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(54) **Eljárás legalább egy paraméter beállítására egy jármű egy vezérelt rendszerében**

Description

[0001] The invention relates to a method and a device for producing bags, the walls of which contain stretched polyolefin material.

[0002] Devices and methods for producing plastic bags are known. In this case, tube pieces made of plastic often serve as starting workpieces, which may consist, for example, of a coated plastic fabric. This plastic fabric is often made from stretched plastic bands which are woven on a loom into a round fabric. Another possibility is the production of a flat fabric, which is later formed into a tube by joining the longitudinal sides.

[0003] The coating of the plastic fabric may take place in two ways. Thus, the stretched webs may be coated before weaving. However, it is advantageous to provide the finished fabric as a whole with a one-sided or double-sided coating.

[0004] The structure of the fabric of stretched plastic bands and a coating imparts particular properties to this material. The stretched plastic bands are highly tear-resistant and lead to high strength in the case of a workpiece produced therefrom, as a result of the interweaving in all possible load directions. However, in order to be able to connect different components of such workpieces together, a coating is provided which strongly adheres to the plastic bands. These coatings may be fused together by chemical or thermal processes, when two components of these tube pieces or bags are to be joined. The attempt to connect the plastic bands directly to one another in such processes often leads to impairment of the strength. This is especially true when heat is applied to the plastic bands.

[0005] In the production of bags from a coated plastic fabric, components, for example, locks or flaps of the subsequent bottom, are connected to one another. The production process proceeds as follows: Firstly, at least one end of a tube part separated from a tube is brought up and stretched out to produce an open bottom rectangle and lateral, triangular corner inserts. Subsequently, a valve slip or a valve tube piece may be inserted into the open bottom. This is usually combined with the bottom in the context of a sealing operation using hot air. The bottom is now closed by the longitudinal edges of the bottom rectangle not adjoining the corner inserts, being folded together and connected to one another as well as to the corner inserts and/or to the workpiece forming the valve. Finally, a so-called bottom cover sheet may be attached to the bottom to give it even higher strength. All the

aforementioned joining processes are made possible by the use of hot air according to the state of the art. The positioning of the bag components against each other generally takes place in a roller gap.

[0006] US 6 134 387 A, US 4 625 495 A, EP 1 719 705 A1, US 4 210 480 A, GB 655 893 A and SU 1 482 815 A1 disclose hot-air welding processes and apparatuses in which the components to be connected to each other are respectively exposed to hot air from the outside. In the manufacture of bags whose walls contain woven polyolefin fabrics, this approach reduces the durability of these bags

[0007] A device for the production of cross or block bottom bags from the plastic material in question is shown, *inter alia*, by DE 195 02 255 C2. Further devices for this purpose are disclosed in US 2002/084028 A1 and EP 0 953 429 A2.

[0008] In the above-mentioned methods, a continuous air flow, which is generally produced with a radial compressor, is fed past a heating device to heat the air. The heated air flow is then passed through a way valve, which is designed as a temperature-resistant rotary valve to convey the air flow to a slot die when a bag is in the filling station. If there is no bag in the filling station, the way valve changes to a different switching state and directs the air into an exhaust tube, which deflects the air.

[0009] One constant endeavor in the specialist world is to increase the production speed of bagging machines. In order to be able to achieve a higher speed in the temperature-induced joining of bag components as well, DE 10 104 002 B4 proposes the insertion of slips, i.e. in particular, valve slips or bottom cover sheets, even before the actual joining process during which the slips are subjected to pressure loads and additional temperature input to the bag bottoms to be heated up.

[0010] In a similar context, EP 2 125 353 B1 proposes preheating the bag bottoms, which are often acted upon by hot air with the aforementioned slips.

[0011] The above-mentioned measures certainly contribute to an acceleration of bag production. However, there is still a need for even faster production equipment and processes.

[0012] Therefore, the object of the present invention is to provide a further contribution to the acceleration of the production of bags whose walls contain stretched polyolefin material.

[0013] This object is achieved according to the claims 1 and 6.

[0014] The present invention makes use of the fact that the pulsating air flow only absorbs maximum amounts of thermal energy when it is used for joining. Therefore, there is no unnecessary cooling of heating elements during the intervals when there are no bags in the joining station.

[0015] A pulsating air flow is an air flow with varying flow velocity. Often, regular changes occur, which lead to a sinusoidal dependence on time, when the air flows do not have to come to a complete standstill.

[0016] The further advantages of the invention include that, as a rule, no complex, relatively temperature-independent, way valves (rotary valves) are necessary to carry out the method. These rotary valves are expensive, often leak and have a large heat capacity. In particular, when these valves are not used in the implementation of the present invention, inter alia, the entire air flow is interrupted when there is no bag in the joining station, wherein the invention also allows great energy savings to be obtained.

[0017] Air flows may be caused by pressure gradients. According to the invention, a pulsating air flow is produced with a pressure reservoir and a valve-like switching element. A special case of a pulsating air flow is an air flow which is temporarily and completely interrupted, which may mean that the valve is completely closed during the aforementioned type of production of the relevant air flow. A temperature-induced joining process is a joining process that takes place with temperature input. Adhesive processes which take place in this manner are also conceivable. As a rule, bag walls which contain stretched polyolefin material also contain a further plastic or polyolefin component which has a lower melting and/or softening temperature than the stretched material. In this context, woven fabrics made of stretched polypropylene bands which are laminated with a low-melting polyolefin, or otherwise somehow coated, are typical.

[0018] The temperature input with hot air heats the lower melting material until it is sealed or welded. It is advantageous if, at this point, the stretched material has not yet reached the temperature at which it loses, or starts to lose, its properties acquired during the stretching process.

[0019] A pressure reservoir in the sense of the present application is present when a chamber has a higher pressure than its surroundings. Such a pressure reservoir may be

a compressed air bottle, but it may also be a chamber into which a suitable blower presses in air and thereby compresses the air. In this case, the blower may also be operated in a controlled manner, wherein the desired value to be achieved may be a specific pressure value. The blower or the compressor may operate continuously during several joining processes.

[0020] There are a number of advantageous possibilities for the continuous provision of air at a higher pressure. Due to the high demand for air in the bag production process, it is advantageous if a suitable compressor or supercharger is in a working position with at least one pressure reservoir. The working position may be where a compressor is assigned to one or more pressure reservoirs, i.e. is connected to them via lines. However, compressors or superchargers may also supply a compressed air system that provides compressed air for different components of the bag factory.

[0021] One advantageous way of providing the compressed air in the present context, is a turbocharger.

[0022] The term air is used in connection with the present document as a synonym for gaseous media. Of course, suitable gases such as nitrogen may also be used instead of air. This is especially true if oxidation is to be feared during the heating of the bag material.

[0023] The air may advantageously be guided through a plurality of channels. These channels may be downstream of the valve and they may be used to heat the air. In this connection, it is advantageous if the channels are made of a metal, preferably aluminum, copper or brass. An advantageous possibility consists in the provision of a "channel plate or nozzle plate" provided with grooves or bores which form the channels. This plate may be heated by at least one heating device, such as a thermocouple. A heating cartridge or a Peltier element is often used as a thermocouple.

[0024] It is advantageous if the channels cause the air flow to fan out, i.e. produce a wide air flow, for example, from a narrow air flow. Preheating the bag components to be joined is also advantageous. In this case as well, a pulsating air flow may be advantageously used in the sense of the devices and methods presented in this publication. It is of great advantage if at least one pressure reservoir is used in the manner discussed above. This at least one pressure reservoir may be heated. The ideal gas equation must be observed.

Thus, it is advantageous to control the heating according to the temperature, to control the pressure in the reservoir and/or to provide at least a pressure-relief valve.

[0025] Further exemplary embodiments of the invention will become apparent from the following description and the drawing.

[0026] The individual figures are as follows:

Fig. 1 shows a side view of a workstation in a device for producing bags, the components of which contain stretched polyolefin material.

Fig. 2 shows a (lateral) functional diagram of means for generating a hot air flow according to the prior art

Fig. 3 shows a (lateral) functional diagram of means for generating a hot air flow according to the invention

Fig. 4 shows a (lateral) functional diagram of further means according to the invention for generating a hot air flow

Fig. 5 shows a (lateral) functional diagram of further means according to the invention for generating a hot air flow

Fig. 6 shows a functional diagram (as a top view) of further means according to the invention for generating a hot air flow

Fig. 7 shows a functional diagram (as a plan view) of further inventive means for generating a hot air flow

[0027] As has already been explained in detail in the introductory description, a plurality of process steps are necessary in the production of bags made of coated plastic fabric tubes. In particular, corresponding workstations must be provided for connecting different components of the later bags. Specifically, these are: a workstation for applying valve slips, workstations for permanently closing the bottoms, and workstations for applying bottom cover sheets to reinforce the bottoms of the bags. The use of workstations for applying the bottom cover sheets may be dispensed with as necessary. Further workstations are conceivable.

[0028] As a rule, the workstations duplicated, so that the corresponding work may be carried out simultaneously at both ends of the tube pieces, which are generally conveyed transversely to the longitudinal axis of the tube. The number of workstations for introducing

the valve slips or tubes may deviate from this rule, depending on the desired number of valves.

[0029] Fig. 1 shows the side view of such a workstation 1 in a device according to the invention, which is a workstation for applying bottom cover sheets 3, 3' to bags 2, 2'. The transversely-conveyed bags 2, 2' lie on a table 4 and are transported in the transport direction z by a suitable transport means (not shown). The prepared bottoms already laid are also placed in the plane of the table. However, the invention is not limited to this; rather, the bottoms may also lie in a plane which is orthogonal to the plane which is stretched by the plane of the table.

[0030] A web material 6, from which the bottom cover sheets 3, 3' are cut, is fed via a feed 5 to the workstation 1. For this purpose, the leading end of the web material 6 is detected by the cutting cylinder 7 and the transport belt 8 and is advanced and cross-cut by the cutting device 9 integrated in the cutting cylinder 7 (not shown). The so-formed bottom cover sheet 3, 3' is picked up by the suction cylinder 10 and placed on the bottom of the bag 2, 2'. The suction cylinder 10 forms a roller gap 12 with the counter-pressure cylinder 11. In this way, the bottom cover sheet 3' is pressed onto the bag 2' under high force. In Fig. 1, a part of the bag 2' with the bottom cover sheet 3' has already been guided through the gap. On the inlet side of the roller gap 12 are arranged means to generate a hot air flow 13, whose hot air flow 18 is directed into the inlet side of the roller gap 12. The hot air causes melting of the coating both on the bottom of the bag 2 'and on the bottom cover sheet 3'. As may be gathered from Fig. 1, the coatings of the surfaces are melted or plasticized and are brought together immediately thereafter. The surfaces of the still-melted coating material are brought together in the rolling gap 12, so that the coatings now form an intermediate layer, which may be regarded as homogeneous, between the bottom cover sheet and the bottom, which permanently connects the components mentioned after cooling.

[0031] A preheating device 20 is pre-positioned in the transport direction z, to preheat the next tube piece or the next bag 2, so that the material of the bag 2 does not receive as much heat before plasticization through the means for generating a hot air flow 13 of the surface coating, as would be the case if the bag still had ambient temperature shortly before the inlet into the roller gap 12. In this way, the amount of hot air passed through

the nozzle 14 per unit of time may be reduced and/or the temperature of the hot air flow may be reduced and/or the residence time of the components to be heated in the hot air flow may be shortened. The structure and function of the means for generating a hot air flow will be explained below with reference to Fig. 2 to 7.

Fig. 2 shows means for producing a hot-air flow 13 according to the state of the art, in which a blower 15 generates a continuous air flow, which is fed through a tube 17 to a heating device 16. In this case, the airflow temperature rises. The resulting hot air flow 18 is then fed to the way control valve 23. This way control valve 23 conducts the hot air alternately to the exhaust tube 22 and the nozzle 18. The hot air, which flows through the nozzle 14, subsequently contributes to the temperature-induced joining of the bag components (2, 2', 3, 3') in the roller gap 12. When the way valve 23 is set to supply the air to the exhaust tube 22, an exhaust air flow is produced, which is indicated by the dashed arrow 24.

Fig. 3 shows means 13 for producing a hot air flow 18, which may be part of a simple embodiment of the invention. These means 13 for generating a hot air flow are built almost the same as the means 13 described above for generating a hot air flow 18 in Fig. 2. Only the heating cartridges 21 differ in the region of the tube 17 downstream of the valve 23 and also of the nozzle 14 downstream of the valve 23. They are located in a thermally-operative connection to the hot-air flow 18, which is just a pulsing hot-air flow downstream of the valve 23.

In Fig. 2 and 3, the flow path 42 is drawn in as a dashed line. The directed air flow generally follows such a flow path 42 on its way from the location of its generation to the point where the bag components 2, 2', 3, 3' are joined. Heating devices 16, 21 for heating the air flow 18 are arranged to this flow path so that they may heat the air flow 18. In the case of heating cartridges 21, this may mean that these are directly protruding into the air flow 18. However, it may also mean that heating cartridges 21 or other heating devices 16 heat up device elements, which in turn are in direct contact with the air flow.

[0032] In Fig. 4, a compressor is provided, which presses a gaseous medium, preferably air, through the pressure tube 26 into the pressure reservoir 27. Through the tube 17, the air reaches the valve 28, which may function according to a different functional principle than the rotary or way valve 23, which is indicated by the slide 30 and the double arrow

29. Electronic valves which may switch very quickly may be used in this context. The valve is followed by a further tube 17, the nozzle 14 and the heating cartridges 21 in the flow direction x of the hot air. The heating cartridges 21 thus function as a heating device for the hot air flow 18 which pulsates due to the use of the valve 28.

The means 13 for generating a hot-air flow 18 shown in Fig. 5 differ from the means 13 of Fig. 4 in the following features:

The pressure reservoir 27 may already be heated by the heating cartridges 21. Alternatively and additionally, it is possible to thermally isolate the pressure reservoir 27, since the compression of the air by the compressor 25 leads to an increase in the temperature. Alternatively or additionally, the temperature and pressure of the pressure reservoir 21 as well as the heating power of the heating cartridges may be measured or even regulated. A further advantageous measure consists in the attachment of a pressure-relief valve 31, which vents air when a maximum pressure is exceeded. Since the pressure reservoir 27 may now be hot and a temperature-sensitive valve may be used, it is advantageous to produce the tube 17 as thin as possible (but sufficiently pressure-resistant) and of insulating material (e.g. ceramic). The valve 28 may be cooled. This is indicated by the cooling device 32 and the cooling lines 33. It may be a water cooling, but also cooling elements such as Peltier elements are advantageous. The tube downstream of the valve in the air flow direction x may also be thin-walled and insulating. Heating cartridges are again provided for heating the air in the area of the nozzle, through which the pulsating air flow 18 again flows, and which is activated as long as the material to be joined is located in the filling station 1 or in the area of the roller gap 12.

[0033] With the devices shown in Fig. 4 and 5, no pulsating exhaust air flow is generated. This also applies to the device shown in Fig. 6, which is very similar to the two aforementioned devices. The pressure reservoir 27 forms the starting point of the air flow 18, wherein, for example, a suspension of the pressure reservoir 27 has been dispensed with. The weakly heat-conducting tube 17, which may also be made of stainless steel, connects the pressure reservoir 27 to the valve 28, to which a heat sink 39 is assigned. After the passage through the valve 28, the now pulsating airflow passes through the tube

17 into the area of the nozzle plate 34, which is not closed off upwards from its cover plate, so that there is a clear view of the channels 36 in the form of grooves in the nozzle plate. In this way, the nozzle 14 is traversed by channels 36, which fan out the air flow 18. The nozzle plate may be heated, which is indicated by the heating cartridges 21. The heating cartridges are advantageously located in bores of at least one nozzle plate, which is made of a thermally-conductive material such as brass or aluminum. At the end of the nozzle plate, the channels open into a slot die 37.

[0034] The heated and heatable device components in the nozzle area are advantageously insulated with the insulating material 40 against the holder 35, on which the means 13 for producing a hot-air flow 18 are suspended. Thus, the transition of the at least one nozzle plate 34 to the holder may be heat-insulated. The cover plates for the outside air may also contain insulating material 40.

[0035] It is conceivable to manufacture parts of the holder from temperature-resistant plastic.

[0036] Furthermore, the area 38 of the mounting of the holder 35 on the machine frame may contain further insulating material 40 and/or further insulating material 40 may be placed between the holder and the machine frame.

[0037] The heat sink 39 may be a heat sink through which air flows and which has cooling fins. Its operative connection to the valve 28 to be cooled may be brought about by mechanical contact, while the operative connection of the cooling device 32 to the valve 28 in Fig. 5 is produced by cooling lines. In both cases, the valve, is cooled, controlled and measured.

[0038] In Fig. 6 the valve is downstream of the valve in the flow direction x of the air.

[0039] Fig. 7 shows a functional diagram of further means 13 for producing a hot air flow, which contain a plurality of pressure reservoirs 27, tubes 17 and valves 28. Again, the nozzle plate 34 with diverging channels 36 fans out the air flow and distributes it over the width of the slot die. The heating cartridges are arranged in the vicinity of each channel. In this way, their effect may be assigned to one or more channels. In this way, the heating power may be controlled or regulated over the width of the nozzle and, for example, a temperature gradient (for example, hotter on the outside than the inside) may be imparted. In order to improve the assignment of individual heaters to individual or several channels,

the nozzle plate may be interrupted or weakened though slots 41, or it may consist of different components.

List of reference numerals/factors

1	Workstation	24	Exhaust air flow
2,2'	Bag	25	Compressor/turbocharger
3.3'	Bottom cover sheet	26	Pressure tube
4	Table	27	Pressure reservoir
5	Feed	28	Valve
6	Web material	29	Double arrow
7	Cutting cylinder	30	Valve slide
8	Conveyor belt	31	Pressure relief valve
9	Cutting device	32	Cooling device
10	Suction cylinder	33	Cooling line
11	Counter-pressure cylinder	34	Nozzle plate
12	Roller gap	35	Holder
13	Means for generating a hot air flow	36	Channel
14	Nozzle	37	Broad slot nozzle
15	Blower	38	Mounting area of the holder
16	Heating device	39	Heat sink
17	Tube	40	Insulating material
18	Hot air flow	41	Slots in the nozzle plate
19	Rotary valve	42	Flow path
20	Preheating device	x	Flow direction of the hot air
21	Heating cartridge	z	Direction of transport of the bags 2, 2'
22	Exhaust tube		
23	Rotary valve		

SZABADALMI IGÉNYPONTOK

ELJÁRÁS LEGALÁBB EGY PARAMÉTER BEÁLLÍTÁSÁRA EGY JÁRMŰ EGY VEZÉRELT RENDSZERÉBEN

1. Eljárás zsákok (2, 2') előállítására, amelynek falai kifeszített polyolefin anyag szövetet és bevonatokat tartalmaz,

- ahol legalább egy hőmérsékletindukált kötési eljárást alkalmazunk, amelyben az összekötendő anyagok (2, 2', 3, ,3') legalább egy részét egy forró légárammal (18) felhevítjük,

- amely forró légáramot (18) úgy állítjuk elő, hogy először a levegőt egy vagy több melegítő berendezésen (16, 21) átvezetjük és utána az összekötendő anyagra (2, 2', 3, 3') rávezetjük,

- ahol a forró légáramot egy hengerrés (12) bemeneti oldalára vezetjük, és ahol az összekötendő anyag felületének bevonatát megolvasztjuk, és a hengerrésben összenyomjuk,

azzal jellemezve, hogy

a légáramot (18) pulzálva a legalább egy melegítő berendezésbe (16, 21) bevezetjük, ahol legalább a pulzáló légáram (18) előállítására egy szelepet (23, 28) működtetünk, és a szeleppel (23, 28) egy az atmoszférikus nyomásnál nagyobb nyomást tartalmazó nyomástartály (27) nyílását vezéreljük.

2. Az előző igénypont szerinti eljárás, azzal jellemezve, hogy a légáramot (18) két impulzus között megszakítjuk.

3. Az előző igénypontok egyike szerinti eljárás, azzal jellemezve, hogy a nyomástartályt (27) a kötési eljárások között feltöltjük.

4. Az előző igénypontok egyike szerinti eljárás, azzal jellemezve, hogy a levegőt egy zsák (2, 2') aljához vezetett levegőt több csatornán (36) vezetjük oda.

5. Az előző igénypontok egyike szerinti eljárás, azzal jellemezve, hogy az összekötendő anyag (2, 2', 3, 3') legalább egy részét előmelegítjük, mielőtt a pulzáló légárammal (18) egy erőhatás alatt összekötjük.

6. Eszköz zsákok (2, 2') előállítására egy kifeszített polyolefin anyag szövetet és bevonatokat tartalmazó zsákanyagból,

- amely legalább egy állomást (1) tartalmaz a zsákanyag (2, 2', 3, 3') egy hőmérsékletindukált kötéséhez,

- ahol az első állomás (1) egy hengerrést (12) és egy légáram (18) előállítására szolgáló eszközt (13) tartalmaz, amely egy irányított légáram (18) kinyomására van kialakítva,

- ahol az eszköz (13) egy vagy több fűtőberendezést (16, 21) tartalmaz, amelyek úgy vannak a légáramhoz (18) képest elrendezve, hogy a légáramot (18) melegítsék,

- ahol a forró légáram egy eszközön (13) keresztül a hengerrés (13) bemeneti oldalára vezethető, és

- ahol a forró légáram által a zsákanyag felületeinek bevonatai megolvaszthatóak, és a hengerréssel (12) összeköthetőek,

azzal jellemezve,

hogy a légáram irányában (x) legalább egy fűtőberendezéssel (16, 21) szemben legalább egy szelep (23, 28) van elrendezve, ahol a forró légáram a szelep (23, 28) betétje révén pulzál, és

hogy a légáram (18) irányában (x) a szelep (23, 28) előtt legalább egy nyomástartály (27) van elhelyezve.

7. Az előző igénypont szerinti eszköz azzal jellemezve, hogy, a legalább egy nyomástartály (27) fűthető.

8. Az előző két igénypont egyike szerinti eszköz, azzal jellemezve, hogy a legalább egy nyomástartály (27) a nagynyomású levegő tárolására alkalmas.

9. A 6-8. igénypontok egyike szerinti készülék, azzal jellemezve, hogy a légáram (18) vezetésére áramlási irányban (x) a legalább egy szelep (23, 28) előtt legalább két légcsatorna (36) van elhelyezve.

10 Az előző igénypont szerinti eszköz, azzal jellemezve, hogy a legalább két légcsatorna (36) legalább egyike fűthető.

11. Az előző két igénypont egyike szerinti eszköz, azzal jellemezve, hogy a két csatorna (36) legalább egyike az áramlási irányban (x) kiszélesedik.

12. A 6-11. igénypontok egyike szerinti eszköz, azzal jellemezve, hogy egy hűtőeszköz (32, 39) van a legalább egy szeleppel (23, 28) működő kapcsolatban van.

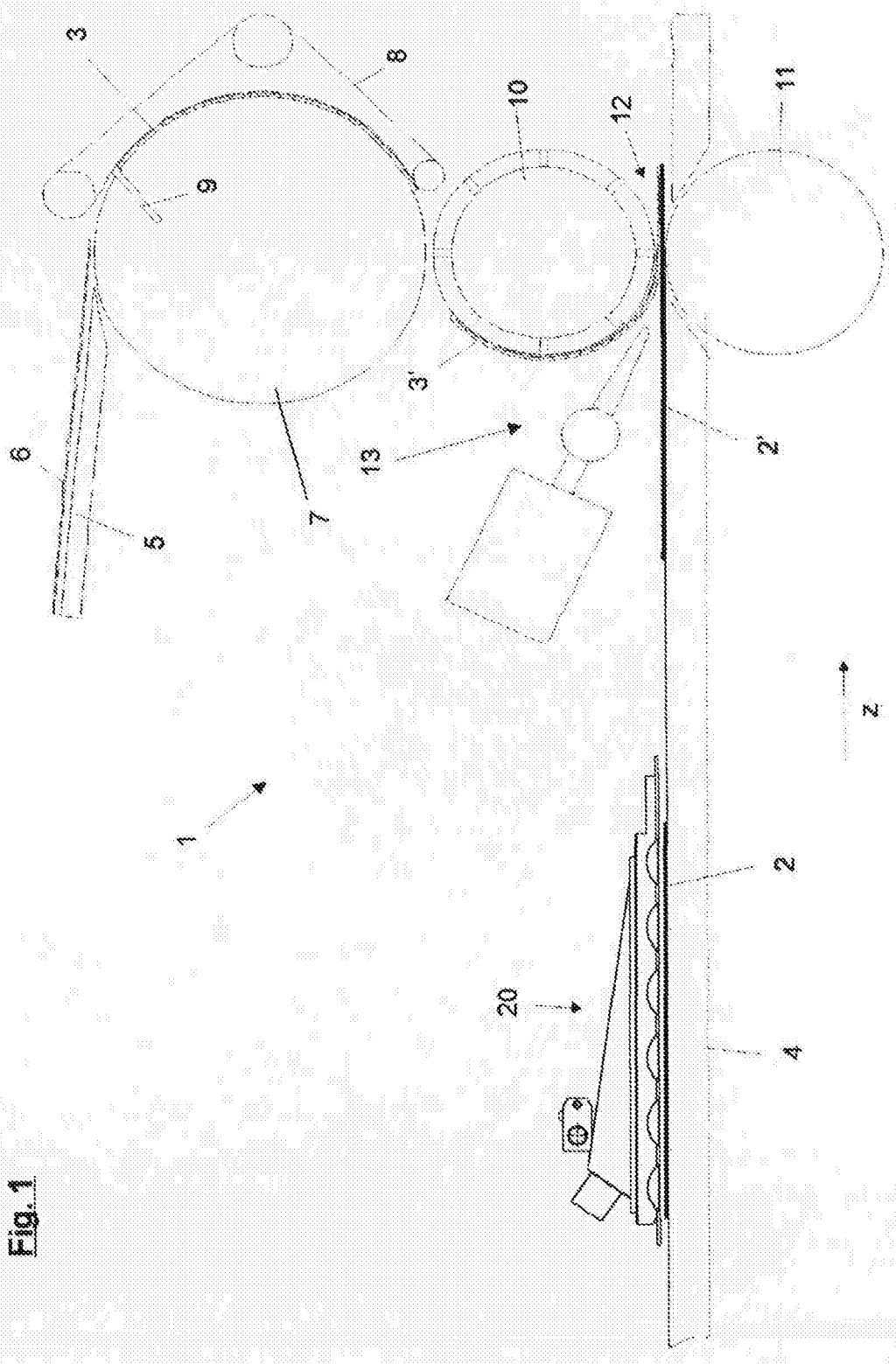

Fig. 1

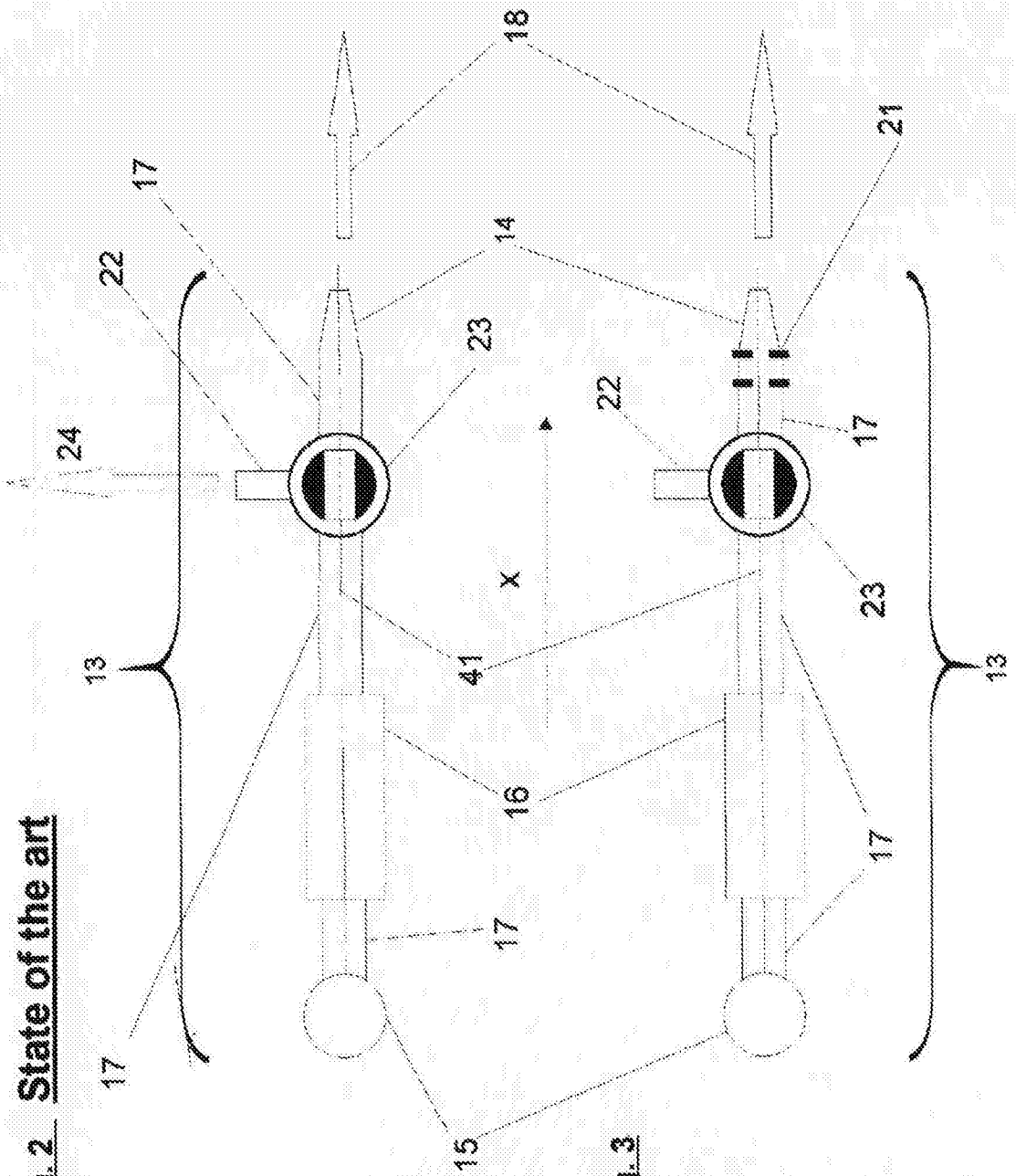

Fig. 2 State of the art

Fig. 3

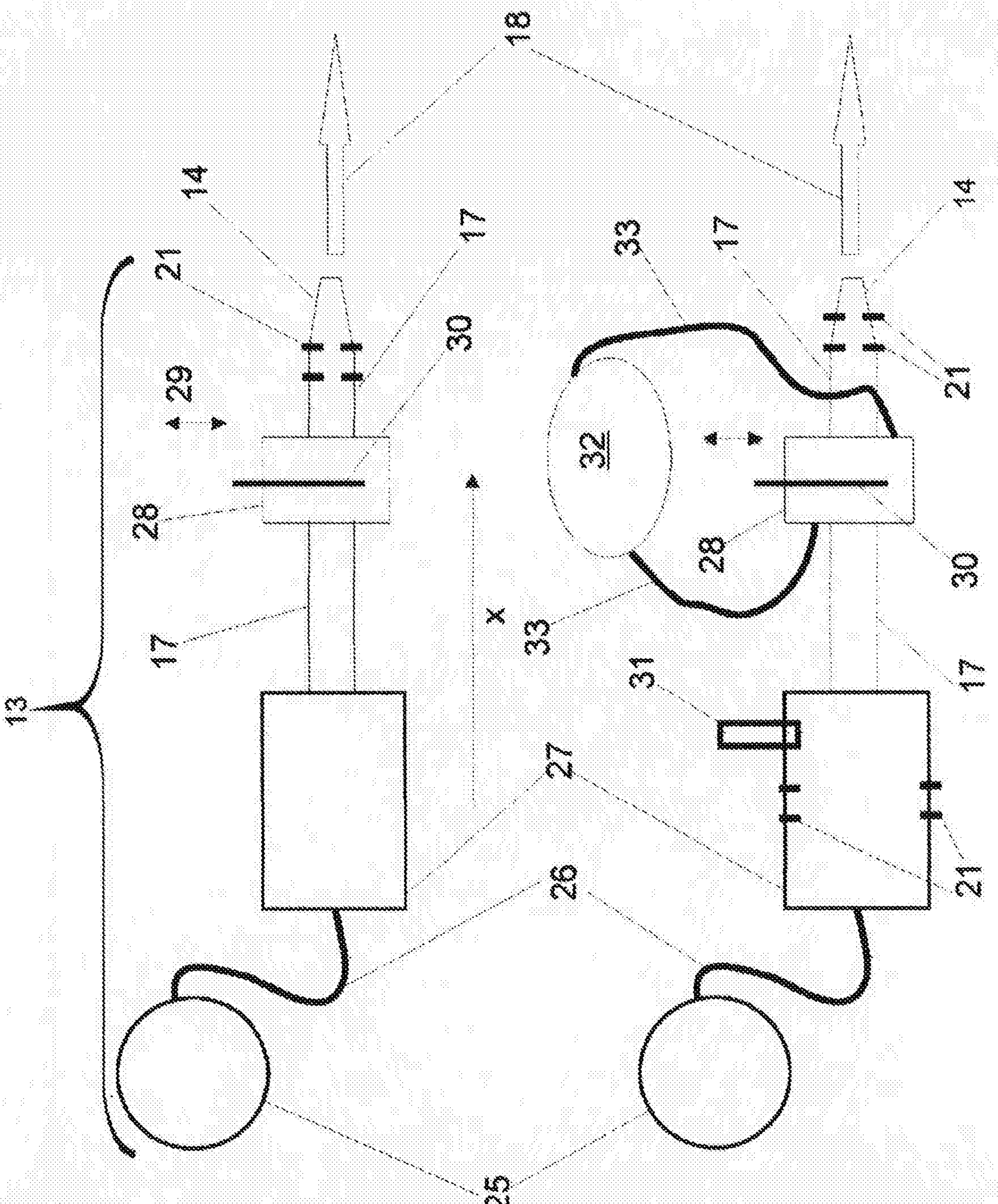

Fig. 4

Fig. 5

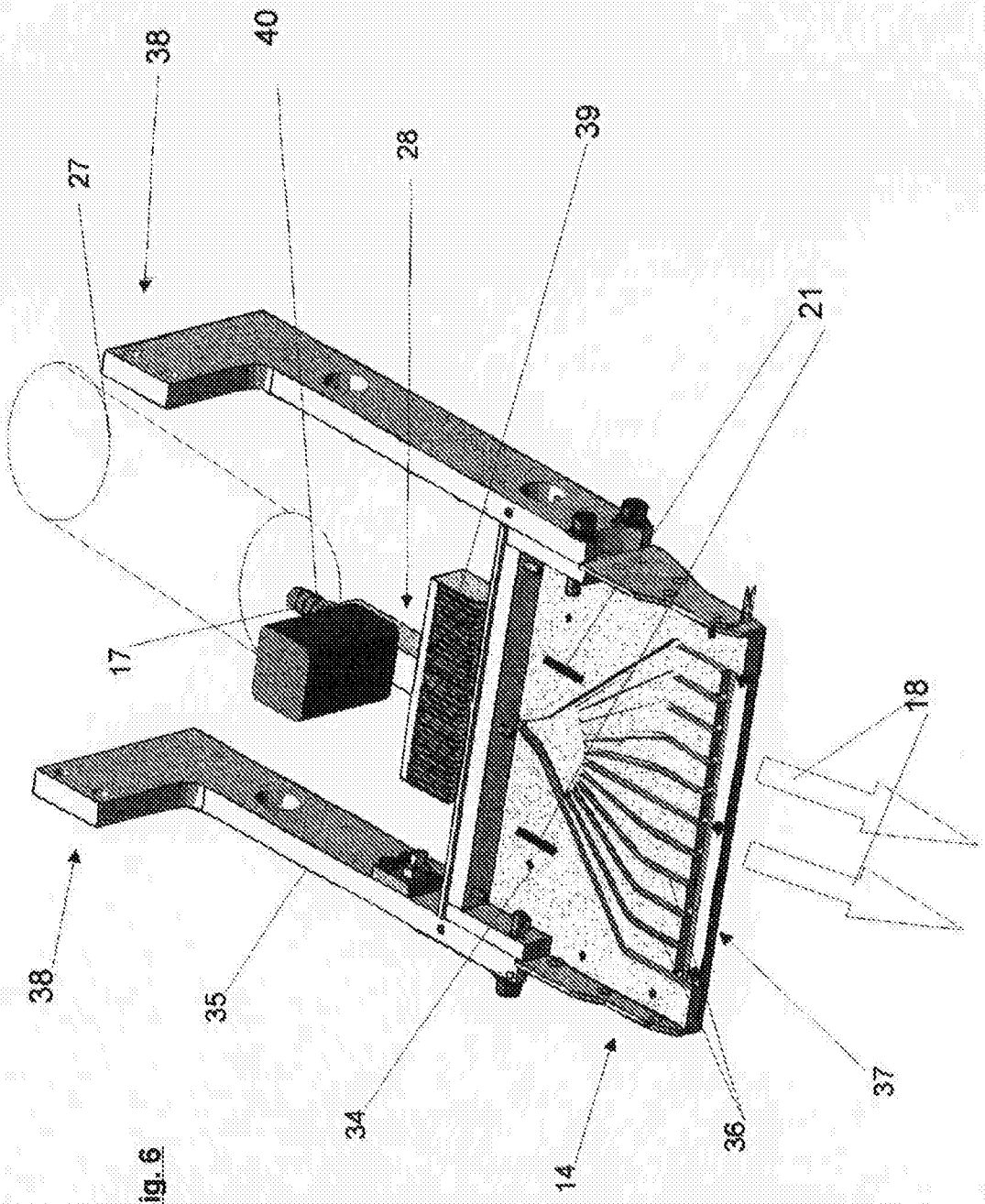

Fig. 6

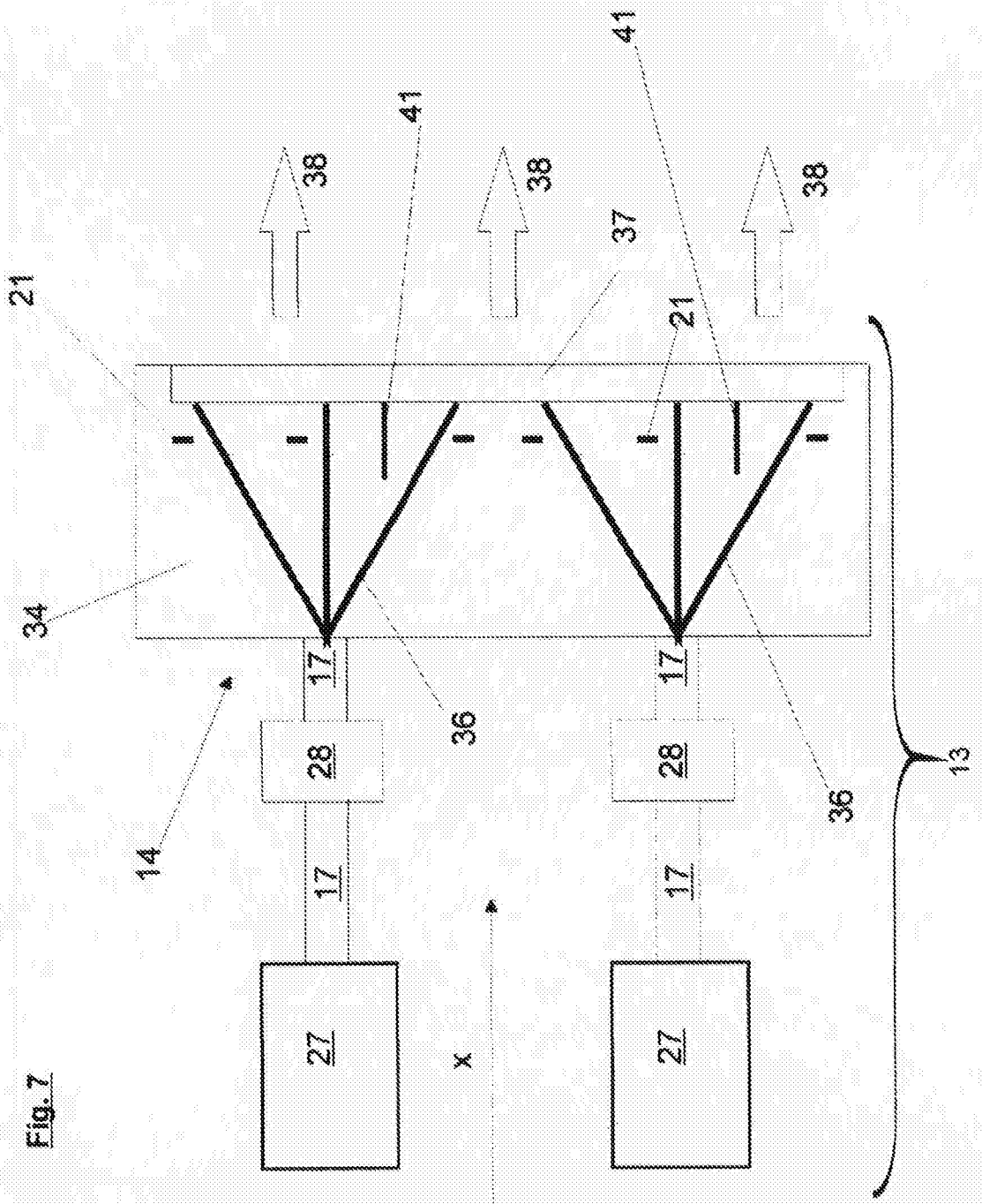

Fig. 7