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(54) **DISPENSING DEVICE**

ABGABEVORRICHTUNG

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Description

[0001] The present invention relates to a dispensing device for use in vending machines, the device having at least one support piece extending in the longitudinal direction of the device, the support piece being provided with a merchandise article pusher which is controllably driven by an electromotor via a spindle and a carrier on the pusher with which the spindle rotatably engages, wherein the pusher, in a controllable manner, is arranged to push articles of merchandise with or without packaging towards a dispensing end of a transport path, as disclosed in the preamble of attached claim 1.

[0002] A great many dispensing devices are previously known, and one such device is described in, inter alia, US Patent 6,604,652, wherein there are arranged in levels above one another trays having fixed, upright walls for forming pushing channels for articles of merchandise, typically tobacco articles such as cigarettes and the like. Each channel has its own drive motor that is connected to a spindle which is in threaded engagement with a merchandise article pusher in the pushing channel. Power transmission from the drive motor to the spindle takes place via pulleys and standard belt drive, and the motor is fixedly mounted on the tray. If there is a change in the width of the merchandise articles, a tray of this type must be completely remodelled or a new tray of the right channel width must be provided. This is therefore a cumbersome and costly solution if the owner of a vending machine wishes to change the merchandise article range and finds that the pushing channels in the machine do not quite fit the new product range as desired. Furthermore, standard belt drive is not a preferable solution, apart from it being able to act as a slip clutch in the event of the machine becoming jammed or the like, because there will be no possibility of measuring the exact position of the pusher in the pushing channel and thus the number of articles still present in the pushing channel.

[0003] Other known solutions can be seen from, inter alia, US Patent 2,590,736, EP patent 1,119,830, and international application published under WO 2005/109355 A2.

[0004] Accordingly, it has been an object of the present invention to remedy the disadvantages that appear to be associated with the prior art, and in such manner that replacement or adjustment of equipment in the vending machine can take place quickly and in a cost-effective manner. It has been a further object of the invention to arrive at a technical solution which enables not only the dispensing of articles of merchandise standing in a row in a pushing channel, but also the dispensing of merchandise articles hanging in such a pushing channel.

[0005] According to a first aspect of the invention, the dispensing device is characterised in that it has at least one side wall, the distance of the side wall from the adjacent longitudinal side of the support piece being adjustable for adaptation of the width of the transport path to the width of the merchandise articles that are to be moved along the transport path and successively dispensed.

[0006] According to a second aspect of the invention, the dispensing device is characterised in that the support piece in a first position of use is designed to form the bottom of the transport path, and that the support piece in a second position of use, which is inverted 180° about the longitudinal axis of the device in relation to the first position of use, is designed to have mounted thereon an elongate support rail or loop which extends along the transport path of the support piece, the support rail or loop being designed for sliding engagement with a suspension hole in packaging or a suspension tab for the merchandise article.

[0007] In said first and second aspects, the support piece is in addition arranged to form support for the motor, spindle and drive gear between the motor and the spindle, and also forms a guide for the pusher and its carrier.

[0008] Additional embodiments of the invention will be apparent from attached subsidiary claims 2-16, and from the following description with reference to the attached drawings which show in a non-limiting manner the currently preferred embodiments of the invention.

Fig. **1** is a perspective view from above, the rear and one side of a first embodiment of the dispensing device in a first position of use according to the invention.

Fig. **2** is a perspective view from above, the rear and the other side of a first embodiment of the dispensing device in a first position of use according to the invention.

Fig. **3** shows the dispensing device from below and slightly tilted to the side.

Fig. **4** is a perspective view of the dispensing device from below.

Fig. **5** shows an example of the dispensing device having a second position of use that is inverted 180° about the longitudinal axis of the device in relation to the position of use shown in Figs. **1-4,** seen in perspective from behind, from one side and seen from below with respect to its second position of use according to the invention and intended for hanging articles of merchandise.

Fig. **6** is a perspective view of the dispensing device shown in Fig. **5,** from in front, from the opposite side and seen from below with respect to its second position of use.

Fig. **7** shows a detail of the device according to Figs. **5** and **6** for the hanging of a merchandise article, for example so-called blister packs.

Fig. **8** shows a detail of the dispensing device ac-

cording to Figs. **1-7** with a motor control unit and device for detecting the position of the pusher.

Fig. **9** shows enlarged details of the side adjustment of a side wall in relation to the dispensing device support piece.

Fig. **10** shows a detail of the dispensing area of a pusher channel.

Fig. **11** shows details of the pusher and the merchandise article hanger for hanging articles of merchandise.

Fig. **12** illustrates two cooperating support pieces with side walls for use for dispensing particularly wide articles of merchandise.

Fig. **13** shows the principle of the mounting of a support piece on a wall in a vending machine.

Fig. **14** shows a simplified block diagram of the electrical/electronic cooperating functional parts included in the dispensing device.

[0009] In, inter alia, Figs. **1-5** there is shown a dispensing device **1** which is especially designed for use in a vending machine (not shown). The device has at least one support piece **2** which extends in the longitudinal direction of the device, and the support piece **2** is provided with a merchandise article pusher **3** which is controllably driven by an electromotor **6** via a spindle **7** and a carrier **8** on the pusher **3** with which the spindle **7** rotatably engages. The pusher **3** is in a controllable manner arranged to push merchandise articles **9** with or without packaging towards a dispensing end **10** of a transport path 11 which is provided with side walls **12, 13.** The distance, for example **d1; d2,** that a side wall, for example **12, 13,** may have from an adjacent longitudinal side **2'; 2"** of the support piece **2** is adjustable for adaptation of the width **d3** of the transport path **11** to the width of the merchandise articles **9** that are to be moved along the transport path and successively dispensed.

[0010] It will be seen from, inter alia, Figs. **1-4** and **8** and **9** that the support piece **2** forms support for the motor **6,** the spindle **7** and drive gear in the form of gearwheels **14, 15** between the motor **6** and the spindle **7,** and also forms a guide for the pusher **3** and its spindle engaging carrier **8.**

[0011] As shown in Figs. **3** and **4** and in greater detail in Fig. **9,** the support piece **2** has sliding guides **16, 17; 18, 19; 20, 21** and **22, 23** with associated engaging hooks **16', 17'; 18', 19'; 20', 21'** and **22', 23'** for adjustably fixing the respective mounting brackets **12', 12"** and **13', 13"** of at least one side wall. As can be seen clearly from Fig. **9,** the mounting brackets, the mounting brackets **12', 13'** shown here, have toothed bars **24, 25** and **28, 29** for engagement with the engaging hooks **16', 17'** and **18', 19'.** Similar toothed bars **26, 27** and **30, 31** will of course be present on the two other mounting brackets **12"** and **13",** as indicated in Figs. **3** and **4.**

[0012] As shown in Figs. **1, 2, 6** and **10,** the side walls **12; 13** at or close to the dispensing end 10 of the transport path have a split **32; 33** so that a portion **12"'; 13'"** moulded in one piece with the wall **12; 13** will bear resiliently against a side portion of at least the merchandise article **9'** which is closest to the dispensing end **10.** Furthermore, at the dispensing end **10,** at the free end of the respective portion **12"'; 13"',** there are respective inwardly directed hooks **12"; 13"".** The hooks and the spring portions will together retain the outermost article of merchandise until with the aid of the pusher **3** it is pushed with force past the elastically yielding hooks **12""; 13"".** As can be seen clearly from Fig. **10,** the support piece **2** has at the dispensing end **10** of the transport path a bevelled portion **2'"** projecting transverse to the path, which serves to give the merchandise article **9'** that is to be discharged a gentle lift up from the bottom of the transport path **11,** so that the merchandise article **9'** has a more marked departure from the dispensing device and with minimum friction against said bottom. The portion **2'"** also serves to form a retainer for the front bottom edge of the merchandise article **9',** so that it remains standing stably at the dispensing end **10** prior to dispensing. In addition, the bevelled portion **2"',** together with the yielding hooks **12"", 13"",** represents a marked edge area at the dispensing end **10,** where the merchandise article **9'** will experience some physical resistance from it and will thus result in the drive motor **6,** in order to maintain a constant feed rate of the pusher **3; 3, 3',** having to be given greater driving torque by an increase of motor current, which is controlled by a motor control unit **55.** The functions of the motor control unit **55** are otherwise explained in more detail later in the description.

[0013] At the rear end area of the support piece **2** there are formed at least two suspension hooks **34, 35** and/or **36, 37** intended for cooperation with a suspension mounting, see Fig. **13,** which is provided with suspension holes **39-42,** for example a plate, the hooks located uppermost at any given time, in Fig. **13** shown as **34; 35,** being adapted for engagement with suspension holes **39; 40** in the mounting, whilst the lowermost hooks **36, 37** are arranged for abutment against the portion of the mounting **38** which does not have holes. This means that the dispensing device **1** is given a slight upward inclination of the transport path in the forward direction or the dispensing direction, which is favourable for the operational performance of the device for dispensing merchandise articles, as not only in the case of lighter merchandise articles, but also in the case of heavier articles, it prevents them from sliding uncontrollably towards the dispensing end. To secure the device to the mounting **38,** mounting holes **43, 44** for fixing screws are provided in the end area, such as shown, for example, in Fig. **13**, a screw can pass through the hole **44** and be fastened in a hole **45** (not visible). Similarly, it will be seen that in coopera-

tion with the suspension hook holes **41, 42** in the mounting **38** there is a screw fastening hole **46.** If the dispensing device **1** is turned about its longitudinal axis 180° so that it can be used for hanging merchandise articles, as shown in Figs. **5-7** and **11,** it will in this case be the hooks **37, 36** that are hooked into the respective holes **39, 40,** whilst the hooks **34, 35** then come to rest against the portion of the mounting **38** that does not have holes, and that a screw is passed through the hole **43** and is fastened in the hole **45.**

[0014] As mentioned in the introduction, one of the objects of the invention is to provide a dispensing device that is capable of dispensing articles of merchandise which it is necessary to allow to hang. Certain types of merchandise articles are packed in such manner that they are unsuitable for pushing along a channel with a bottom and side walls, as just illustrated and described. This relates in particular to articles of merchandise with packaging that does not have right angles, articles with an irregular outer surface, and articles that are packed in so-called blister packs, and a feature that is common to all of these is that they cannot rest in a stable manner on a surface.

[0015] However, the present invention solves the dispensing of such merchandise articles and their packaging or hanging means, if any, in a simple and very neat manner.

[0016] As illustrated and described, in particular in connection with the first position of use according to Figs. **1-4,** the support piece **2** in this first position will be adapted to form the bottom of the transport path **11** with side walls **12, 13.** The unique solution according to the invention is that the support piece **2** in a second position of use, as shown in Figs. **5, 6** and **11,** and with respect to other details, also in Figs. **7-9,** is inverted 180° about the longitudinal axis of the device relative to the first position of use and in this second position of use is adapted to have mounted thereon a merchandise article hanger **47,** for example, an elongate support rail or loop, which extends along the transport path on the support piece **2** from a securing aperture or apertures **48, 49** in the rear, forward facing part **2""** of the support piece, the merchandise article hanger **47** being designed for sliding engagement with suspension hole **50** in the packaging **51** or a suspension tab (not shown) for the merchandise article. The hanger **47** may, apart from being secured in the said apertures **48, 49,** also be fastened to the support piece **2** slightly closer to the dispensing end **10** by fastening clips **47', 47".** This ensures a multi-point, steady support of the hanger **47,** and on the right choice of material for the hanger, the hanger **47** will extend essentially parallel to the longitudinal axis of the dispensing device and the transport path **11,** even when heavy articles are hung on it

[0017] As shown in Figs. **5, 6** and **11,** the length of the pusher **3** perpendicular to the length of the support piece **2** may be optionally extendible by means of a snap-on extension piece **3'.** This may be useful if a merchandise article has a height that is substantially larger than the normal height of the pusher **3.**

[0018] It is of course possible to allow a computer to have an overview of how many articles of merchandise from each dispensing device in a vending machine are dispensed over time, but an extra security control is provided in that the position of the pusher along the transport path **11** in each dispensing device is detectable. Such detection can be carried out by the gearwheel **15** which also serves as a detection wheel in gear connection **14** with the drive shaft **52** of the motor and an optical position sensor **53, 53'** adapted to detect angularly separated markers **57** (a total of 11 shown on the detection wheel **15**). One end of the spindle 7, i.e., the rear end **7"',** forms, as shown in Fig. **8,** a fixed connection with the rotatable gearwheel **15** which has the said markers **57.** The optical sensor **53, 53'** which is connected to the motor control unit **55** is adapted to detect the successive passing of the markers **57** and thus calculate the position of the pusher **3** as a function of the rotation of the spindle **7.**

[0019] As shown in Figs. **1-5,** an override **lever 54** is arranged on the support piece **2** which upon activation (depression) is adapted to actuate the motor control unit **55** containing the motor control electronics (not shown in Fig. **8**) to move the pusher back to a rear nominal position on the support piece. As shown in Fig. **8,** this takes place in that the lever **54** has an end **54'** which on depression of the lever will move from a normal position in a slightly outward direction as indicated by the arrow **54'.** Thus, a light path between the sensor's light emitter **53** and light receiver **53'** is interrupted and when this happens the light receiver **53'** will trigger the motor control unit **55** to operate the motor **6** as desired. In the rear position of the pusher **3,** the dispensing device will then be able to be filled with merchandise articles if there is still room for extra ones. The sensor **53, 53'** may be mounted on a circuit board **56.** The motor control unit **55** may optionally be mounted on such a circuit board **56** or be separate, and the circuit board **56** is fastened, for instance, by being snapped onto mounting brackets **58, 58'.**

[0020] The motor control unit **55** also permits adaptive control of the driving torque of the motor **6** in relation to the power that is needed to maintain essentially the same pushing rate of the pusher **3; 3, 3'** during dispensing, irrespective of how many articles of merchandise are in the transport path **11.** This control is obtained by allowing the motor control unit **55** to register the rotational speed of the gearwheel **15** using the markers **57** which are detected by the sensor **53, 53'** and adjusting the driving torque with extra help from a signal from a current meter **59** which measures the motor's driving current, so that the rate at which the markers pass the sensor **53, 53'** is kept as constant as possible.

[0021] With the solution shown in Fig. **12** where two pushers **3** are to effect the advance of relatively wide merchandise articles, it will be important that the pushers **3,** which are in this case driven by lateral drive motors **6** (not visible in Fig. **11**), are both driven at the same drive

speed and driving force each time an article of merchandise is to be dispensed, to prevent the articles from being dispensed askew. The motor control unit **55** will in this case sense the speed of motion of the respective pushers as a function of the rotational speed of associated driving wheel **15** and adjust the speeds of the pushers so they are the same. This happens in cooperation with the said motor current meter **59,** so that adapted driving torque as a function of current to the motors maintains identical speeds of motion for all pushers.

[0022] Instead of having a common support piece for all the dispensers in a vending machine, as mentioned in the introduction as known, the present invention, as suggested as a non-limiting example in Fig, **12,** allows, for example, at least two support pieces **2** with respective motor-driven spindle-actuatable pusher **3,** to be arranged side by side. A solution of this kind will of course be possible whether the merchandise articles are of the standing type or hanging type. In such a case it will be only the longitudinal support piece sides **2', 2"** which lie laterally outermost in the assembly that are provided with distance-adjustable side walls **12, 13** for the substantially wider transport path.

[0023] A production and assembly economising solution for the dispensing device according to the invention is that the support piece **2** and its transport path portion **11,** the supports **7', 7 ,** of the spindle **7,** the drive motor mount **6',** support for the driving gear connection **14, 15** between the motor **6** and the spindle **7,** the sliding guides **16-22** and engagement hooks **16' - 22'** for the side wall mounting brackets **12', 12", 13', 13",** mounting brackets **58, 58'** for the circuit board **56,** fasteners **48, 49** for the suspension rail or loop **47,** the lever **54, 54'** and the suspension hooks **34-37** are moulded in one piece of a plastic material.

[0024] Furthermore, as previously suggested, each of the side walls **12; 13** and their respective mounting brackets **12', 12"; 13', 13"** with respective toothed bars **24, 25, 26, 27; 28, 29, 30, 31** may be moulded in one piece of a suitable plastic material.

[0025] This means that the dispensing device in terms of production will be significantly cheaper than previously known dispensing devices, whilst assembly, repairs and maintenance and use adjustments will be considerably simplified.

[0026] As can be seen from Fig. **14,** the motor control unit **55** connected to the electromotor **6** is adapted to measure the driving current of the electromotor using a current meter **59,** The torque of the spindle **7** and thus the thrust on the merchandise articles may therefore easily be computed as a function of the current intensity. This is a very important extra function for the monitoring and control of the whole dispensing device.

Claims

1. A dispensing device (1) for use in a vending machine, the device comprising:

- at least one elongate support piece (2) extending in the longitudinal direction of the device, the support piece having an article dispensing end (10) at a front end thereof and forward facing part (2"") at a rear end thereof,
- a merchandise article pusher (3) co-operative with the support piece (2) and which is controllably driven by an electromotor (6) via a spindle (7) and a spindle engaging carrier (8) on the pusher with which the spindle rotatably engages, the pusher(3), in a controllable manner, being arranged to push articles of merchandise (9; 9'; 51) with or without packaging towards the dispensing end (10) of a transport path (11),
- at least one side wall (12; 13) related to a longitudinal side (2'; 2") of the support piece, the distance (d1; d2) of such side wall from an adjacent longitudinal side of the support piece being adjustable for adaptation of the width (d3) of the transport path (11) to a width of the articles of merchandise (9; 9'; 51) that are to be moved along the transport path (11) and successively dispensed at the dispensing end (10), and
- the support piece provides support for the electromotor (6) with a drive motor mount (6') at said rear end thereof, and support (7'; 7") for the spindle (7) at either end thereof, and forms a guide for the pusher (3) and its carrier (8),

characterised in

- mounting brackets (12', 12"; 13', 13") on at least one side wall 12; 13) which slidably and releasably engage sliding guides (16, 17; 18, 19; 20, 21; 22, 23) on the support piece (2) for adjustment of said distance,
- a drive gear (14, 15) at said rear end of the support piece operatively linking a rear end (7"') of the spindle (7) with the motor (6), and
- the dispensing device (1) selectively having a first mode or a second mode of operation,

  - wherein in the first mode of operation the support piece (2) is in a first position of use and configured to form a bottom of the transport path (11) to support the articles (9) from below when pushed by the pusher (3), and
  - wherein in the second mode of operation the support piece (2) is in a second position of use, which is inverted 180° about the longitudinal axis of the device relative to the first position of use, and is configufred to have mounted thereon a merchandise article hanger (47), e.g. an elongate support rail or loop, extending along the transport path on the support piece from a securing aperture or apertures (48, 49) in the rear, forward facing part (2"") of the support

piece, and the merchandise article hanger providing sliding engagement with a suspension hole (50) in a hanging article packaging (51) or a suspension tab for the merchandise article when pushed by the pusher (3).

2. A dispensing device as disclosed in claim 1, characterised in that the sliding guides (16, 17; 18, 19; 20, 21; 22, 23) on the support piece (2) have releasable engaging hooks (16',17'; 18', 19'; 20', 21'; 22', 23) which are engageable with toothed bars (24, 25; 28, 29) on the mounting brackets (12', 12"; 13', 13") for adjustably fixing of the mounting brackets of said at least one side wall (12; 13) relative to said longitudinal side (2'; 2") of the support piece (2).

3. The dispensing device as disclosed in claim 1 or 2, **characterised in that** the side walls (12; 13) at or close to the dispensing end (10) of the transport path (11) have a split (32; 33) in order, with the aid of a portion (12"'; 13"') moulded in one piece with the wall, to bear resiliently against a side portion of at least the merchandise article (9) that is closest to the dispensing end (10).

4. The dispensing device as disclosed in claim 1, 2 or 3, **characterised in that** the support piece at the dispensing end (10) of the transport path (11) has a bevelled portion (2"') projecting transverse to the path.

5. The dispensing device as disclosed in any one of claims 1-4, **characterised in that** the length of the pusher (3) perpendicular to the support piece (2) is extendible by means of a snap-in extension piece (3').

6. The dispensing device as disclosed in any one of claims 1 - 5, **characterised in that** the pusher (3) has a hole therein to allow the hanger (47) to extend therethrough when the pusher (3) is moved along the the hanger (47), and that fastening clips (47'; 47") fastened to the support piece (2) in addition to the securing aperture(s) (48;49) provide for multi-point, steady support of the hanger (47).

7. The dispensing device as disclosed in any one of claims 1- 6 , **characterised in that** the position of the pusher (3; 3, 3') along the transport path (11) is registrable by means of a detection wheel (15) being a gearwheel (15) of the gear drive connection with the motor drive shaft, and that a position detector formed by sensor (53, 53') is configured to detect equally, angularly spaced markings (57) on the detection wheel (15).

8. The dispensing device as disclosed in claim 7, **characterised in that** on the support piece there is arranged an override lever (54) which on activation is designed to actuate a motor control unit (55) in order to move the pusher (3; 3, 3') back to a rear nominal position on the support piece.

9. The dispensing device as disclosed in any one of claims 1- 6, **characterised in that** one end of the spindle (7) forms a connection with a rotatable wheel (15) which has angularly separated markers (57), and that an optical sensor (53, 53') coupled to the motor control unit (55) is adapted to detect a successive passing of the markers (57) and thus calculate the position of the pusher (3; 3, 3') as a function of the rotation of the spindle (7).

10. The dispensing device as disclosed in any one of the preceding claims, **characterised in that** the support piece at a rear end area is provided with at least two pairs of suspension hooks (34, 35; 36, 37) intended for cooperation with a perforated suspension mounting (38), e.g. a plate, wherein the hooks (34, 35 or 36, 37) located uppermost at the end area at any given time of said first mode or said second mode of operation are adapted for engagement with suspension holes (39, 40; 41, 42) in the mounting, whilst the lowermost located hooks (36, 37 or 34, 35) are adapted to rest against a portion of the mounting (38) that does not have holes.

11. The dispensing device as disclosed in claim 10, **characterised in that** in connection with the suspension hooks there are provided mounting holes (43; 44) for fixing screws engagable wiith a screw hole (45; 46) on the suspension mounting (38).

12. The dispensing device as disclosed in any one of claims 1-11, **characterised in that** the dispensing device is designed to be suspended at its rear end area to a suspension mounting (38), so that the transport path (11) and/or merchandise article hanger (47) is thus given an ascending gradient in the direction of the dispensing end (10).

13. The dispensing device as disclosed in any one of the preceding claims, **characterised in that** at least two support pieces (2) equipped with a respective motor-driven, spindle-actuatable pusher (3), are arranged side by side, and that only the longitudinal support piece sides (2'; 2") which lie laterally outermost are provided with distance-adjustable side walls (12; 13) for the transport path (11).

14. The dispensing device as disclosed in any one of claims 1- 13, **characterised in that** the transport path (11) portion of the support piece (2), the spindle supports (7', 7"), the drive motor mount (6'), the support for the gear connection (14, 15) between the

motor (6) and the spindle (7), the sliding guides (16, 17; 18, 19; 20, 21; 22, 23) and engaging hooks (16',17'; 18', 19'; 20', 21'; 22', 23') for side wall mounting brackets (12', 12"; 13', 13"), mounting brackets (58, 58') for a motor control related circuit board (56), fastenings aperture(s) (48, 49) for the suspension rail or bar (47), the lever (54) and the suspension hooks (34, 35; 36, 37) are moulded in one piece from a suitable plastic material.

15. The dispensing device as disclosed in any one of claims 1-14, **characterised in that** the side wall (12; 13) and its mounting brackets (12', 12"; 13', 13") are moulded in one piece from a suitable plastic material.

16. The dispensing device as disclosed in any one of claims 1- 15, **characterised in that** a motor control unit (55) connected to the electromotor (6) is adapted to compute the driving torque of the electromotor (6) onto the spindle and thus a thrust on the merchandise articles (9) as a function of a magnitude of driving current of the electromotor (6).

Patentansprüche

1. Abgabevorrichtung (1) zur Verwendung in einem Automaten, welche Vorrichtung Folgendes umfasst:

- zumindest ein längliches Unterstützungsstück (2), das sich in der Längsrichtung der Vorrichtung erstreckt, wobei das Unterstützungsstück ein Warenabgabeende (10) an einem vorderen Ende davon und einen nach vorne zeigenden Teil (2"") an einem hinteren Ende davon aufweist,
- einen Warenschieber (3), der mit dem Unterstützungsstück (2) zusammenwirkt und durch einen Elektromotor (6) über eine Spindel (7) und einen Spindelkupplungsträger (8) auf dem Schieber, mit welchem die Spindel drehbar in Eingriff geht, steuerbar angetrieben wird, wobei der Schieber (3), auf steuerbare Art und Weise, eingerichtet ist, um Waren (9; 9'; 51) mit oder ohne Verpackung gegen das Abgabeende (10) eines Transportweges (11) zu schieben,
- zumindest eine Seitenwand (12; 13), die mit einer Längsseite (2'; 2") des Unterstützungsstücks in Verbindung steht, wobei der Abstand (d1; d2) einer solchen Seitenwand zu einer angrenzenden Längsseite des Unterstützungsstücks zur Anpassung der Breite (d3) des Transportweges (11) an einer Breite der Waren (9; 9'; 51), die entlang dem Transportweg (11) zu bewegen und am Abgabeende (10) hintereinander abzugeben sind, einstellbar ist, und
- das Unterstützungsstück unterstützt den Elektromotor (6) mit einer Antriebsmotorhalterung (6') am hinteren Ende davon und unterstützt (7'; 7") die Spindel (7) an beiden Enden davon und bildet eine Führung für den Schieber (3) und seinen Träger (8),

gekennzeichnet durch

- Halterungsteile (12', 12"; 13', 13") auf zumindest einer Seitenwand (12; 13), die gleitend und lösbar mit Gleitführungen (16, 17; 18, 19; 20, 21; 22, 23) auf dem Unterstützungsstück (2) zur Einstellung des Abstands in Eingriff gehen,
- ein Antriebsgetriebe (14, 15) am hinteren Ende des Unterstützungsstücks, das ein hinteres Ende (7"') der Spindel (7) mit dem Motor (6) funktionsfähig verbindet, und **dadurch** dass
- die Abgabevorrichtung (1) selektiv einen ersten oder einen zweiten Betriebsmodus aufweist,
- wobei das Unterstützungsstück (2) im ersten Betriebsmodus in einer ersten Anwendungsposition ist und eingerichtet ist, um einen Boden des Transportwegs (11) zu bilden, um die Waren (9) von unten zu unterstützen, wenn sie vom Schieber (3) geschoben werden, und
- wobei das Unterstützungsstück (2) im zweiten Betriebsmodus in einer zweiten Anwendungsposition ist, die um die Längsachse der Vorrichtung im Verhältnis zur ersten Anwendungsposition 180° umgekehrt ist, und eingerichtet ist, um darauf einen Warenaufhänger (47) gehaltert zu haben, z.B. eine längliche Unterstützungsschiene oder Schlaufe, die sich entlang dem Transportweg auf dem Unterstützungsstück von einer Sicherungsöffnung oder - Öffnungen (48, 49) im hinteren, nach vorne zeigenden Teil (2"") des Unterstützungsstücks erstreckt, und der Warenaufhänger gleitenden Eingriff mit einem Aufhängungsloch (50) in einer hängenden Warenverpackung (51) oder einem Aufhängungsstreifen für die Ware beim Schieben **durch** den Schieber (3) bereitstellt.

2. Abgabevorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Gleitführungen (16, 17; 18, 19; 20, 21; 22, 23) auf dem Unterstützungsstück (2) lösbare Eingriffshaken (16', 17'; 18', 19'; 20', 21'; 22', 23) aufweisen, die mit gezahnten Stangen (24, 25; 28, 29) auf den Halterungsteilen (12', 12"; 13', 13") zum einstellbaren Festmachen der Halterungsteile der zumindest einen Seitenwand (12; 13) im Verhältnis zur Längsseite (2'; 2") des Unterstützungsstücks (2) in Eingriff gehen können.

3. Abgabevorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Seitenwände (12; 13) am oder nah am Abgabeende (10) des Transportwegs (11) einen Spalt (32; 33) aufweisen, um, mittels eines Teils (12"'; 13"'), der einstückig mit der Wand geformt ist, nachgiebig gegen einen Seitenteil zumindest derjenigen Ware (9) zu stützen, die am

dichtesten am Abgabeende (10) ist.

4. Abgabevorrichtung nach Anspruch 1, 2 oder 3, **dadurch gekennzeichnet, dass** das Unterstützungsstück am Abgabeende (10) des Transportwegs (11) einen schrägen Teil (2 "') aufweist, der quer zum Weg hervorsteht.

5. Abgabevorrichtung nach einem der Ansprüche 1-4, **dadurch gekennzeichnet, dass** die Länge des Schiebers (3) senkrecht zum Unterstützungsstück (2) durch ein Einrastverlängerungsstück (3') erweiterbar ist.

6. Abgabevorrichtung nach einem der Ansprüche 1-5, **dadurch gekennzeichnet, dass** der Schieber (3) ein Loch darin aufweist, um zu ermöglichen, dass sich der Aufhänger (47) dadurch erstrecken kann, wenn der Schieber (3) entlang dem Aufhänger (47) bewegt wird, und dass Befestigungsschellen (47'; 47"), die am Unterstützungsstück (2) befestigt sind, zusätzlich zu der oder den Sicherungsöffnung(en) (48; 49) stabile Mehrpunktunterstützung des Aufhängers (47) bereitstellen.

7. Abgabevorrichtung nach einem der Ansprüche 1-6, **dadurch gekennzeichnet, dass** die Position des Schiebers (3; 3, 3') entlang dem Transportweg (11) durch ein Detektionsrad (15) registrierbar ist, das ein Getrieberad (15) der Getriebeverbindung mit der Motorgetriebewelle ist, und dass ein Positionsdetektor, der durch einen Sensor (53, 53') ausgemacht wird, eingerichtet ist, um gleichmäßig winkelig beabstandete Markierungen (57) auf dem Detektionsrad (15) zu detektieren.

8. Abgabevorrichtung nach Anspruch 7, **dadurch gekennzeichnet, dass** auf dem Unterstützungsstück ein Übersteuerungshebel (54) angeordnet ist, der bei der Aktivierung eingerichtet ist, um eine Motorsteuerungseinheit (55) zu aktivieren, um den Schieber (3; 3, 3') zurück zu einer hinteren nominalen Position auf dem Unterstützungsstück zu bewegen.

9. Abgabevorrichtung nach einem der Ansprüche 1-6, **dadurch gekennzeichnet, dass** ein Ende der Spindel (7) eine Verbindung mit einem drehbaren Rad (15) bildet, das winkelig getrennte Markierungen (57) aufweist, und dass ein optischer Sensor (53, 53'), der mit der Motorsteuerungseinheit (55) gekoppelt ist, eingerichtet ist, um ein fortlaufendes Vorbeifahren der Markierungen (57) zu detektieren und somit die Position des Schiebers (3; 3, 3') als Funktion der Drehung der Spindel (7) zu berechnen.

10. Abgabevorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Unterstützungsstück an einem hinteren Endbereich mit zumindest zwei Paaren von Aufhängungshaken (34, 35; 36, 37) versehen ist, die für die Zusammenwirkung mit einer durchlochten Aufhängungshalterung (38) vorgesehen sind, z.B. einer Platte, wobei die Haken (34, 35 oder 36, 37), die zuoberst am Endbereich angeordnet sind, zu irgendeinem gegebenen Zeitpunkt des ersten oder zweiten Betriebsmodus zum Eingreifen mit Aufhängungslöchern (39, 40; 41, 42) in der Halterung eingerichtet sind, während die zuunterst angeordneten Haken (36, 37 oder 34, 35) eingerichtet sind, um gegen einen Teil der Halterung (38) zu ruhen, der keine Löcher aufweist.

11. Abgabevorrichtung nach Anspruch 10, **dadurch gekennzeichnet, dass** in Verbindung mit den Aufhängungshaken Halterungslöcher (43; 44) zum Festmachen von Schrauben, die mit einem Schraubenloch (45; 46) auf der Aufhängungshalterung (38) in Eingriff gehen können, versehen sind.

12. Abgabevorrichtung nach einem der Ansprüche 1-11, **dadurch gekennzeichnet, dass** die Abgabevorrichtung ausgeformt ist, um an seinem hinteren Endbereich an einer Aufhängungshalterung (38) aufgehängt zu werden, so dass der Transportweg (11) und/oder der Warenaufhänger (47) somit eine steigende Neigung in Richtung des Abgabeendes (10) bekommt.

13. Abgabevorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** mindestens zwei Unterstützungsstücke (2), die mit einem jeweiligen motorangetriebenen, spindelaktivierbaren Schieber (3) versehen sind, neben einander angeordnet sind, und dass nur die längslaufenden Unterstützungsstückseiten (2'; 2"), die lateral zuäußerst liegen, mit abstandseinstellbaren Seitenwänden (12; 13) für den Transportweg (11) versehen sind.

14. Abgabevorrichtung nach einem der Ansprüche 1-13, **dadurch gekennzeichnet, dass** der Transportweg (11)-Teil des Unterstützungsstückes (2), die Spindelunterstützungen (7', 7"), die Antriebsmotorhalterung (6'), die Unterstützung für die Getriebeverbindung (14, 15) zwischen dem Motor (6) und der Spindel (7), die Gleitführungen (16, 17; 18, 19; 20, 21; 22, 23) und Eingriffshaken (16',17'; 18', 19'; 20', 21'; 22', 23') für Seitenwandhalterungsteile (12', 12"; 13', 13"), Halterungsteile (58, 58') für eine motorsteuerungsverbundene Printplatte (56), Befestigungsöffnung(en) (48, 49) für die Aufhängungsschiene oder -Stange (47), der Hebel (54) und die Aufhängungshaken (34, 35; 36, 37) einstückig aus einem geeigneten Kunststoffmaterial geformt sind.

15. Abgabevorrichtung nach einem der Ansprüche 1-14,

dadurch gekennzeichnet, dass die Seitenwand (12; 13) und ihre Halterungsteile (12', 12"; 13', 13") einstückig aus einem geeigneten Kunststoffmaterial geformt sind.

16. Abgabevorrichtung nach einem der Ansprüche 1-15, **dadurch gekennzeichnet, dass** eine Motorsteuerungseinheit (55), die mit dem Elektromotor (6) verbunden ist, eingerichtet ist, um das Antriebsmoment des Elektromotors (6) auf die Spindel und somit einen Druck auf die Waren (9) als Funktion einer Größe von Antriebsstrom des Elektromotors (6) zu berechnen.

Revendications

1. Dispositif de distribution (1) pour une utilisation dans un distributeur automatique, le dispositif comprenant:

- au moins une pièce de support allongée (2) s'étendant dans la direction longitudinale du dispositif, la pièce de support présentant une extrémité de distribution d'articles (10) à une extrémité avant de celle-ci et une partie faisant face vers l'avant (2"") à une extrémité arrière de celle-ci,
- un poussoir d'article de marchandise (3) étant coopératif avec la pièce de support (2) et étant entraîné de manière contrôlable par un électromoteur (6) via une broche (7) et un support engageant la broche (8) sur le poussoir avec lequel la broche s'engage de manière rotatoire, le poussoir (3), d'une manière contrôlable, étant agencé pour pousser des articles de marchandise (9; 9'; 51) avec ou sans emballage vers l'extrémité de distribution (10) d'un trajet de transport (11),
- au moins une paroi latérale (12; 13) connexe à un côté longitudinal (2'; 2") de la pièce de support, la distance (d1; d2) d'une telle paroi latérale d'un côté longitudinal adjacent de la pièce de support étant réglable pour l'adaptation de la largeur (d3) du trajet de transport (11) à une largeur des articles de marchandise (9; 9'; 51) qui doivent être déplacés le long du trajet de transport (11) et distribués successivement à l'extrémité de distribution (10), et
- la pièce de support fournissant le support pour l'électromoteur (6) avec une monture pour le moteur d'entraînement (6') à ladite extrémité arrière de celle-ci, et un support (7'; 7") pour la broche (7) aux deux extrémités de celle-ci, et formant un guide pour le poussoir (3) et son support (8),

caractérisé par

- des braquettes de fixation (12', 12"; 13', 13") sur au moins une paroi latérale (12; 13) qui entrent en prise glissante et détachable avec des guides glissants (16, 17; 18, 19; 20, 21; 22, 23) sur la pièce de support (2) pour le réglage de ladite distance,
- un engrenage d'entraînement (14, 15) à ladite extrémité arrière de la pièce de support raccordant fonctionnellement une extrémité arrière (7"') de la broche (7) avec le moteur (6), et
- le dispositif de distribution (1) ayant sélectivement un premier mode ou un deuxième mode de fonctionnement,
- dans le premier mode de fonctionnement, la pièce de support (2) étant dans une première position d'usage et configurée pour former un fond du trajet de transport (11) pour soutenir les articles (9) du dessous lorsqu'ils sont poussés par le poussoir (3), et
- dans le deuxième mode de fonctionnement, la pièce du support (2) étant dans une deuxième position d'usage, qui est inversée 180° autour de l'axe longitudinal du dispositif par rapport à la première position d'usage et est configurée pour y avoir monté un soutien d'article de marchandise (47), p. ex. un rail de support allongé ou une boucle, s'étendant le long du trajet de transport sur la pièce de support à partir d'un orifice ou d'orifices de rattachement (48, 49) dans la partie arrière faisant face vers l'avant (2"") de la pièce de support, et le soutien d'article de marchandise fournissant une prise glissante avec un trou de suspension (50) dans un emballage d'article pendant (51) ou une patte de suspension pour l'article de marchandise quand il est poussé par le poussoir (3).

2. Dispositif de distribution selon la revendication 1, **caractérisé en ce que** les guides glissants (16, 17; 18, 19; 20, 21; 22, 23) sur la pièce de support (2) présentent des crochets de prise détachable (16', 17'; 18', 19'; 20', 21'; 22', 23) qui peuvent entrer en prise avec des barres dentées (24, 25; 28, 29) sur les braquettes de fixation (12', 12"; 13', 13") pour la fixation réglable des braquettes de fixation de l'au moins une paroi latérale (12; 13) par rapport au côté longitudinal (2'; 2") de la pièce de support (2).

3. Le dispositif de distribution selon la revendication 1 ou 2, **caractérisé en ce que** les parois latérales (12; 13) au niveau de ou près de l'extrémité de distribution (10) du trajet de transport (11) présentent une fente (32; 33) pour, avec l'aide d'une portion (12"'; 13"') moulée en une pièce de la paroi, s'appuyer élastiquement contre une portion latérale de l'au moins un article de marchandise (9) qui est le plus près de l'extrémité de distribution (10).

4. Le dispositif de distribution selon la revendication 1,

2 ou 3, **caractérisé en ce que** la pièce de support à l'extrémité de distribution (10) du trajet de transport (11) présente une portion biseautée (2"') faisant saillie transversalement au trajet.

5. Le dispositif de distribution selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** la longueur du poussoir (3) perpendiculaire au pièce de support (2) peut être étendue au moyen d'une pièce d'extension à encliquetage (3').

6. Le dispositif de distribution selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** le poussoir (3) présente un trou pour permettre au soutien (47) de s'étendre à travers le poussoir lorsqu'il (3) est déplacé le long du soutien (47), et des pinces d'agrafage (47'; 47") fixées à la pièce de support (2) en plus de l'orifice ou des orifices de rattachement (48; 49) fournissent un support stable de plusieurs points du soutien (47).

7. Le dispositif de distribution selon l'une quelconque des revendications 1 à 6, **caractérisé en ce que** la position du poussoir (3; 3, 3') le long du trajet de transport (11) est enregistrable au moyen d'une roue de détection (15) étant une roue d'engrenage (15) de la liaison d'entraînement d'engrenage avec l'arbre d'entraînement de moteur, et qu'un détecteur de position formé par capteur (53, 53') est configuré pour détecter des marquages espacés angulairement et également (57) sur la roue de détection (15).

8. Le dispositif de distribution selon la revendication 7, **caractérisé en ce que** sur la pièce de support est arrangé un levier de dépassement (54) qui, sur l'activation, est conçu pour activer une unité de commande de moteur (55) afin de remettre le poussoir (3; 3, 3') à une position nominale arrière sur la pièce de support.

9. Le dispositif de distribution selon l'une quelconque des revendications 1 à 6, **caractérisé en ce que** une extrémité de la broche (7) forme une liaison avec une roue rotatoire (15) qui présente des marqueurs angulairement séparés (57), et qu'un capteur optique (53, 53') couplé à l'unité de commande de moteur (55) est adapté pour détecter un passage successif des marqueurs (57) et ainsi calculer la position du poussoir (3; 3, 3') comme une fonction de la rotation de la broche (7).

10. Le dispositif de distribution selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la pièce de support à une zone d'extrémité arrière est pourvue d'au moins deux paires de crochets de suspension (34, 35; 36, 37) destinés pour la coopération avec une fixation de suspension perforée (38), p. ex. une plaque, les crochets (34, 35 ou 36, 37) situés le plus haut à la zone d'extrémité à tout moment donné dudit premier mode ou dudit deuxième mode de fonctionnement étant adaptés pour la prise avec des trous de suspension (39, 40; 41, 42) dans la fixation, tandis que les crochets situés le plus bas (36, 37 or 34, 35) sont adaptés pour s'appuyer contre une portion de la fixation (38) qui n'a aucun trou.

11. Le dispositif de distribution selon la revendication 10, **caractérisé en ce qu'**en liaison avec des crochets de suspension sont pourvus des trous de fixation (43; 44) pour fixer des vis qui peuvent entrer en prise avec un trou de vis (45; 46) sur la fixation de suspension (38).

12. Le dispositif de distribution selon l'une quelconque des revendications 1 à 11, **caractérisé en ce que** le dispositif de distribution est conçu pour être suspendu à sa zone d'extrémité arrière à une fixation de suspension (38), si bien que le trajet de transport (11) et/ou le soutien d'article de marchandise (47) est/sont ainsi pourvu(s) d'un gradient ascendant dans la direction de l'extrémité de distribution (10).

13. Le dispositif de distribution selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**au moins deux pièces de support (2) chacune pourvue d'un poussoir actionnable par une broche et entraîné par un moteur (3), sont arrangées l'une à côté de l'autre, et que seuls les côtés longitudinaux des pièces de support (2'; 2") qui se trouvent latéralement le plus en dehors sont pourvus de parois latérales réglables en distance (12; 13) pour le trajet de transport (11).

14. Le dispositif de distribution selon l'une quelconque des revendications 1 à 13, **caractérisé en ce que** la portion du trajet de transport (11) de la pièce de support (2), les supports de broche (7', 7"), la monture pour le moteur d'entraînement (6'), le support pour la liaison d'engrenage (14, 15) entre le moteur (6) et la broche (7), les guides glissants (16, 17; 18, 19; 20, 21; 22, 23) et les crochets en prise (16', 17'; 18', 19'; 20', 21'; 22', 23') pour les braquettes de fixation des parois latérales (12', 12"; 13', 13"), les braquettes de fixation (58, 58') pour un circuit imprimé connexe au commande du moteur (56), orifice(s) de rattachement (48, 49) pour le rail ou la barre de suspension (47), le levier (54) et les crochets de suspension (34, 35; 36, 37) sont moulés en une pièce à partir d'un matériau plastique approprié.

15. Le dispositif de distribution selon l'une quelconque des revendications 1 à 14, **caractérisé en ce que** la paroi latérale (12; 13) et ses braquettes de fixation (12', 12"; 13', 13") sont moulés en une pièce à partir d'un matériau plastique approprié.

16. Le dispositif de distribution selon l'une quelconque des revendications 1 à 15, **caractérisé en ce qu'**une unité de commande de moteur (55) reliée à l'électromoteur (6) est adaptée pour calculer le couple d'entraînement de l'électromoteur (6) sur la broche et ainsi une poussée sur les articles de marchandise (9) comme une fonction d'une magnitude de courant d'entraînement de l'électromoteur(6).

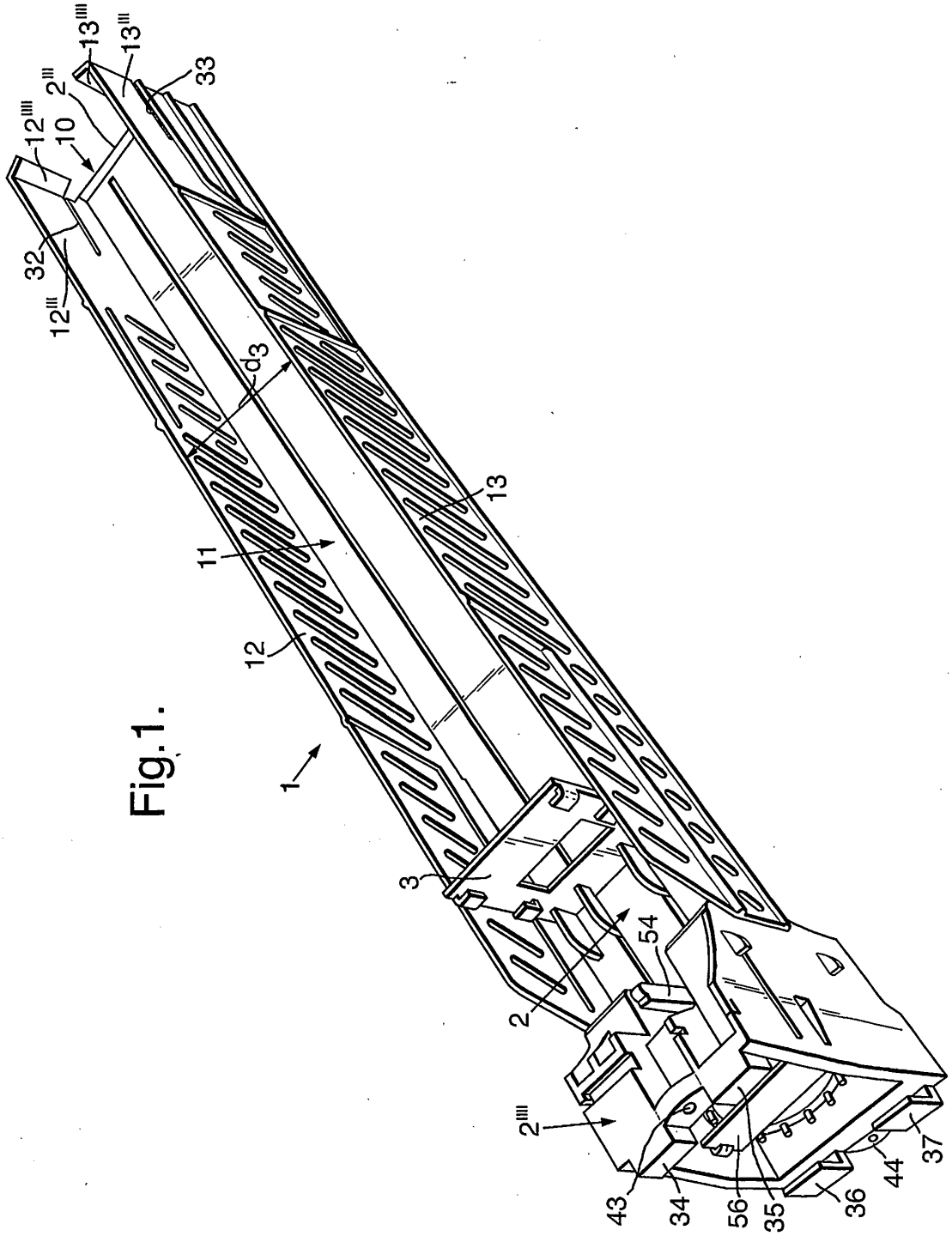

13IIII
13III
2III
33
12IIII
10
32
12III
d3
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54
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2IIII
43
34
56
35
36
44
37

Fig.1.

Fig.2.

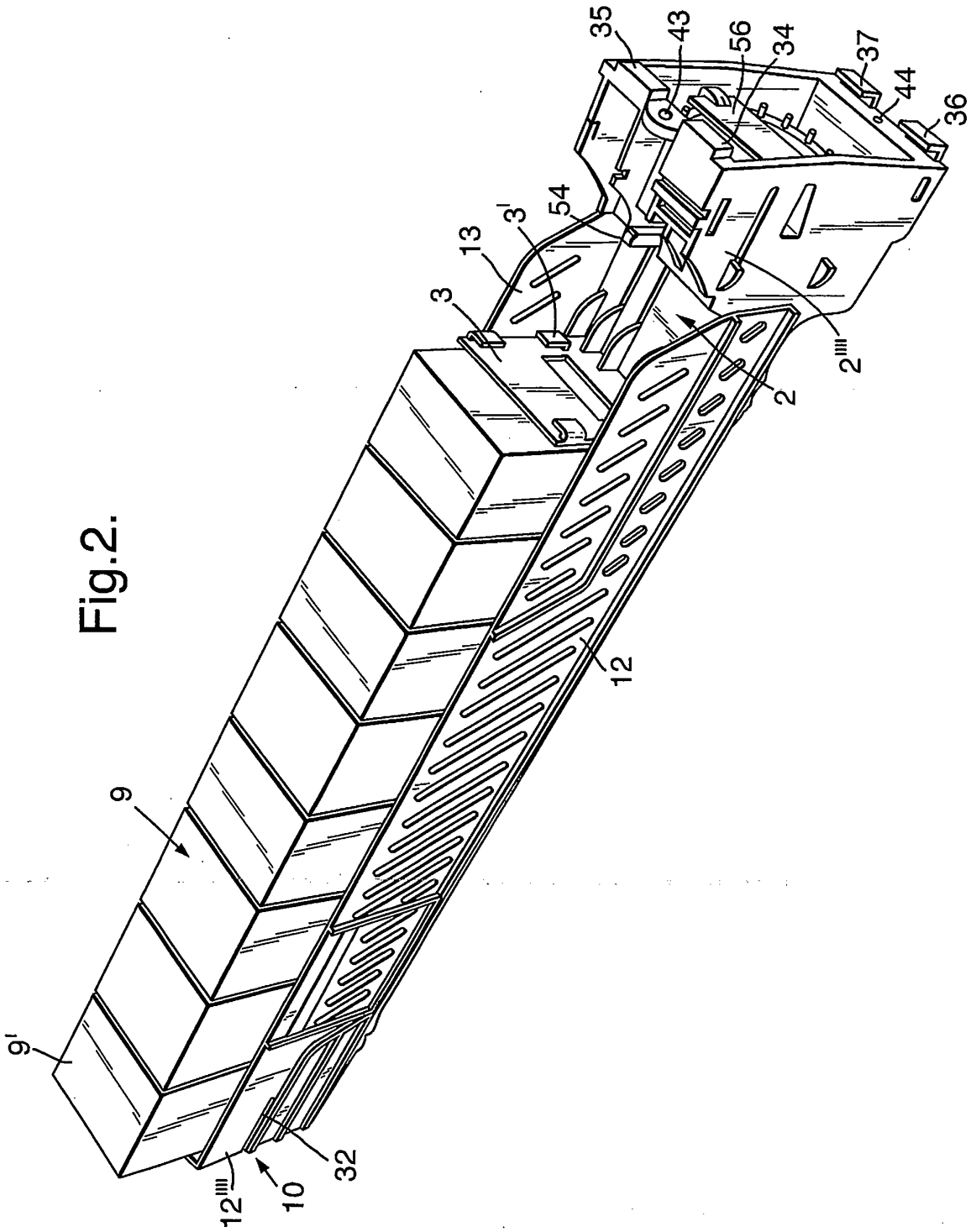


Fig.3.

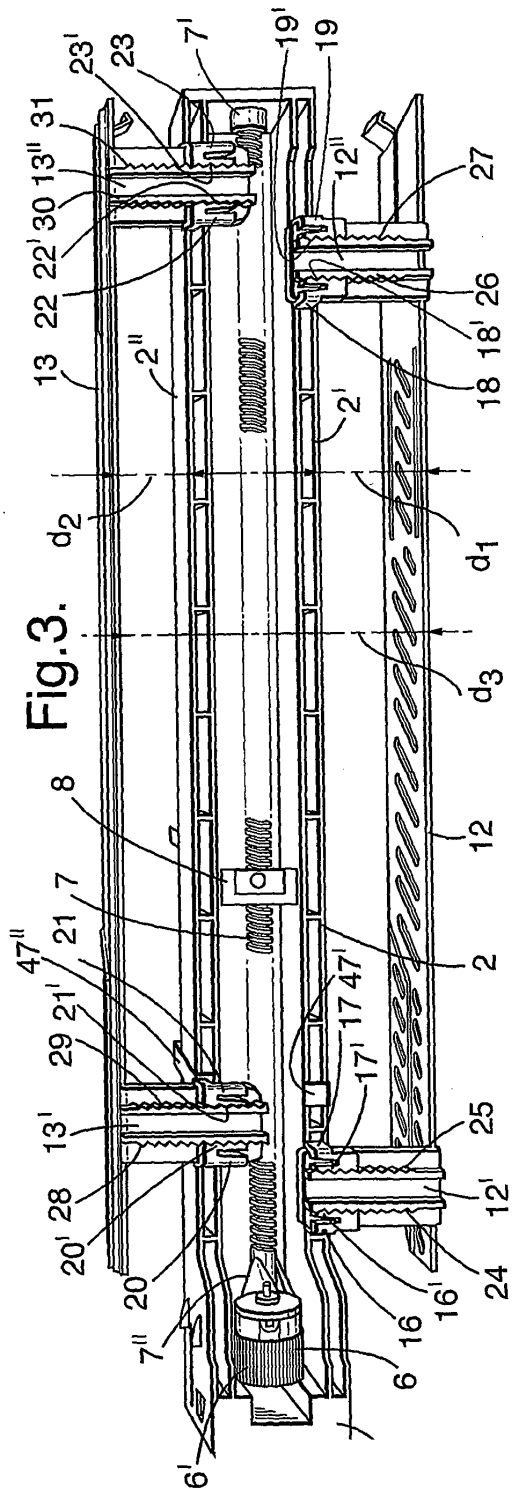

23'
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22
12''
27
13
2''
2'
26
18'
18
d_2
d_1
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8
12
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2
47''
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21'
29
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28
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6
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Fig.4.

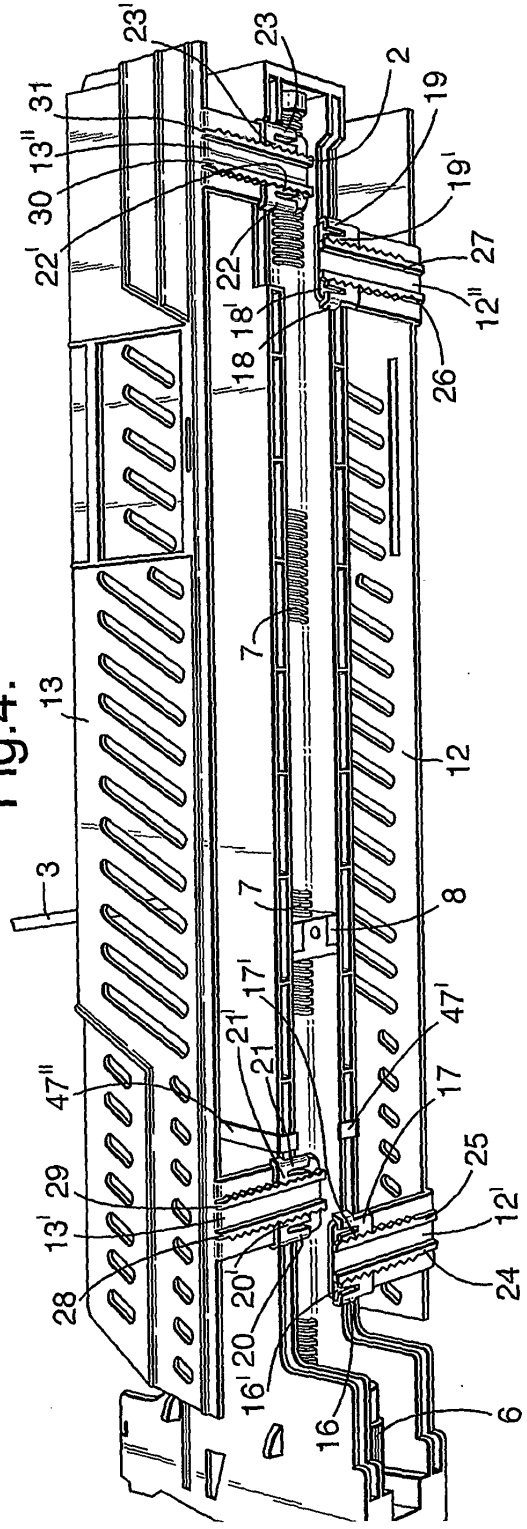

23'
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Fig.5.

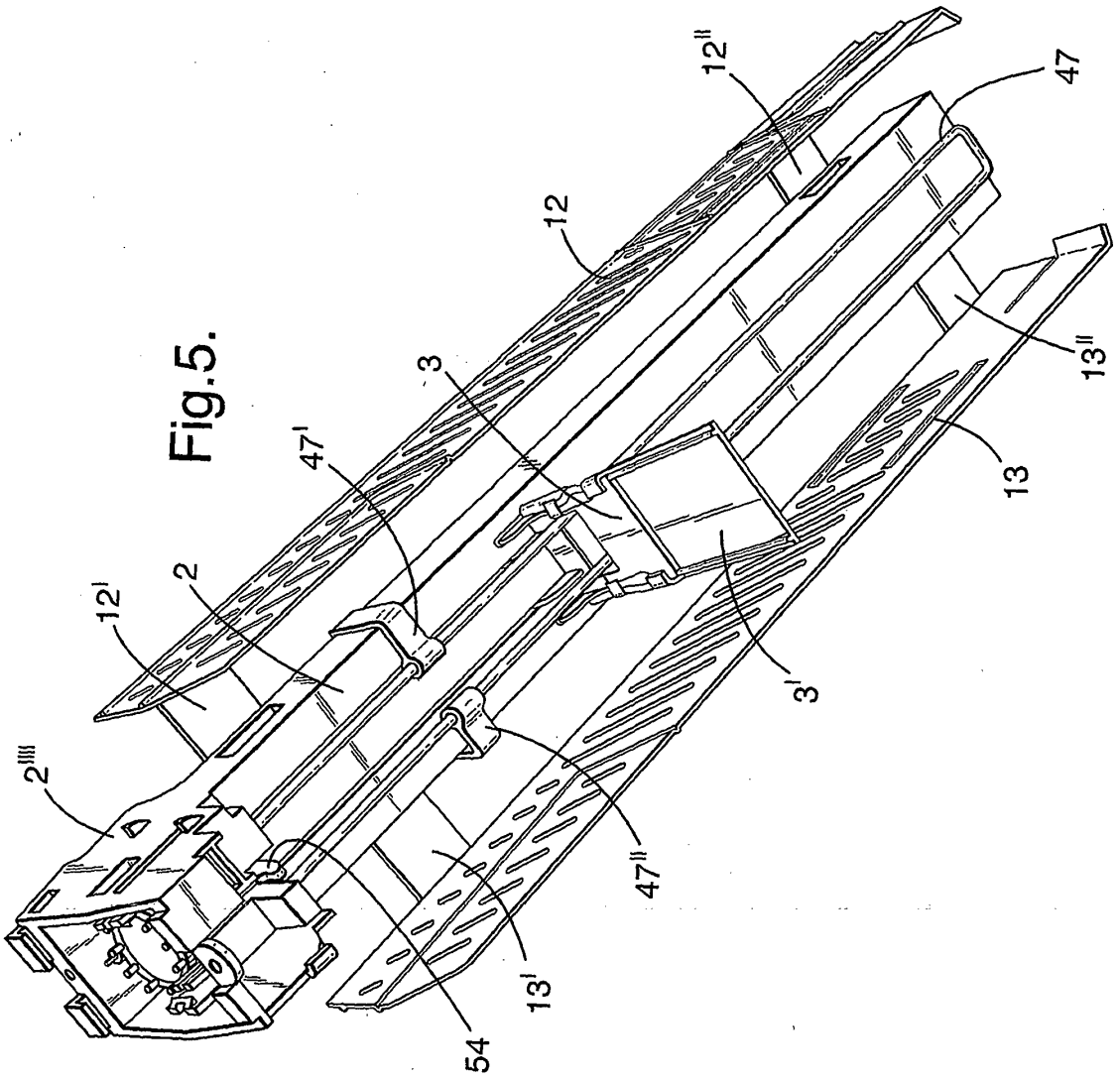


Fig.6.

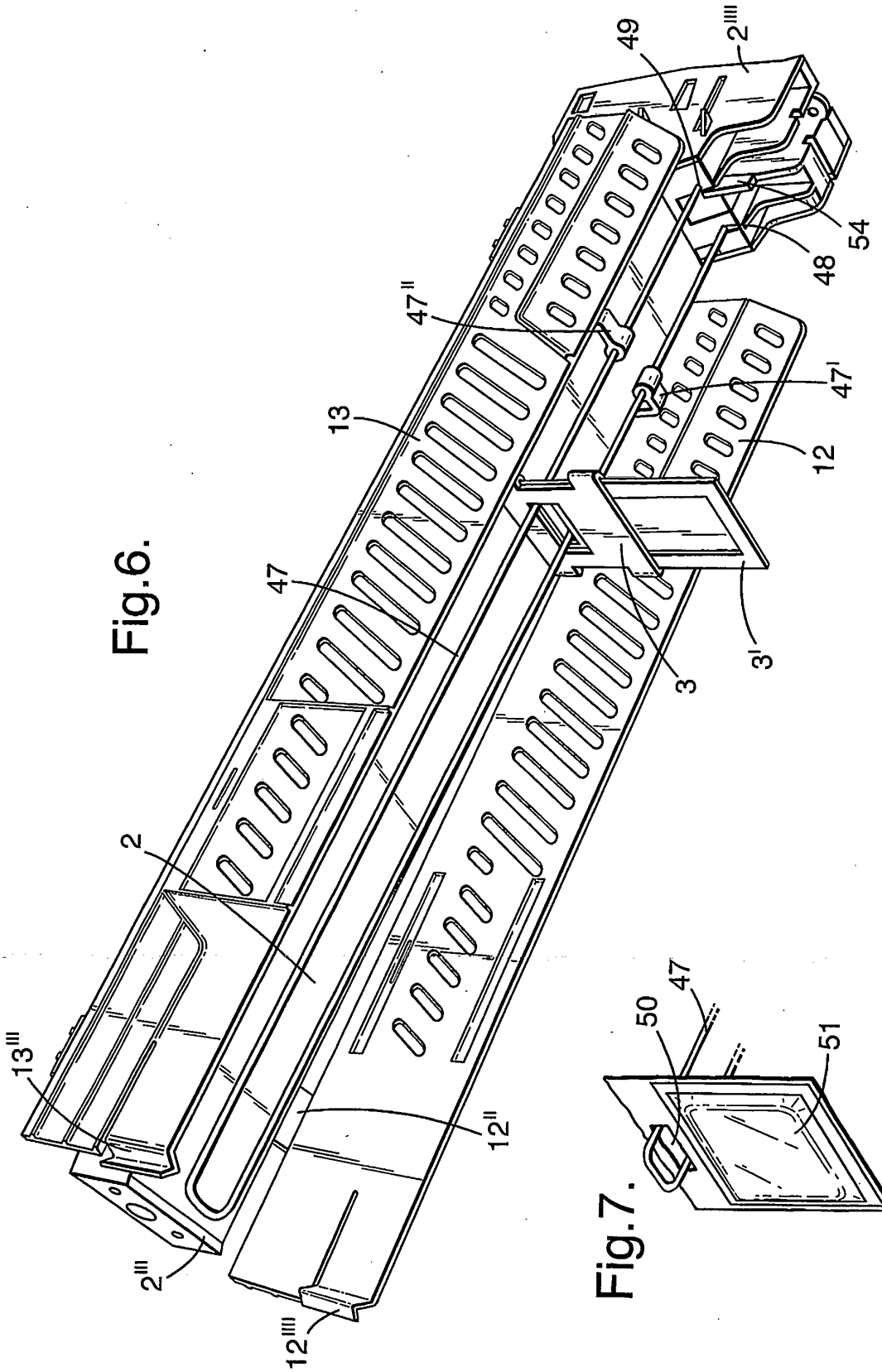

49
2IIII
54
48
47II
47I
13
12
47
3I
3
2
13III
12II
2III
12IIII

Fig.7.

47
50
51

Fig.8.

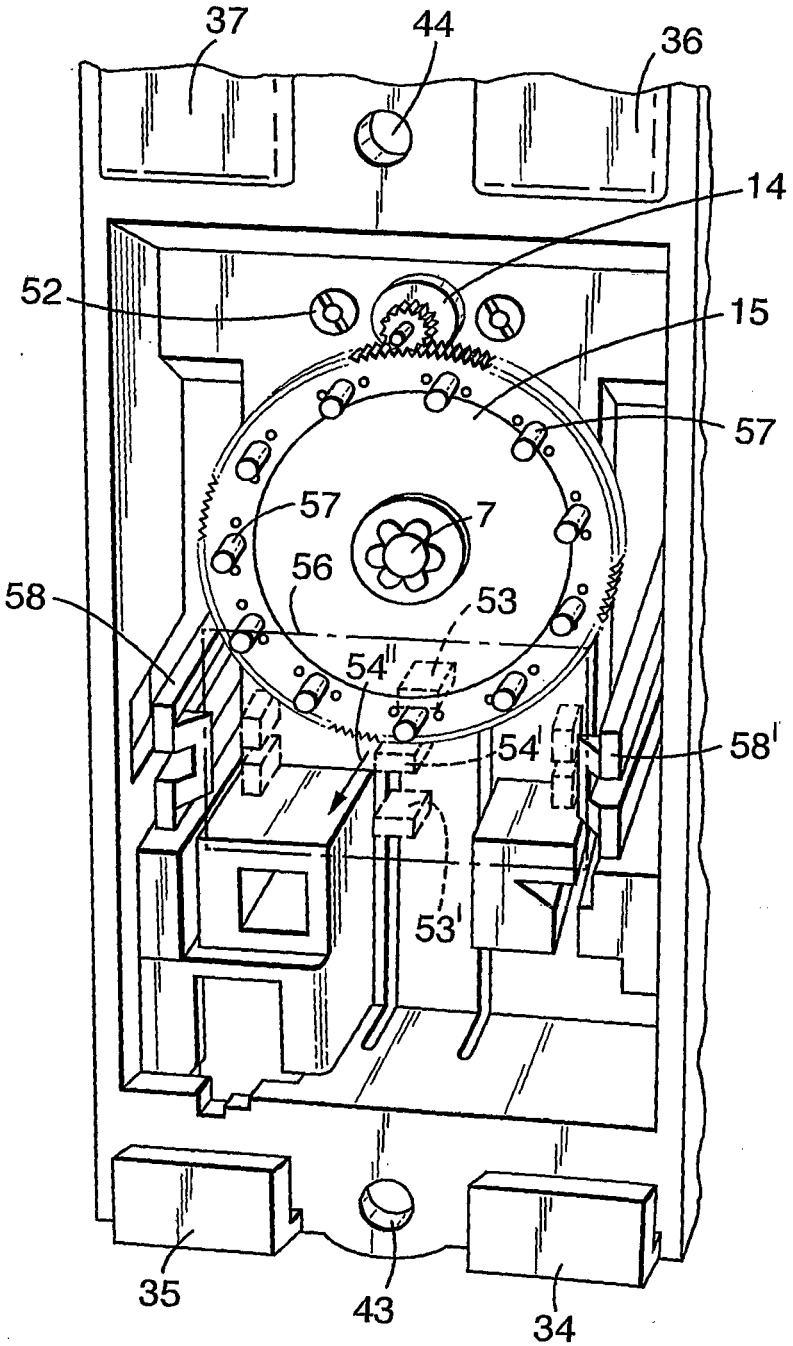


Fig.9.

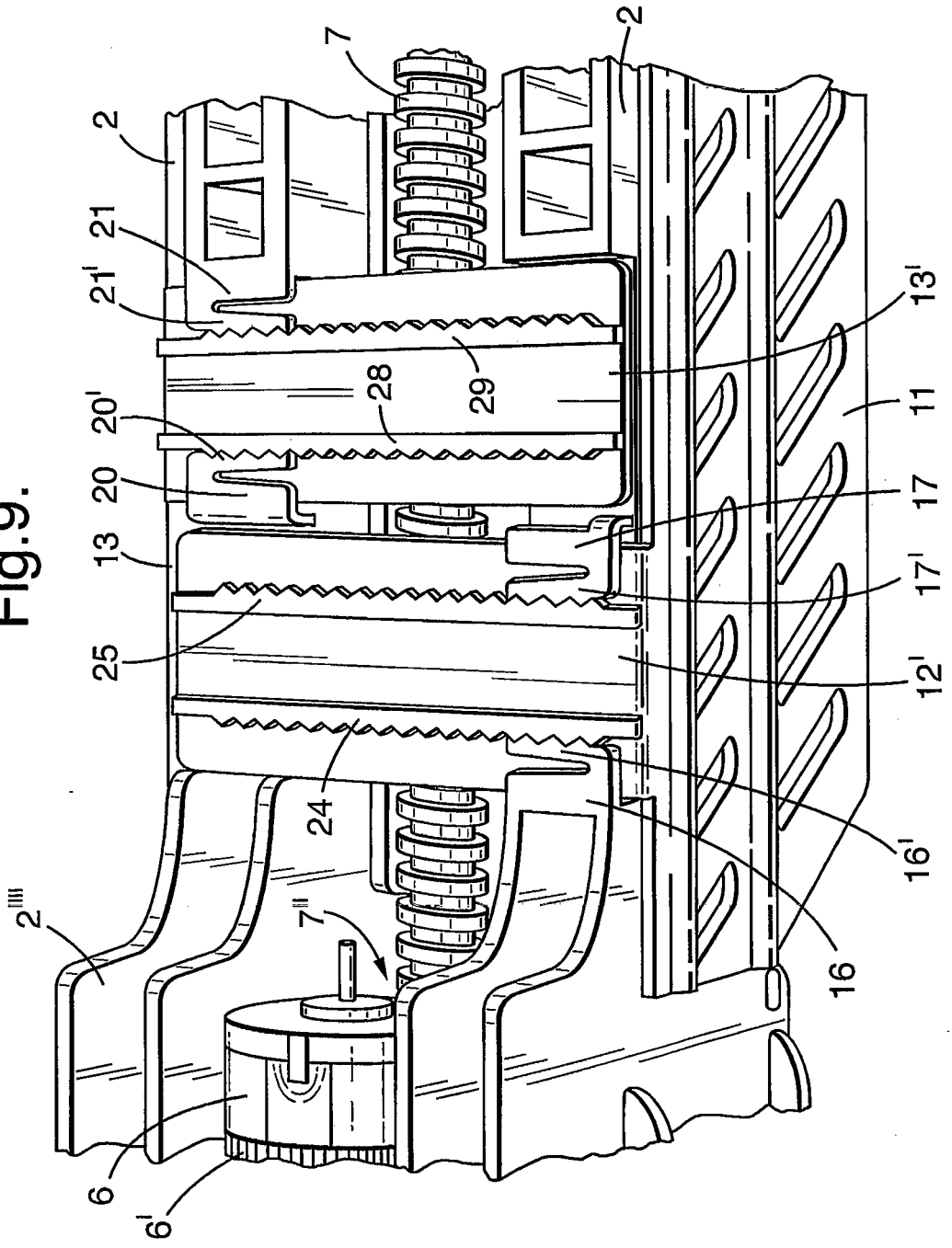


Fig.10.

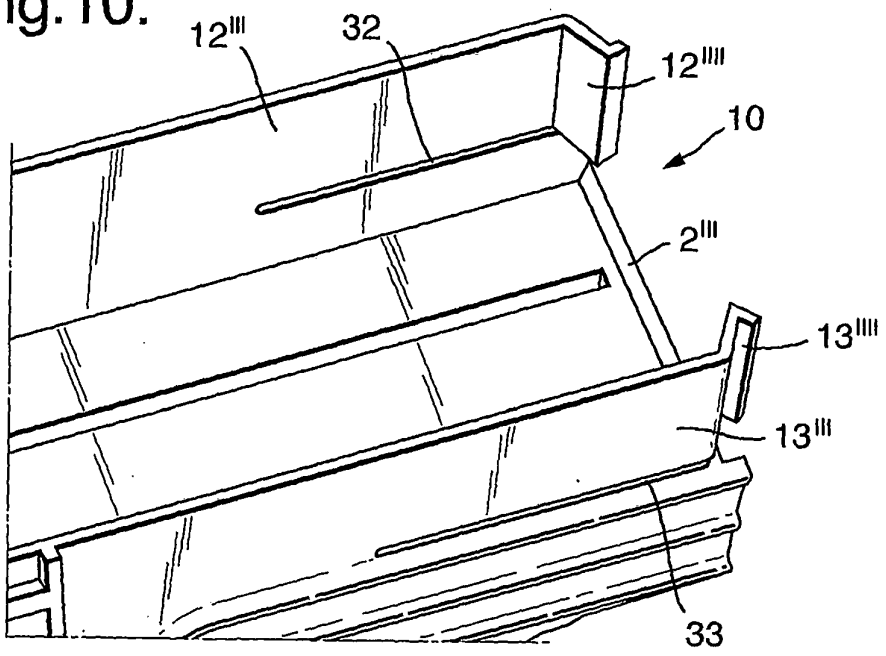


Fig.11.

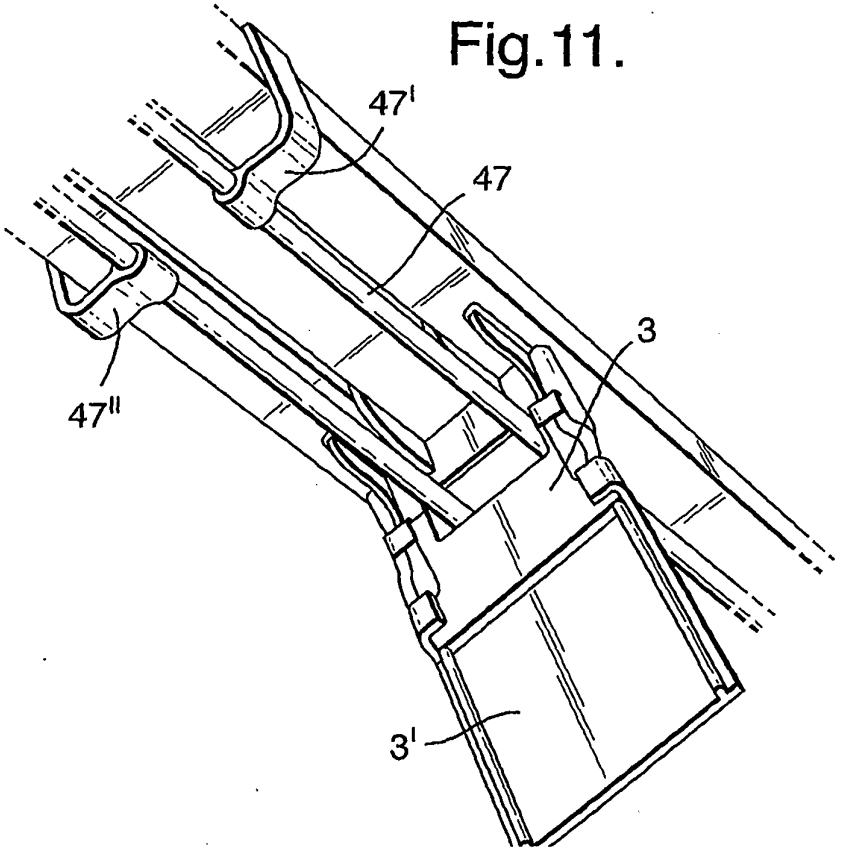


Fig.12.

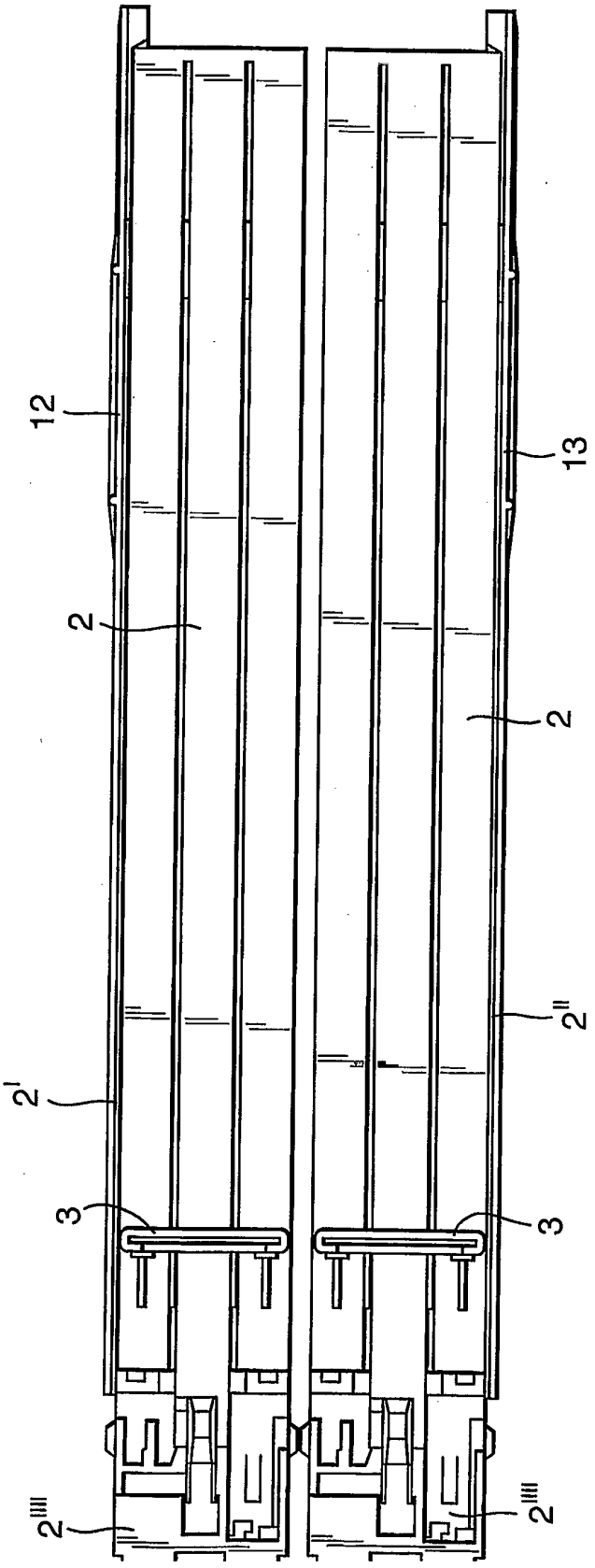


Fig.13.

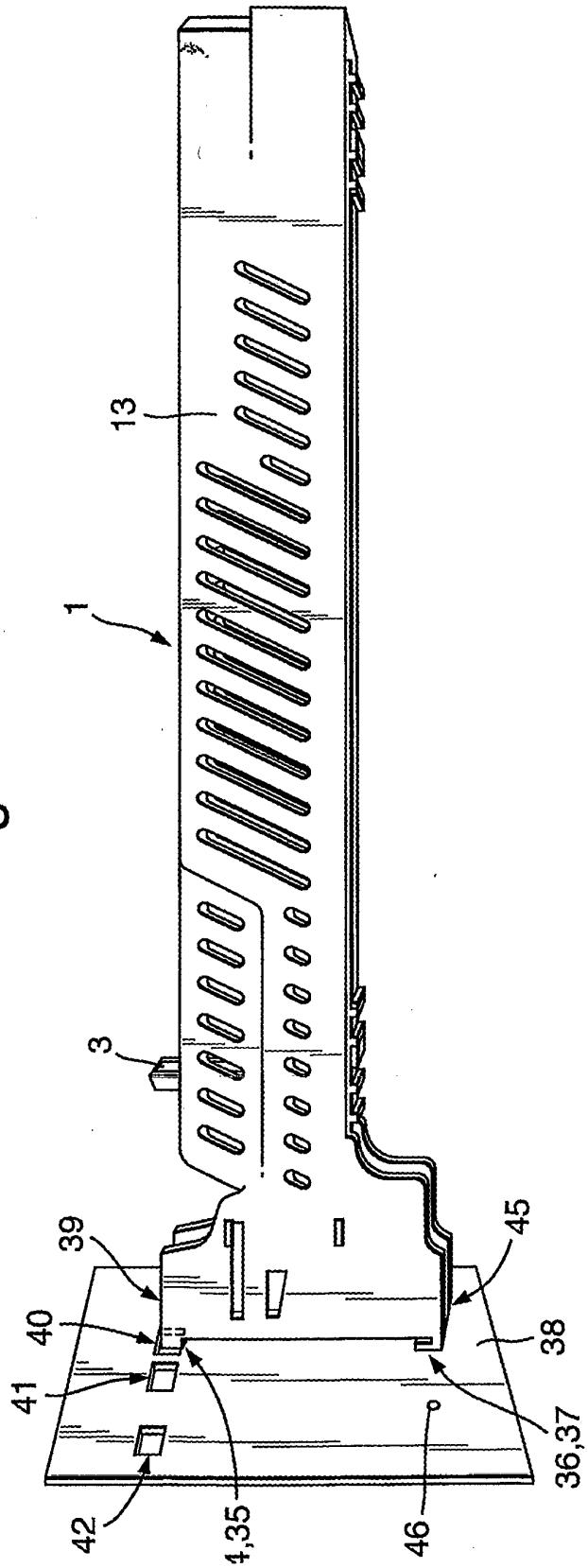
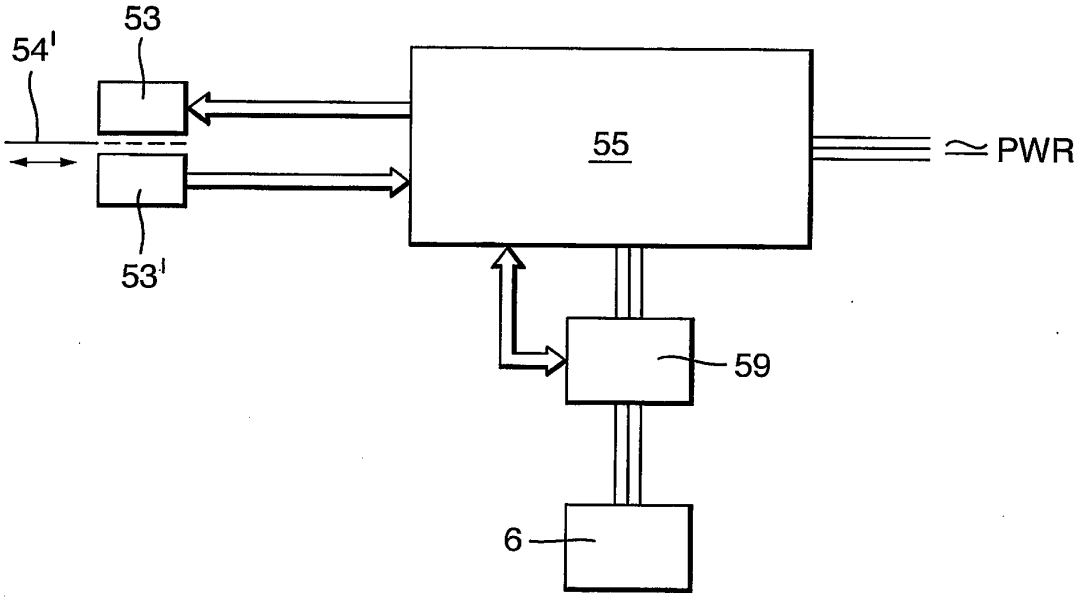


Fig.14.



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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