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(54) **Automatic machine for ironing trousers such as jeans or elasticated or sports trousers**

Automatische Maschine zum Bügeln von Hosen wie Jeans oder elastischer Hosen oder Sporthosen

Machine automatique pour le repassage de pantalons tels que jeans, pantalons élastiques ou de sport

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## Description

### BACKGROUND OF THE INVENTION

[0001] The present invention relates to an automatic machine which has been specifically designed for ironing trousers free of folds, preferably of a jeans type, or made of elasticized or sports fabrics.

[0002] As is known, in the trouser making field it is necessary to iron and size stabilize the made trousers.

[0003] In particular, for making trousers free of folds, or "unfolded" trousers, it is absolutely necessary to perform a plurality of ironing operations, which must be carried out both depending on the trouser fabric type and on the size and size stabilization to be obtained.

[0004] At present, the above mentioned operating steps are substantially manually carried out, and the processing operations to be performed must be specifically selected by the operator, to achieve, the desired result.

[0005] It should be apparent that such a manual processing method, in addition to providing unevenly processed cloth articles, further require a comparatively high labour amount, which seriously adds to the final cost of the made cloth articles.

[0006] An automatic ironing machine with all the features of the preamble of claim 1 is known from US 6 052 916 A.

### SUMMARY OF THE INVENTION

[0007] Accordingly, the aim of the present invention is to overcome the above mentioned drawbacks, by providing an automatic machine, specifically designed for ironing trousers free of folds, preferably of a jeans type, or made of elasticized or sports fabric, allowing the possibility of controlling, in a fully automatic manner, an automatic sizing of the trousers, both at the pelvic region and leg region of the user, while consequently controlling the size quality of the cloth article during its ironing operation.

[0008] Within the scope of the above mentioned aim, a main object of the present invention is to provide such an automatic machine which allows to carry out, in a fully automatized manner, a lot of different trouser processing operations.

[0009] Yet another object of the present invention is to provide a trouser ironing machine which, due to its specifically designed construction, is very reliable and safe in operation.

[0010] Yet another object of the present invention is to provide such an automatic trouser ironing machine which can be easily made starting from easily available elements and materials and which, furthermore, is very competitive from a mere economic standpoint.

[0011] According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent here-

inafter, are achieved by an automatic machine for ironing unfolded trousers, preferably of a jeans type or made of elasticized or sports fabrics, with the features of claim 1.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of an automatic ironing machine, specifically designed for ironing unfolded trousers, preferably of a jeans type or made of an elasticized or sports fabric, being shown, by way of an indicative but not limitative example, in the figures of the accompanying drawings, where:

Figure 1 is a schematic elevation view showing the automatic ironing machine according to the present invention;

Figure 2 is a top plan view of the automatic ironing machine according to the invention, clearly showing a blowing pattern thereof;

Figure 3 is a further elevation view illustrating the blowing pattern with which different air blows are distributed to different operating assemblies;

Figure 4 is a schematic top plan view illustrating the automatic ironing machine according to the invention, and clearly showing the steaming and heating circuits;

Figure 5 is a further elevation view illustrating the automatic ironing machine according to the invention, and clearly showing the steaming circuits;

Figure 6 shows, on an enlarged scale, a detail of the drum assembly for overheating the processing steam;

Figure 7 is a schematic front elevation view showing an operating assembly for processing or ironing trousers or cloth articles made of elasticized fabrics, supplied to the ironing machine with mixed sizes;

Figure 8 schematically shows the assembly illustrated in figure 7, by a further side elevation view;

Figure 9 is a front elevation view showing an operating assembly for processing or ironing jeans supplied with mixed sizes;

Figure 10 schematically shows the assembly of figure 9, by a further side elevation view;

Figure 11 shows an operating assembly during a sizing operation, being provided with an electric detent element, and operating on separated different size trousers;

Figure 12 is a side elevation view showing the assembly illustrated in figure 11;

Figure 13 is a further elevation view showing an operating assembly for performing the trouser sizing operation, and being provided with a mechanical detent element, operating on separated different size trousers;

Figure 14 is a side elevation view showing the oper-

ating assembly of figure 13;

Figure 15 shows the mentioned operating assembly during a trouser leg tensioning or pulling operation, and being provided with an electrical-pneumatic sensor;

Figure 16 is a further side elevation view showing the operating assembly of figure 15;

Figure 17 is a further front elevation view showing the mentioned operating assembly, during the pulling of a trouser leg, for properly sizing the trousers and being provided with an electric-pneumatic dent element;

Figure 18 is a further side elevation view showing the operating assembly of figure 17;

Figure 19 is a schematic front view of the operating assembly, at the end of the trouser ironing or processing operation before the removal of the processed or ironed trousers;

Figure 20 is a top plan view showing the operating assembly in the operating position thereof shown in figure 19;

Figure 21 is a further side elevation view illustrating the automatic ironing machine in the position of figure 19;

Figure 22 is a front view showing an operating step in which the removal grippers are engaged with the cloth article or trousers, at the end of the ironing operation;

Figure 23 is a schematic front view showing a removal operation in which the patterns are removed from the ironed cloth article;

Figure 24 is a schematic top plan view showing a removal operation for removing the patterns from the processed or ironed cloth articles or trousers;

Figure 25 is a further side elevation view showing the operating step of figure 23;

Figure 26 is a further front view illustrating the removal operation or step in which the processed cloth article is removed from the related patterns;

Figure 27 is a top plan view showing the pattern unloading step or operation;

Figure 28 is a side elevation view showing the unloading step in which the processed cloth article is unloaded from the patterns or molds;

Figures 29, 30 and 31 shows three possible procedures for depositing the ironed or processed cloth article on an unloading or removing belt; and

Figure 32 is a schematic top plan view of the automatic ironing machine according to the present invention, in which the cloth articles are illustrated during an unloading operation thereof.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] With reference to the number references of the above mentioned figures, the automatic ironing machine, specifically designed for ironing unfolded trousers, pref-

erably of a jeans type, or made of elasticized or sports fabrics, according to the present invention, which has been generally indicated by the reference number 1, comprises a bearing framework 2, rotatably bearing thereon a carousel element 3 which is provided with four operating assemblies 4 for supporting the cloth articles or trousers being processed or ironed.

[0014] As clearly shown in figure 2, inside the mentioned bearing framework, is provided a blower 10 for blowing air inside the several operating assemblies, said blower or blowing unit being coupled to a diffuser 11 which, through adjustment gate 12, communicates with each of said operating assemblies 4, to allow pressurized air to be properly distributed depending on the processing requirements.

[0015] The adjustment gate 12, in particular, is electropneumatically driven for a set time, and can be driven to any desired position during the rotary movement of the carousel 3, for one or more gates simultaneously.

[0016] As clearly shown in figure 4, the automatic ironing machine according to the present invention further comprises a plurality of steaming assemblies, which comprise a first and second steaming drums 15 and 16, respectively, which can be coupled to the mentioned operating assemblies.

[0017] Each steaming drum 15 and 16 is designed for overheating the steam generated by steam boilers, operating under pressure and at a very high temperature.

[0018] The above mentioned device comprises a vessel 20, encompassing each drum, in which a taking or delivery duct 21 is provided, branched into a first branch 22 and a second branch 23, said branches being respectively controlled by a first solenoid valve 24 and a second solenoid valve 25, controlling the communication with a first coil 26 and a second coil 27, arranged inside the envelope 20.

[0019] The device allows the steam held in said envelope or vessel 20 to be easily taken, said steam being held at a pressure of about 5 atm and at a temperature of 150°C.

[0020] Thus, the steam, by opening one of the mentioned solenoid valves, will be conveyed through the corresponding coil, which is coupled to an atmospheric pressure user source.

[0021] Thus, the steam will expand and its temperature will decrease up to 100°C, corresponding to a normal atmospheric pressure.

[0022] Then, the steam, after expansion, will be sent into the related coil, arranged inside the mentioned tank where the temperature is of about 150°C.

[0023] In this manner, the steam will be overheated to a variable volume, so as to achieve a temperature near to that of the pressurized steam.

[0024] By the above mentioned solution, it is possible to generate overheated steam, without using electric overheaters, or gas and oil overheaters, which would involve a very complex construction.

[0025] The subject automatic ironing machine com-

prises moreover a rotary coupling, generally indicated by the reference number 28, providing an inlet for the steam and an outlet for the condensate.

**[0026]** A main feature of the present invention is that each said operating assembly is specifically designed for processing the cloth articles applied thereto by differently programmed modes of operation.

**[0027]** As is shown in figure 7, each operating assembly 4 generally comprises a fixed frontal plate 30, usually made of a net material, to be arranged inside the flap of the cloth article being processed, and being indicated by the reference letter C.

**[0028]** At the front portion 30, is provided an outside pressing element 31, driven by a cylinder 31a provided for firmly holding the cloth article being processed, by bearing thereon.

**[0029]** On a side of the front plate 30 are provided a pair of pelvis templates or shaped elements, generally indicated by the reference number 32, which are swingably mounted about sliders 33 adapted to be horizontally driven.

**[0030]** The sliding movement of said sliders is performed by a collecting cogged belt 34, coupling said sliders so as to cause them to be oppositely slidably driven, said belt being coupled, by a fitting element 35, to a pelvis portion spreading cylinder 36.

**[0031]** Each of said operating assemblies further comprises specifically designed means which are driven depending on the processes to be carried out.

**[0032]** With reference, for example, to figures 7 and 8, is performed therein a pelvis portion spreading or widening operation, on elasticized fabrics with mixed sizes.

**[0033]** In this pelvis portion spreading operation, by driving the cylinder 36, the templates or patterns 32 are moved away from one another to be properly put under tension.

**[0034]** As the trouser pelvis portion encounters the left template or pattern 32, with reference to the drawing, by distributing the force through the overall surface, a rotary movement about a fulcrum 37 is obtained, with a consequent interference between the amplifier 38 projecting from the pattern 32 and an electric limit switch 39, provided for locking the driving to the cylinder 36, by controlling an electric-pneumatic valve 40 for stopping the pelvis portion widening or spreading operation.

**[0035]** Thus, it is possible to automatically use the operating assembly on elasticized fabric cloth articles or trousers, which are accordingly brought to the desired size without the damaging the fabric material.

**[0036]** In a case in which the pelvis portion spreading operation is made on jeans cloth articles, supplied with mixed sizes, and as is shown in figures 9 and 10, the pattern driving cylinder 36 is operatively driven to in turn drive the mentioned patterns which are advantageously made of molded and perforated stretched sheet metal elements; in this condition, as a pattern or mold encounters a cloth article, then the operating force will be transmitted to a pneumatic sensor 41 which will provide a pull-

ing operation, depending on a pressure set through the pressure adjusting element 42.

**[0037]** Then, a second limit switch 43 is operated, for locking said cylinder 36, while holding such a locked position for the overall working cycle, up to the end of the ironing steps.

**[0038]** If the pelvis portion spreading operation is performed on cloth articles or trousers of different and separated sizes, as shown in figures 11 and 12, then a further limit switch 45, arranged on a graduated rod 46 would be used, said graduated rod 46 being designed for interfering against a cam 47 which is operatively coupled to the spreading cylinder 36.

**[0039]** Under a pelvis portion spreading command, the cylinder will start the pelvis portion pulling or tensioning operation, as the cam 47 arrives at the pelvis portion spreading limit switch 45, as fitted on the graduated rod 46.

**[0040]** Then, the cylinder 36 is locked, through the valve 40, and the locked position will be held through the overall processing or working cycle.

**[0041]** Under such a condition, the counter-pressure cylinder 41 and related sensor are not operated.

**[0042]** On the other hand, the single piston 36 is used, which is driven by setting the pelvis portion spreading amount through the slider including the limit switch 45.

**[0043]** In a case in which the pelvis portion is spread with a simultaneous sizing operation, then, by operating on separated sizes, a detent pad 50 is provided, which can be properly located through the adjustment rod 46, and which constitutes a processing method alternative to the above disclosed method.

**[0044]** More specifically, the pad 50 can be properly located by operating a small wheel 51.

**[0045]** Under the pelvis portion spreading command, the spreading cylinder 36 is actuated for starting the pulling operation.

**[0046]** As the carriage arrives at the pad 50, properly located through the wheel 51 and graduated rod 46, then it will be blocked by holding the assembly in this set position through the overall processing or working cycle.

**[0047]** Each operating assembly comprises moreover a trouser leg pulling or tensioning assembly, generally indicated by the reference number 60 including an operating piston 61 for adjusting the displacement or stroke and locating of the pulling or tensioning assembly 60, which can be slidably driven by a vertical cylinder 62.

**[0048]** The operating assembly 60 further comprises a pair of grippers 63, which are driven by a gripper cylinder 64, engaging the end portions of the trousers.

**[0049]** The cylinders 64 are supported by a swinging rod 65 including a pneumatic sensor 66 constituted by a sensor piston, mounted on a swinging rod and being controlled by a pressure reducing unit for properly pulling the trouser legs 67.

**[0050]** Moreover, a leg pulling limit switch 68 and an adjusting spring 69 operating on the swinging rod are provided.

**[0051]** Upon a command related to the trouser leg elongation operation, the operating cylinder 62 will start the pulling or tensioning step.

**[0052]** As the trouser leg actuates the swinging carriage and rod 65, by a force controlled by the piston 66 and reducing unit 67, an elongation limit switch 68 is actuated for controlling a valve 99 of the vertical cylinder 64, and for locking said cylinder for the overall processing or working cycle.

**[0053]** As shown in figures 17 and 18, the trouser leg can be properly pulled or tensioned by using an electric-pneumatic detent element.

**[0054]** To that end a vertical graduated rod 70 is provided on a vertical cylinder 62, and on said graduated rod 70 is provided an electric limit switch 71.

**[0055]** Moreover, for operating said detent element, a plurality of cams 72 are provided.

**[0056]** Under a trouser leg elongation command, the cylinder 62 starts the tensioning operation and, as the cams 72 engage with the limit switch 71, arranged on said graduated rod, then said cylinder will be locked through the valve 99, while holding this locked position for the overall working cycle.

**[0057]** The machine comprises moreover an assembly for taking the processed cloth articles or trousers, said taking assembly being generally indicated by the reference number 80.

**[0058]** More specifically, said taking or removing assembly comprises a pair of removing grippers 81 which are mounted on movable arms 82, which can be driven toward and away from the region wherein are arranged the mentioned operating assemblies 4, by a slanted pane guide 83, on which is driven a carriage 84 bearing a vertically movable supporting assembly 85 for supporting the arms 82.

**[0059]** Each gripper 81 comprises a supporting plate 90, thereon a gripper hook element 91 is articulated, said gripper hook element being turned by a gripper cylinder 92, for engaging in cutouts 32' defined by the pattern 32.

**[0060]** Moreover, a further pad 93 for allowing the grippers to hold the trousers at the belt height is provided.

**[0061]** As shown in figures 19 to 21, the grippers are herein represented in a spaced apart position and are so driven as to engage said patterns, as shown in figure 22.

**[0062]** As the grippers 81 engage the cloth article or trousers at the belt level, then the patterns 32 will be caused to be withdrawn (figures 23 to 25), the trousers being held supported by the grippers.

**[0063]** Said grippers, by operating a driving cylinder supporting the assembly 85, are downward driven to deposit the processed cloth article on a conveyor belt 95, which can be continuously driven or so driven as to provide a partial overlapping of the cloth articles or to provide an alternating overlapping thereof.

**[0064]** The cloth articles, as automatically processed, will be then removed from the machine through the conveyor belt 95 allowing to arrange said cloth articles as desired.

**[0065]** From the above disclosure it should be apparent that the invention fully achieves the intended aim and objects.

**[0066]** In particular, the fact is to be pointed out that an automatic ironing machine has been provided, which allows to process, by differently programmable mode of operation, a plurality of cloth articles or trousers.

**[0067]** Thus, it will be possible to precisely control the desired size of the trousers, both at the pelvis portion and at the leg portion thereof, while providing a quality size control of the trousers to be ironed.

**[0068]** In this connection it should be moreover pointed out that the ironing and setting operations can be performed in a fully automatic manner by the subject apparatus which, being of a transfer type, allows to simultaneously use a plurality of operating stations, in which it is possible to successively perform conventional ironing operations, by overheated steam and pressurized air jets.

**[0069]** The invention, as disclosed, is susceptible to several modifications and variations, all of which will come within the scope of the invention, as defined in the claims.

**[0070]** In practicing the invention, the used materials, as well as the contingent size and shapes, can be any, depending on requirements.

## Claims

1. An automatic ironing machine (1), for ironing unfolded trousers, preferably of a jeans type or made of elasticized or sports fabrics, said machine comprising a bearing framework (2) rotatably supporting a carousel element (3) supporting a plurality of programmable operating assemblies (4) for supporting the trousers being processed, said operating assemblies being adapted to be coupled to a trousers steam ironing steam generating assembly (15, 16, 28) for steam ironing trousers loaded on said machine, each said operating assembly (4) comprising a fixed front plate (30) which can be arranged inside a flap (C) of the trousers being processed and that, at said plate (30), is provided a pressing element (31) driven by a cylinder (31a) for holding the trousers being processed, a processed or ironed trouser taking or removing assembly (80, 81, 82, 83, 84, 85, 90, 91, 92) and a processed or ironed trouser conveyor belt (95) each said operating assembly (4) being adapted to be programmed for automatically performing a lot of different processing operations, depending on said trousers being supplied to the machine divided by sizes or with mixed sizes, each said operating assemblies (4) further comprising a trousers pelvis spreading operating assembly (32, 36, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 50, 51), and a trouser leg pulling operating assembly (60, 61, 62, 63, 64, 65, 66, 67, 68, 69) allowing to provide an automatic siz-

- ing of said trousers both at a pelvic region and at a leg region thereof, said pelvis spreading assembly comprising a pair of patterns (32) for the trouser pelvis portion arranged near said front plate (30), said pulling assembly (60) including moreover a pair of grippers (63), **characterized in that** said patterns (32) are swingably mounted on horizontally moving sliders (33), that said leg pulling operating assembly comprises a piston (61) which can be slidably driven through a vertical cylinder (62) coupled to said bearing framework (2), that said grippers are driven by a gripper cylinder (64), that said patterns (32) are driven by driving means including a pelvis portion spreading cylinder (36) coupled to a cogged belt coupling the sliders (33) of said pelvis portion patterns (32) for allowing said sliders (33) to be driven in opposite directions, and that said pelvis spreading assembly further comprises an amplifier element for amplifying a swinging displacement of the pelvis portion pattern (32), said amplifying element being adapted to cooperate with an electric limit switch (39) for locking said pelvis portion spreading cylinder (36) during the use of said spreading assembly on elasticized fabrics with mixed sizes.
2. An automatic ironing machine, according to Claim 1, **characterized in that** said front plate (30) and pelvis portion patterns (32) comprise a net element or a perforated metal sheet element,
  3. An automatic ironing machine, according to Claim 1, **characterized in that** said pelvis spreading assembly further comprises a pneumatic sensor (41) arranged axially aligned with the pelvis portion spreading cylinder (36), said pneumatic sensor driving a second electric limit switch (43) for driving said cylinder (36).
  4. An automatic ironing machine, according to Claims 1 to 3, **characterized in that** said pelvis spreading assembly further comprises a graduated rod (46) including a pelvis portion spreading limit switch (45) adapted to interfere against a cam (47) operatively coupled to said pelvis portion spreading cylinder (36), during a sizing operation on cloth articles of separated sizes.
  5. An automatic ironing machine, according to Claims 1 to 4, **characterized in that** said pelvis spreading assembly further comprises a detent pad (50) which can be located by said graduated rod (46), and that said pad (50) is controlled by a pelvis portion spreading wheel (51), as the machine is operated on separated cloth article sizes.
  6. An automatic ironing machine, according to Claim 1, **characterized in that** said gripper cylinder (64) is supported by a swinging rod (65) including a pneumatic sensor (66) constituted by a piston controlled by a pressure reducing unit (67).
  7. An automatic ironing machine, according to Claim 6, **characterized in that** said pneumatic sensor (66) cooperates with a limit switch (68) for tensioning the trouser legs.
  8. An automatic ironing machine, according to Claim 6, **characterized in that** said swinging rod (65) is controlled by an adjusting spring (69).
  9. An automatic ironing machine, according to Claim 6, **characterized in that** said swinging rod (65) is coupled to an electric limit switch (68), cam means being moreover provided for operating said electric limit switch (68) for driving said vertical gripper cylinder (64).
  10. An automatic ironing machine, according to Claim 1, **characterized in that** said steam ironing assembly comprises, inside said bearing framework (2), a blowing unit (10) for blowing pressurized air in said operating assemblies (4), and that said blowing unit (10) is coupled to a diffuser (11) communicating with each of said operating assemblies (4) through an adjustment gate (12).
  11. An automatic ironing machine, according to Claim 10, **characterized in that** said adjustment gate (12) is driven by electric-pneumatic means.
  12. An automatic ironing machine, according to Claim 10, **characterized in that** said adjustment gate (12) can be driven in any turning step of said carousel, either individually or in combination.
  13. An automatic ironing machine, according to Claim 1, **characterized in that** said steam ironing assembly is supplied with ironing steam by steaming assemblies (15, 16) comprising a first and second steaming drums (15, 16), each of which can be coupled to two different operating assemblies (4).
  14. An automatic ironing machine, according to Claim 13, **characterized in that** each of said steaming drums (15, 16) comprises a steam vessel (20), including a steam duct (21), on which operates a solenoid valve (24, 25) to control a communication with a steam coil (26, 27), arranged inside said vessel (20), and that in said vessel (20) is provided high pressure saturated steam and that, at an outlet of said coil (26, 27) is supplied atmospheric pressure overheated steam.
  15. An automatic ironing machine, according to Claim 14, **characterized in that**, for each said vessel (20), are provided a first and second arms (22, 23), re-

spectively controlled by said first and second solenoid valves (24, 25), each said arm (22, 23) communicating with a said coil (26, 27) arranged inside said vessel (20).

16. An automatic ironing machine, according to Claim 1, **characterized in that** said machine comprises a rotary coupling (28) for allowing said steam to enter and for discharging condensate material.
17. An automatic ironing machine, according to Claim 1, **characterized in that** said processed trouser taking assembly (80) comprises a pair of grippers (81) mounted on gripper arms (82) which can be driven towards and away from a region where said operating assemblies (4) operate.
18. An automatic ironing machine, according to Claim 17, **characterized in that** said arms (82) are coupled by a vertically driving piston to a carriage (84) coupled to a slanted plane guide (83).
19. An automatic ironing machine, according to Claim 17, **characterized in that** each gripper (81) comprises a supporting plate (90) thereon a gripper hook element (91) is pivoted, said gripper hook element (91) being rotatively driven by a gripper cylinder (92) for engaging said gripper hook element (91) in cut-outs (32') defined by the pelvis portion patterns (32), an abutment pad (93) for said grippers (81) for holding the cloth articles at the belt level being moreover provided.
20. An automatic ironing machine, according to Claim 1, **characterized in that** said conveyor belt (95) is either continuously or intermittently movable, being arranged under a cloth article releasing-region, and designed for overlapping the processed cloth articles or arranging said processed cloth articles with a spaced and offset relationship.

#### Patentansprüche

1. Automatische Bügelmaschine (1), zum Bügeln von Hosen ohne Falten, bevorzugt von jeansartigen Hosen oder Hosen aus elastischen oder Sportstoffen, wobei die Maschine ein Traggestell (2) umfasst, das drehbar ein Karussellelement (3) trägt, das eine Vielzahl von programmierbaren Betriebsanordnungen (4) trägt, um die Hosen in Verarbeitung zu tragen, wobei die Betriebsanordnungen dazu geeignet sind, um an eine Hosendampfbügeldampf generierende Anordnung (15, 16, 28) zum Dampfbügeln von Hosen, die auf die Maschine geladen sind, gekoppelt zu werden, wobei die Betriebsanordnung (4) eine feststehende Vorderplatte (30) umfasst, die in einem Futter (C) der Hosen in Verarbeitung angeordnet

sein kann, und dass an der Platte (30) ein Presselement (31), das von einem Zylinder (31a) angetrieben wird, um die Hosen in Verarbeitung festzuhalten, eine die verarbeiteten oder gebügelten Hosen aufnehmende oder entfernende Anordnung (80, 81, 82, 83, 84, 85, 90, 91, 92) und ein Förderband (95) für verarbeitete oder gebügelte Hosen bereitgestellt werden, wobei jede Betriebsanordnung (4) dazu geeignet ist, programmiert zu werden, um automatisch viele verschiedene Verarbeitungsgänge auszuführen, in Abhängigkeit von den der Maschine zugeführten Hosen, nach Größen getrennt oder in verschiedenen Größen, wobei jede Betriebsanordnung (4) ferner eine Hosenbeckendehnungs-Betriebsanordnung (32, 36, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 50, 51) so wie eine Hosenbeinzug-Betriebsanordnung (60, 61, 62, 63, 64, 65, 66, 67, 68, 69) umfasst, die es ermöglichen, eine automatische Sortierung der Hosen sowohl in einem Beckenbereich als auch in einem Beinbereich davon bereitzustellen, wobei die Beckendehnungsanordnung ein Paar Formbretter (32) für den Hosenbeckenabschnitt umfassen, die neben der Vorderplatte (30) angeordnet sind, wobei die Zugsanordnung (60) zudem ein Paar Greifer (63) umfasst, **dadurch gekennzeichnet, dass** die Formbretter (32) schwenkbar auf waagrecht beweglichen Gleitstücken (33) angebracht sind, dass die Beinzugbetriebsanordnung einen Kolben (61) umfasst, der gleitbar durch einen senkrechten Zylinder (62) angetrieben werden kann, der an das Traggestell (2) gekoppelt ist, dass die Greifer von einem Greiferzylinder (64) angetrieben werden, dass die Formbretter (32) von Antriebsmitteln angetrieben werden, die einen Beckenabschnittdehnzylinder (36) umfassen, der an ein Streckband gekoppelt ist, das die Gleitstücke (33) der Beckenabschnittformbretter (32) koppelt, damit die Gleitstücke (33) in entgegengesetzte Richtungen angetrieben werden können, und dass die Beckendehnungsanordnung ferner ein Verstärkerelement umfasst, um eine Schwenkbewegung des Beckenabschnitt-Formbretts (32) zu verstärken, wobei das Verstärkerelement dazu geeignet ist, mit einem elektrischen Grenzscharter (39) zusammenzuarbeiten, um den Beckenabschnittdehnungszyylinder (36) während des Gebrauchs der Dehnungsanordnung an elastischen Stoffen in verschiedenen Größen zu arretieren.

2. Automatische Bügelmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Vorderplatte (30) und die Beckenabschnitt-Formbretter (32) ein Netzelement oder ein perforiertes Blechtafelement umfassen.
3. Automatische Bügelmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Beckendehnungsanordnung ferner einen Druckluftsensor (41)

- aufweist, der axial an dem Beckenabschnittdehnungszyylinder (36) ausgerichtet angeordnet ist, wobei der Druckluftsensor einen zweiten elektrischen Grenzscharter (43) antreibt, um den Zylinder (36) anzutreiben.
4. Automatische Bügelmaschine nach Anspruch 1 bis 3, **dadurch gekennzeichnet, dass** die Beckendehnungsanordnung ferner einen eingeteilten Stab (46) umfasst, der einen Beckenabschnittdehnungs-Grenzscharter (45) umfasst, der dazu geeignet ist, während eines Sortiervorgangs an Kleidungsstücken getrennter Größen gegen eine Nocke (47) zu wirken, die wirksam an den Beckenabschnittdehnungszyylinder (36) gekoppelt ist.
  5. Automatische Bügelmaschine nach Anspruch 1 bis 4, **dadurch gekennzeichnet, dass** die Beckendehnungsanordnung ferner einen Sperrklotz (50) umfasst, der auf den eingeteilten Stab (46) gesetzt werden kann, und dass der Klotz (50) von einem Beckenabschnittdehnungsrad (51) gesteuert wird, während die Maschine für getrennte Kleidungsstückgrößen betätigt wird.
  6. Automatische Bügelmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** der Greiferzylinder (64) von einem Schwenkstab (65) getragen wird, der einen Druckluftsensor (66) umfasst, der aus einem Kolben besteht, der von einer Druckminderungseinheit (67) gesteuert wird.
  7. Automatische Bügelmaschine nach Anspruch 6, **dadurch gekennzeichnet, dass** der Druckluftsensor (66) mit einem Grenzscharter (68) zusammenarbeitet, um die Hosenbeine zu straffen.
  8. Automatische Bügelmaschine nach Anspruch 6, **dadurch gekennzeichnet, dass** der Schwingstab (65) von einer Stellfeder (69) gesteuert wird.
  9. Automatische Bügelmaschine nach Anspruch 6, **dadurch gekennzeichnet, dass** der Schwingstab (65) an einen elektrischen Grenzscharter (68) gekoppelt ist, wobei ferner Nockenmittel bereitgestellt werden, den elektrischen Grenzscharter (68) zu betätigen, um den senkrechten Greiferzylinder (64) anzutreiben.
  10. Automatische Bügelmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Dampfbügelanordnung innerhalb des Traggestells (2) eine Blaseinheit (10) umfasst, um Druckluft in die Betriebsanordnungen (4) zu blasen, und dass die Blaseinheit (10) an einen Diffusor (11) gekoppelt ist, der mit jeder der Betriebsanordnungen (4) durch einen Stellschieber (12) in Verbindung steht.
  11. Automatische Bügelmaschine nach Anspruch 10, **dadurch gekennzeichnet, dass** der Stellschieber (12) von elektrischen Druckluftmitteln angetrieben wird.
  12. Automatische Bügelmaschine nach Anspruch 10, **dadurch gekennzeichnet, dass** der Stellschieber (12) in einem beliebigen Drehschritt des Karussells einzeln oder kombiniert angetrieben werden kann.
  13. Automatische Bügelmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Dampfbügelanordnung von Dämpfanordnungen (15, 16), die erste und zweite Dämpftrommeln (15, 16) umfassen, mit Bügeldampf versorgt werden, wobei jede der Trommeln an zwei verschiedene Betriebsanordnungen (4) gekoppelt sein kann.
  14. Automatische Bügelmaschine nach Anspruch 13, **dadurch gekennzeichnet, dass** jede der Dämpftrommeln (15, 16) einen Dampfbehälter (20) umfasst, der eine Dampfleitung (21) umfasst, an der ein Magnetventil (24, 25) funktioniert, um eine Verbindung mit einer Dampfschlange (26, 27) zu steuern, die in dem Behälter (20) angeordnet ist, und dass der Behälter (20) mit Hochdruck-Sättigungsdampf versorgt wird, und dass am Auslass der Schlange (26, 27) Luftdruck-Heißdampf geliefert wird.
  15. Automatische Bügelmaschine nach Anspruch 14, **dadurch gekennzeichnet, dass** für den Behälter (20) erste und zweite Arme (22, 23) bereitgestellt werden, die jeweils von ersten und zweiten Magnetventilen (24, 25) gesteuert werden, wobei jeder Arm (22, 23) mit einer Schlange (26, 27), die in dem Behälter (20) angeordnet ist, in Verbindung steht.
  16. Automatische Bügelmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Maschine eine Rotationskopplung (28) umfasst, um das Eintreten von Dampf und das Ablassen von Kondensationsprodukten zu erlauben.
  17. Automatische Bügelmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die verarbeitete Hose aufnehmenende Anordnung (80) ein Paar Greifer (81) umfasst, die an Greiferarmen (82) angebracht sind, die zu oder von einem Bereich angetrieben werden können, indem die Betriebsanordnungen (4) funktionieren.
  18. Automatische Bügelmaschine nach Anspruch 17, **dadurch gekennzeichnet, dass** die Arme (82) durch einen senkrecht antreibenden Kolben an einen Schlitten (84) gekoppelt sind, der an eine schräge Planführung (83) gekoppelt ist.
  19. Automatische Bügelmaschine nach Anspruch 17,

**dadurch gekennzeichnet, dass** jeder Greifer (81) eine Tragplatte (90) umfasst, auf der ein Greiferhaken-  
element (91) schwenkbar ist, wobei das Greiferhaken-  
element (91) drehbar von einem Greiferzylinder (92) angetrieben wird, um das Greiferhaken-  
element (91) in Ausschnitten (32') in Eingriff zu bringen,  
die von den Beckenabschnitt-Formbrettern (32) de-  
finiert werden, wobei ferner ein Anschlagsklotz (93)  
für die Greifer (81) bereitgestellt wird, um die Klei-  
dungsstücke auf Gurthöhe festzuhalten.

20. Automatische Bügelmaschine nach Anspruch 1, **da-  
durch gekennzeichnet, dass** das Förderband (95)  
entweder kontinuierlich oder diskontinuierlich be-  
wegbar ist, indem es unter einem Kleidungsstück-  
Lösebereich angeordnet ist, und dazu ausgelegt ist,  
die verarbeiteten Kleidungsstücke zu überlappen  
oder die verarbeiteten Kleidungsstücke in einem be-  
abstandeten und versetzten Verhältnis anzuordnen.

## Revendications

1. Machine à repasser automatique (1), permettant de  
repasser un pantalon déplié, de préférence de type  
jeans ou conçu à partir de tissus élastiques ou de  
type sport, ladite machine comprenant un cadre  
d'appui (2) supportant la rotation d'un élément de  
carrousel (3) supportant une pluralité d'ensembles  
à fonctionnement programmable (4), permettant de  
supporter le pantalon en cours de traitement, lesdits  
ensembles de fonctionnement étant conçus pour  
être couplés à un ensemble de repassage de pan-  
talon générant de la vapeur (15, 16, 28) permettant  
de repasser à la vapeur un pantalon chargé sur ladite  
machine, chaque dit ensemble de fonctionnement  
(4) comprenant une plaque avant fixe (30), qui peut  
être agencée à l'intérieur d'un rabat (C) d'un pan-  
talon en cours de traitement et qui, au niveau de ladite  
plaque (30), est équipé d'un élément de pressage  
(31), entraîné par un cylindre (31a), pour maintenir  
le pantalon en cours de traitement, d'un ensemble  
d'enlèvement ou de retrait d'un pantalon traité ou  
repassé (80, 81, 82, 83, 84, 85, 90, 91, 92), et d'une  
courroie transporteuse de pantalons traités ou re-  
passés (95), chaque dit ensemble de fonctionne-  
ment (4) étant conçu pour être programmé afin de  
réaliser automatiquement un grand nombre d'opé-  
rations de traitement différentes, en fonction dudit  
pantalon fourni à la machine, en fonction des tailles,  
ou ayant des tailles mélangées, chaque dit ensemble  
de fonctionnement (4) comprenant, en outre, un en-  
semble de fonctionnement d'étirage de la partie de  
taille du pantalon (32, 36, 38, 39, 40, 41, 42, 43, 44;  
45, 46, 47, 50, 51) et un ensemble de fonctionnement  
de défroissage des jambes du pantalon (60, 61, 62,  
63, 64, 65, 66, 67, 68, 69), permettant de fournir une  
mise à la taille automatique dudit pantalon, tant au

niveau de la région de la taille qu'au niveau des jam-  
bes, ledit ensemble d'étirage de la partie de taille  
comprenant une paire de gabarits (32) pour la partie  
de taille du pantalon agencée à proximité de ladite  
plaque avant (30), ledit ensemble de défroissage  
(60) incluant, en outre, une paire de dispositifs de  
préhension (63), **caractérisé en ce que** lesdits ga-  
barits (32) sont montés, par oscillation, sur les cou-  
lisseaux se déplaçant horizontalement (33), **en ce  
que** ledit ensemble de fonctionnement de défrois-  
sage des jambes comprend un piston (61), qui peut  
être entraîné par coulissement à travers un cylindre  
vertical (62), couplé audit cadre d'appui (2), **en ce  
que** lesdits dispositifs de préhension sont entraînés  
grâce un cylindre de préhension (64), **en ce que**  
lesdits gabarits (32) sont entraînés par le moyen  
d'entraînement incluant un cylindre d'étirage de la  
partie de taille (36), couplé à une courroie crantée  
couplant les coulisseaux (33) dudit gabarit de la par-  
tie de taille (32), pour permettre que lesdits coulis-  
seaux (33) soient entraînés dans les sens opposées,  
et **en ce que** ledit ensemble d'étirage de la partie de  
taille comprend, en outre, un élément amplificateur  
permettant d'amplifier un déplacement par oscilla-  
tion du gabarit de la partie de taille (32), ledit élément  
d'amplification étant conçu pour coopérer avec un  
interrupteur de fin de course (39) permettant de ver-  
rouiller lesdits cylindres d'étirage de la partie de taille  
(36), lors de l'utilisation dudit ensemble d'étirage, sur  
des tissus élastiques ayant des tailles mélangées.

2. Machine à repasser automatique, selon la revendi-  
cation 1, **caractérisée en ce que** ladite plaque avant  
(30) et lesdits gabarits de la partie de taille (32) com-  
prennent un élément de filet ou un élément de feuille  
métallique perforé.
3. Machine à repasser automatique, selon la revendi-  
cation 1, **caractérisé en ce que** ledit ensemble d'éti-  
rage de la partie de taille comprend, en outre, un  
capteur pneumatique (41), agencé de manière à être  
aligné axialement avec le cylindre d'étirage de la par-  
tie de taille (36), ledit capteur pneumatique entraî-  
nant un deuxième interrupteur de fin de course élec-  
trique (43), pour entraîner ledit cylindre (36).
4. Machine à repasser automatique selon les revendi-  
cations 1 à 3, **caractérisée en ce que** ledit ensemble  
d'étirement de la taille comprend, en outre, une tige  
graduée (46), incluant un interrupteur de fin de cour-  
se d'étirage de la partie de taille (45), conçu pour  
interférer contre une came (47) couplée, de façon  
opérationnelle, audit cylindre d'étirage de la partie  
de taille (36), lors d'une opération de mise à la taille  
sur des articles en tissu de tailles séparées.
5. Machine à repasser automatique, selon les reven-  
dications 1 à 4, **caractérisée en ce que** ledit en-

semble d'étirage de la partie de taille comprend, en outre, un tampon d'arrêt (50), qui peut être placé par ladite tige graduée (46), et **en ce que** ledit tampon (50) est commandé par une roue d'étirage de la partie de taille (51), à mesure que la machine est actionnée sur des tailles d'article en tissu séparées.

6. Machine à repasser automatique, selon la revendication 1, **caractérisée en ce que** ledit cylindre de préhension (64) est supporté par une tige oscillante (65) incluant un capteur pneumatique (66) constitué d'un piston commandé par une unité de réduction de la pression (67). 10
7. Machine à repasser automatique selon la revendication 6, **caractérisée en ce que** ledit capteur pneumatique (66) coopère avec un interrupteur de fin de course (68) permettant de tendre les jambes du pantalon. 15
8. Machine à repasser automatique selon la revendication 6, **caractérisée en ce que** ladite tige oscillante (65) est commandée par un ressort de réglage (69). 20
9. Machine à repasser automatique selon la revendication 6, **caractérisée en ce que** ladite tige oscillante (65) est couplée à un interrupteur de fin de course électrique (68), un moyen de came étant en outre fourni pour actionner ledit interrupteur de fin de course électrique (68) afin d'entraîner ledit cylindre de préhension vertical (64). 25
10. Machine à repasser automatique selon la revendication 1, **caractérisée en ce que** ledit, ensemble de fer à la vapeur comprend, à l'intérieur dudit cadre d'appui (2), une unité de soufflage (10) permettant de souffler de l'air pressurisé dans lesdits ensembles de fonctionnement (4), et **en ce que** ladite unité de soufflage (10) est couplée à un diffuseur (11) communiquant avec chacun desdits ensembles de fonctionnement (4), par l'intermédiaire d'une barrière de réglage (12). 30
11. Machine à repasser automatique selon la revendication 10, **caractérisée en ce que** ladite barrière de réglage (12) est entraînée, par un moyen électrique pneumatique. 35
12. Machine à repasser automatique selon la revendication 10, **caractérisée en ce que** ladite barrière de réglage (12) peut être entraînée pendant toute étape de rotation dudit carrousel, soit individuellement soit en combinaison. 40
13. Machine à repasser automatique selon la revendication 1, **caractérisée en ce que** ledit ensemble de repassage à la vapeur est alimenté en vapeur de 45

repassage grâce à des ensembles de vapeur (15, 16) comprenant un premier et un second tambours à vaporiser (15, 16), dont chacun peut être couplé à deux ensembles de fonctionnement différents (4).

14. Machine à repasser automatique selon la revendication 13, **caractérisée en ce que** chacun desdits tambours à vaporiser (15, 16) comprend une cuve à vapeur (20), incluant un conduit de vapeur (21), sur lequel fonctionne une électrovalve (24, 25) pour commander une communication avec un serpentin à vapeur (26, 27), agencé à l'intérieur de ladite cuve (20), **en ce que** dans ladite cuve (20) est fournie, une vapeur saturée de pression élevée, et **en ce qu'**au niveau de la sortie dudit serpentin (26, 27) est fournie une vapeur surchauffée à pression atmosphérique. 50
15. Machine à repasser automatique selon la revendication 14, **caractérisée en ce que**, pour chaque dite cuve (20), sont fournis un premier et un deuxième bras (22, 23), commandés respectivement par lesdites première et deuxième électrovalves (24, 25), chaque dit bras (22, 23) communiquant avec un dit serpentin (26, 27) agencé à l'intérieur de ladite cuve (20). 55
16. Machine à repasser automatique selon la revendication 1, **caractérisée en ce que** ladite machine comprend un couplage rotatif (28) pour permettre l'entrée de la vapeur et pour évacuer la matière condensée.
17. Machine à repasser automatique selon la revendication 1, **caractérisée en ce que** ledit ensemble de prise du pantalon traité (80) comprend une paire de dispositifs de préhension (81), montés sur des bras de préhension (82), qui peuvent être entraînés vers et à distance d'une région où lesdits ensembles de fonctionnement (4) fonctionnent.
18. Machine à repasser automatique selon la revendication 17, **caractérisée en ce que** lesdits bras (82) sont couplés par un piston d'entraînement vertical à un chariot (84) couplé à un guide plan incliné (83).
19. Machine à repasser automatique selon la revendication 17, **caractérisée en ce que** chaque dispositif de préhension (81) comprend une plaque de support (90) sur laquelle pivote un élément de crochet de préhension (91), ledit élément de crochet de préhension (91) étant entraîné par rotation par un cylindre de préhension (92), pour venir en prise avec ledit élément de crochet de préhension (91) dans des coupes (32') définies par les gabarits des parties de la taille (32), un tampon de butée (93) pour lesdits dispositifs de préhension (81) permettant de maintenir les articles en tissu au niveau de la ceinture

étant fourni également.

20. Machine à repasser automatique selon la revendication 1, **caractérisée en ce que** ladite courroie transporteuse (95) est mobile en continu ou bien par intermittence, étant agencée sous une région de libération de l'article en tissu et conçue pour chevaucher les articles en tissu traités ou agencer lesdits articles en tissu traités selon une relation espacée et décalée.

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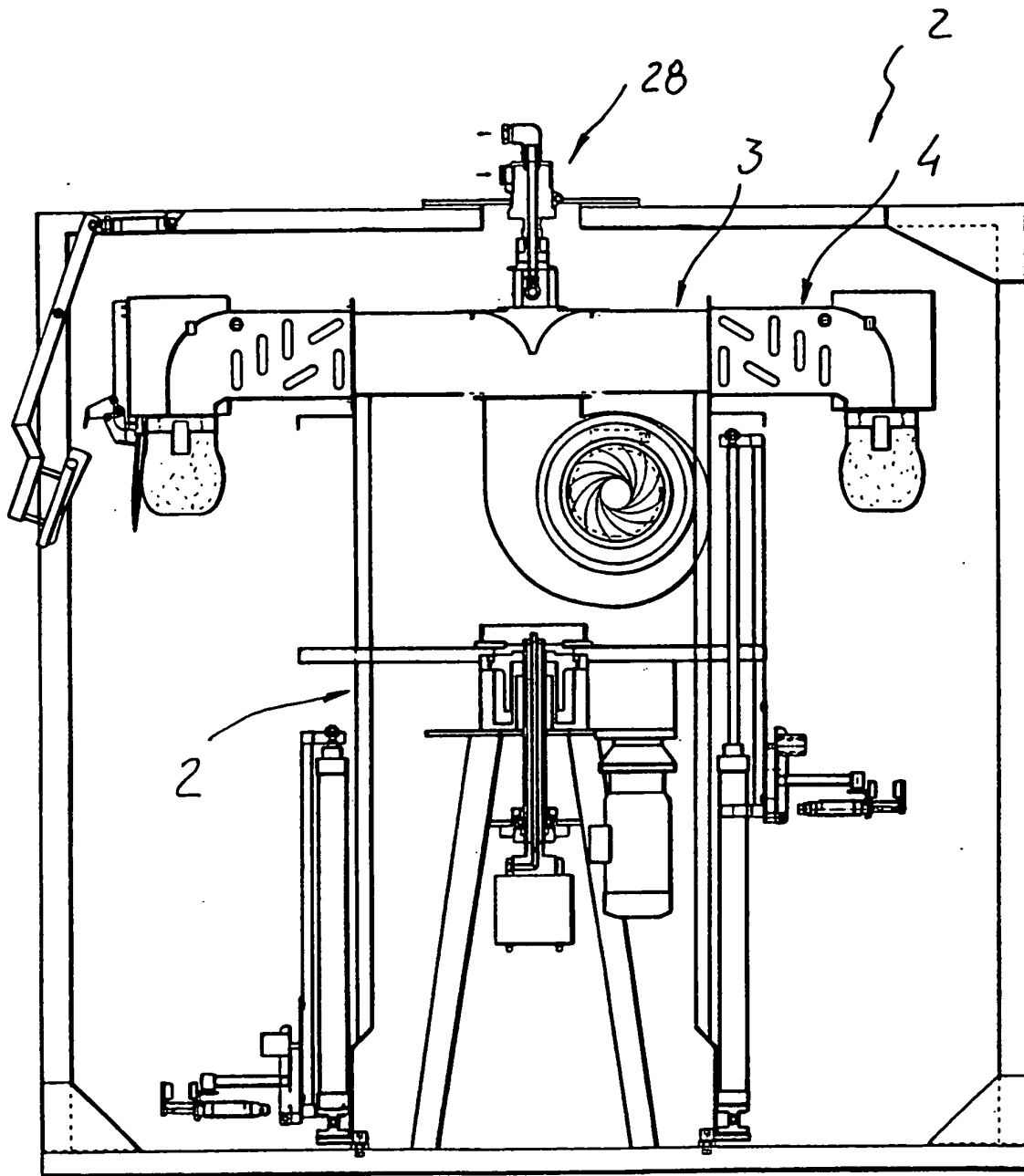


FIG. 1

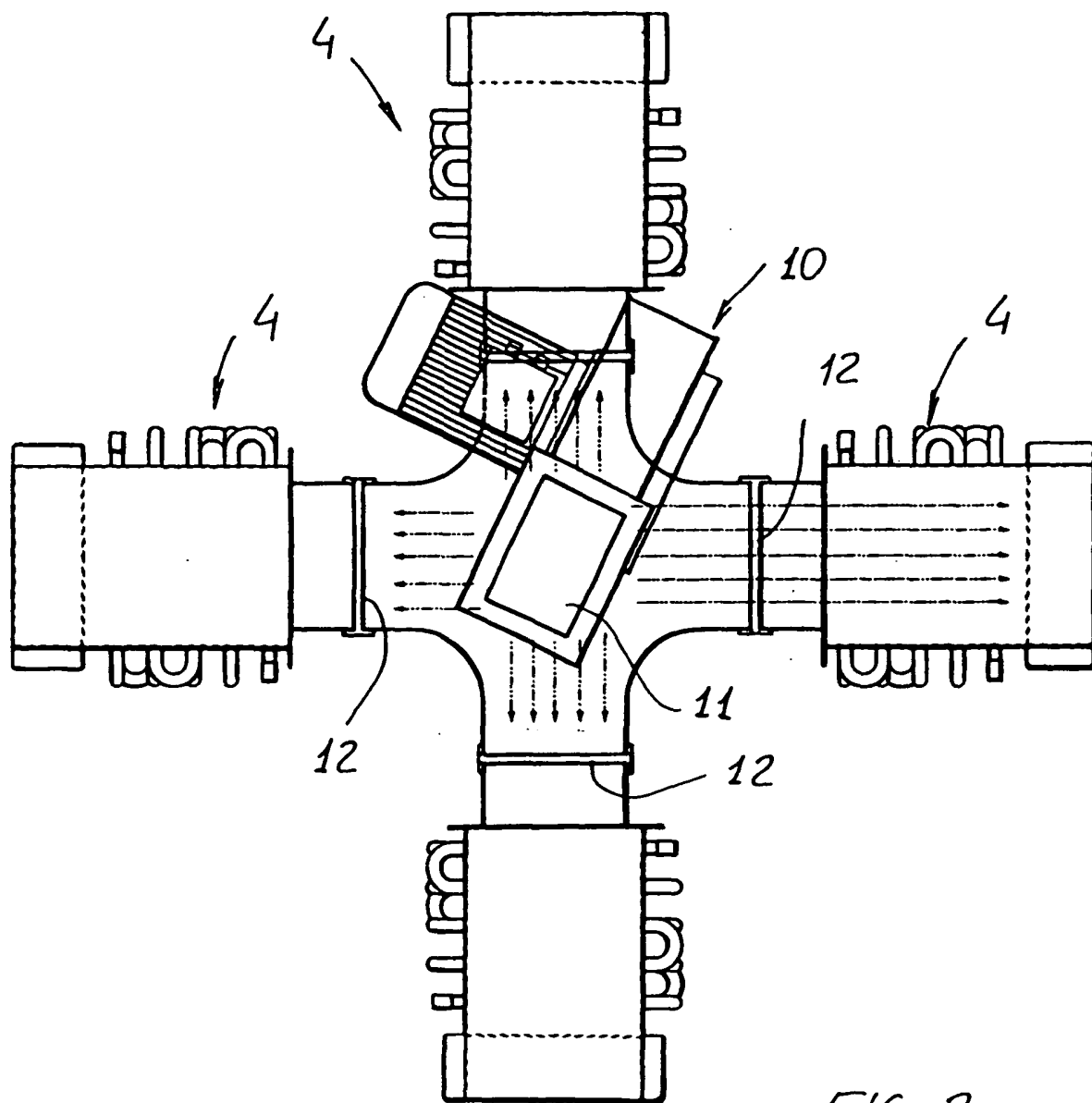


FIG. 2

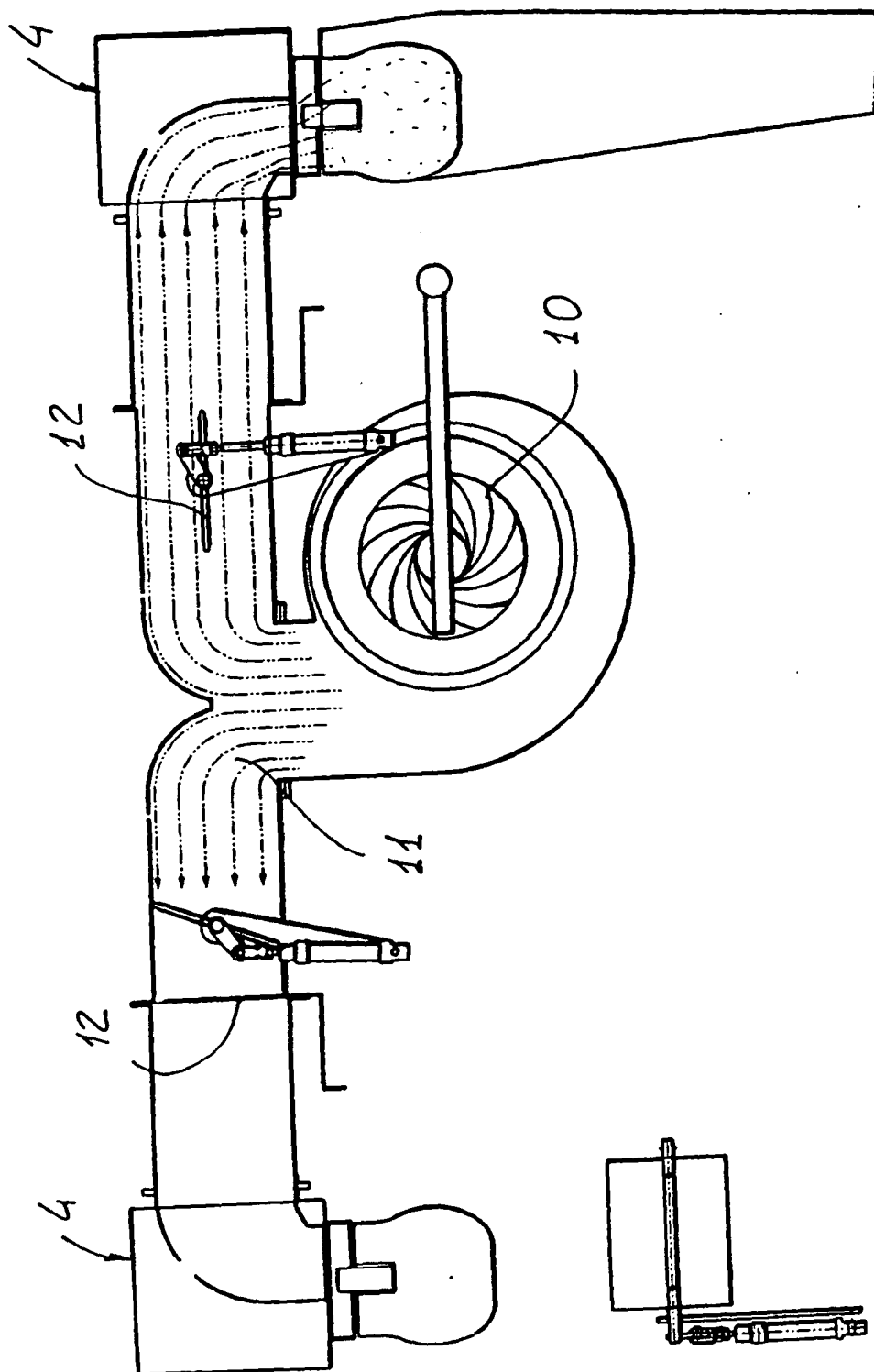


FIG. 3

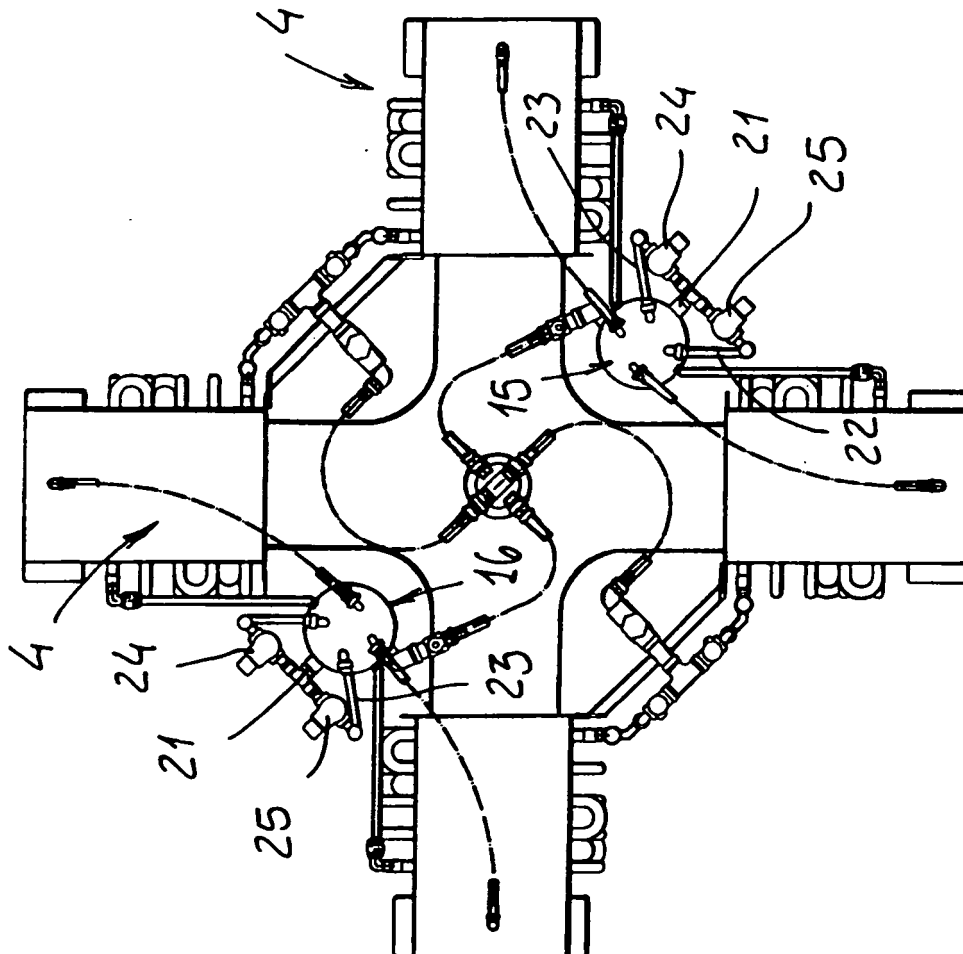


FIG. 4

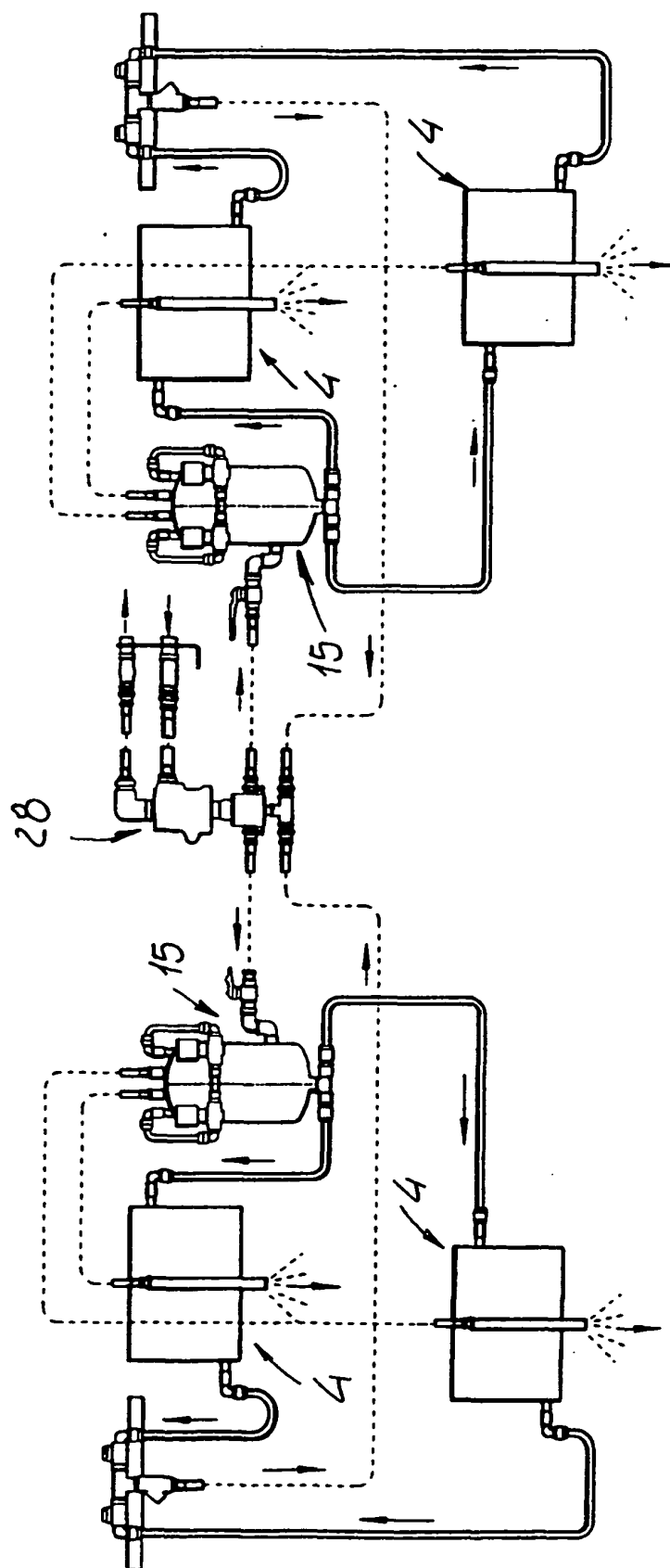
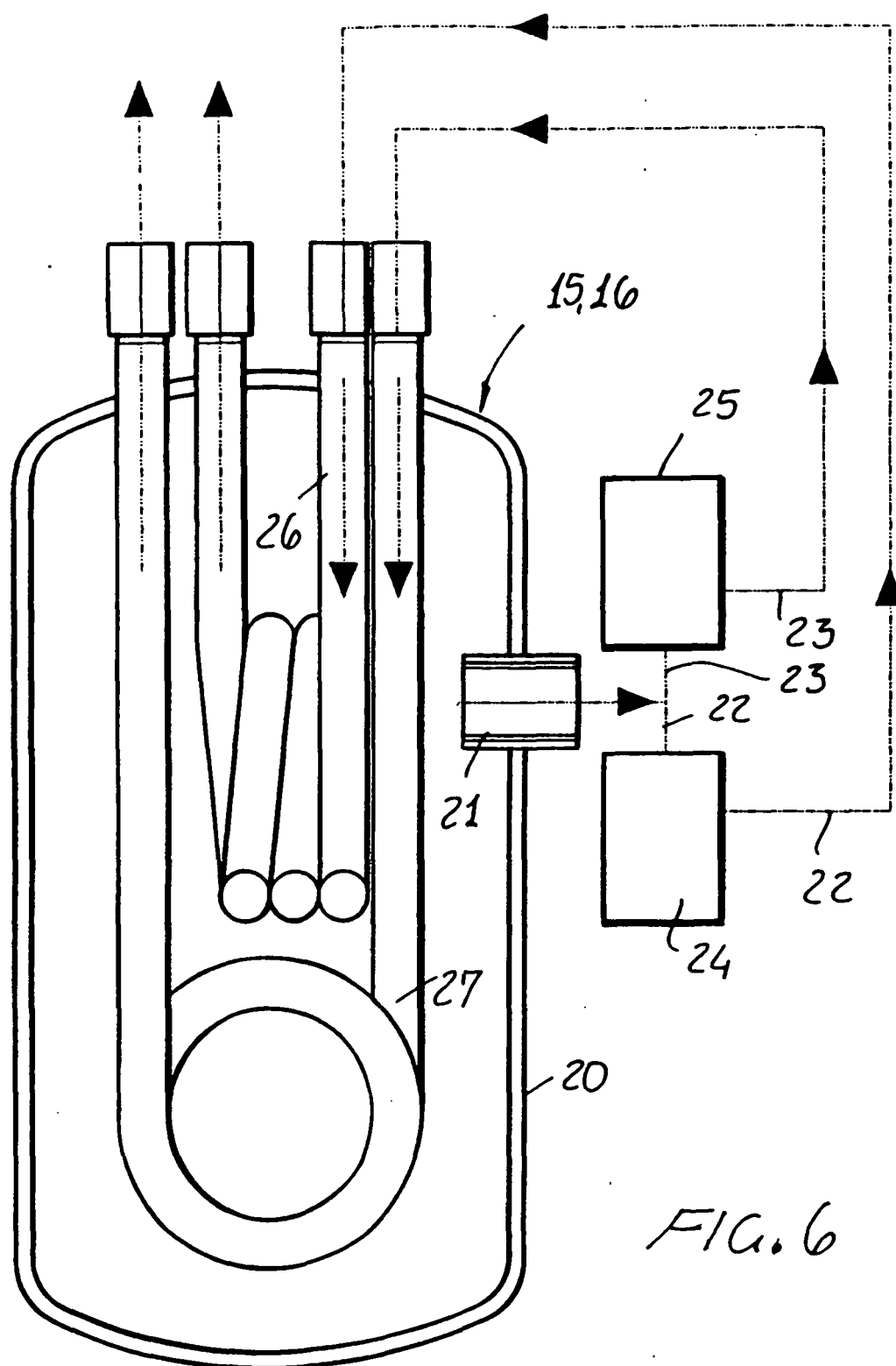
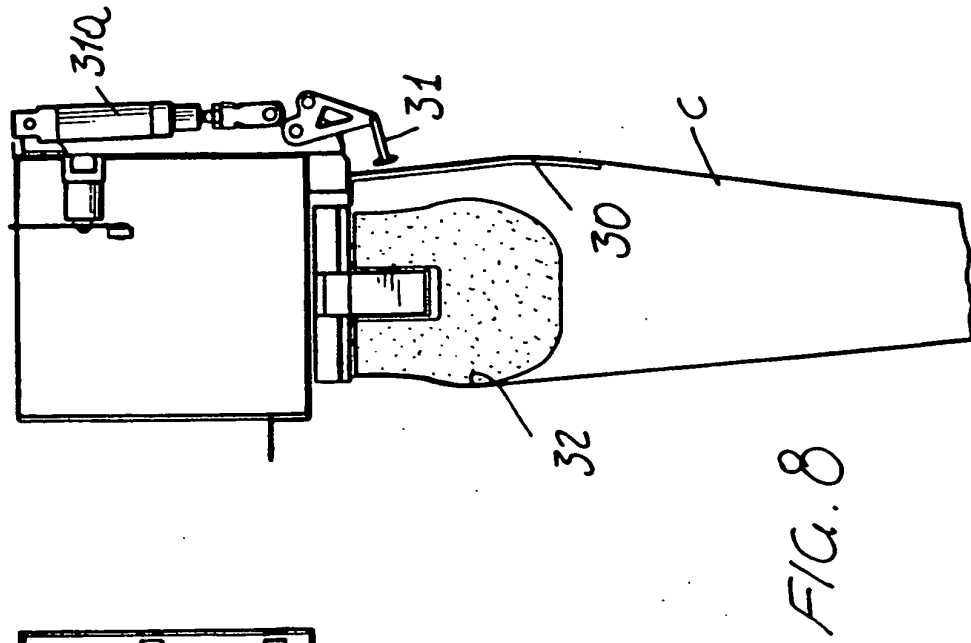
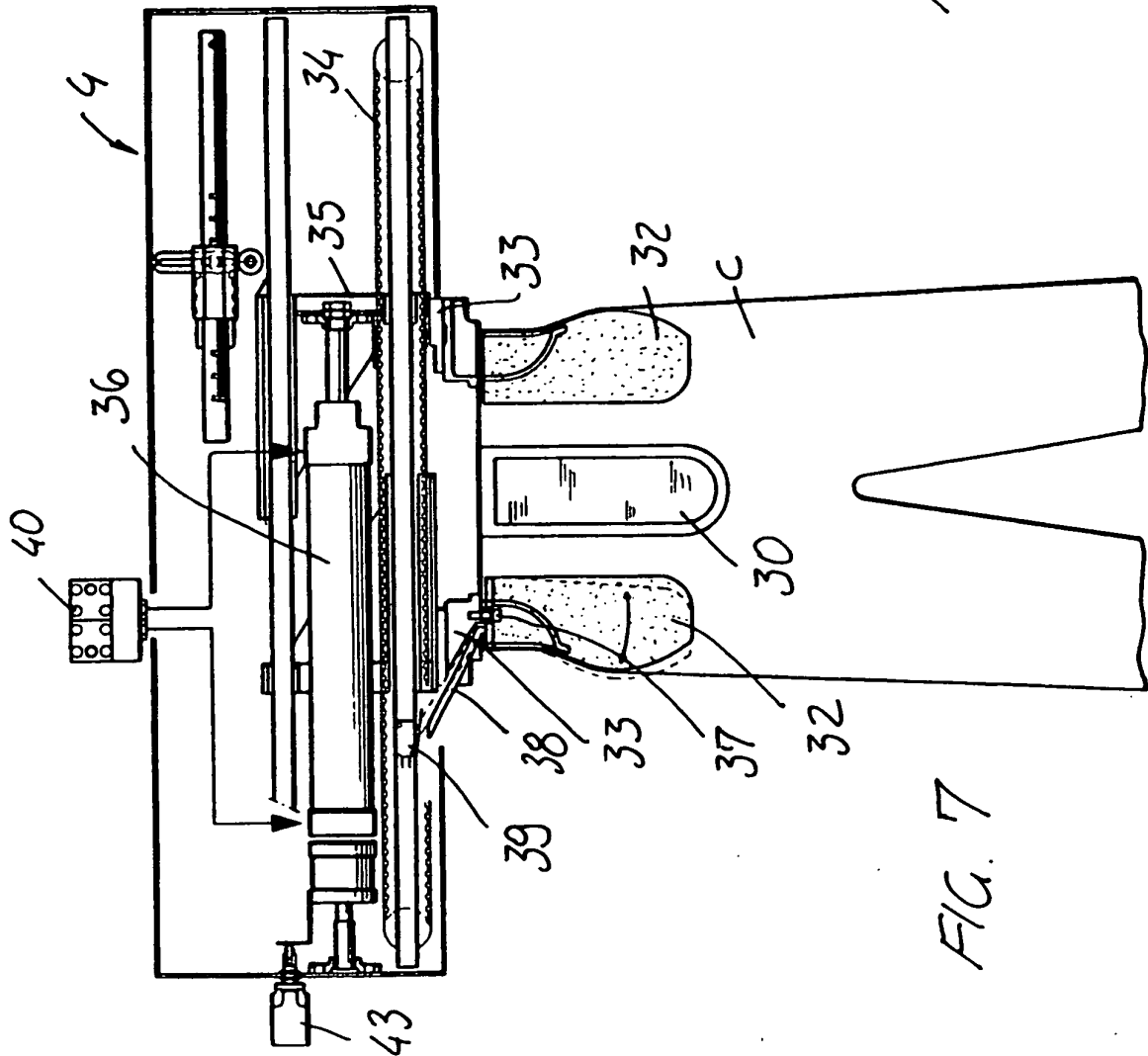
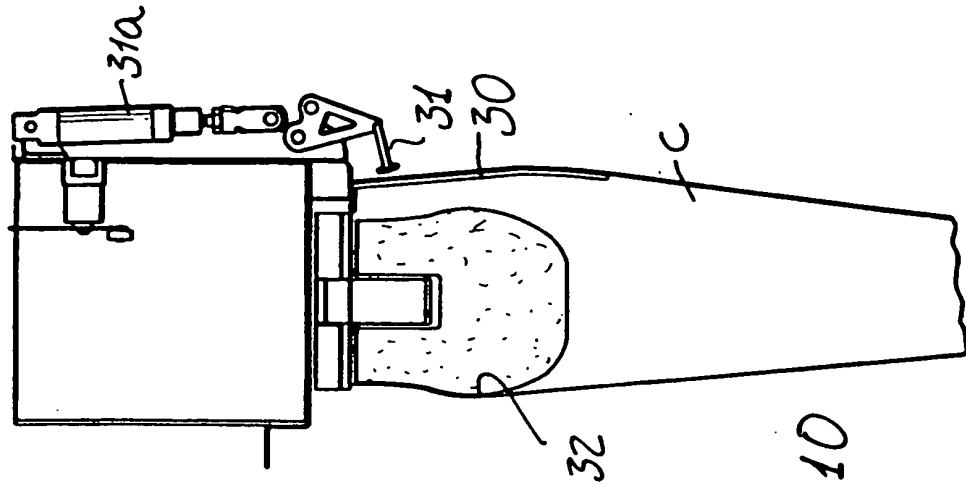
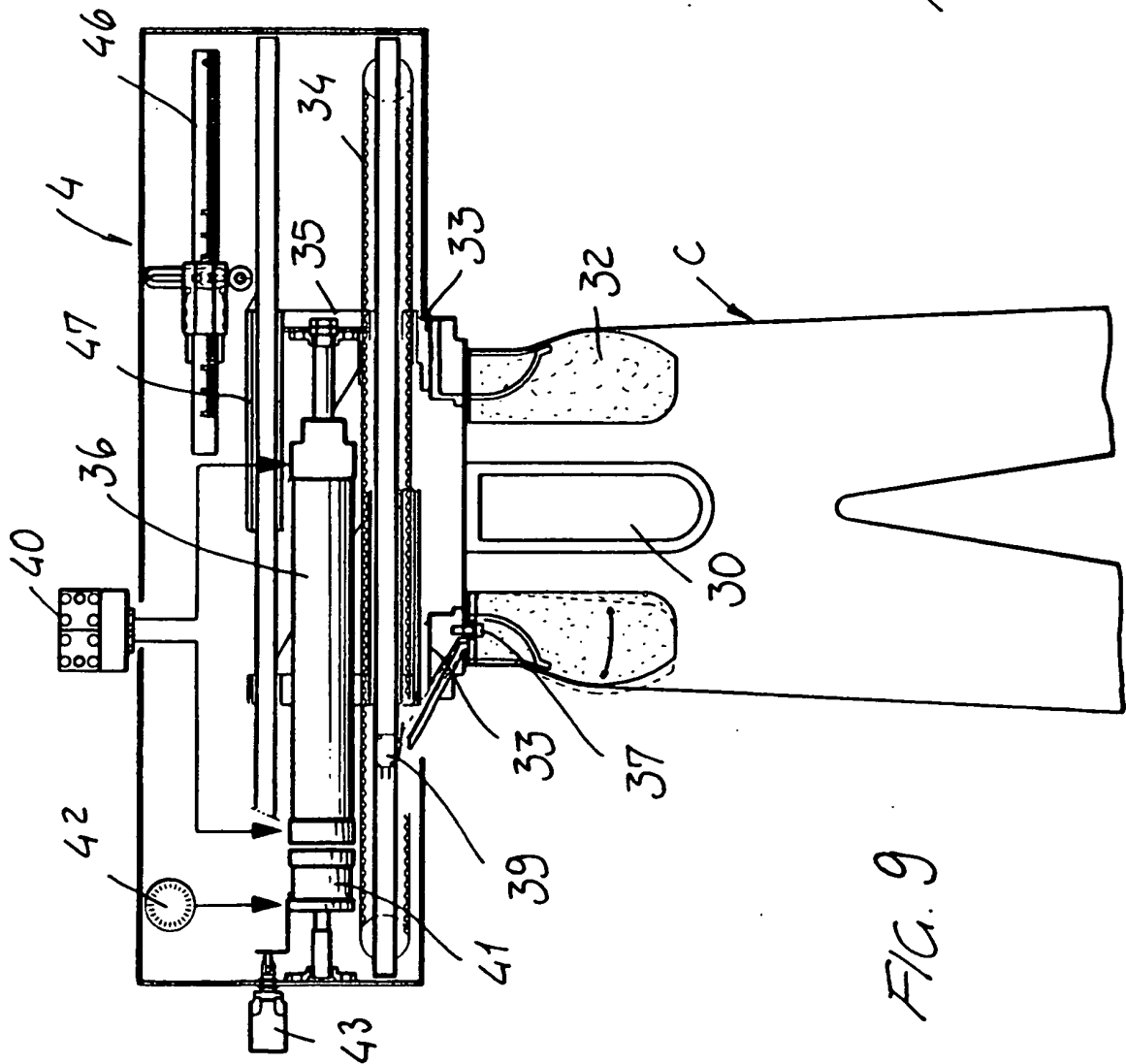
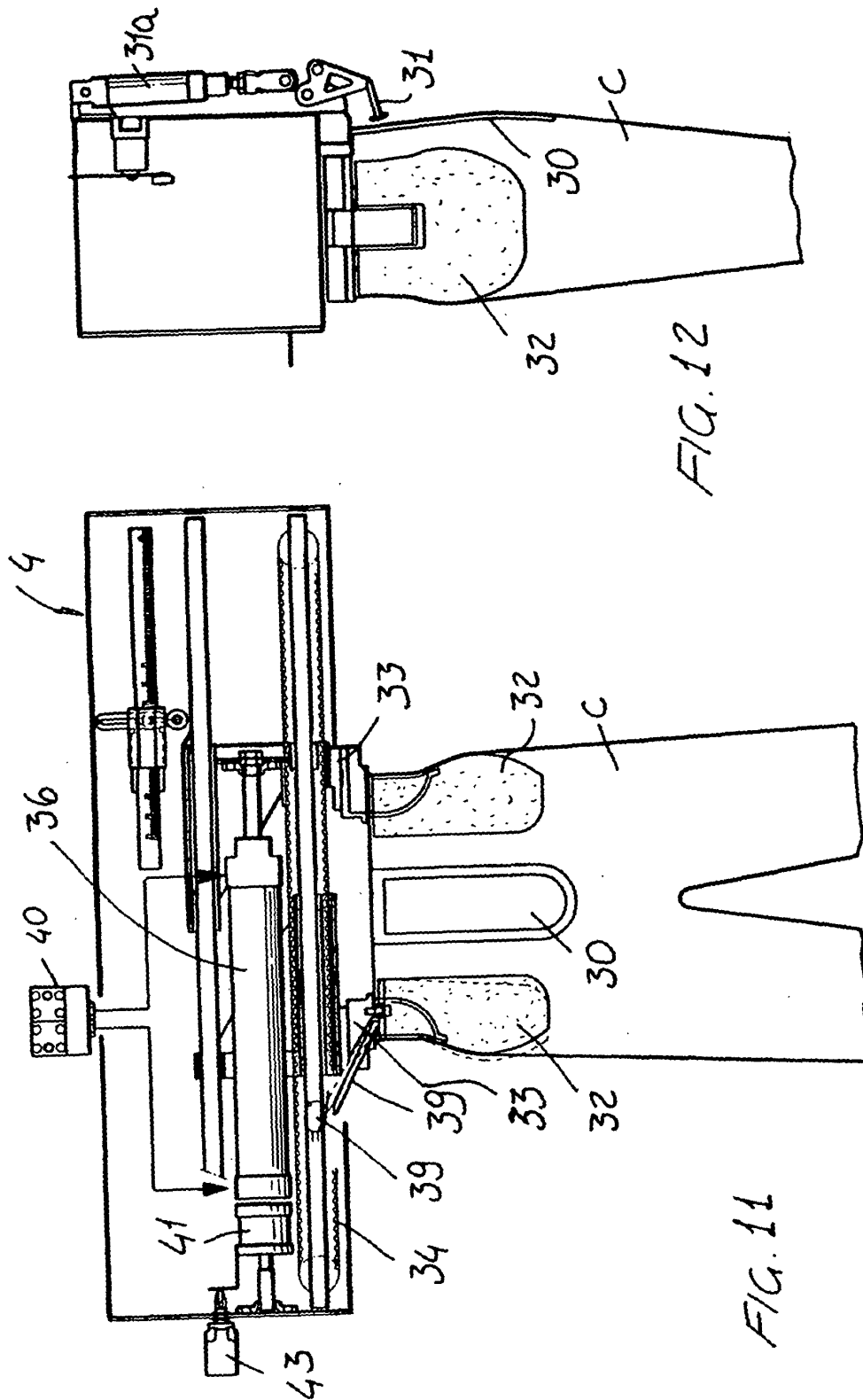


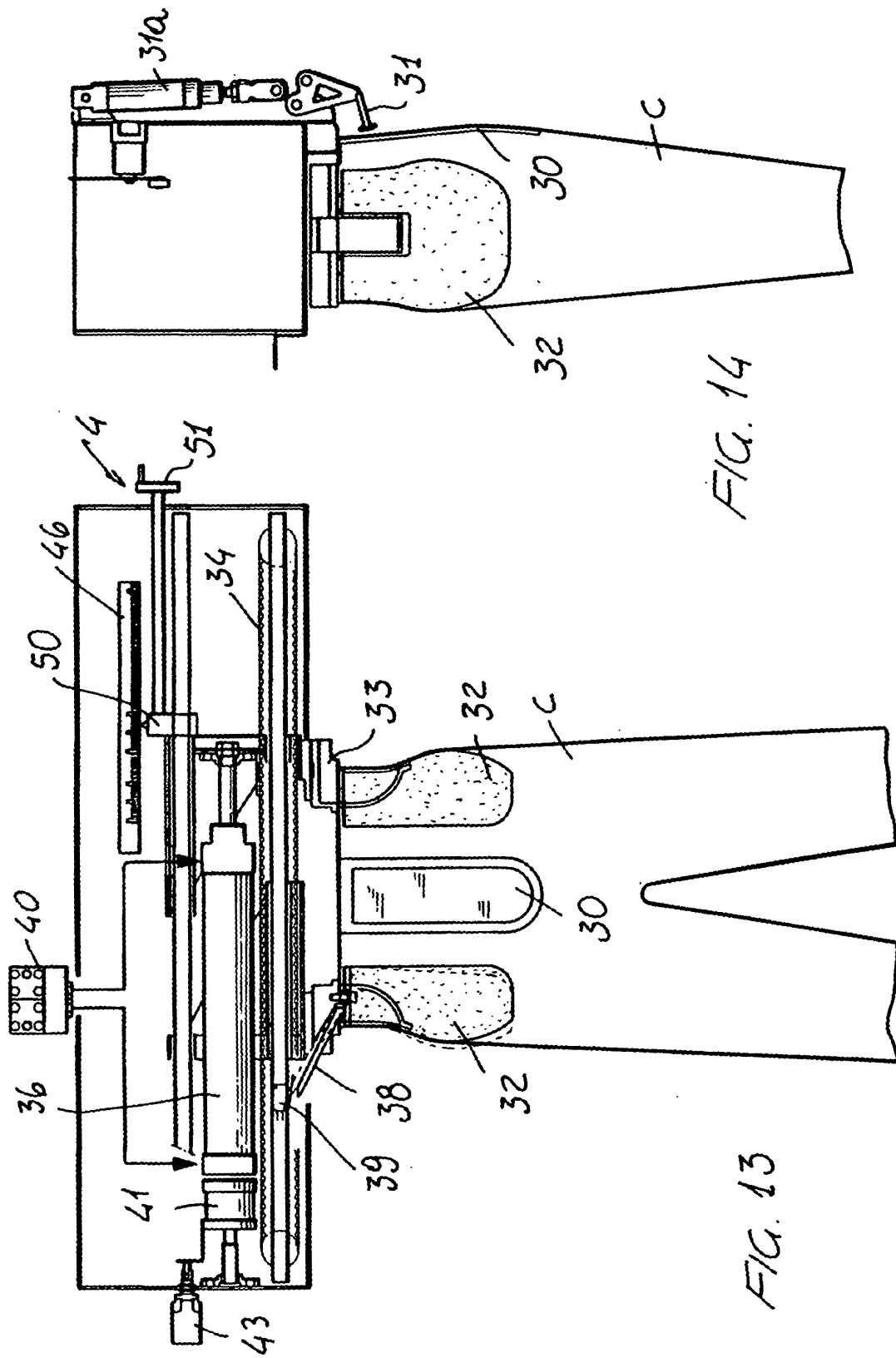
FIG. 5











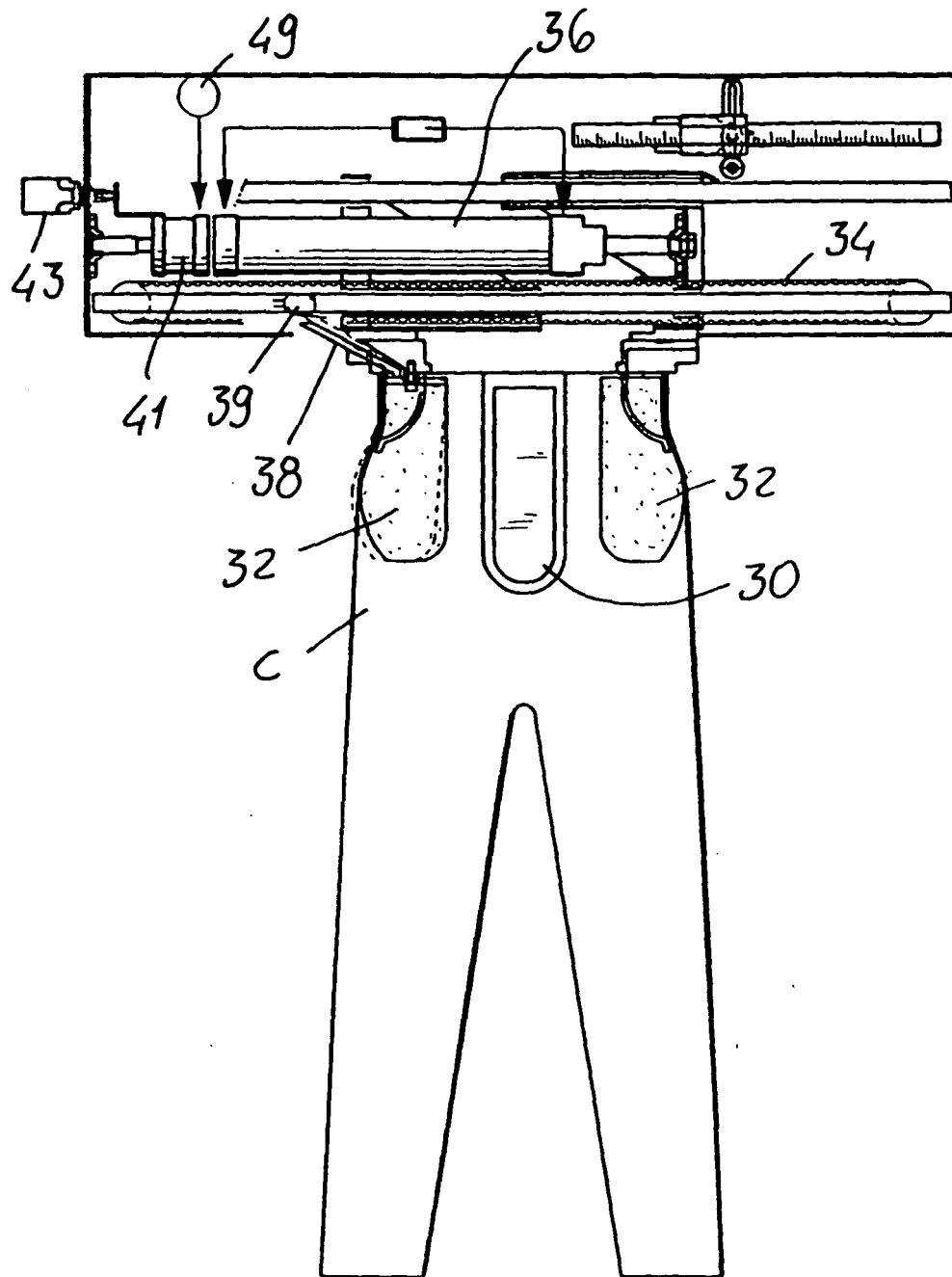


FIG. 15

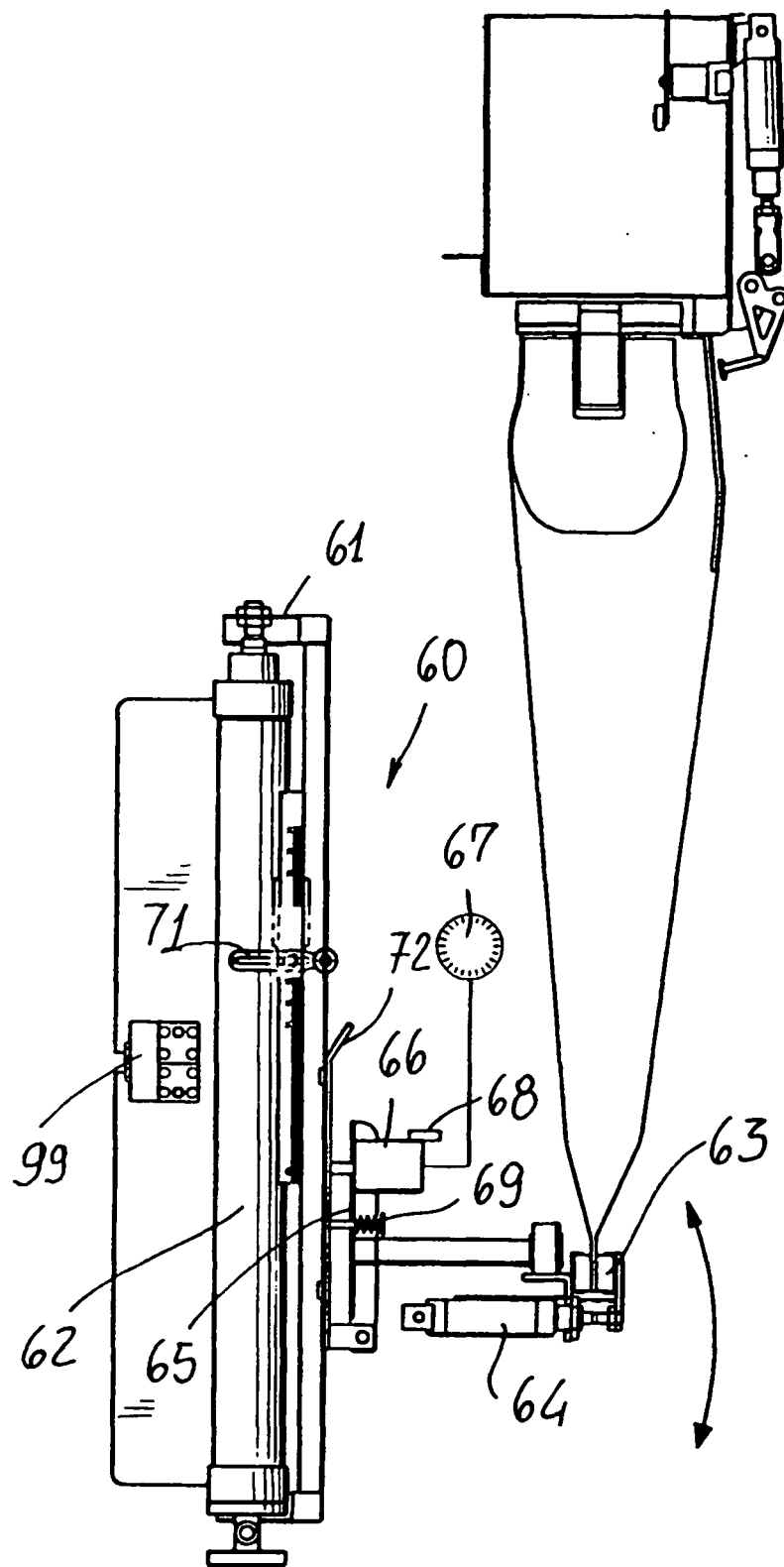


FIG. 16

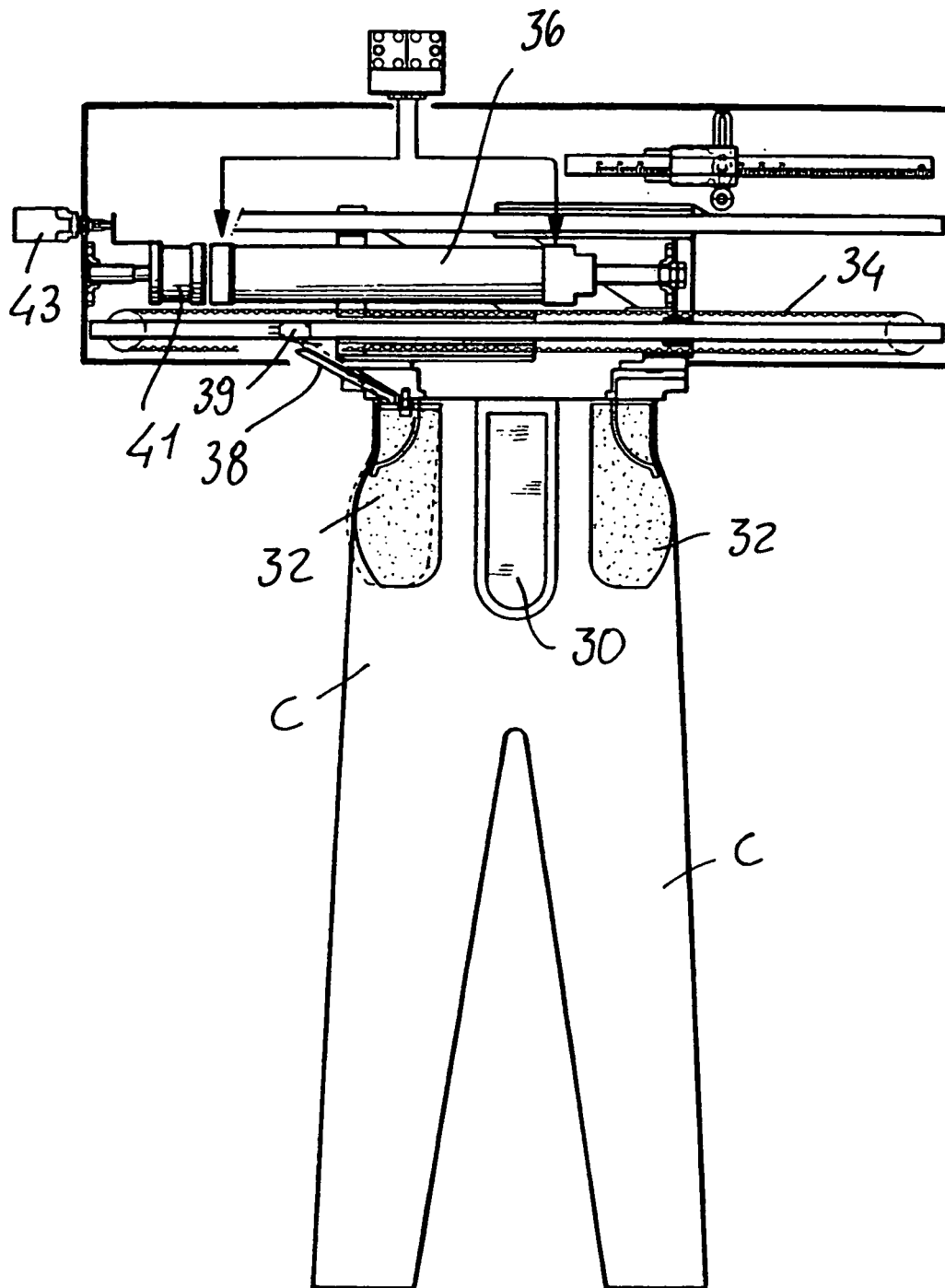


FIG. 17

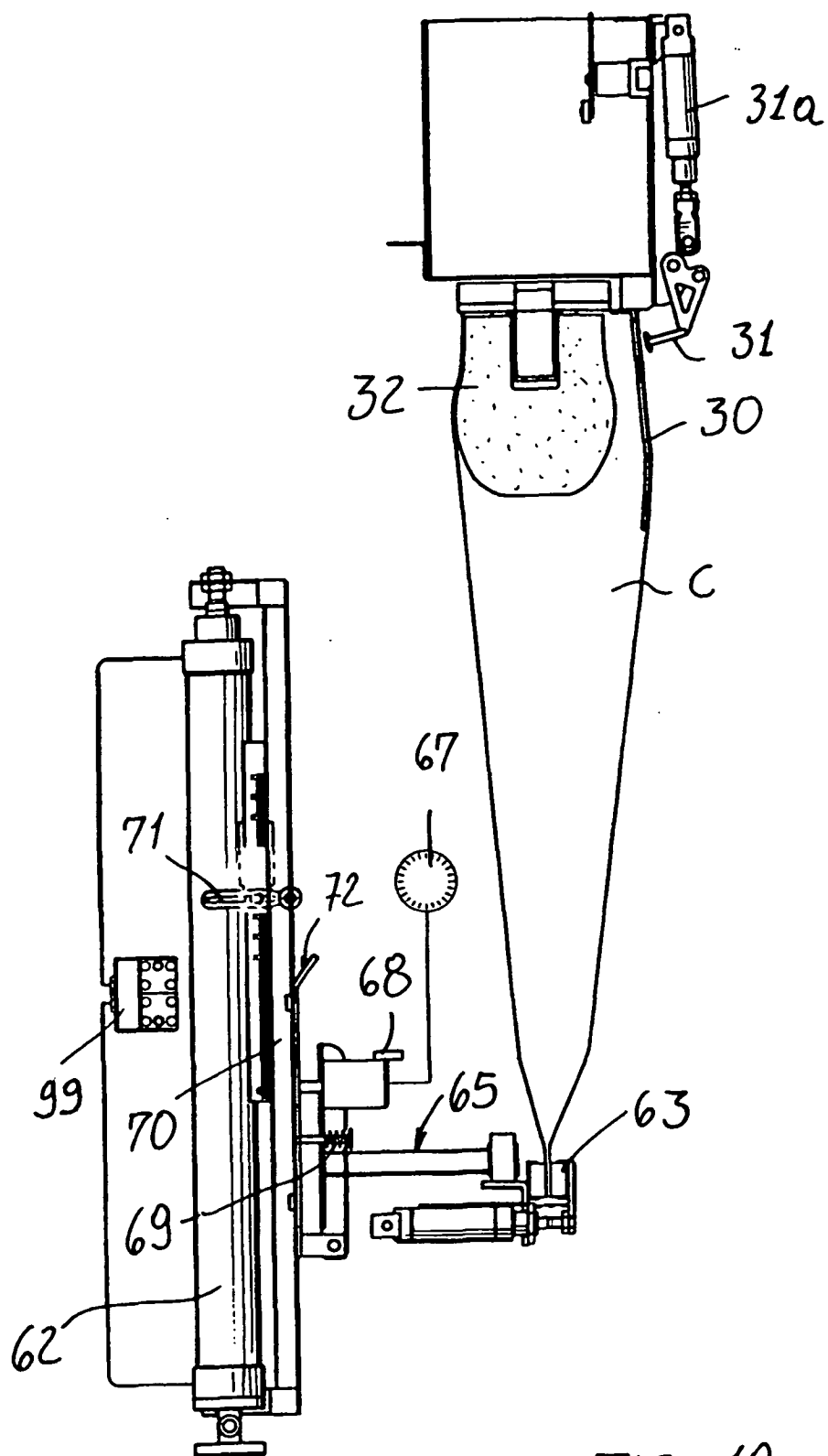


FIG. 18

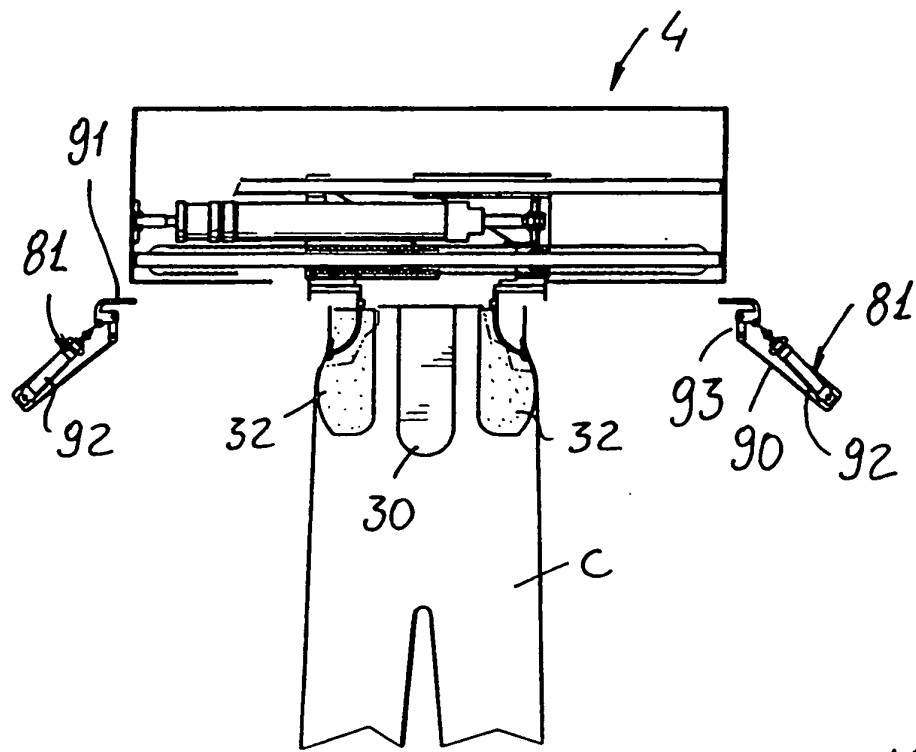


FIG. 19

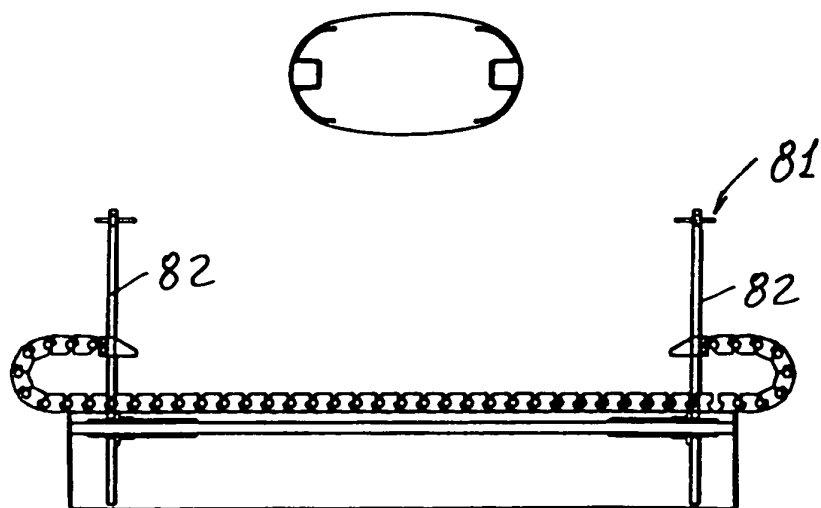


FIG. 20

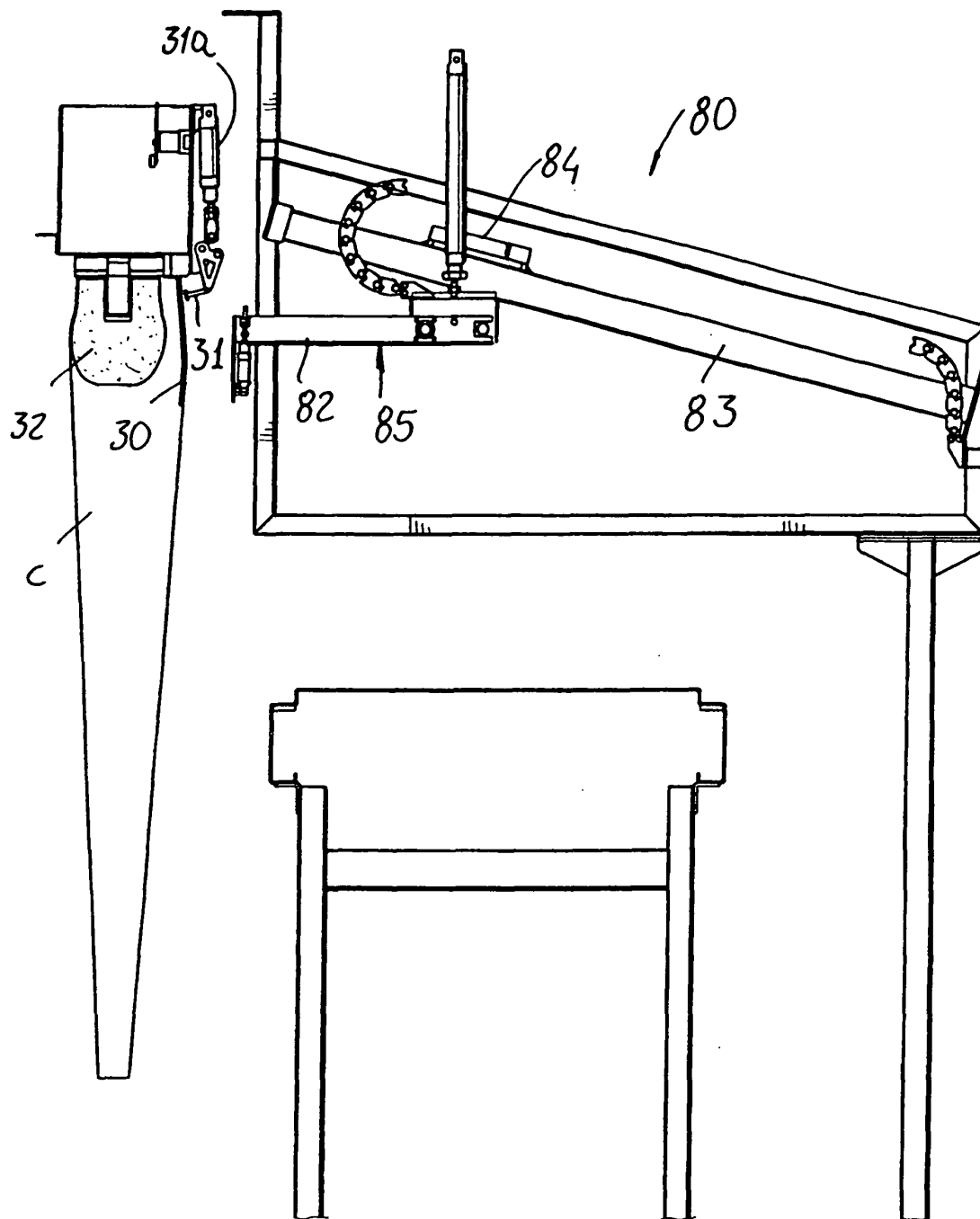


FIG. 21

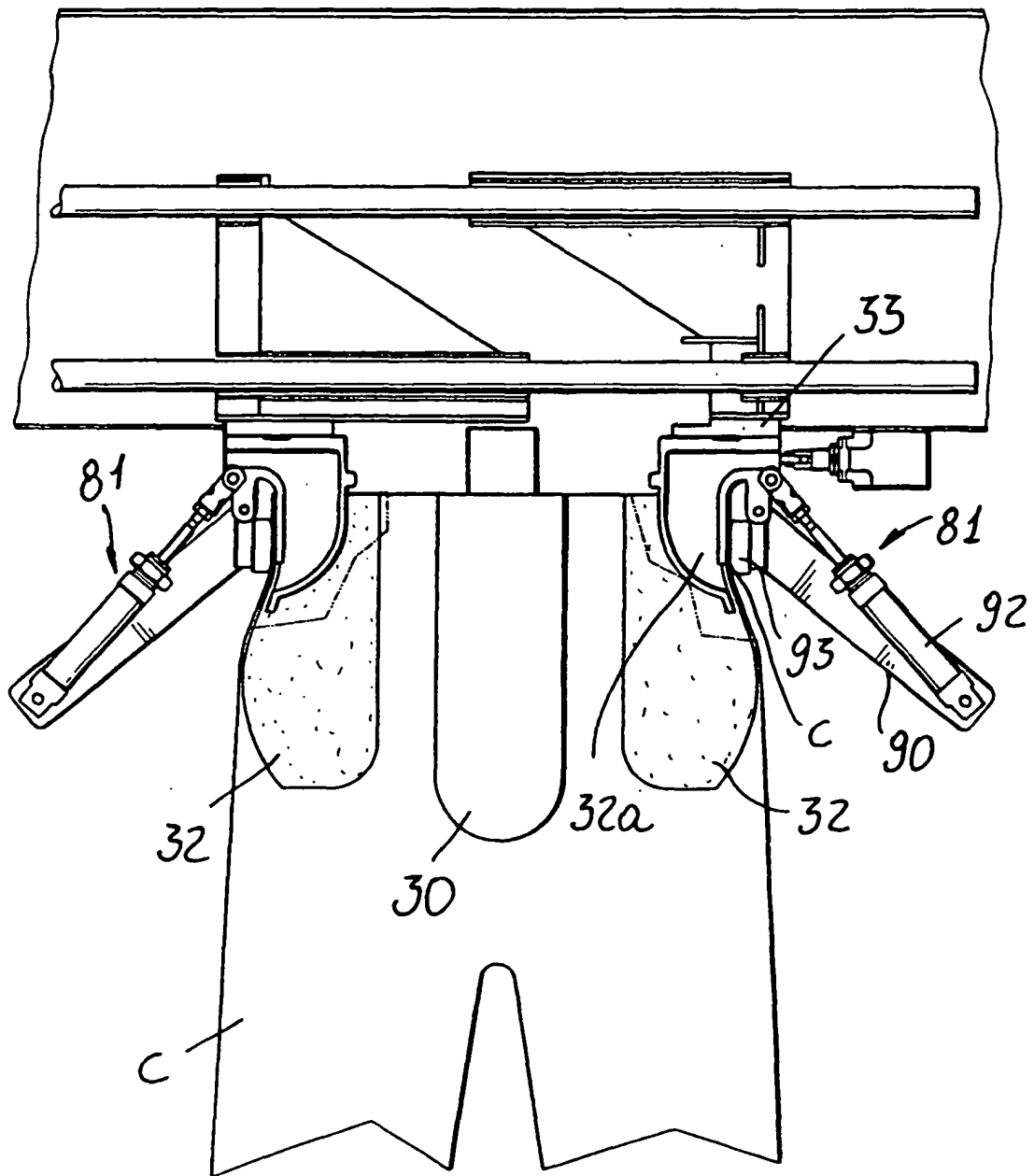


FIG. 22

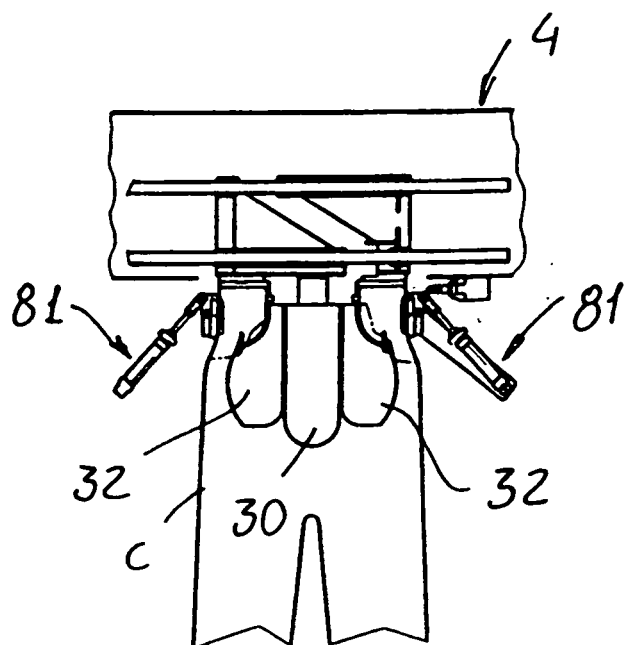


FIG. 23

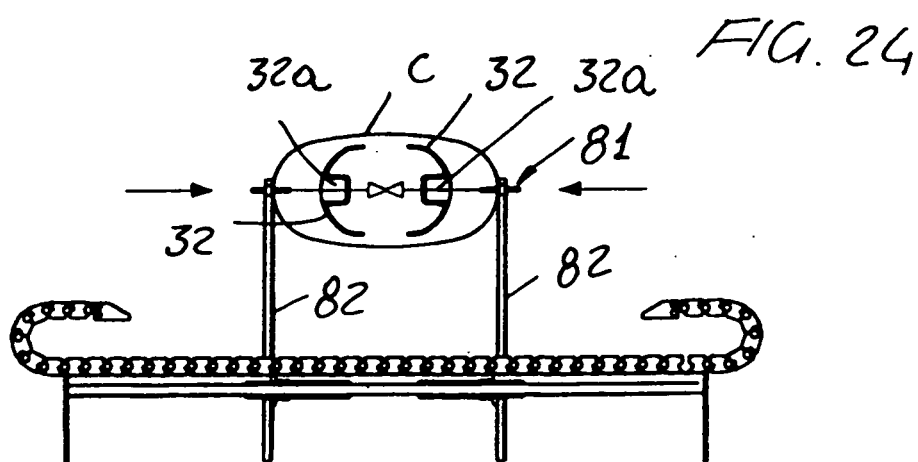


FIG. 24

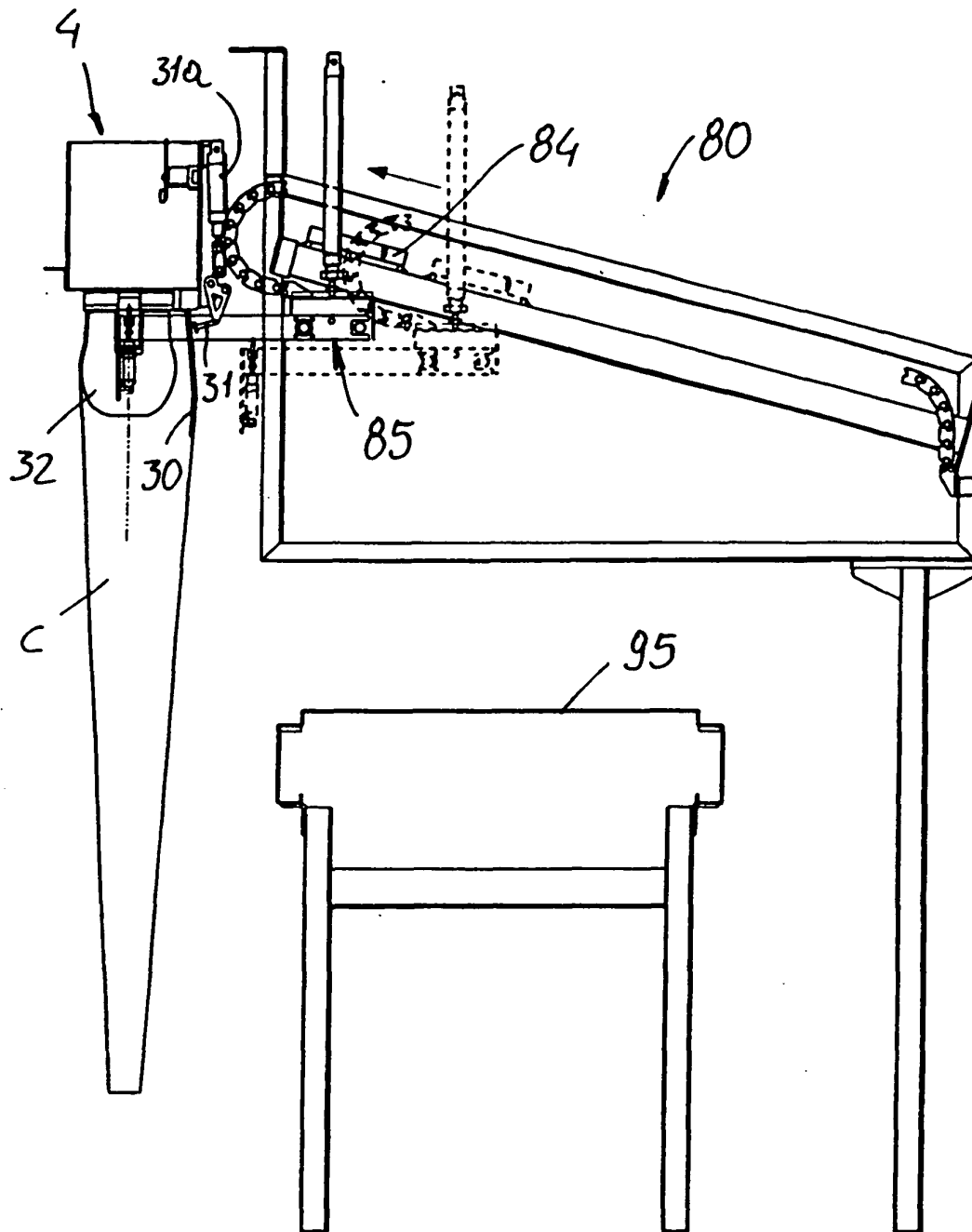


FIG. 25

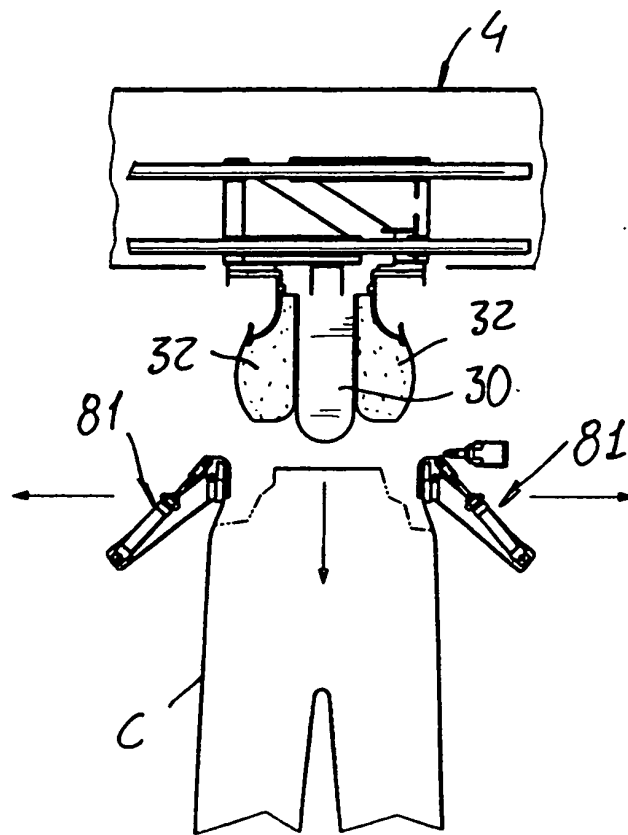


FIG. 26

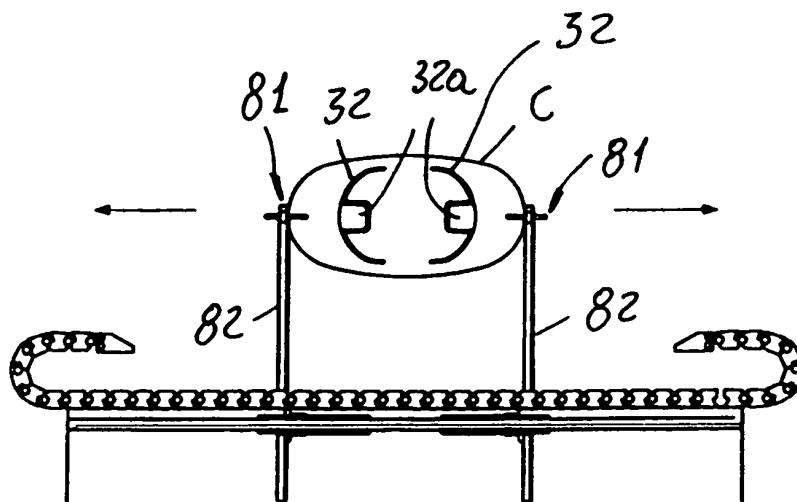


FIG. 27

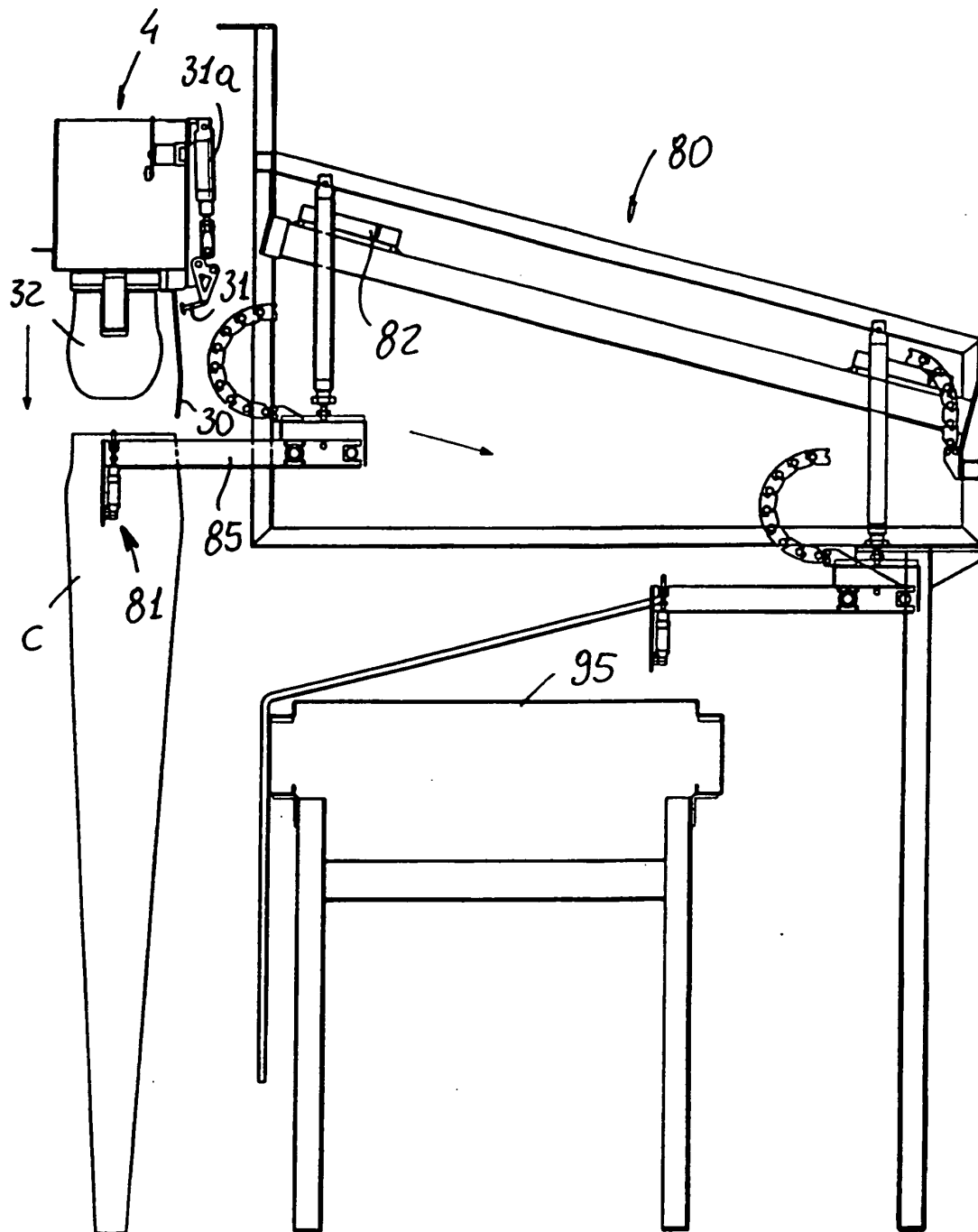
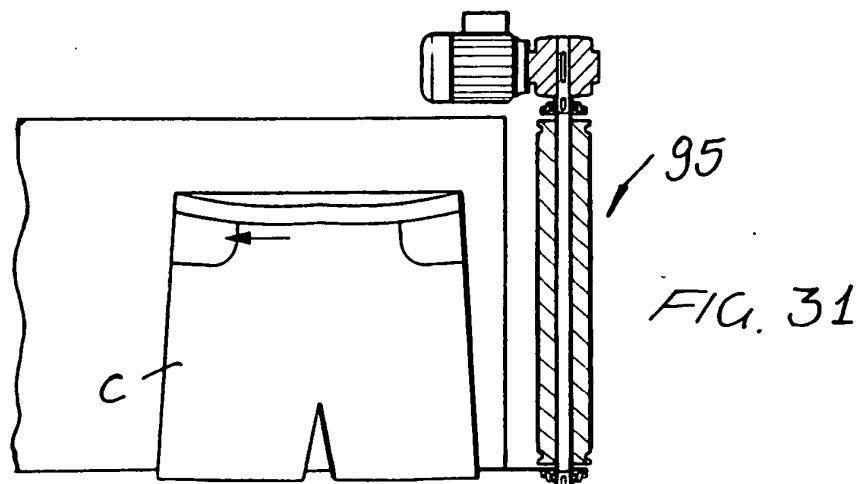
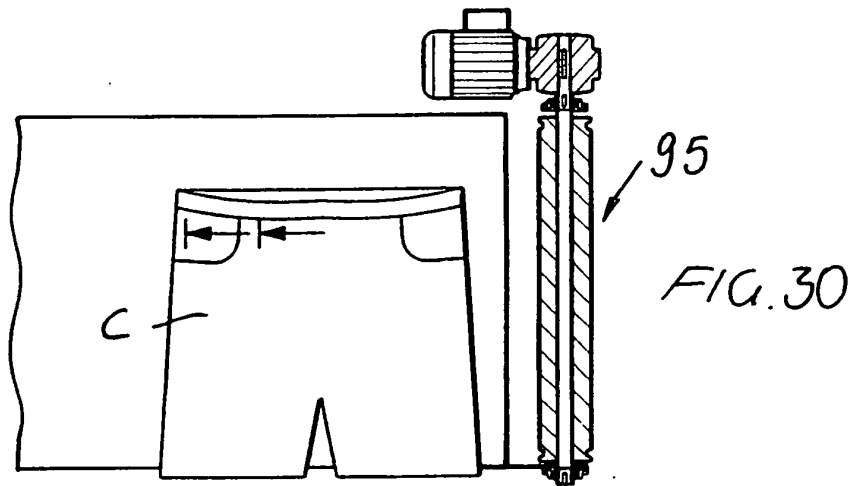
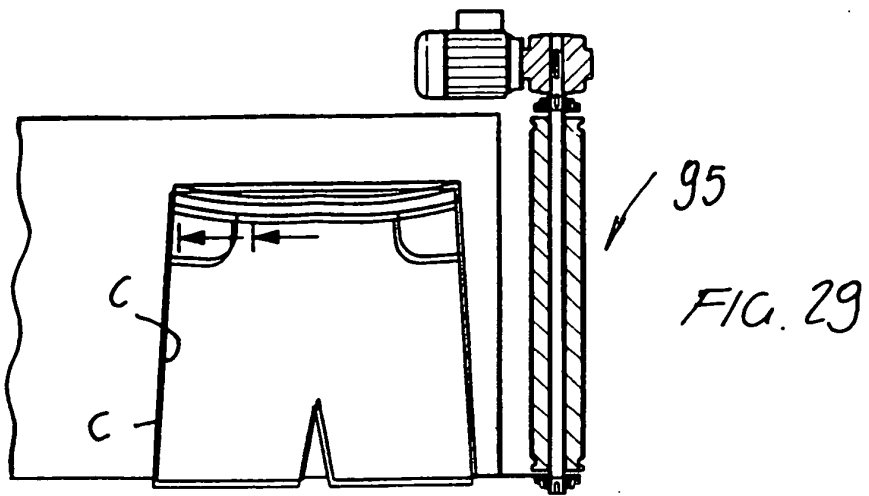


FIG. 28



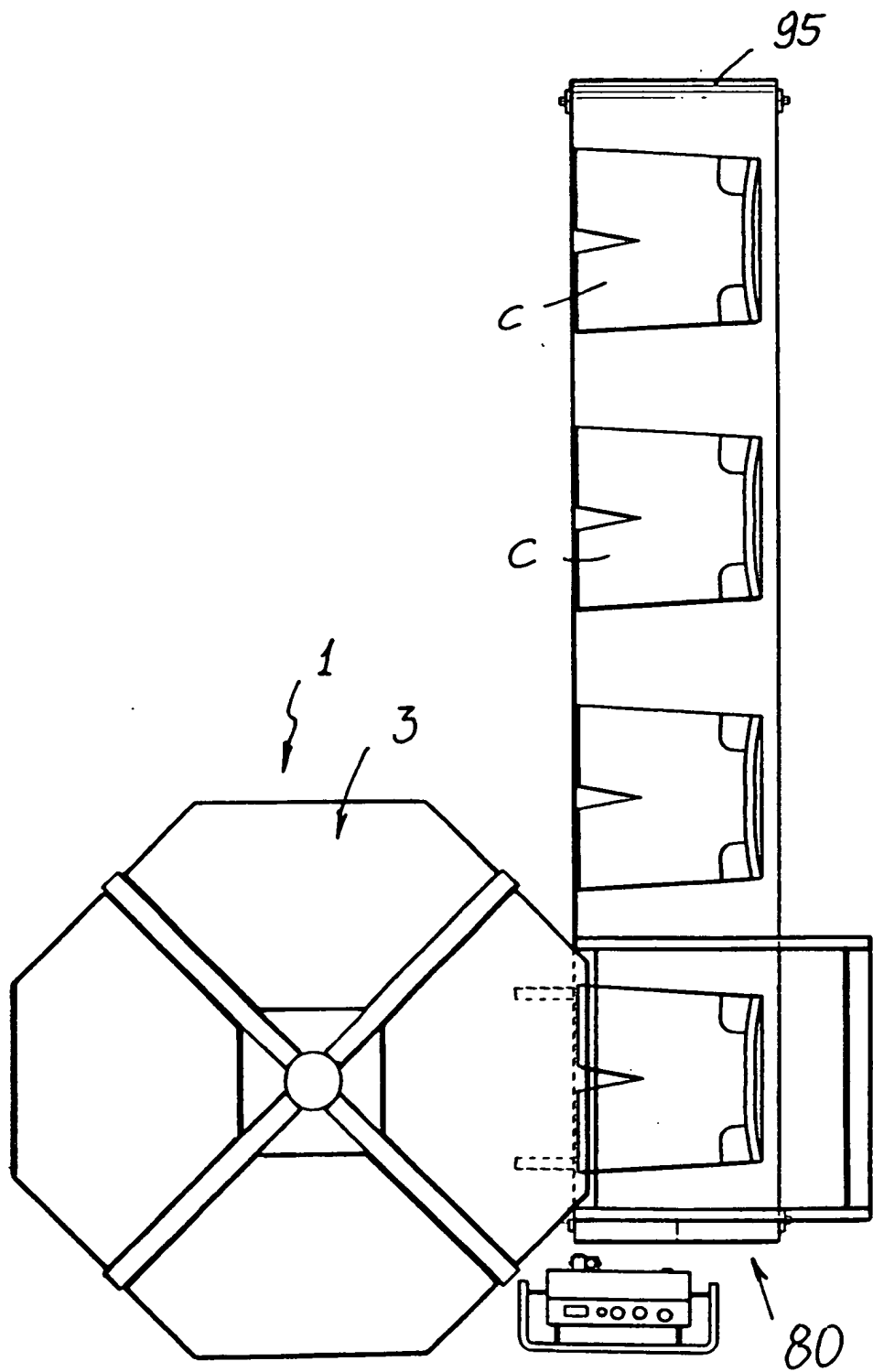


FIG. 32