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(54) **Berendezés és eljárás zsákok előállítására tömlődarabokból**

Az európai szabadalom ellen, megadásának az Európai Szabadalmi Közlönyben való meghirdetésétől számított kilenc hónapon belül, felszólalást lehet benyújtani az Európai Szabadalmi Hivatalnál. (Európai Szabadalmi Egyezmény 99. cikk(1))

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Device and method for producing sacks from tube pieces

Description

The invention relates to an apparatus for producing bags from flexible-tube pieces, which preferably comprise woven fabric made of drawn plastic strips according to the preamble to Claim 1 as well as a method according to the preamble to Claim 11.

A suchlike apparatus and a suchlike method have most recently been disclosed through the publication by the applicant of Patent Application WO 2010/054955. The ends or at least one end of the flexible-tube pieces in this case are folded through 90 degrees. The resulting fold line is subsequently stamped into the flexible-tube material by a stamping device, such that the restoring force is reduced and the following bottom opening and bottom formation take place on the whole in a more trouble-free manner and the bottoms ultimately also correspond to the desired shape.

The bags produced in this way meet the aforementioned requirements in full. A further problem has emerged, however. In the course of drop tests performed on suchlike bags, which bags had been filled furthermore, the bags were found to burst open precisely on the fold line.

This gave rise to the object of improving the apparatus and the method for producing bags in such a way that the bursting of filled bags is avoided.

The object is accomplished by an apparatus according to Claim 1 and a method according to Claim 11.

A folding-over device is proposed, therefore, by means of which regions of the two walls of one end can be folded over the bottom-folding edge by more than 90 degrees. This device is used to fold the end of the flexible-tube piece back on itself over the folding edge. Once the flexible-tube piece has passed through said device, a stamping element and a mating element act upon the end of the flexible-tube piece, wherein both of said elements are in contact with the same wall of the flexible-tube piece. In this case, however, the two elements act upon the two different sides of the fold line. In this way, the ends of the flexible-tube pieces can be folded over in the regions of the fold lines through 180 degrees and can be pressed against one another, such that the fold line is of stronger configuration. Folding over by means of the folding-over device can be used to fold over the flexible-tube piece end by approximately 180 degrees, such that the flexible-tube piece end arrives in the region between the stamping element and the mating element without interruption.

The present invention has been based on the finding that the stamping element according to WO 2010/054955 damaged the woven fabric strongly with its quite sharp edge, such that said woven fabric was no longer able to withstand the loads when dropped and was torn. The stamping device according to the present invention acts simply by the application of a strong pressure to the fold line. In the process, the stamping element and the mating element bear against the flexible-tube piece with a significantly larger surface compared with the sharp edge, such that damage to and associated weakening of the woven fabric are avoided. No disadvantages have become apparent in relation to the manufacture in a proper

fashion of bags having an accurate format, to which the aforementioned folding-over device makes a significant contribution.

In a preferred embodiment of the invention, the stamping element and the associated mating element comprise rollers. The flexible-tube piece end accordingly arrives in their roller nip, whereby the fold line preferably runs in the centre of the rollers.

It is expedient to provide the outer surfaces of the stamping element and the mating element with an elastic coating, in order to avoid any slipping or displacement of the bag material during the stamping process.

In one advantageous embodiment, a drive is assigned to the stamping element and/or the mating element, by means of which drive the aforementioned element or the two aforementioned elements can be driven at a circumferential speed which is greater than the speed at which the flexible-tube pieces are transported. This rather greater speed is designated in this case as the "lead". The drive in this case can be an autonomous motor for the stamping element and/or the mating element, which motor can be synchronized with the main drive of the apparatus. Both of the elements can, of course, each be driven by its own individual drive. However, the drive can also be provided via the main drive of the machine, which preferably also drives the transporting device for the flexible-tube pieces. A step-up drive must then be provided between the drive and the aforementioned elements. The lead is used to tension the flexible-tube piece in the transporting direction, such that no creases occur and these are stamped into the tube material, if possible.

It is particularly advantageous if a drive is assigned to only one of the elements, and if the other element can be driven by way of a friction fit. The drive is preferably onto the mating element. The stamping element and the mating element can be provided with O-rings on their surfaces for producing the frictional fit, which O-rings are elevated in relation to the circumferential surfaces.

In a further advantageous embodiment, the stamping element or the mating element can be positioned against the other element by means of a force-exerting mechanism. The element that is capable of having a force exerted upon it is preferably the stamping element. The positionable element is preferably mounted at one end of a lever arm, upon the other end of which the force-exerting device acts. The force-exerting device can comprise a spring element, a piston cylinder unit or a simple mass, which is under the influence of gravity. The appropriate choice of the force enables the fold line to be stamped sufficiently strongly, but without damage being caused to the woven fabric.

In order to determine the folding edge, before the stamping device acts upon the folding edge, a folding element is provided, which has an operating edge for determining the folding edge. This operating edge runs parallel to the transporting direction of the flexible-tube pieces. In addition to the folding element, a further guide element is provided as a component part of the folding-over device, by means of which the end of the flexible-tube piece can be folded over around the operating edge of the folding element. In this way, the end of the flexible-tube piece can already be folded back on itself for the most part. The folding element in this case extends in a wedge-shaped manner as far as the folding edge of the flexible-

tube piece. The guide element, on the other hand, is disposed in an inclined manner in relation to the transporting direction of the flexible-tube pieces, wherein it overlaps the folding element during transport.

It is of considerable advantage, furthermore, if the folding element has assigned to it a pulling element, by means of which the flexible-tube piece material is pulled against the operating edge of the folding element, such that the folding edge is produced in the pre-determined position of the flexible-tube piece. The pulling element can be a roller, of which the axis of rotation is inclined both against the direction in which the flexible-tube piece extends and in relation to the transporting plane of same. The pulling element can be impinged upon by a force, such that it is pressed against the folding element.

Further illustrative embodiments of the invention can be appreciated from the present description.

In the individual figures:

Fig. 1 depicts a principle drawing of an apparatus for producing woven fabric bags

Fig. 2 depicts a perspective view of a bottom-opening station in an apparatus according to the invention

Fig. 3 depicts the view III - III in Figure 2

Fig. 4 depicts the view IV - IV in Figure 3

Fig. 5 depicts the view V - V in Figure 3

Fig. 6 depicts the view VI - VI in Figure 3

Fig. 7 depicts the view VII - VII in Figure 3

Fig. 8 depicts the view VIII - VIII in Figure 3

Fig. 9 depicts the view IX - IX in Figure 3

Fig. 1 depicts schematically individual steps for the processing of a woven fabric tube into bags, as they take place in the bag-producing apparatus 1.

The woven fabric tube 2 is first supplied to the bag-producing apparatus 1. This takes place advantageously by unwinding the woven fabric tube constituting a reel 3 in an unwinding device 4. The tube 2 can then undergo so-called opening in the opening station 5. In the process, the woven fabric tube is guided around an internal tool, which separates the two layers from one another, such that the layers are separated in the event that they were bonded together in one of the manufacturing steps of the tube. Only in the case of separated layers is it possible to ensure that the following production steps can be properly carried out. The material layers of the tube that have been separated from one another are subsequently laid on top of one other again.

The woven fabric tube is now fed to the cross-cutting device 6, which separates the woven fabric tube into individual flexible-tube pieces.

A change is then made from the original transporting direction z, in which the tube or the flexible-tube pieces were transported in the direction of their longitudinal axes, to the new transporting direction x, such that the flexible-tube pieces are now no longer transported in the direction z of their tube longitudinal axis (also referred to below as the direction in which the flexible-tube pieces extend), but transversely thereto, such that the ends of the flexible-tube pieces are accessible from the side for the purpose of forming the bottoms.

In the following station, being the bottom-opening station 8, both ends of each flexible-tube piece are opened, and the so-called bottom rectangles are laid in position. In the following valve station 9, a valve is positioned on and secured to one of the two open ends. The open bottoms are now closed in the bottom closing station 10, wherein two flaps are laid one on top of the other and are connected permanently to one another, for example by welding. The actual bag production process is completed by the application of a bottom cover sheet to each of the bottoms in the cover sheet station 11. The cover sheets can likewise be attached by welding for this purpose. The finished bags are subsequently deposited on the stack of bags 12 and are transported away from that point in a manner that is not described in more detail here.

Fig. 2 depicts details of a bottom-opening station 8 in an apparatus according to the invention. The flexible-tube pieces 13 are transported by means of a transport device shown in the following figures in the direction x of the surface of a support 14, for example lying flat, that is to say substantially horizontally, on the surface of a table. Transport preferably takes place at a uniform speed, that is to say in a continuous transport. In order to open one end 15 of the flexible-tube piece, said end is first brought from the horizontal layer into a vertical position. In order to facilitate this folding, the flexible-tube piece must be impinged upon by a counter-layer.

The flexible-tube piece 13 is threaded for this purpose under a folding element 16 representing the counter-layer. Said folding element 16 is securely attached to the machine frame or to the support. This means that the flexible-tube pieces 13 are displaced relative to the folding element. In order to prevent the flexible-tube pieces from becoming caught on the folding element 16, an additional transporting device, for example a transport belt 30, is provided under the folding belt (see Figures 6 to 9). One or more rollers can be provided in the region of the folding element 16, in order to be able to press the respective flexible-tube piece onto the transport belt 30. Once the flexible-tube piece 13 has been threaded in, it is subsequently guided past a guide element 17, for example past a guide plate. Said guide plate is shaped so that the end 15 of the flexible-tube piece 13 is brought successively into a vertical position to either side of the fold line 27 (which the bottom centre line represents).

The flexible-tube piece 13 subsequently reaches the actual bottom opening device 18, which is represented only schematically in this Figure. The flexible-tube piece passes through the stamping device 26 on its way to the bottom-opening station. Here the end 15 of the flexible-tube piece 13 is folded further upwards by one or a number of guide elements 25, such that it is folded back onto the flexible-tube piece. The folding back above all affects the region in the vicinity of the fold line, whereas the further regions can remain in a vertical position. This is particularly advantageous, since the entire end

must be in a vertical position once more for the bottom opening. After folding back is complete, the flexible-tube piece 13 passes through the pair of rollers, which is formed from a stamping element 28 and a mating element 29.

Two suction bars, which engage to either side of the upward-folded end and are guided in or against the direction z, are provided in the bottom opening device 18, such that the material layers are separated from one another. The interior of the end 15 of the flexible-tube piece 13 is now accessible. Expanding elements now engage in this interior space, which force the material layers further apart until they are lying horizontally once more. This situation is represented by means of the opened bottom 19.

Opening of the second end 15' of the flexible-tube piece 13 proceeds in the same way. The stamping device in particular is configured identically. However, the processing of the second end 15' proceeds offset in relation to the processing of the first end 15. The first end has already been opened in the bottom opening device 18, whereas the second end 15' is guided under the folding belt 16'. The opened bottom 19' is produced in the previously described manner by means of the guide element 17' and the bottom opening device 18'. Before the flexible-tube piece 13 reaches the second bottom opening device 18', it passes through the stamping device 26'. An offset arrangement of the component parts is advantageous if bags with very small bottom centre distances A are to be produced. In this case, the stamping devices 26, 26' can also be arranged offset in relation to one another. One possible arrangement would be for the (second) stamping device 26' to be arranged opposite the (first) bottom opening device 18.

Upon leaving the bottom-opening station 8, the flexible-tube piece is present with opened bottoms 19, 19', wherein all the component parts of the opened bottoms lie substantially in the plane of the support 14.

One particular aspect of the bottom-opening station 8 can be appreciated from the fact that each bottom opening device 18, 18' is supplied with torque by its own drive. This is illustrated by the motor 22 on the bottom opening device 18. The corresponding motor on the bottom opening device 18' is not visible in the represented view. The motor of a bottom opening device 18, 18' above all supplies the suction strips with a driving torque, such that the latter are able to move the material layers away from one another. The expanding elements are also supplied with torque by this motor. These drives for the bottom opening devices 18, 18' are able to drive respectively one or both rollers 28, 29 of the stamping devices 26, 26' through a gearbox.

The closure of the bottom opening devices 18, 18' is formed by the pressure rollers 23, 23', which serve the purpose of compressing the freshly opened bottoms and thereby fixing them in their position. The folded edges that have come about as a part of the bottom opening are thus further spread out in the process and then form proper folding edges, such that the tendency of the bottoms to stand up again is reduced. Either the support 14 or the counter-pressure rollers 24, 24' act as the counter-pressure element for the pressure rollers 23, 23'. The pressure rollers 23, 23' are arranged at the same height when viewed in the transporting direction x in Figure 2. These rollers 23, 23' can also be arranged offset in relation to

one another, however, such that the opened bottoms can also be compressed in the described manner immediately after the opening process.

Figure 3 depicts the view III - III in Figure 2 and thus details of the stamping device 26. The representation of flexible-tube pieces has been dispensed with in this view, however, in the interests of greater clarity. The support 14, the folding element 16 and the guide element 17 can be seen initially in this view. A further guide piece 31, which prevents the end of the flexible-tube piece from returning into the region of its folding edge, is arranged in the region in which the guide element 17 has brought the end of the flexible-tube piece 13 into a vertical position. In the further course of the transport of the flexible-tube pieces in the transporting direction x, the guide element 25 is secured to the guide piece 31, which can be effected, for example, by means of screws. Adjoining the guide element 25 is a pulling roller 32, by means of which the end of the flexible-tube piece are pulled substantially in the direction in which the flexible-tube pieces z extend, such that these touch the operating edge 33 of the folding element 16. Were this touching not to be assured, the introduction of the folding edges with positional accuracy could not be guaranteed. The axis of rotation of the pulling roller is inclined. As a result, it comprises a component in the x-direction, in the z-direction and also in the y-direction. The peripheral surface in this case lies parallel to the inclined surface 34 of the folding element 16 (see Figure 6).

After the folding edge 27 of the flexible-tube piece 13 has been secured in the described manner, the flexible-tube piece 13 enters the gap between the stamping roller 28 and the counter-roller 29. The counter-roller 29 is driven with a lead by a drive via a pulling element, for example via a toothed belt 35. The toothed belt 35 transmits its driving force onto a toothed wheel 41, which is securely connected to the roller 29. onto The stamping roller 28 presses with a defined force against the peripheral surface of the counter-roller 29. For this purpose, the stamping roller 28 is mounted in a freely rotatable manner at one end of a lever arm 36. The lever arm 36 in turn is rotatably mounted in a fixed support 37. The second end of the lever arm 36 is connected to a piston cylinder unit 38, which applies a force, which is represented here by the arrow F. The piston cylinder unit can be operated with compressed air, wherein the air pressure can be approximately 3 bar. The effect of the aforementioned force enables the fold line 27 to be stamped sufficiently well, without damage being caused to the material of the flexible-tube pieces 13.

The stamping roller 28 is advantageously driven in a likewise manner, which is explained in more detail on the basis of Figure 4. If this were not to be the case, it would require to be accelerated initially by a flexible-tube piece 13, although this could lead to damage being caused to said flexible-tube piece. The drive of the stamping roller 28 is effected, however, through friction with the counter-roller 29. For this purpose, both rollers 28 and 29 respectively have on their outer circumference an O-ring 39 and 40, which O-rings roll on one another. The O-rings are disposed in such a way that they do not come into contact with the flexible-tube piece 13 (see Figure 9). The contact between the O-rings may be released if a flexible-tube piece 13 is present in the roller nip, as depicted in Figure 9. At this moment, the stamping roller 28 is caused to move by the flexible-tube piece 13. The transfer of a light torque through the flexible-tube piece 13 onto the roller 28 in order to compensate for the rolling resistance is

unproblematic in contrast with the acceleration of a stationary roller 28 and does not result in any appreciable damage to the flexible-tube piece 13.

Figure 5 depicts the view IV - IV in Figure 3. The guide element 25 that is arranged inclined in relation to the transporting direction x, which overlaps the folding element 16 in the course of the transporting direction x, can be seen in this Figure. The pulling roller 32 as well as its spatial arrangement are also clearly visible.

Figures 6 to 9 depict various views depicted in Figure 3, wherein the flexible-tube piece 13 is represented here in each case. The sequence of actions required for stamping the fold line 27 is illustrated by these figures. Figure 6 depicts in addition the horizontally arranged end 15 of the flexible-tube piece 13, after it has been threaded under the folding element 16. The edge 42 of the flexible-tube piece 13, on which the upper wall 43 and the lower wall 44 are connected together, can be seen represented with broken lines.

The flexible-tube piece 13 is transported by means of the transporting device 45, which, for example, comprises the flexible-tube piece 13 rotating at the speed of transport between two transport belts 46 and 47. A further transport belt 30 can be provided here in order to assist the proper feeding of the flexible-tube piece 13 in the region of the folding element 16. The wedge-shaped design of the folding element 16 can be appreciated, which at its thinnest point comprises the operating edge 33, which determines the position of the subsequent folding edge 27. The position of the folding edge is depicted by the broken line 48. The flexible-tube piece 13 is already present in the region of the guide element 17.

In Figure 7, the end 15 of the flexible-tube piece 13 has been brought into a vertical position by the guide element 17 and has thus been folded around the folding edge 27.

Figure 8 depicts the situation in which the guide element 25 has impinged upon the end 15 of the flexible-tube piece 13 and has moved further around the operating edge 33 of the folding element 16. The angle by which the end is moved is more than 90 degrees, preferably more than 135, and in particular more than 150 degrees. Also visible here, furthermore, is the guide piece 31, which prevents the folding edge 27 from rolling outwards, that is to say against the direction z. Regions of the end 15 in this case can be held in a vertical position by means of guide devices that are not represented here.

The final Figure 9 depicts the action of the stamping roller 28 and the counter-roller 29 on the wall 44 of the flexible-tube piece 13. The stamping roller 28 in this case touches the wall 44, which may be considered here as a component part of the end 15 of the flexible-tube piece 13, whereas the counter-roller acts upon the wall 44 of the flexible-tube piece 13. The folded edge 27 is disposed between these two operating areas. The wall 43 is not touched by the rollers 28, 29.

List of Reference Designations	
1	bag-producing apparatus
2	woven fabric tube

List of Reference Designations	
3	reel
4	unwinding device
5	opening station
6	cross-cutting device
7	
8	bottom-opening station
9	valve station
10	bottom closing station
11	cover sheet station
12	stack of bags
13	tube piece
14	support
15 15'	flexible-tube piece end
16 16'	folding element
17 17'	guide element
18 18'	bottom opening device
19 19'	opened bottom
20	
21	
22	motor
23 23'	pressure roller
24 24'	counter-pressure roller
25	guide element
26 26'	stamping device
27	fold line
28	stamping element
29	mating element
30	transport belt

List of Reference Designations	
31	guide piece
32	pulling roller
33	operating edge
34	inclined surface of the folding element 16
35	toothed belt
36	lever arm
37	fixed support
38	piston cylinder unit
39	O-ring
40	O-ring
41	toothed wheel
42	edge of the flexible-tube piece 13
43	upper wall
44	lower wall
45	transporting device
46	transport belt
47	transport belt
A	bottom centre distance
F	representation of force
x	transporting direction
y	
Z	tube longitudinal axis

Berendezés és eljárás zsákok előállítására tömlődarabokból

Szabadalmi igénypontok

1. Berendezés (1) zsákok előállítására tömlődarabokból, amelyek előnyösen nyújtott műanyag szalagokból készített szövetből állnak és két egymás feletti fallal (43, 44) rendelkeznek, ahol a berendezésben (1) legalább a következő egységek vannak elrendezve:

– egy továbbító szerkezet (45), amellyel a tömlődarabok a kiterjedési irányukra (z) keresztirányban húzódó továbbítási irányban (x) megmunkáló állomásokhoz (8, 9, 10, 11) továbbíthatók,

– egy fenékfelnyitó állomás (8), amellyel a tömlődarab legalább egyik falához tartozó tartományoknak fenék-visszahajtási élek körüli átfordításával egy tömlődarab legalább egyik végén nyitott végszakaszok hozhatók létre,

– egy lezáró állomás, amellyel a falak részeinek és/vagy füleknek további visszahajtási élek körüli átfordítása révén a nyitott fenék-téglalapok fenékké zárhatók össze,

– egy prégelő szerkezet (26, 26'), amellyel a fenék-visszahajtási él és/vagy a további visszahajtási élek legalább egy része a tömlődarabokba beprégelhető, és amely egy prégelőelemet (28) és egy hozzárendelt ellenelemet (29) tartalmaz,

azzal jellemezve, hogy

– egy átfordító szerkezet van elrendezve, amellyel mindkét fal tartományai a fenék-visszahajtási élek körül több mint 90°-kal átfordíthatók, és

– hogy a prégelőelem (28) és a hozzárendelt ellenelem (29) az átfordító szerkezet után van elrendezve, ahol az átfordított falak oly módon juttathatók be a prégelőelem (28) és az ellenelem (29) közé, hogy azok a tömlődarab ugyanazon falával állnak érintő érintkezésben.

2. Az 1. igénypont szerinti berendezés (1), ***azzal jellemezve,*** hogy a prégelőelemet (28) és a hozzárendelt ellenelemet (29) görgők képezik.

3. Az előző igénypontok bármelyike szerinti berendezés (1), ***azzal jellemezve,*** hogy a prégelőelem (28) és az ellenelem (29) külső felülete rugalmas bevonattal van ellátva.

4. Az előző igénypontok bármelyike szerinti berendezés (1), ***azzal jellemezve,*** hogy a prégelőelemhez (28) és/vagy az ellenelemhez (29) egy olyan hajtás van hozzárendelve, amellyel az egyik elem vagy mindegyik elem olyan kerületi sebességgel hajtható meg, amely nagyobb, mint a tömlődarabok továbbítási sebessége.

5. Az előző igénypontok bármelyike szerinti berendezés (1), ***azzal jellemezve,*** hogy a prégelőelem (28) vagy az ellenelem (29) a mindenkori másik elem által súrlódásos kapcsolódással hajtható meg.

6. Az előző igénypontok bármelyike szerinti berendezés (1), ***azzal jellemezve,*** hogy a prégelőelem (28) vagy az ellenelem (29) egy erőkifejtő szerkezet által a másik elemhez hozzáállítható.

7. Az előző igénypontok bármelyike szerinti berendezés (1), ***azzal jellemezve,*** hogy a fenék-visszahajtási él legalább egy olyan visszahajtó elem (16, 16') által határozható meg, amelynek a munkaéle párhuzamosan húzódik a tömlődarabok továbbítási irányával (x).

8. Az előző igénypontok bármelyike szerinti berendezés, ***azzal jellemezve,*** hogy legalább egy olyan vezetőelem (25) van elrendezve, amellyel a tömlődarab falai átvethetők a visszahajtó elem (16, 16') munkaéle körül.

9. Az előző igénypontok bármelyike szerinti berendezés, *azzal jellemezve*, hogy a visszahajtó elemhez (16, 16') egy húzóelem (32) van hozzárendelve, amely oly módon hat a tömlődarab falaira, hogy azok szorosan felfeküdjenek a visszahajtó elemre (16, 16').

10. Az előző igénypontok bármelyike szerinti berendezés (1), *azzal jellemezve*, hogy a húzóelem (32) egy görgőt tartalmaz, amelynek forgástengelye mind a továbbítási síkhoz (x-y), mind pedig a tömlődarabok kiterjedési irányához képest meg van döntve.

11. Eljárás zsákok előállítására tömlődarabokból, amelyek előnyösen nyújtott műanyag szalagokból készített szövetből állnak és két egymás feletti fallal (43, 44) rendelkeznek, ahol az eljárás legalább a következő lépéseket tartalmazza:

– egy továbbító szerkezet segítségével tömlődarabokat továbbítunk megmunkáló állomásokhoz (8, 9, 10, 11) egy, a tömlődarabok kiterjedési irányára (z) keresztirányban húzódó továbbítási irányban (x),

– nyitott végszakaszokat hozunk létre a tömlődarab legalább egyik végén a tömlődarab legalább egy falához tartozó tartományoknak egy fenékfelnyitó állomás (8) általi átfordításával egy fenék-visszahajtási él körül,

– a nyitott fenék-téglalapokat egy lezáró állomás révén fenekekké zárjuk össze falak részeinek és/vagy füleknek átfordításával további visszahajtási élek körül,

– a fenék-visszahajtási élnek és/vagy a további visszahajtási éleknek legalább a részeit beprégeljük a tömlődarabokba egy prégelő szerkezettel (26, 26'), amely egy prégelőelemet (28) és egy hozzárendelt ellenelemet (29) tartalmaz,

azzal jellemezve,

hogy egy átfordító szerkezettel mindkét fal tartományait több mint 90°-ban átfordítjuk a fenék-visszahajtási élek körül, és

hogy a prégelőelemet (28) és a hozzárendelt ellenelemet (29) a tömlődarab ugyanazon falával hozzuk érintő érintkezésbe.

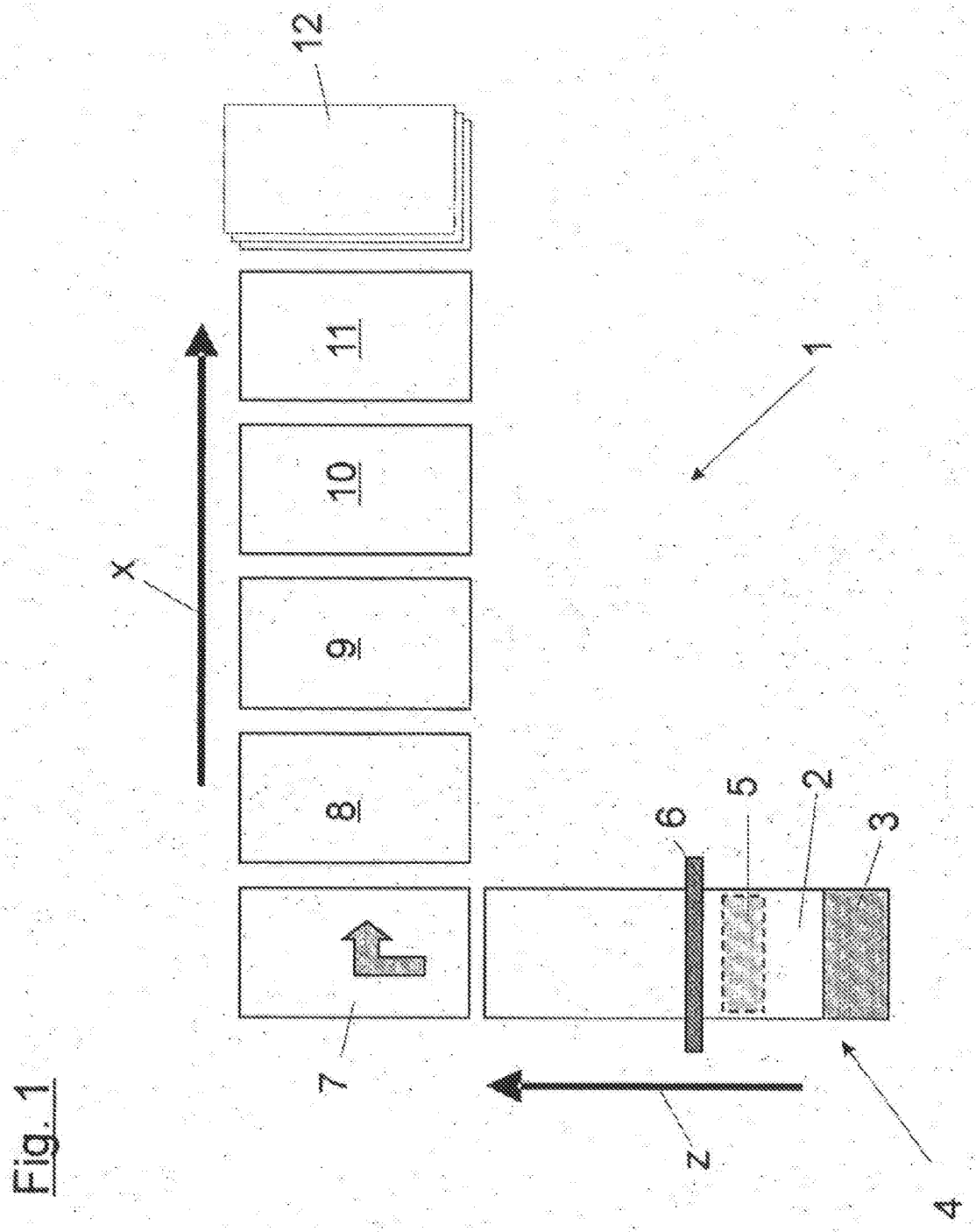


Fig. 1

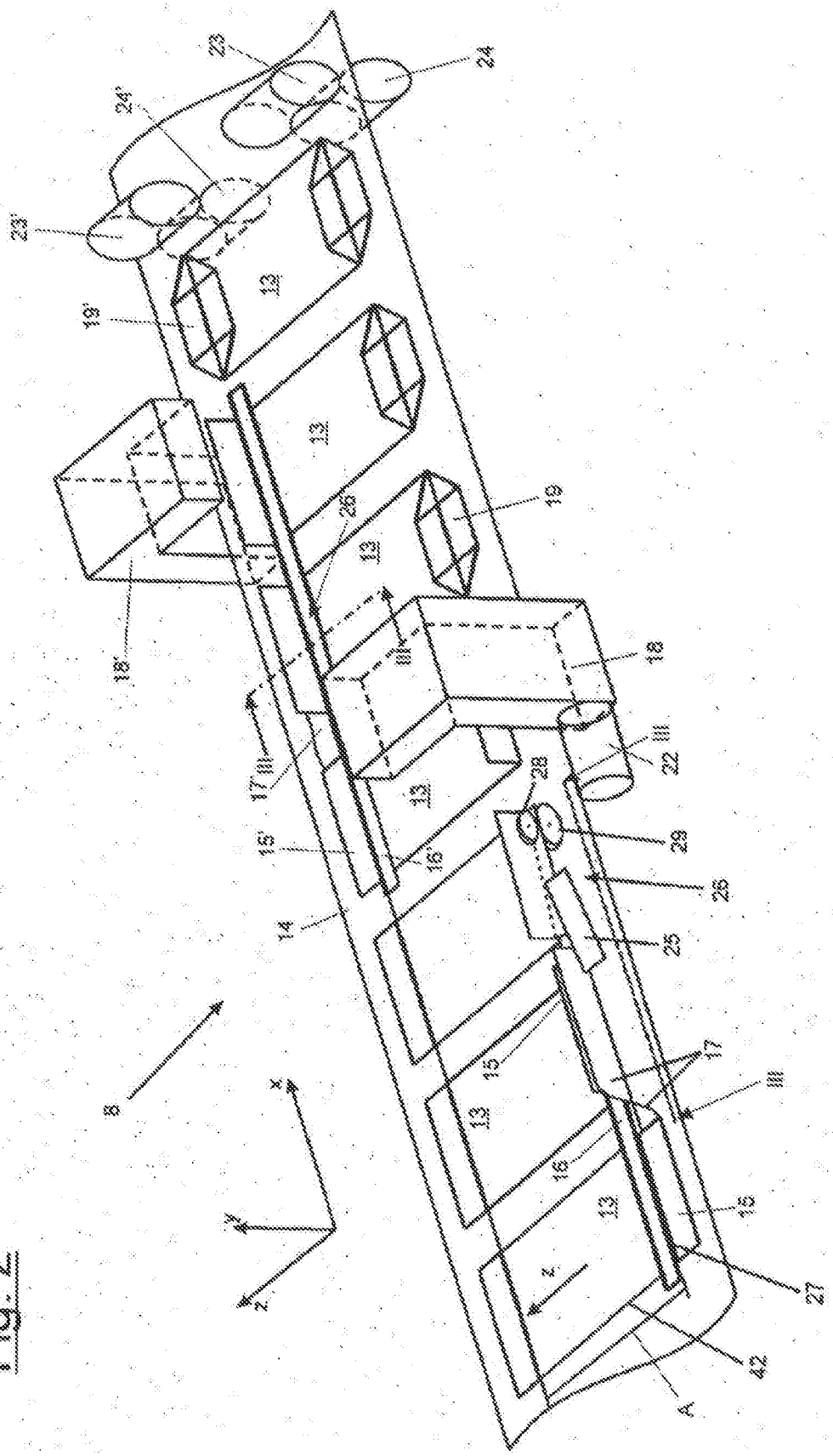

23
24
24'
23'
19'
13
14'
19
18'
III
17
III
18
22
III
28
29
16'
16
26
14
25
8
x
15
17
III
y
z
13
16
19
27
42
A

Fig. 2

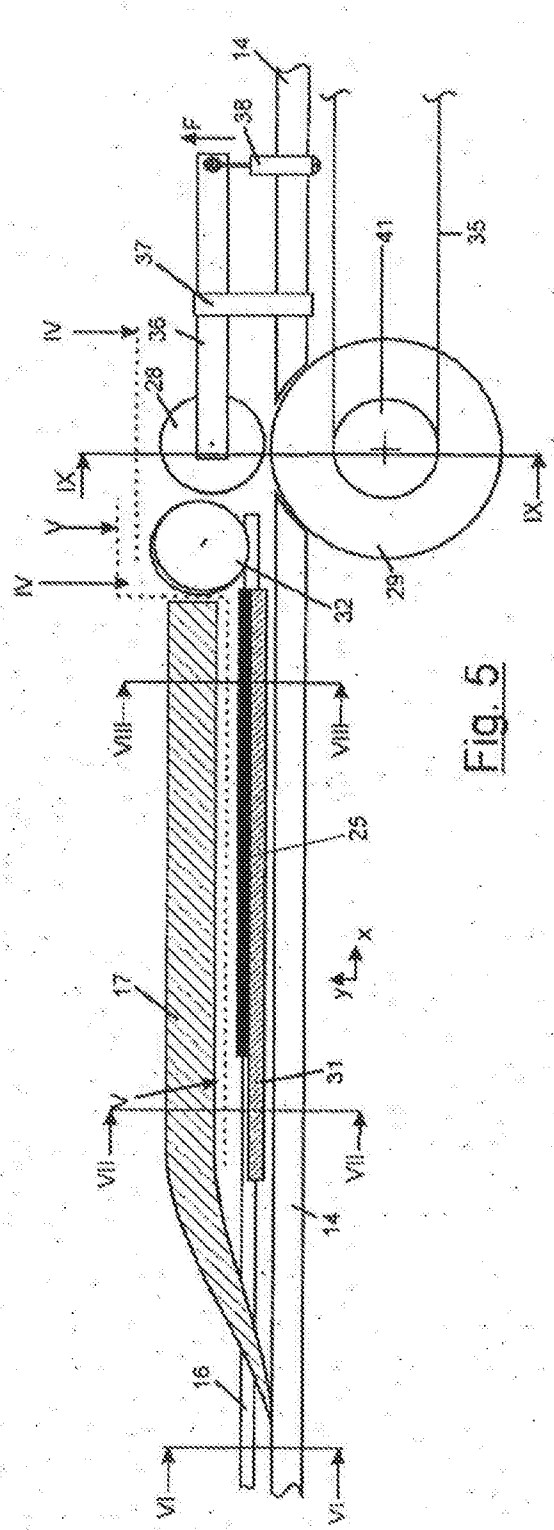


Fig.3

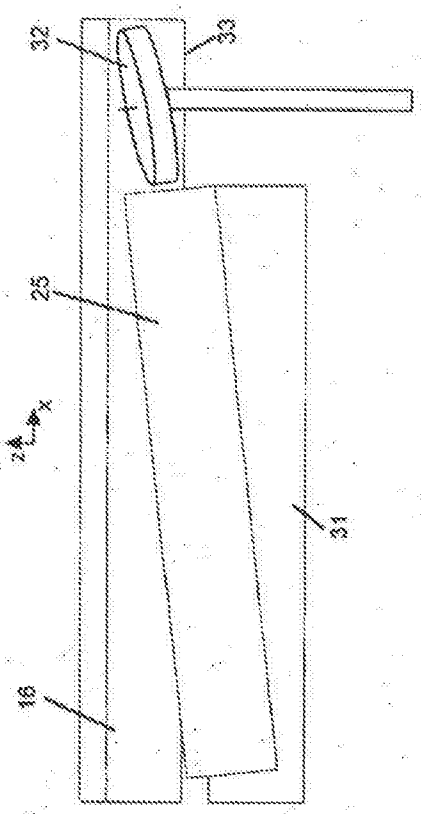


Fig.5

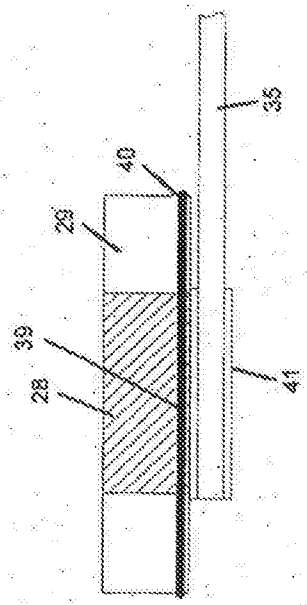


Fig.4

Fig. 6

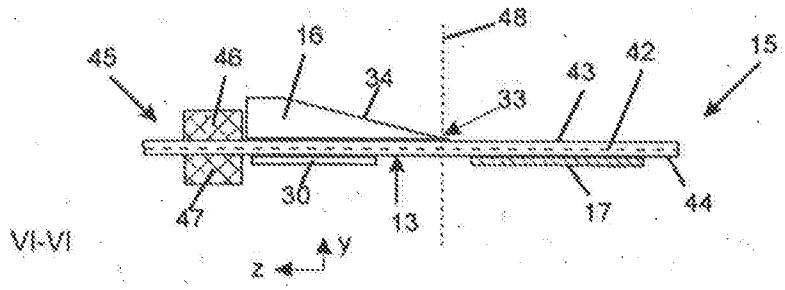


Fig. 7

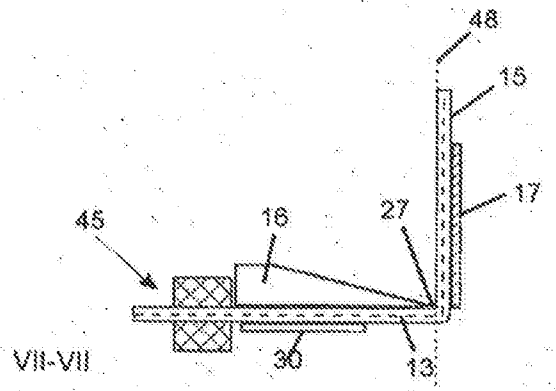


Fig. 8

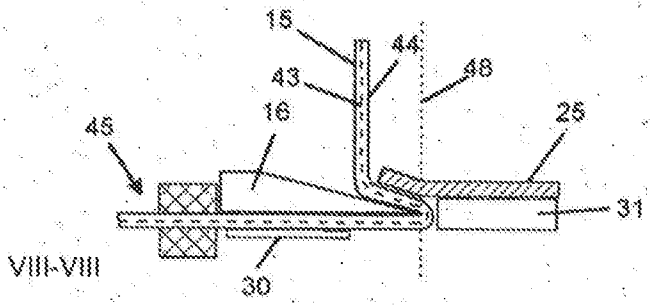


Fig. 9

