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LOUVRE SYSTEM AND BOX FURNITURE

5 Technical field

The invention relates to a louvre system according to the preamble of Claim 1 as well as to a box furniture which has a louvre system of this kind.

10 Prior Art

It is known to provide box furniture in particular with doors which are comprised of louvre slats. Here on the one hand there is the standard louvre blind in which a curtain of interconnected louvre slats is guided in a furniture body. Furthermore, a
15 louvre system has also been established in the past in which the standard louvre blind curtain is replaced by an arrangement of slats which are guided parallel to one another and which are moved by a gear arrangement mounted on the end sides of the slats. The latter arrangement has in particular the optical advantage that the entire louvre door can be basically arranged in front of the furniture body.
20 This therefore avoids wasting space inside the furniture body in which the slats are to be housed when in the opened state. To bring the louvre system into the opened position or into the closed position a drive motor is used which actuates the gear arrangement which is mostly configured as a scissor drive. US 9, 637 966 B1 describes a louvre blind according to the preamble of Claim 1.

25

The invention

The object of the present invention is to further develop the louvre system of the type mentioned at the beginning and to provide a box furniture in which motorized
30 drives can be omitted.

This is achieved by a louvre system with the feature of Claim 1. The object is

further achieved by a box furniture having the features of Claim 13. Advantageous embodiments are found in the respective dependent claims.

5 The louvre system according to the invention has a louvre curtain which comprises a plurality of slats, as well as a displacement device for moving the slats. The plurality of slats are coupled to one another so that they can be moved by means of the displacement device from a closed position, in which the wide sides of the slats lie substantially flush in a plane parallel to the opening and closing direction and narrow sides of the adjacent slats face one another, by displacing the slats in
10 the opening and closing direction, into an opened position. In the opened position the wide sides of the, in particular of each of the, slats lie in particular parallel to one another, but not parallel to the opening and closing position. The displacement device comprises at least one draw means which is coupled at one end to the louvre curtain. The slats can be basically of any material but glass or
15 plastic are the preferred materials.

According to the invention the louvre system further comprises at least one pulley which is mounted rotatable in two directions about an axis. The draw means is attached by its other end to this pulley. At least one locking means is arranged on
20 the pulley and is designed to block rotation of the pulley in the opened position.

In this way the louvre curtain can be moved from the closed position into the opened position and can be fixed there in the opened position without the need for an electric drive motor with self-locking or the like.

25

In order to lock the louvre curtain in the opened position and/or in the closed position it is proposed that the at least one locking means comprises a magnet and/or a magnetizable, in particular ferromagnetic, material. The magnetic variation has the advantage that on the one hand locking is possible without any
30 movement so that this form of locking also does not wear out through frequent opening and closing of the louvre system. In order to make the louvre system according to the invention even more flexible, the locking means can be formed on

the pulley in an adjustable and in particular fixable manner in its position, in particular by a slide guide provided in the pulley. In this way it is possible to undertake a fine adjustment of the precise stopping point in the opened position and closed position of the slats.

5 .

The louvre system according to the invention according to a particular embodiment can comprise at least a first draw means and a second draw means. The two draw means are then preferably each coupled by their one end to the louvre curtain.

10

With this embodiment having two draw means it can also be proposed in particular that each draw means is assigned a pulley. It is thus preferably proposed that the louvre system according to the invention comprises in this embodiment in addition a second pulley which is mounted for rotation about an axis in two directions,

15 wherein the first draw means is attached by its other end to the first pulley, and the second draw means is attached by its other end to the second pulley. With two pulleys it is thus possible advantageously to move in particular heavier curtains. In this case, even with the locking of the pulleys in the opened position a locking can also be selected where the two pulleys are mutually held in the opened position.

20 According to a special embodiment of the present invention it can therefore be proposed that at least one in particular magnetic or magnetizable locking means is arranged on each pulley and is designed to block the relative rotation of the pulleys in the opened position.

25 According to a preferred embodiment of the present invention it is proposed that the one end of the at least one draw means – and preferably for reasons of symmetry two draw means are provided on both lateral regions of the louvre curtain – is connected to a displacement element which is coupled to the louvre curtain. This displacement element can be guided by way of example, although
30 this need not absolutely be the case. The end of the draw means can also be connected alternatively directly to the louvre curtain. According to a preferred embodiment it is proposed that the displacement element is formed as a driver

which seizes the louvre curtain at a suitable place and draws it along.

It is preferably proposed that the slats are coupled to one another by a scissor gear. In the case of the design having a scissor gear it can be proposed in particular that the slats are attached to lever projections which are arranged on levers of the scissor gear guided parallel to one another wherein the projections protrude towards a front side of the louvre curtain. This produces a good automatic guide for the individual slats. It is moreover sufficient here if the draw means only engage on one part of the scissor gear. By way of example the displacement element can be coupled, i.e. fixedly connected to or in contact with the scissor gear. By way of example the draw means can be arranged in connection with the displacement element below the lowermost lever of the scissors and on moving into the opened position draw along the lowermost lever of the scissors. A loose coupling has the advantage that the louvre curtain can be dismantled for maintenance purposes without having to dismantle the entire displacement mechanism.

It can further be proposed that the pulley is coupled to a pretensioning element, in particular a spiral spring. This pretensioning element can be designed in particular so that the louvre curtain is pretensioned so that the pretensioning element assists the movement of the slats into the opened position. In this way it becomes significantly easier for an operator to manually open a box furniture provided with the louvre system according to the invention.

The invention further relates also to a box furniture which comprises a furniture body and an opening on the front side and a louvre system described above. The slats of the louvre system are thus arranged on the box furniture so that in the closed position they close the opening of the furniture body.

In particular it can be proposed on the box furniture according to the invention that a further locking counter element which interacts with the locking means of the pulley to fix the position of the louvre curtain is attached with the at least one

locking means of the pulley to the furniture body. The pulley is preferably mounted in rotatable manner on the furniture body, in particular on the top shelf thereof. The said locking counter element can according to a preferred embodiment be attached in particular to a top shelf of the box furniture. The locking counter
5 element can – like also the locking means on the pulley – comprise a magnet and/or magnetizable, in particular ferromagnetic, material, so that the locking is effected through magnetic interaction. Naturally it is possible to provide further locking means on the pulley or locking counter elements on the furniture body, in particular a top shelf, particularly when fixing the louvre curtain in the closed
10 position and/or in an intermediate position is desired.

According to a preferred embodiment of the box furniture according to the invention the louvre curtain is guided in a guide region of the furniture body, in particular via one or two scissor gears, on one or both side walls delimiting the
15 opening. The guide region can be provided so that this can be inserted into the side walls of the furniture body. In this way a very compact guide mechanism can be provided for the louvre curtain.

It can also be proposed that the displacement element described above is guided
20 in displaceable manner in the opening and closing directions in at least one guide extending parallel to the opening and closing directions. This guide can equally lie in the guide region in which the louvre curtain is also guided.

The mechanics described above with the at least one pulley can be used with
25 particularly heavy curtains, e.g. with tall cupboards in order to additionally attach a drive motor. It can then be proposed that the at least one pulley is mounted on a rotary bearing attached to the top shelf. The rotary bearing then has a motor attachment flange on which the drive motor is fixed. The motor shaft is then coupled to the pulley so that the motor can drive the pulley in rotation. In this way,
30 the rotation of the motor shaft is transferred to the pulley and as a result of the torques thus arising even greater forces can be transferred to the or each draw means and thus to the curtain. Furthermore, the drive can be easily exchanged

without having to dismantle the remaining louvre system or the remaining drive mechanism. In this way a particularly maintenance-friendly design is achieved.

5 The pulleys used here can have diameters which lie in the range of the carcass depth of the box furniture.

More advantageously it can be proposed that the axis of rotation of the motor shaft runs parallel to the axis of rotation of the pulley and is in particular identical therewith.

10

Brief description of the drawings

Fig. 1 shows a perspective front view of a box furniture according to the invention having a louvre system according to the invention in which the louvre curtain is situated in a closed position;

15

Fig. 2 shows the box furniture according to the invention illustrated in Fig. 1 with the louvre curtain in the opened position;

20 Fig. 3 shows a perspective rear view of the furniture body according to the invention illustrated in Figs. 1 and 2 in which the louvre curtain is situated between the opened and the closed position;

Fig. 4 shows an enlarged section in a perspective view of the upper side of the box furniture according to the invention;

25

Fig. 5 shows a perspective side view of the box furniture according to the invention in the opened position in which the gear assembly is shown which moves the louvre curtain;

30

Fig. 6 shows finally a side view of a gear assembly suitable for the box furniture according to the invention; and

Fig. 7 shows a further exemplary embodiment according to the invention with two pulleys.

5 Best way for implementing the invention

The box furniture 10 illustrated in more detail in Figs. 1 to 4 is constructed as a furniture carcase and has as such side walls 11, 13, a back wall 12, a top shelf 14 which can still be covered by a cover, a bottom shelf 15 and at the front an opening 16 through which the inside of the box furniture 10 is accessible.

The box furniture 10 is fitted with a louvre system 20 according to the invention in which a curtain of slats 21 closes the opening 16. The louvre system can be opened and closed in an opening and closing direction X. The wide sides 21a of the slats 21 lie flush next to one another in one plane in the closed position shown in Fig. 1. The wider narrow sides 21b, in the drawing, of adjacent slats 21 lie opposite one another. 21c marks the narrow sides of the slats 21 lying at the end side of the slats 21 in the region of the side pieces or side walls 11 and 13.

20 The slats 21 which are coupled to one another are coupled via at least one draw means 22a and 22b, which can preferably be a pull cord or pull strap, to a pulley 23 mounted for rotatable movement in two directions P1, P2, wherein the or each draw means 22a and 22b is guided over the narrow side of the pulley 23. The slats 21 shown in the closed position in Fig. 1 can be moved in the X direction into the opened position, shown in Fig. 2, by raising the curtain of slats 21, by way of example by engaging a handle (not shown here) in the lower region of the box furniture 10. With this process the pulley 23 rotates about the axis of rotation A in the direction of arrow P1. Conversely, the pulley 23 mounted on the top shelf 14 rotates about the axis of rotation A in the direction of arrow P2 when the slats 21 are moved back from the position shown in Fig. 2 into the position shown in Fig. 1. In both cases described, an intermediate position is passed through, as shown in Fig. 3.

The coupling of the draw means 22a, 22b to the pulley 23 and the locking of the pulley 23 is explained in further detail with reference to Figs. 4 and 5. Fig. 4 shows a position which corresponds substantially to the opening position of Fig. 2. In the illustrated example the draw means 22a is guided over a guide pulley 27 and is attached by one end in the region 28a to the pulley 23. A slide guide 29a or a displacement device in general can be attached to the pulley 23 so that the fastening point 28a can still be adjusted radially. This has the advantage that a fine adjustment of the length of the draw means 22a is possible. The same is similar correspondingly as regards the fastening point 28b and the slide guide 29b for the further draw means 22b which is preferably provided.

At least in the opened position the curtain formed from the slats 21 ought not to return through gravity by itself into the closed position. A lock is provided for this which at least in the opened position locks the pulley 23 relative to the top shelf 14 of the box furniture 10. For this a magnet 24 or at least a magnetic material is fixed on the top shelf. A corresponding counter element 25 which is either magnetic or at least magnetizable is situated on the pulley 23. Other locks are naturally also possible. Thus, if the curtain of slats 21 is opened then the pulley moves with the element 25 into the active region of the magnet 24 so that a mutual magnetic attraction is produced between these two elements 24, 25 which holds the pulley 23 there and locks it relative to the top shelf 14 where the magnetic interaction is greatest. For fine adjustment, it is possible to likewise provide here in the circumferential direction on the pulley 23 an adjusting slide 25a or generally a displacement device for adjusting the element 25 on the pulley 23.

If the curtain of slats 21 is to be moved from the opened position back again into the closed position then the user pulls on the curtain of slats 21 (by way of example via a handle already mentioned), and thereby releases the lock by overcoming the magnetic force or another force exerted by the lock, or by unlocking a bolt or the like. The curtain can then be drawn back by an operator into the closed position.

It can be useful here if a pretensioning element is used which exerts a pretensioning force on the pulley 23. This is preferably held so that a pretension builds up when the curtain returns into the closed position. This has the
5 advantage that on the one hand the downward movement of the curtain of slats 21 is braked or damped so that the curtain does not for example strike hard against a stop in the closed position. On the other hand, this pretension can be used to assist during opening of the curtain the muscle power of the operator which otherwise has to be applied against gravity. For this it is preferred if a spiral spring
10 arranged in the region of the rotary pulley 23 around the axis of rotation A is used as the pretensioning element. Other pretensioning elements are naturally also fundamentally possible.

Whilst one end of the draw means 22a 22b is attached to the pulley 23 the other
15 end of the draw means engages on the louvre system 20 in order to raise this during opening and brake it during closing. The draw means can then be connected directly to the slats 21 or their drive device 30. In the example shown in Fig. 5 the drive system 30 of the slats comprises a scissor gear wherein - as shown in Fig. 6 - this scissor gear can be formed from a plurality of levers 31, 32,
20 34 which are connected to one another for articulated movement wherein the levers 31 which are arranged parallel to one another have a projection 33 pointing towards the front side 35 on which the slats 21 are fastened.

In Fig. 5 a guide region 40 is formed on the side wall 13 (a corresponding guide
25 region can also be provided on the opposite side wall 11), in which the scissor gear 30 is guided or in any case housed. At the lower end, in the drawing, of the scissor gear 30 there is a displacement element 42 which is fixedly connected to or in contact with one end of the corresponding draw means 22a, 22b. This displacement element 42 in the illustrated example bears against the lower side of
30 the scissor gear 30. Thus, if the pulley is moved so that the curtain of slats 21 opens then the displacement element 42 presses against the scissor gear and collapses this so that the situation illustrated in Fig 5 is reached. The

displacement element 42 is preferably guided in a guide 41 in the region 40. If in the opened position the lock is released and the curtain is drawn again back in the direction of the closed position then the scissor gear 30 slides apart and slides the displacement element 42 downwards in the X direction until the closed position is reached. If the pulley 23 is pretensioned then the displacement element 42 is braked by the pretension building up during the course of the closing process since it is connected to the pulley via a draw means. Depending on the design of pretension the closing of the curtain can be assisted by the gravity of the curtain. With a suitable design of the pretensioning element it can also be possible that the closing process has a self-locking action so that the curtain can stop in any position between the opened position and the closed position.

In this way a corresponding curtain of slats 21 can be moved manually from an opened position into a closed position and vice versa using a relatively simple system. If a pretensioning element is used this type of displacement is also comfortable and can protect the curtain of slats 21 against damage.

The exemplary embodiment illustrated in Fig. 7 differs from the exemplary embodiment previously discussed only in that not only is one pulley 23' mounted on the top shelf 14 of the furniture body 10 but also a further pulley 23'' is mounted there. Each of the pulleys 23', 23'' is then connected to one end of a draw means whose other end is coupled to the curtain of slats 21, by way of example as described above. In this embodiment there are thus two pulleys and two draw means. The draw means are then guided on both side walls 13, 11 of the furniture 10, for example in the manner described above. It is indeed also possible here that the two pulleys are locked in the opened position correspondingly via locking means with respect to the top shelf 14. In this embodiment however it is preferred if the two pulleys 23', 23'' are mutually held firm in the opened position. This is achieved by a magnetic interaction produced between the two pulleys 23', 23''. For this, magnetic or magnetizable elements 25', 25'' are preferably provided in the radially outer region of the pulleys which are each situated at a position so that they lie opposite one another in the opened state of the furniture 10 and can

magnetically attract one another.

In order to support or lock the curtain in the closed position, in all embodiments it can be proposed that a magnet is arranged in the or on the bottom shelf 16 and at least the last, i.e., lowermost, slat of the curtain or slat lying closest to the bottom shelf 16 in the closed position, has a magnetic or magnetizable component. In the closed position, as a result of the magnetic interaction between the bottom shelf 16 of the furniture body 10 and the last slat this last slat is then drawn against the bottom shelf 16. Naturally the magnetic component or the magnet can also be provided in or on the last slat, and then a counter element interacting with the magnet is then correspondingly situated on the bottom shelf, for example a magnetic or magnetizable component or a correspondingly poled magnet.

Patentkrav

- 1.** Lamelsystem (20) med et lamelforhæng, som omfatter et antal lameller (21), og en forskydningsindretning (22a, 22b, 23) til forskydning af lamellerne (21),
5 idet antallet af lameller (21) er koblet med hinanden, således at de ved forskydning af lamellerne (21) i åbnings- og lukkeretningen (X) ved hjælp af forskydningsindretningen (22a, 22b, 23) kan bevæges fra en lukket stilling, i hvilken lamellernes breddsider (21a) i det væsentlige danner en flade i et med en åbnings- og lukkeretning (X) parallelt plan, og tilstødende lamellers (21)
10 smalsider (21b) vender mod hinanden, til en åbnet stilling, i hvilken lamellernes (21), især hver af lamellernes, breddsider (21a), især ligger indbyrdes parallelt, men ikke parallelt med åbnings- og lukkeretningen (X), idet forskydningsindretningen (22a, 22b, 23) omfatter mindst et trækmiddel (22a, 22b), som i en ende er koblet med lamelforhængen, idet lamelsystemet (20)
15 endvidere omfatter mindst et om en akse (A) i to retninger (P1, P2) drejeligt monteret første trissehjul (23, 23'), til hvilken trækmidlet (22a, 22b) er fastgjort med sin anden ende, idet der på trissehjulet (23) er anbragt mindst et arreteringsmiddel (25, 26), som er udformet til at blokere drejningen af trissehjulet (23) i den åbnede stilling,
20 **kendetegnet ved,**
at det mindst ene arreteringsmiddel (25, 26) omfatter en magnet og/eller et magnetiserbart, især ferromagnetisk, materiale.

- 2.** Lamelsystem (20) ifølge krav 1,
25 **kendetegnet ved,**
at det omfatter et første trækmiddel (22a) og et andet trækmiddel (22b), som hver især med deres ene ende er koblet med lamelforhængen.

- 3.** Lamelsystem (20) ifølge krav 2,
30 **kendetegnet ved,**
at det omfatter et om en akse (A) i to retninger (P1, P2) drejeligt monteret andet trissehjul (23''), idet det første trækmiddel (22a) med sin anden ende er fastgjort til det første trissehjul (23'), og det andet trækmiddel (22b) med sin anden ende

er fastgjort til det andet trissehjul (23").

4. Lamelsystem (20) ifølge krav 3,

kendetegnet ved,

- 5 **at** der på hvert trissehjul (23', 23") er anbragt mindst et, især magnetisk eller magnetiserbart, arreteringsmiddel (25', 25"), som er udformet til i den åbnede stilling at blokere trissehjulen (23', 23") relative drejning.

5. Lamelsystem ifølge et af de foregående krav,

10 **kendetegnet ved,**

- at** den ene ende af mindst et trækmiddel (22a, 22b) er forbundet med et med lamelforhængen koblet forskydningselement (42).

6. Lamelsystem (20) ifølge et af de foregående krav,

15 **kendetegnet ved,**

- at** lamellerne (21) er koblet med hinanden gennem et saksedrev (30).

7. Lamelsystem (20) ifølge krav 6,

kendetegnet ved,

- 20 **at** lamellerne (21) er anbragt på armforlængelser (33), der er anbragt på indbyrdes parallelt førte arme (31) i saksedrevet (30), og som stikker frem mod en forside (35) af lamelforhængen.

8. Lamelsystem (20) ifølge krav 5 og et af kravene 6 eller 7,

25 **kendetegnet ved,**

- at** forskydningselementet (42) med er koblet med saksedrevet (30).

9. Lamelsystem (20) ifølge et af de foregående krav,

kendetegnet ved,

- 30 **at** arreteringsmidlet (25, 26) er anbragt indstilleligt, især så det kan fastgøres, på trissehjulet (23) i sin stilling, især gennem en i trissehjulet (23) tilvejebragt kulissestyring (25a, 26a).

10. Lamelsystem (20) ifølge et af de foregående krav,

35 **kendetegnet ved,**

at trissehjulet (23) er koblet med et forspændingselement, især en spiralfjeder.

11. Lamelsystem (20) ifølge krav 10, **kendetegnet ved**,
at forspændingselementet forspænder lamelforhænget således, at det i den
5 åbne stilling understøtter bevægelsen af lamellerne (21).

12. Kassemøbel (10), omfattende et møbelkorpus (11, 12, 13, 14, 15) og en
åbning (16) i forsiden og et lamelsystem (20) ifølge et af de foregående krav, idet
lamellensystemets (20) lameller (21) er anbragt således på kasse-møblet, at de i
10 lukket tilstand lukker kasse-møblets (10) åbning (16).

13. Kassemøbel (10) ifølge krav 12,
kendetegnet ved,
at der med trissehjulets (23) mindst ene arreteringsmiddel (25, 26) er anbragt et
15 andet, med trissehjulets (23) arreteringsmiddel (25, 26) til tilvejebringelse af en
lejerfiksering af lamelforhænget samvirkende arreteringsmodelement (24) på
møbelkorpuset, især en øverste hylde i dette.

14. Kassemøbel (10) ifølge krav 13,
20 **kendetegnet ved**,
at arreteringsmodelementet (24) omfatter en magnet og/eller et magnetiserbart,
især ferromagnetisk, materiale.

15. Kassemøbel (10) ifølge et af kravene 12 til 14,
25 **kendetegnet ved**,
at trissehjulet (23) er monteret drejeligt på møbelkorpuset, især på dettes
øverste hylde (14).

16. Kassemøbel (10) ifølge et af kravene 12 til 15,
30 **kendetegnet ved**,
at lamelforhænget, især over et eller to saksedrev, er ført på den ene af eller
begge de sidevægge (11, 13), der begrænser åbningen (16) i et ledeområde (40)
i møbelkorpuset.

17. Kassemøbel (10) ifølge et af kravene 12 til 16 og mindst et af kravene 2 til 5, **kendetegnet ved,**
at forskydningselementet (42) er ført forskydeligt i åbnings- og lukkeretningen (X) i mindst en styring (41), der forløber parallelt med åbnings- og lukkeretningen
5 (X).

18. Kassemøbel (10) ifølge et af kravene 12 til 17, **kendetegnet ved,**
at det mindst ene trissehjul (23, 23', 23'') er monteret på et på den øverste hylde
10 fastgjort pinolleje, idet pinollejet har en motortilslutningsflange, på hvilken en
drivmotor er fastgjort, idet motorakslen er koblet med trissehjulet (23, 23', 23'').

19. Kassemøbel (10) ifølge krav 18, **kendetegnet ved,**
at motorakslens omdrejningsakse forløber parallelt med trissehjulets
15 omdrejningsakse (A), især er identisk med denne.

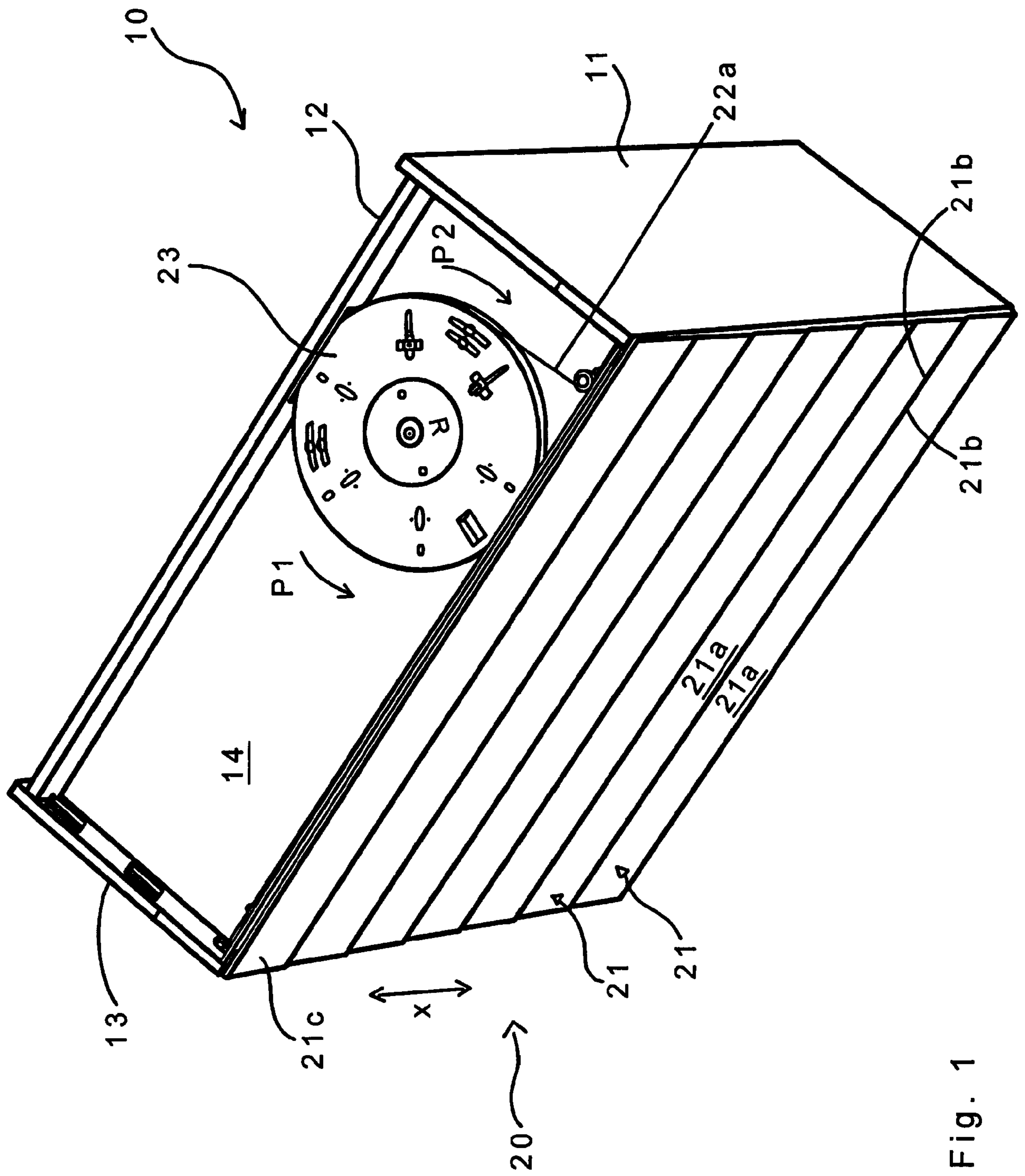


Fig. 1

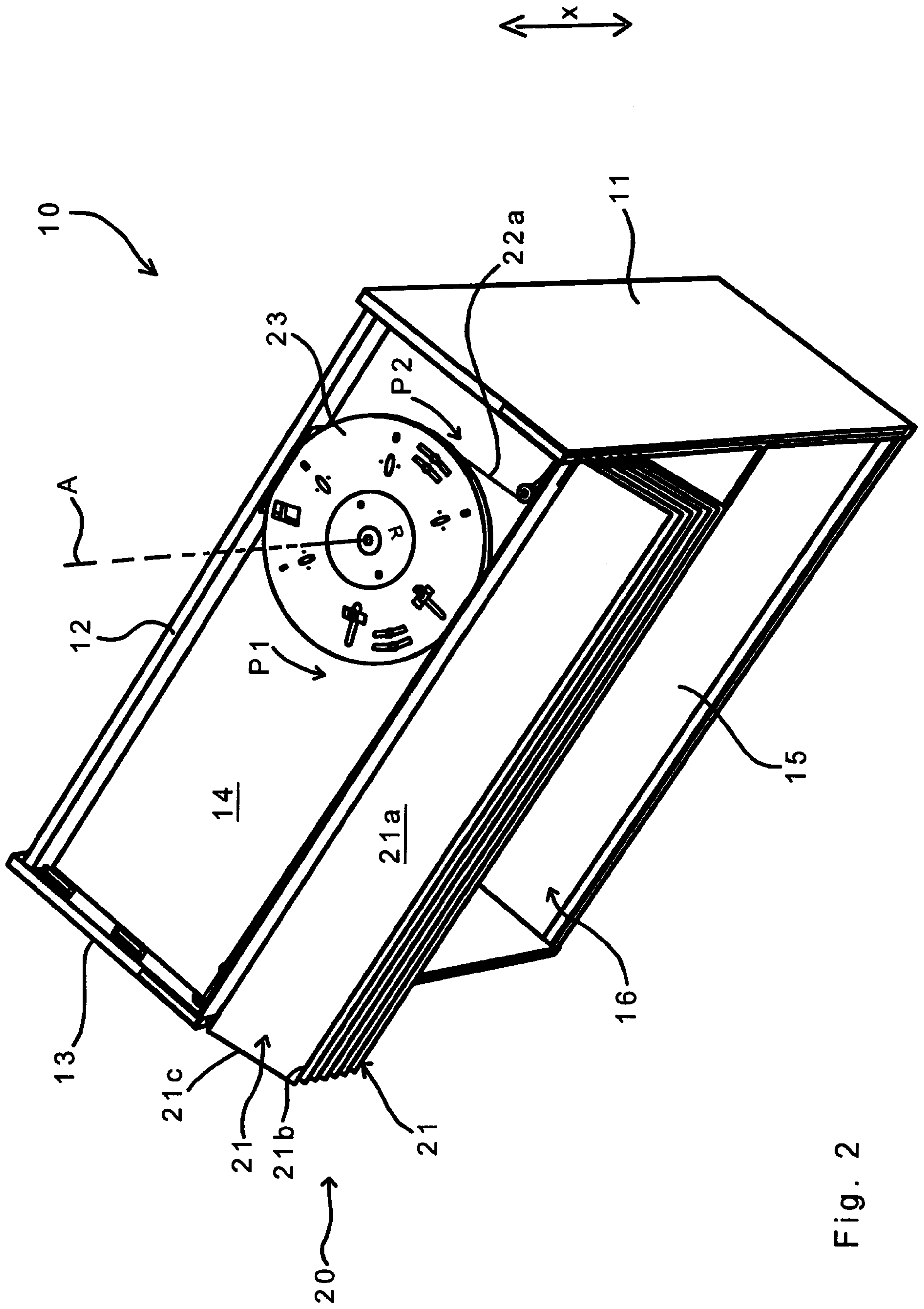


Fig. 2

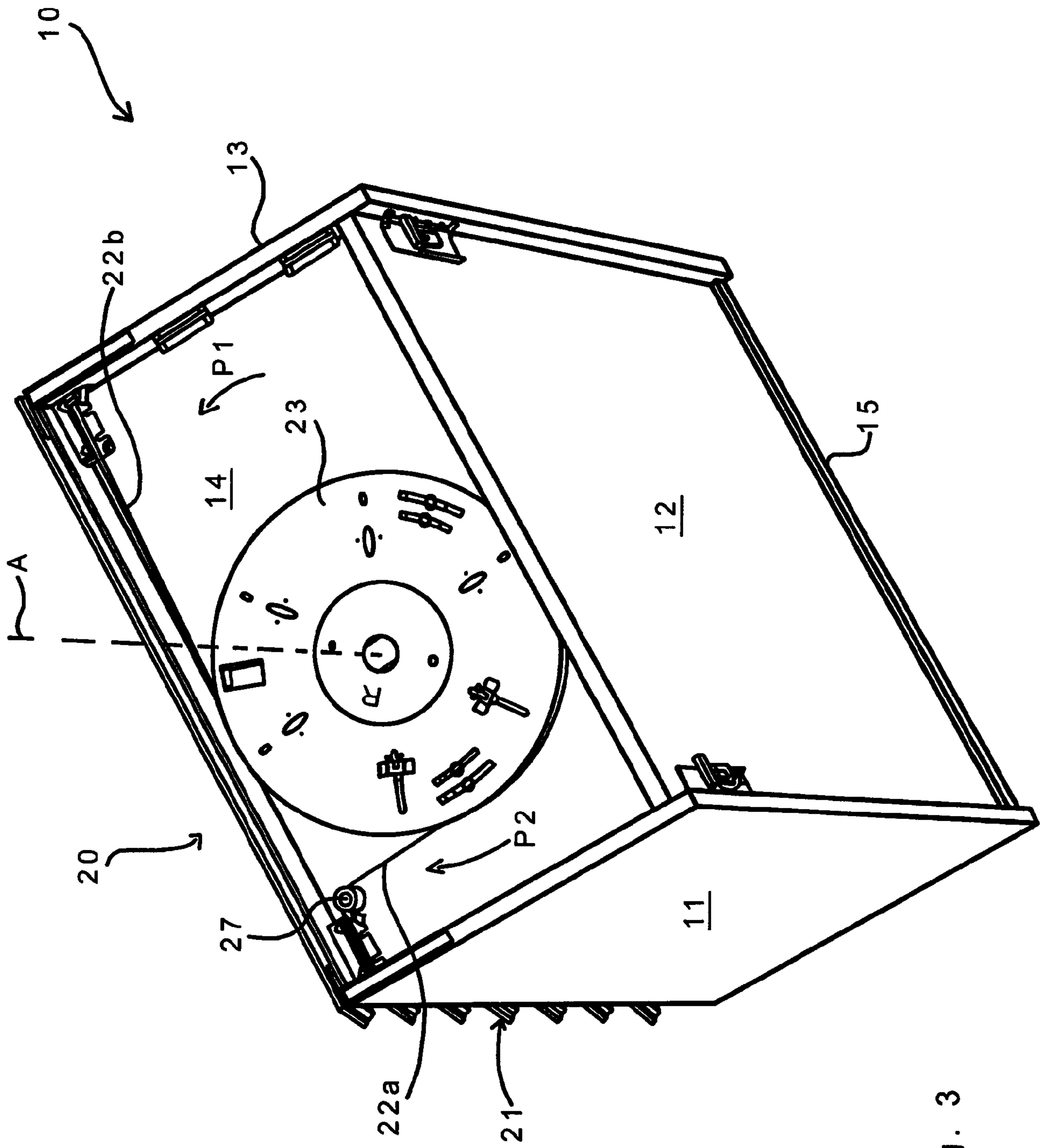


Fig. 3

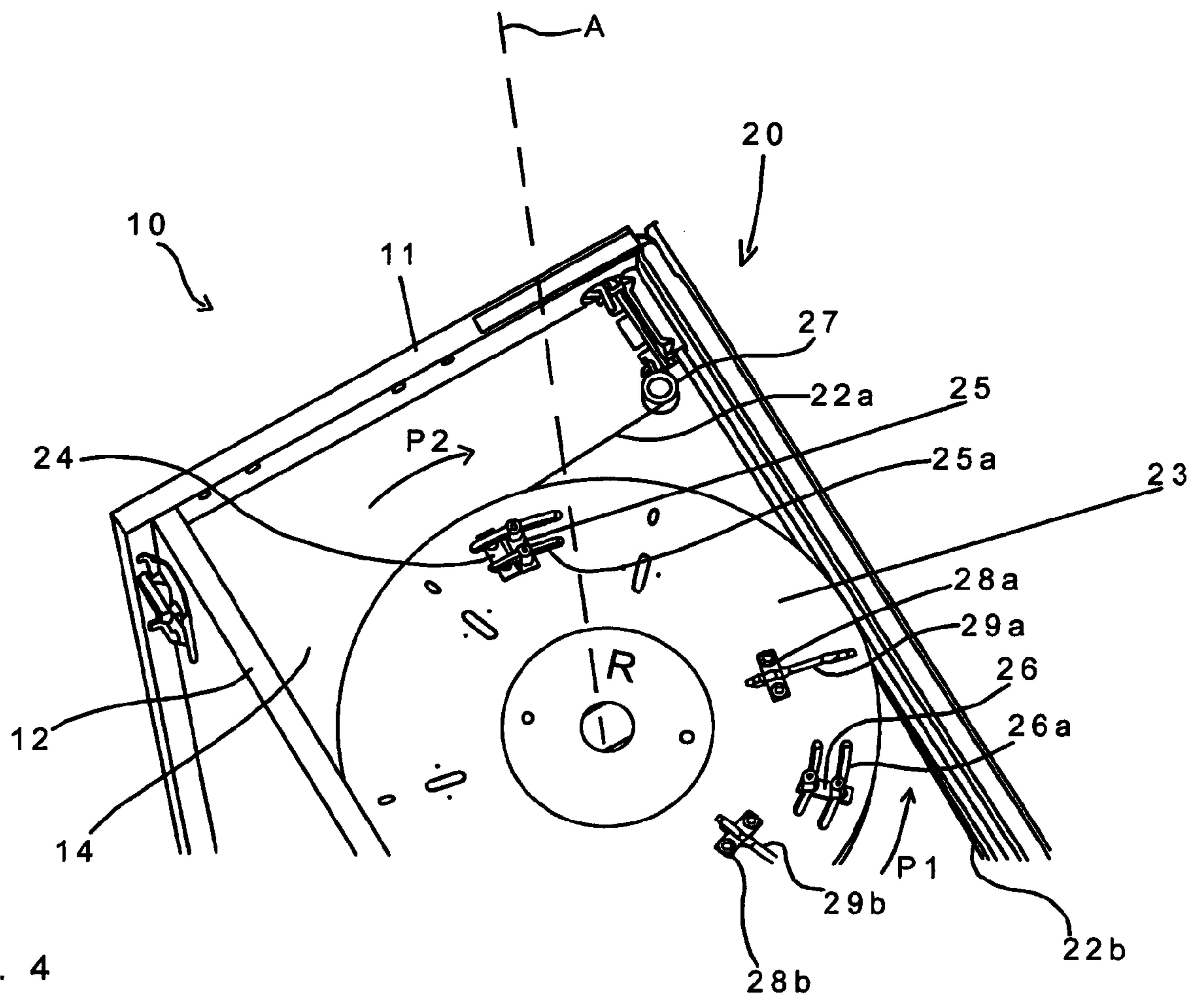


Fig. 4

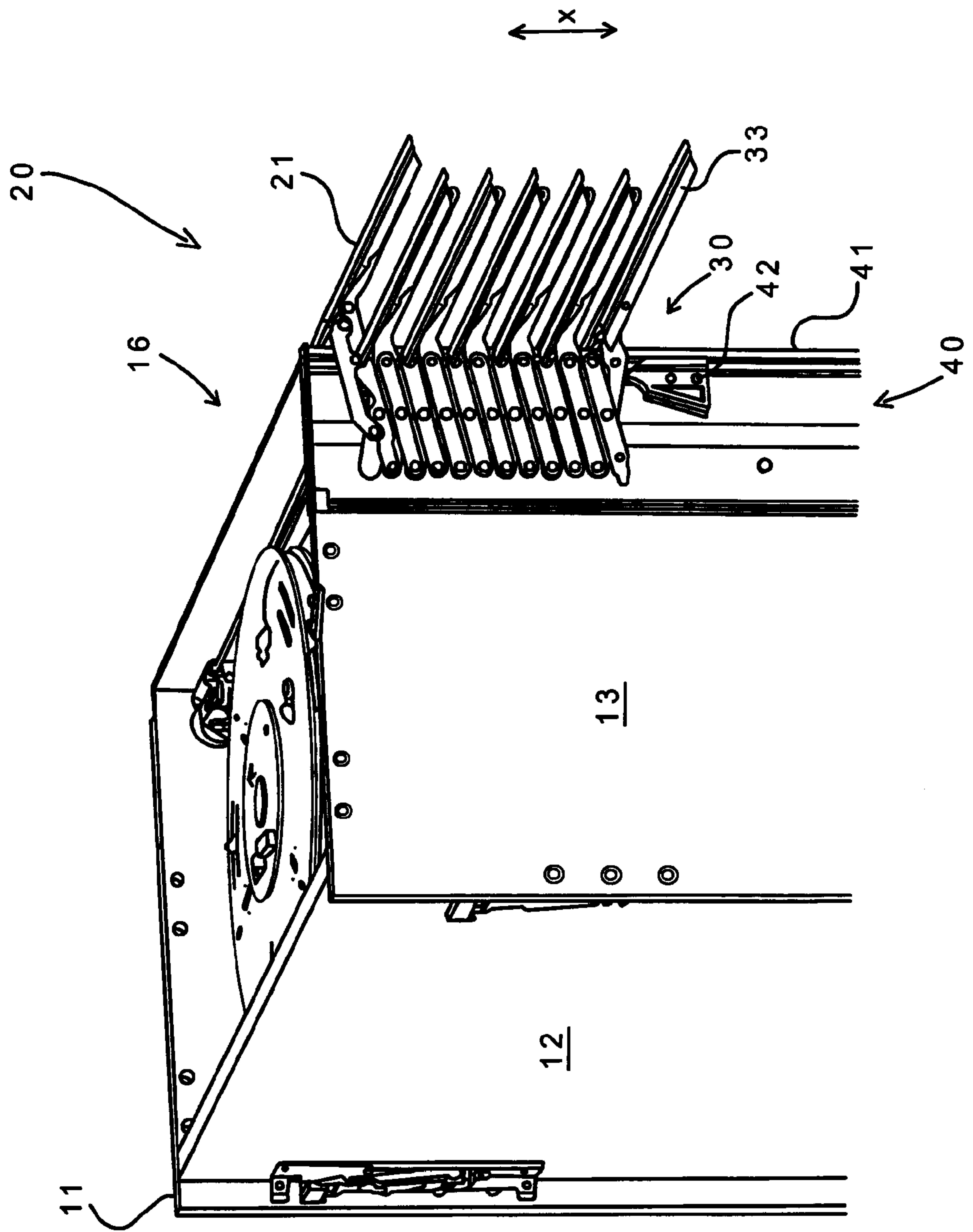


Fig. 5

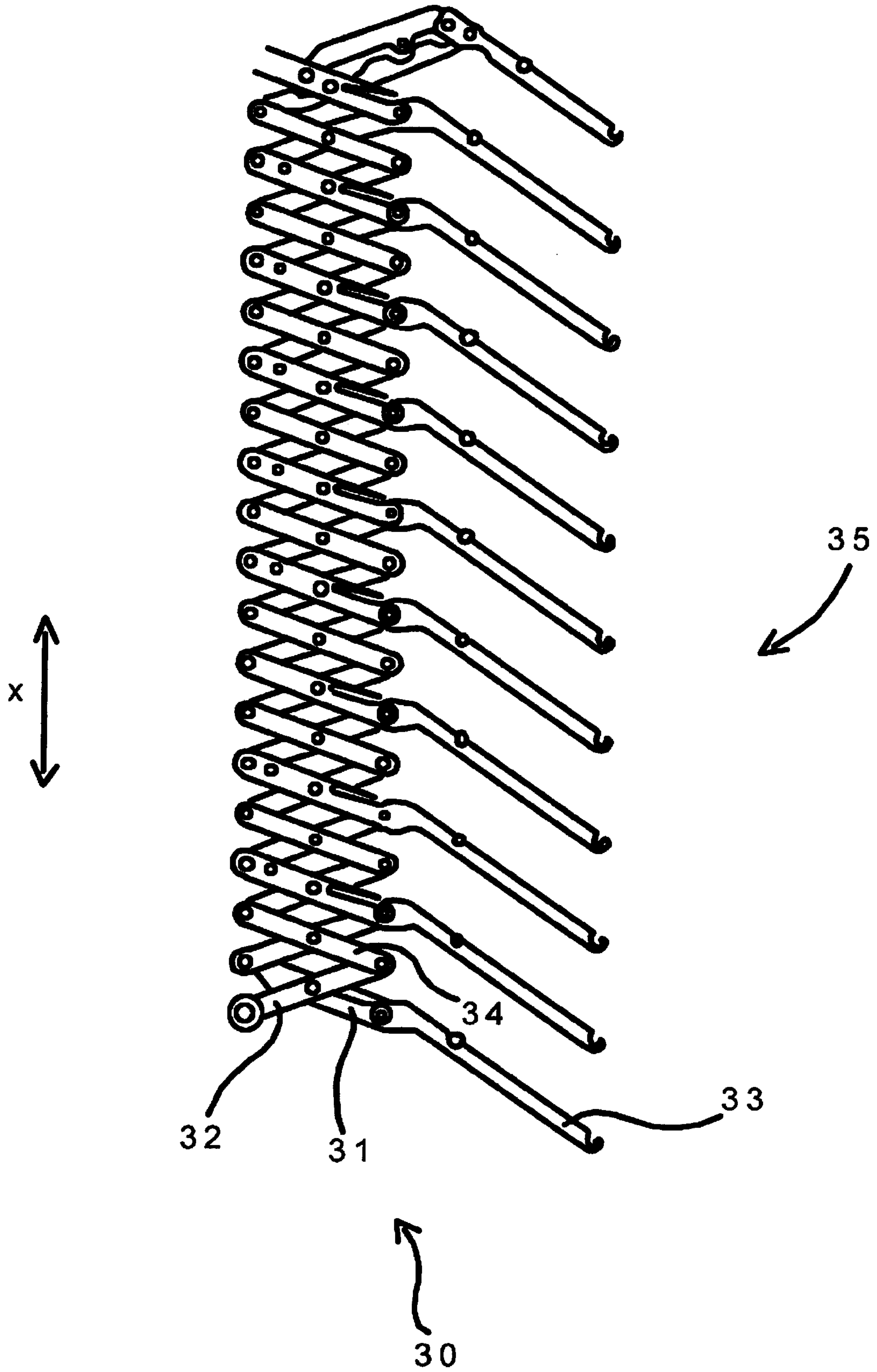


Fig. 6

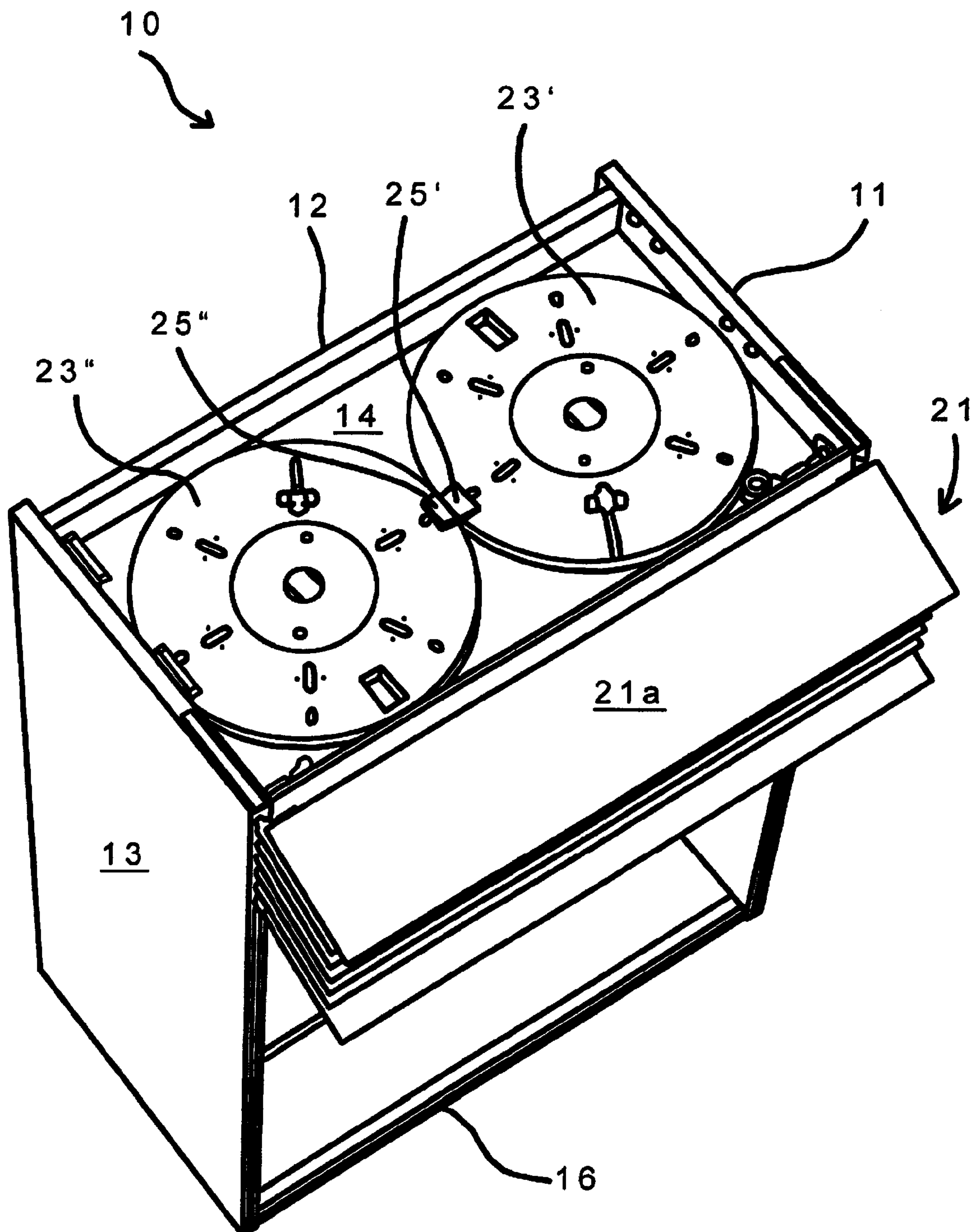


Fig. 7