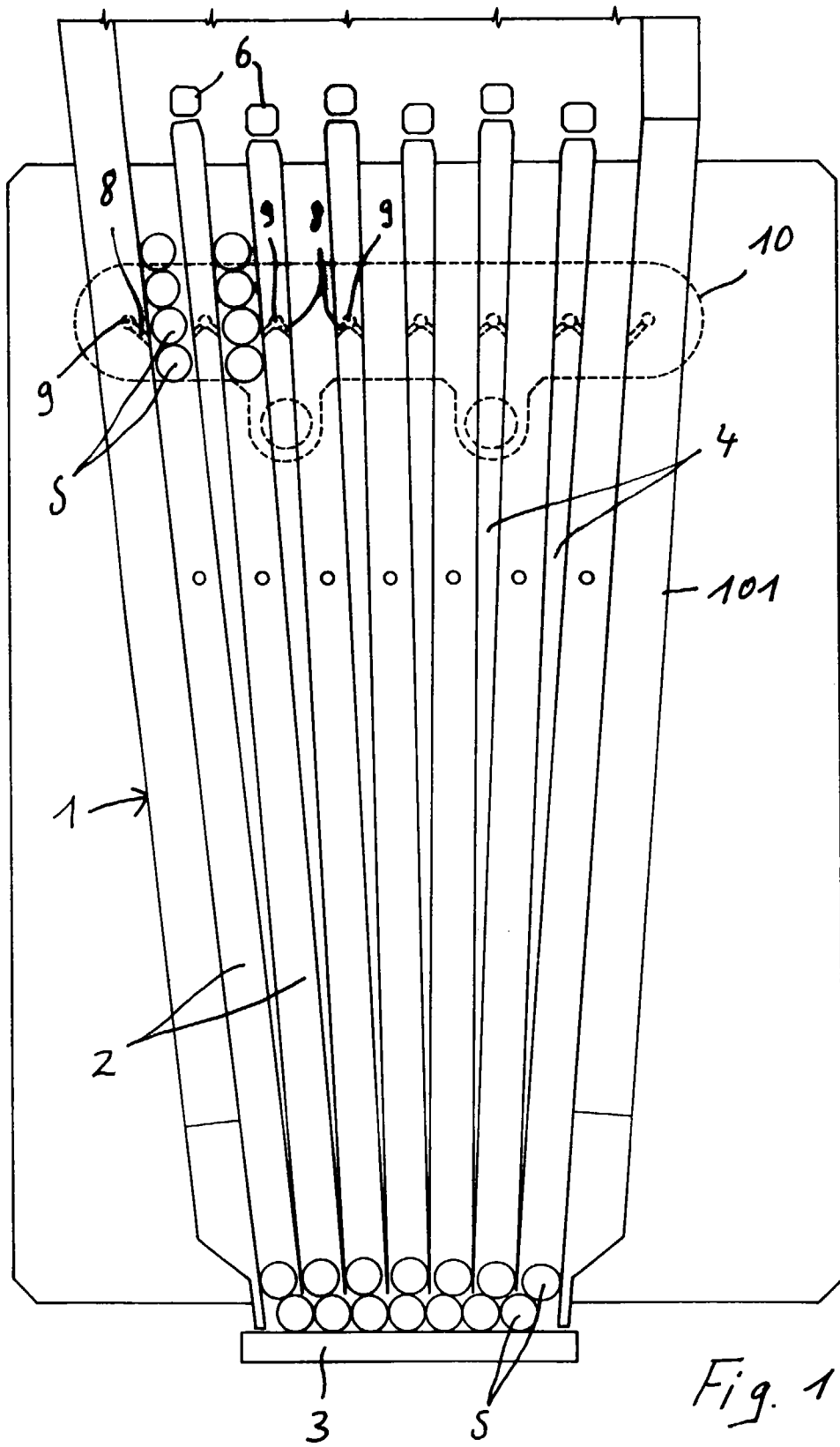
claims, characterized in that it is provided in combination a station for the formation of at least one coplanar row (SC) of cigarettes (S), named array of cigarettes, in which the latter are disposed orderly side-by-side, the said station comprising a supporting surface (20) for the said array (SC), which is provided beneath the outlet of the hopper, the said supporting surface (20) for the array (SC) of cigarettes (S) being made to be at least partially suction operating (21, 121, 22, 23, 24).

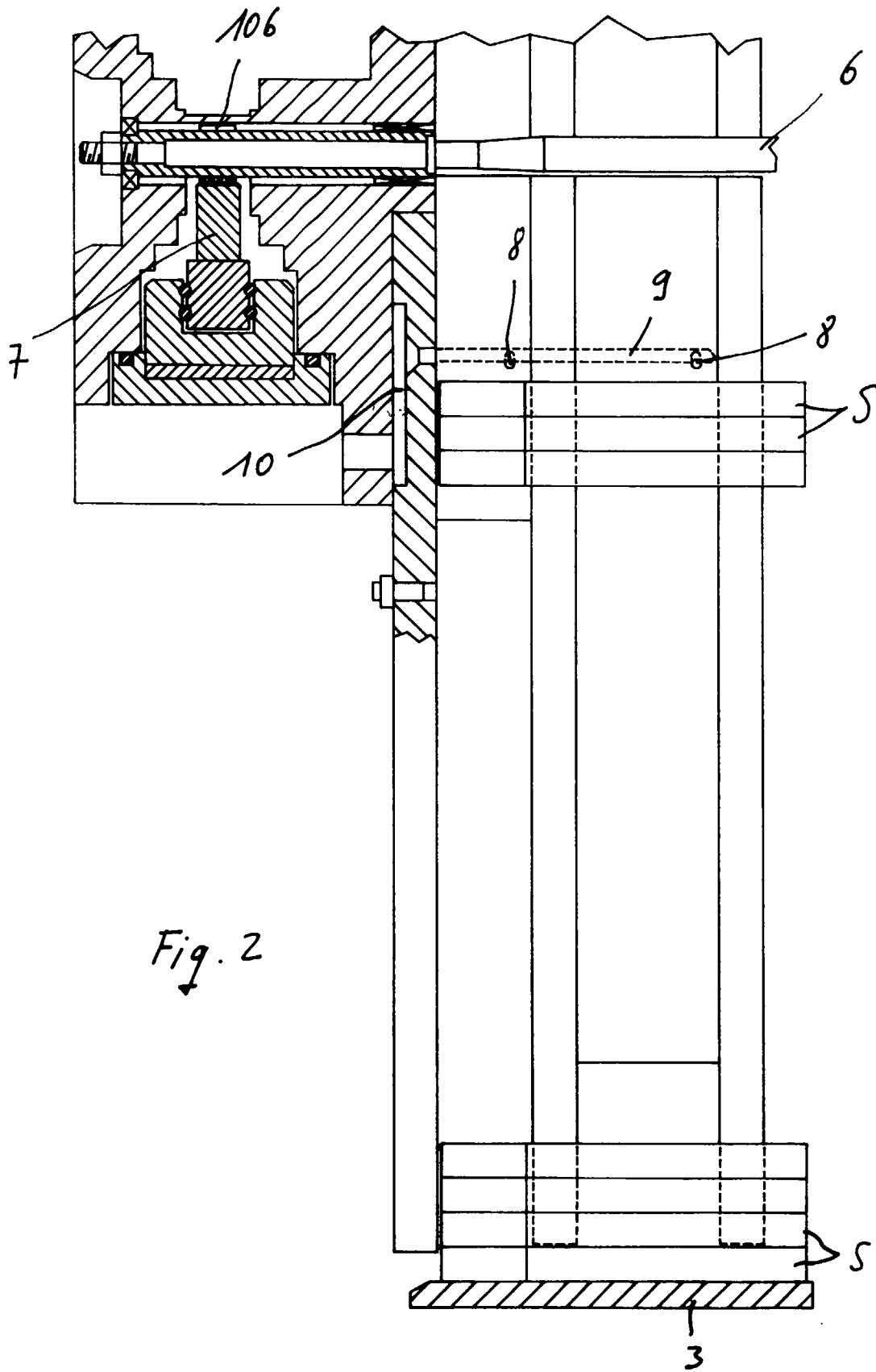
13. Hopper as claimed in claim 12, characterized in that the suction operating supporting surface (20, 21, 121, 22, 23, 24) includes suction means for controlling and accelerating the fall of the cigarettes (S) from the outlet (102) of the ducts (2), onto the supporting surface (20), for forming and regularizing the array (SC) of cigarettes (S) on the said surface (20), for the restrained guidance of that array (SC) while the latter is moved from the supporting surface (20) into its corresponding housing (18), of a conveyor (17) and for eliminating at least partially the blowing air flow in the ducts (2) holding the cigarettes (S) in their correct position.
14. Hopper according to claims 12 or 13, characterized in that the said suction means (21, 121, 22, 23, 24) comprise a plurality of parallel rows (21) of suction holes (121) made on the supporting surface (20), the said rows (21) of holes (121) being orientated and spaced to such an extent as to coincide with the bearing area, in the supporting surface (20), of at least some of the cigarettes (S) in their correct position inside the array (SC).
15. Hopper as claimed in claim 14, characterized in that there are provided manifolds (22, 23) connecting at least some of the rows (21) of holes (121), or some of the holes (121) of the different rows (7) with a common vacuum source (24).
16. Hopper as claimed in one or more of the preceding claims 12 to 15, characterized in that there may be provided a row (121) of holes (21) only for some of the cigarettes (S) of the array (SC) of cigarettes, or for each cigarette (S) of the array of cigarettes (SC), the said arrays (21) being so arranged as to coincide with the contact area of the corresponding cigarette on the supporting surface (20).
17. Hopper as claimed in claim 16, characterized in that there is provided a row (21) of holes (121) only for each of the two cigarettes (S) at the ends of the array (SC) of cigarettes on the supporting surface (20).
18. Hopper as claimed in one or more of the preceding claims 12 to 17, characterized in that at least some of the rows (21) of holes (121) on the supporting

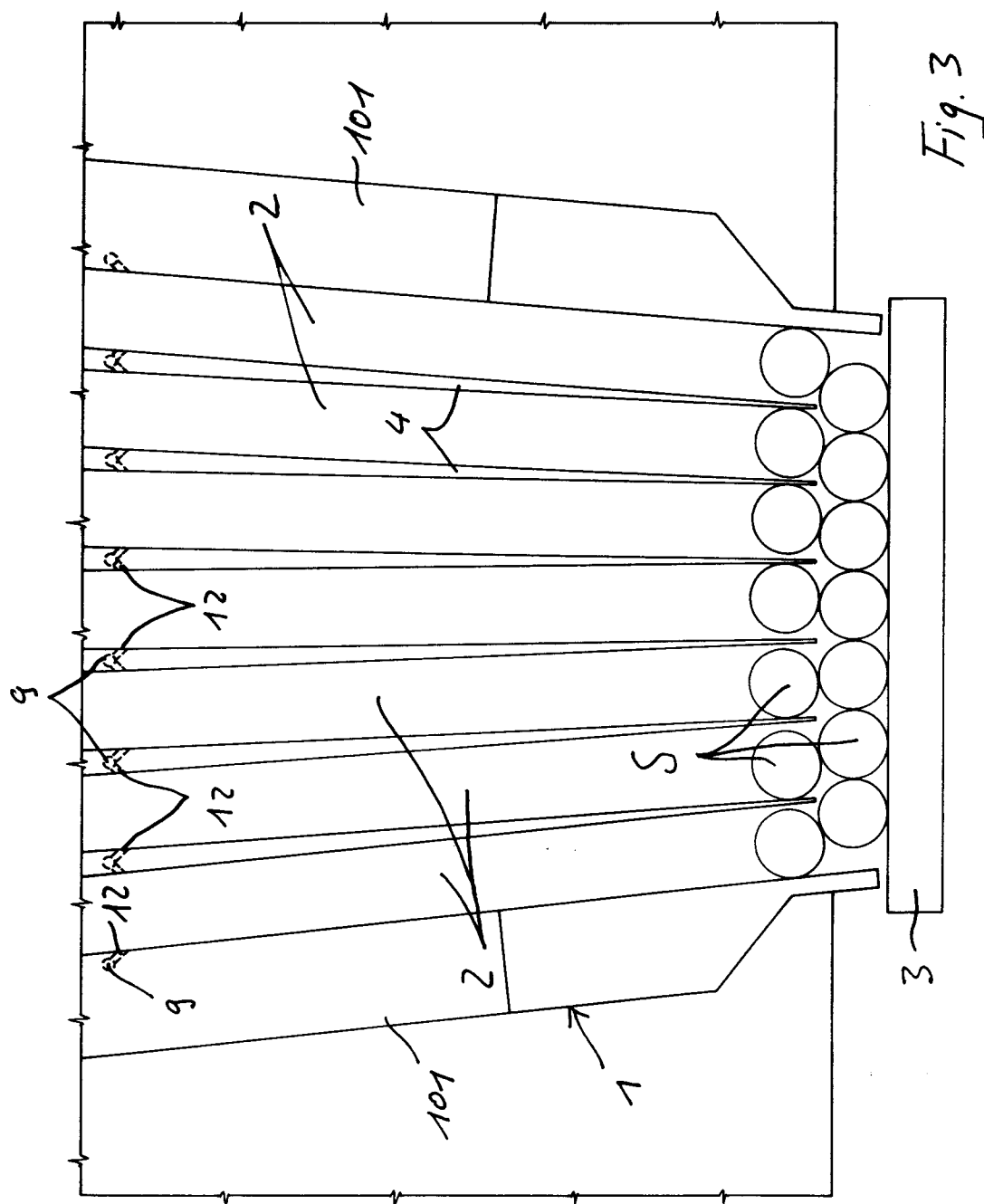
surface (20), or each of them, extend over at least part or substantially the whole of the length of the corresponding cigarette (S).

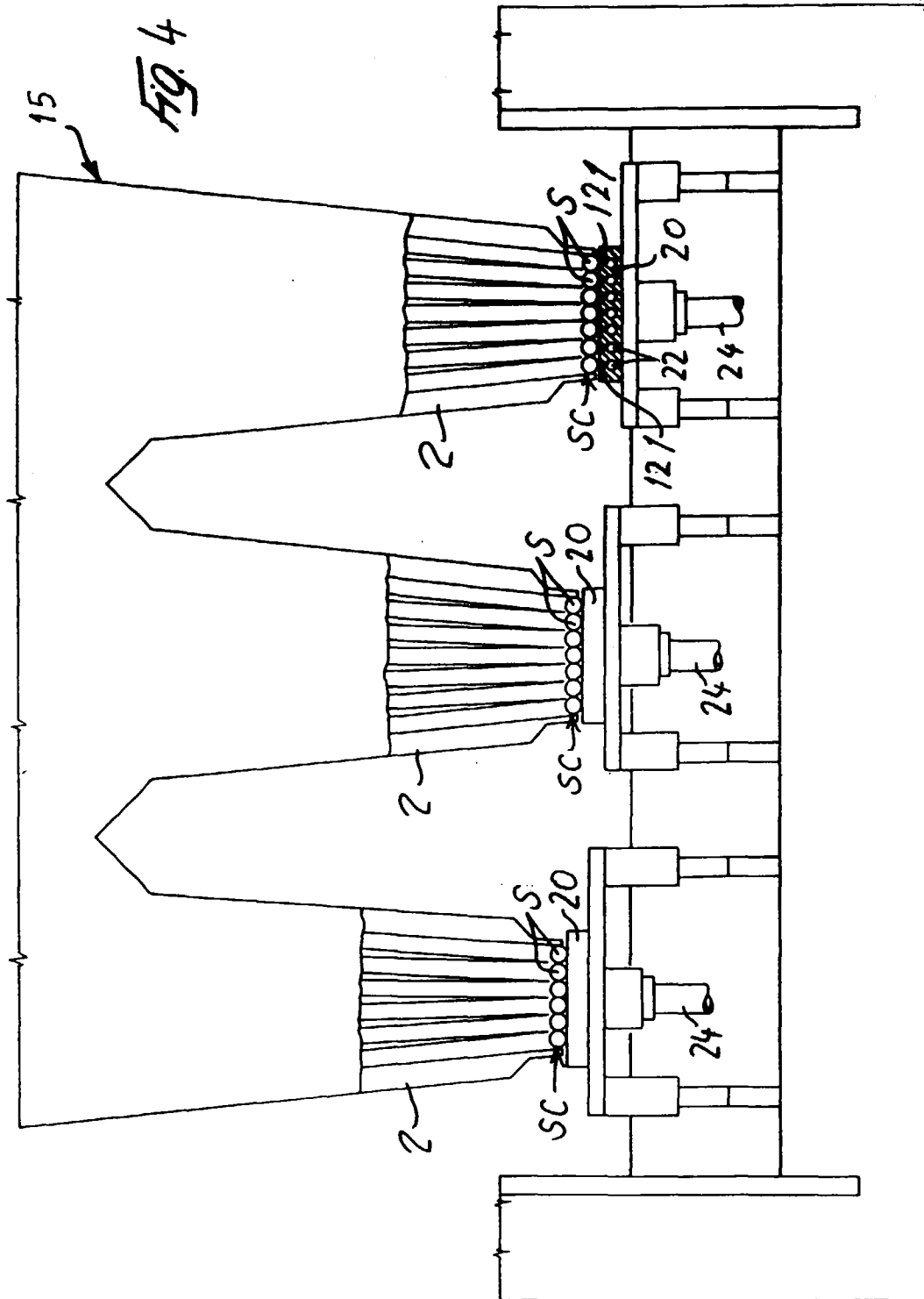
19. Hopper as claimed in one or more of the preceding claims 12 to 18, characterized in that the suction holes (121) of each row (21) come into corresponding manifolds (22), there being provided that all these manifolds (22) communicate with a main manifold (23), which communicates itself with a suction port (24). 5 10
20. Hopper as claimed in one or more of the preceding claims 12 to 19, characterized in that the supporting surface (20) may be made to be alternately, at least partially suction operating, at least partially blowing and at least partially balanced with atmospheric pressure, or at least partially variable with respect to the suction and/or blowing action exerted. 15 20
21. Hopper as claimed in claim 20, characterized in that there are provided switching means, which alternately connect at least some of the holes (121) of the rows (21), or all of the holes (121) of the rows (21) to a vacuum source, to atmospheric pressure, or to a source of air or gas under pressure. 25
22. Hopper as claimed in claim 21, characterized in that the vacuum source can be of the variable type, with respect to the flow rate and power of suction, there being provided means, of the progressive or step-by-step type, for adjusting and modulating the suction action with reference to one or more predetermined values. 30 35
23. Hopper as claimed in one or more of the claims 19 to 22, characterized in that the connection of at least some of the holes (121) of the rows (21) to the vacuum source, to atmospheric pressure or to the source of air under pressure, or the modulation of the suction power fed by the vacuum source (24) is synchronized with the phase of fall of the cigarettes (S) onto the supporting surface (20), with the transfer phase and with the rest phase, in which the supporting surface (20) is idle, and with the blowing and the suction of the air flow in the ducts (2), the suction action being preferably decreased or stopped in a sudden or progressive manner, during the transfer of the cigarettes and the air under pressure being blown out through the holes (121) in the rest phases, in which the supporting surface (20) is idle. 40 45 50

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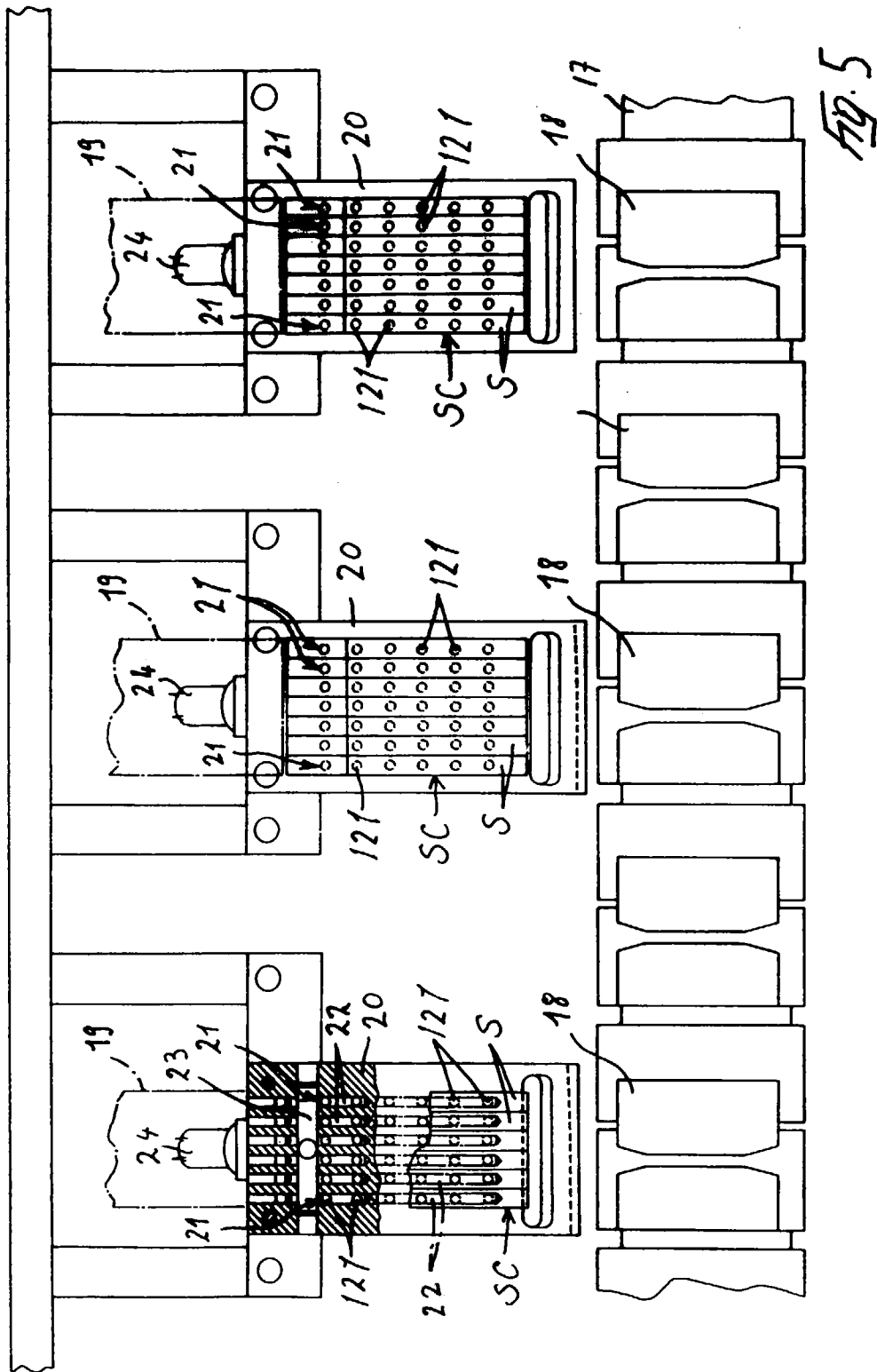
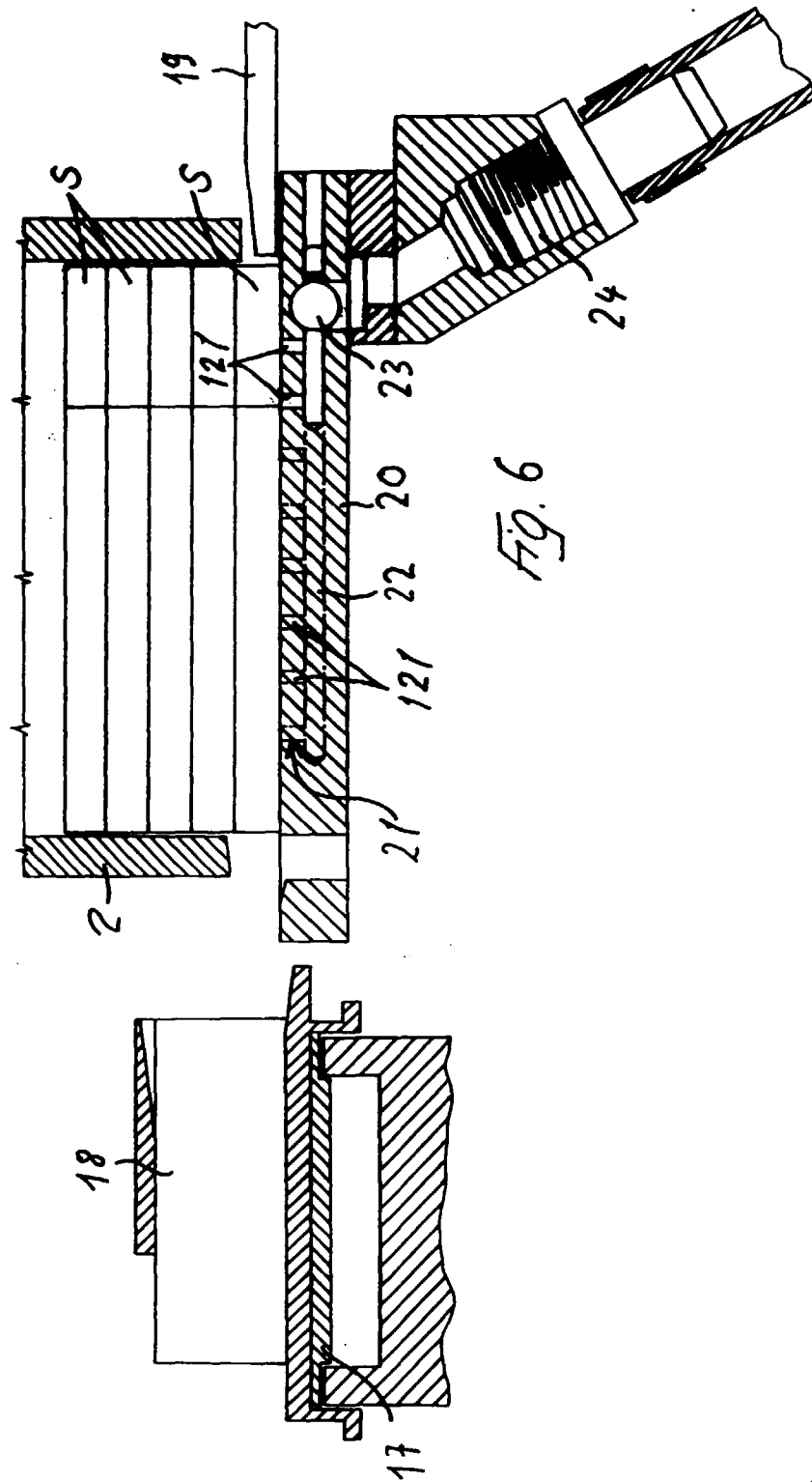


Fig. 5





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 10 0144

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	DE 20 06 425 A (SCHMERMUND) * the whole document *	1,2,4-9 12-16, 18,19	B65B19/04 B65B19/10
Y	DE 612 851 C (MUELLER) * the whole document *	12-16, 18,19	
A	DE 39 18 236 A (KOERBER) * the whole document *	12	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 11 April 1997	Examiner Claeys, H
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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