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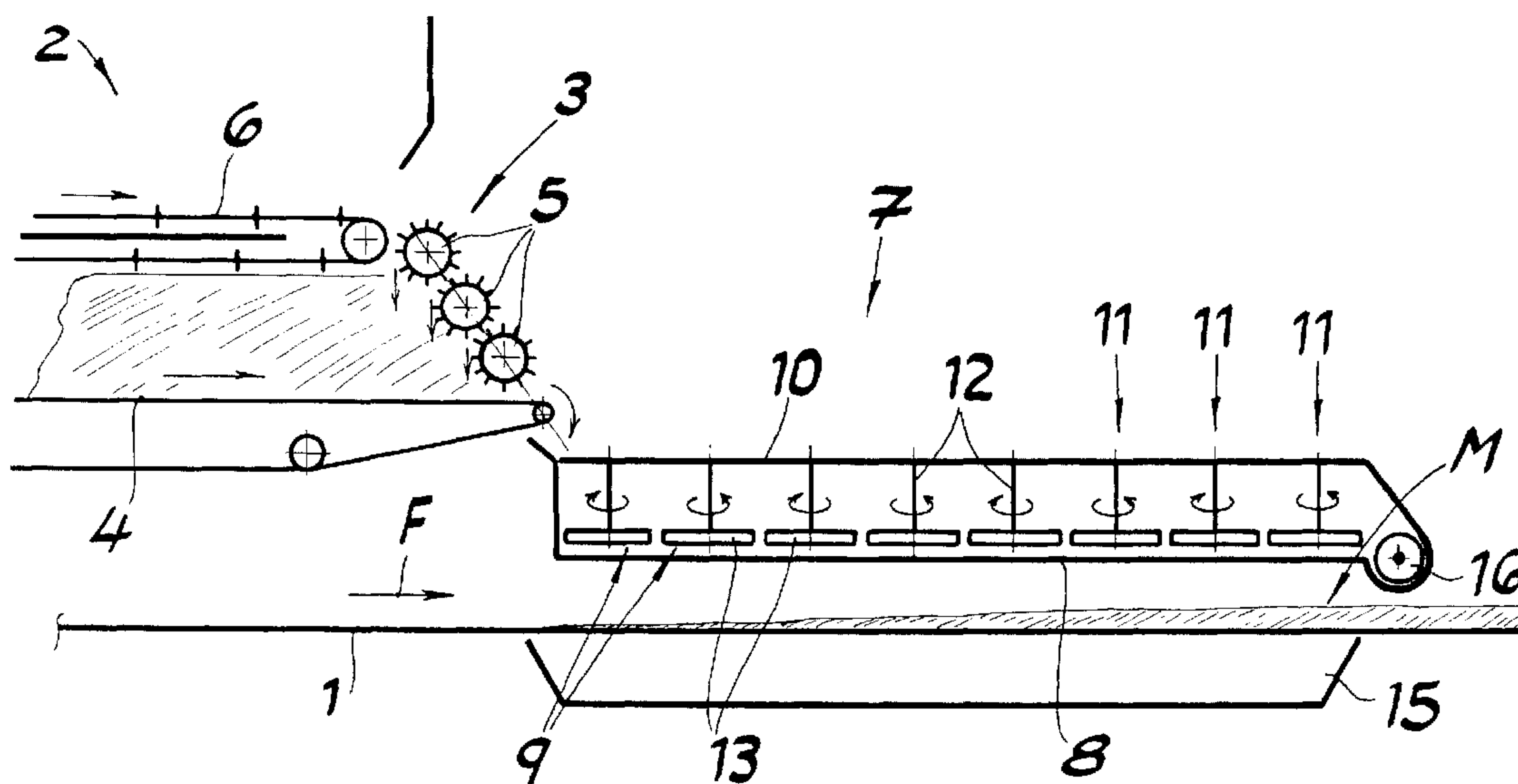
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(54) Titre : INSTALLATION POUR DISPERSER UN MATERIAU, NOTAMMENT DES COPEAUX DE BOIS, DES FIBRES DE BOIS OU SIMILAIRES ENCOLLES, SUR UNE BANDE TRANSPORTEUSE APPROPRIÉE

(54) Title: DISPERSION SYSTEM FOR DISPERSING MATERIAL, ESPECIALLY WOOD CHIPS, WOOD-FIBRE OR SIMILAR, ON A DISPERSING CONVEYOR BELT



(57) **Abrégé/Abstract:**

The invention relates to a dispersion system for dispersing material, especially wood chips, wood fibres or similar, on a dispersing conveyor belt (1) in such a manner that groups of material (M) are formed during the production of chipboard, fibre-board or similar wood material boards. Said system comprises a dispersion material bunker (2) with a dosing unit (3) made from at least one dosing strip (4) and optionally, one or more dosing and/or disintegrating cylinders (5) for dispersing the material on one dispersion head (7) arranged on the end of the dosing unit and above the dispersing conveyor belt. The dispersion head is embodied in the form of a perforated dispersion head with a perforated base (8) and a plurality of agitating elements (9) are disposed at a predetermined distance above said base (8) and form a predetermined agitating width (B).

ABSTRACT

The invention relates to a dispersion system for dispersing material, especially wood chips, wood fibres or similar, on a dispersing conveyor belt (1) in such a manner that groups of material (M) are formed during the production of chipboard, fibre-board or similar wood material boards. Said system comprises a dispersion material bunker (2) with a dosing unit (3) made from at least one dosing strip (4) and optionally, one or more dosing and/or disintegrating cylinders (5) for dispersing the material on one dispersion head (7) arranged on the end of the dosing unit and above the dispersing conveyor belt. The dispersion head is embodied in the form of a perforated dispersion head with a perforated base (8) and a plurality of agitating elements (9) are disposed at a predetermined distance above said base (8) and form a predetermined agitating width (B).

APPARATUS FOR SPREADING PARTICLES, IN PARTICULAR GLUE-COATED
WOOD CHIPS, FIBERS, OR THE LIKE ONTO A CONVEYOR BELT

Description

The invention relates to an apparatus for spreading particles, in particular glue-coated wood chips, fibers or the like on a conveyor belt to form a particle mat used for making chipboard, fiberboard, or the like structural wood panels, having a particle supply with a feeding unit comprised of at least one feed belt and if necessary one or more feeding and/or separating rollers for spreading the particles to a distributing head mounted at an end of the feeding unit above the conveyor belt. The feeding/and or separating rollers can move to separate the particles and/or break up clumps or wads of the particles. To this end for example several separating rollers can be provided above the feed belt so that the feeding function can largely be taken care of by the feed belt. It is also however possible that the one or more rollers are provided in the conveying direction at the end and constituted mainly as feed rollers.

Such apparatuses for spreading, in particular, wood chips or fibers are known in many forms. In the known spreading apparatuses the distributing head is mainly formed as a roller-type distributing head with a plurality of distributing rollers that together form a distributing-roller array. The apparatuses known to date are good, but could be improved.

In addition an apparatus for spreading fibers on a belt or wire mesh is known having a housing with an opening

in its floor across which a mesh is stretched through which the fibers are strewn on to the wire mesh. The fibers are supplied by a plurality of hood-shaped supply devices that are contained in a housing and provided with feed lines. In addition, several rows of stirrers are provided in the housing that set the fiber material into motion. The individual rows of stirrers are separated from one another by partitions. These partitions extend perpendicular to the movement direction of the belt and are provided with openings through the fibers can move from one row to the next (see German 2,848,459).

It is an object of the invention to provide a spreading apparatus of the above-described type which is very compact and produces a uniform distribution of the fibers on the particle conveyor.

This object is attained in an apparatus for spreading particles wherein the distributing head is formed as a sifter with a foraminous floor and a plurality of stirring elements spaced above the foraminous floor and each having a predetermined stirring diameter. Here the distributing head preferably has a plurality of rows spaced apart in a conveying direction of the particle conveyor and each holding a plurality of stirring elements extending transverse to the conveying direction. Furthermore, the stirring elements or their stirring surfaces preferably lie in a plane. The particles are thereby fed to the distributing head by the feeding belt or the feeding rollers so that these particles are discharged into the distributing head at the upstream stirring-element row and from there partly fall through the foraminous floor onto the particle conveyor and partly are moved in the conveying direction or

belt-advance direction inside the distributing head from one stirring-element row to the next or inside each row transversely to the belt-advance direction. In this manner, even with a relatively flat structure of the distributing head, the particles are surprisingly distributed well and uniformly onto the particle conveyor, without clumps forming in the particles. In addition, the stirring elements at the same time reduce particle size or break up clumps. The conveying direction corresponds to the travel direction of the particle conveyor, that is the belt-advance direction. This is generally the travel direction of the feeding belt.

According to a preferred embodiment, the stirring elements each comprise a rotatable axle extending generally perpendicular to the foraminous floor and carrying a stirring blade of a predetermined stirring diameter. Thus the stirring elements according to the invention are of particularly simple construction and operation. The stirring blades rotate in a plane generally parallel to and immediately above the foraminous floor. Each stirring blade is preferably constructed as a double blade with a total blade length that defines the stirring diameter. The stirring blades can thereby be constructed to have one-piece double blades. It is also possible for the stirring blade to have two or more arms to form a double blade. The two arms can for example be eccentric and connected to the axle at spacings from the axis.

Preferably the stirring elements of each row all rotate in the same direction. In contrast the stirring elements in each row rotate oppositely to the stirring elements in adjacent rows. The rotation speeds of the individual stirring elements are preferably the same for the

entire spreader head. Basically however there is the possibility to drive the rows each separately or to set different rotation speeds for the individual stirring elements in a single row. In this regard it is possible to provide a separate drive for each individual stirring element. It is however possible to provide a common drive and transmission for the stirring elements of one or more rows or even for the entire spreading head.

In a preferred further embodiment of the invention a spacing between adjacent stirring elements in each row generally corresponds to the stirring diameter of the stirring elements. This spacing is the distance between the axes of the stirring elements so that the stirring elements are closely juxtaposed. This insures that at most very small spaces in which the fibers cannot be reached by the stirring elements are left between the individual stirring elements. It is understood that the spacing between the stirring elements can only be set so small that defects due to the stirring elements hitting one another are avoided. In order to distribute the particles as uniformly as possible, respectively two adjacent or successive stirring-element rows are offset by a predetermined offset distance to one another transverse to the conveying direction. The offset distance of adjacent rows is generally equal to half of the stirring diameter, giving a staggered layout. In this arrangement it is especially advantageous when a distance between adjacent rows is by a preselected measure less than the stirring diameter. With a sufficient offset of adjacent rows transverse to the transport direction it is possible to set the spacing of adjacent rows to less than the stirring diameter without the generally circular stirring zones

overlapping. The result is an extremely compact construction that nonetheless is distinguished by a very uniform particle distribution.

According to a further suggestion of the invention the stirring elements each have at least one fan blade spaced from the stirring blade. This fan blade positioned, for example, at a predetermined spacing above the stirring blade produces an air stream or blowing effect that supports the movement of the fiber material around the stirring elements and through the foraminous floor onto the particle conveyor. In this system, a particularly good effect is achieved when the fan blade in side view is angled relative to the stirring blade. It is also possible to orient the fan blade generally parallel to the stirring blade.

Furthermore the spacing between the fan blade and stirring blade can be adjustable. This is done by making the fan blade adjustable, e.g. slidable, on the axle of the stirring element. By setting a desired spacing between the fan blade and the stirring blade the air stream coming from the fan or its blowing effect can be specially controlled and directed.

According to a further suggestion of the invention one or more suction boxes are provided on a side of the foraminous floor opposite the particle conveyor, that is underneath it. These accelerate the fiber material as it moves towards the particle conveyor so that the throughput of the particles through the foraminous floor is increased. To this end the particle conveyor is a mesh belt so that a sufficient air throughput is guaranteed. In addition, it is suggested that the distributing head is provided at its downstream end with an outfeed device extending perpendicular to the travel direction or the belt-advance

direction for left over chips or coarse particles and excess material. This outfeed device can be an outfeed auger or aspirating tube or the like operating transverse to the conveying direction. In any case, this ensures that coarse particles or excess material moved by the stirring elements all the way to the downstream end of the distributing head do not uncontrollably reach the particle conveyor, but are carried off or even fed back to the distributing head. In addition the distributing head is constructed such that the spreading width of the distributing head is larger by a preselected amount than a width of the panels being produced. This prevents undesired irregularities or thickness deviations of the particle mats at the edge regions affecting the plate quality, since these edge regions can be removed later.

According to a further suggestion of the invention partitions are provided between adjacent stirring elements of a row that form feed passages extending generally in the conveying direction or belt-advance direction. The partitions and/or the feed passages are sinusoidal in top view. This is the case when, as described above, the individual rows are staggered transversely to the conveying direction. The partitions extending generally in the conveying direction improve the particle transport in the distributing head and ensure a particularly uniform distribution of the particles. Similarly the sinusoidal shape ensures a uniform distribution over the entire belt width. Finally it is possible for the partitions to have filler segments at interstices between the stirring-zones that generally fully cover or fill up the stirring-zone

interstices. This prevents too many particles from getting through the foraminous floor and onto the particle conveyors at the interstices. As a result, the particles are extremely evenly spread over the particle conveyor. Local overloads are avoided.

The invention is more closely described in the following with references to drawing showing a single exemplary embodiment. Therein:

FIG. 1 is a schematic side view of a spreading apparatus according to the invention;

FIG. 2 is a detail of a top view of the apparatus of FIG. 1;

FIG. 3 is an alternative form of a stirring element;

FIG. 4 is a variation on the system according to FIG. 1;

FIG. 5 is a variation on the system according to FIG. 3;

FIG. 6 is a detail view of another embodiment of the stirring element;

FIG. 7a is a variation on the system of FIG. 6;

FIG. 7b is a bottom view of the system of FIG. 7a;

FIG. 8 is another embodiment of the system of FIG. 6;

FIG. 9a is a bottom view of another embodiment of a stirring element according to the invention;

FIG. 9b is a variation on the system of FIG. 9a;

FIG. 9c is another variation on the system of FIG. 9b;

FIG. 10a is a further embodiment of the system of FIG. 6;

FIG. 10b is a bottom view of the system of FIG. 10a.

The figures show a spreading apparatus for spreading particles, in particular glue-coated wood chips, wood fibers or the like on a conveyor belt 1 to form a particle mat M for the production of chipboard, fiberboard or similar wood structural panels. The particle conveyor 1 is foraminous. The spreading apparatus has a schematically illustrated particle hopper 2 with a feeding unit 3. The feeding unit 3 is comprised mainly of a feed belt 4 and several feeding and/or separating rollers 5. Thus particles are supplied by a supply or spreading belt 6 to the hopper or the feeding and/or spreading rollers 5 that essentially break up particle clumps. The hopper is schematically shown filled in FIG. 1 and in FIG. 4 above the feed belt 4. The output of the feed belt hopper or the feeding unit can be adjusted by decreasing or increasing the advance speed of the feed belt 4. The particles are fed from the feeding unit 3 onto a distributing head 7 positioned at the outlet end of the feeding unit and above the particle conveyor 1. This is shown in FIG. 1 in particular. Downstream of the distributing head 7 is a continuously operating press or a batch press that presses the particle mats into structural wood panels. This press is not shown.

The distributing head 7 is a sifter head 7 with a foraminous floor 8 and a plurality of stirring elements 9 set at predetermined spacings above the foraminous floor 8 and each covering a preselected stirring diameter B. The stirring elements 9 are provided in a housing 10 whose bottom wall is formed by the foraminous floor 8 or on whose bottom wall the foraminous floor 8 is provided.

According to FIG. 2 the distributing head 7 has spaced apart in the travel direction F a plurality of rows 11 each holding a plurality of the stirring elements 9 spaced apart transverse to the conveying direction F. The conveying direction F is the conveying direction of the particle conveyor 1, that is the belt-advance direction which corresponds generally to the travel direction of the feed belt 4. The individual stirring elements 9 each have at least one stirring blade 13 projecting radially the width B from an axle 12 perpendicular to the foraminous floor. The stirring blades 13 are for example each made of one piece and formed as a bar of rectangular or square cross-section. These stirring blades 13 rotate in a common plane that is generally parallel to the foraminous floor 8 and immediately above the foraminous floor 8. Here the stirring blades 13 are double blades with a total stirring diameter B. Arrows in FIG. 2 show how in each row 11 all the stirring elements 9 turn in the same direction. The stirring elements 9 of alternate rows 11 rotate oppositely. This is also shown in FIG. 2. Thus the stirring elements of the first, third, fifth, and seventh rows rotate clockwise while the stirring elements of the second, fourth, sixth, and eighth row rotate counterclockwise, whereby the first row is the row 11 adjacent to the feeding unit 3 of the distributing head 7. A spacing A between two adjacent stirring elements 9 of each row 11 corresponds generally to the stirring diameter B of the stirring elements so that this spacing A is generally equal to the distance between the axles 12. In addition FIG. 2 shows that adjacent rows 11, for example the first and second row, have a predetermined offset V transverse to the conveying direction

F or belt-travel direction. This offset V of the rows corresponds to half of the stirring diameter so that the first and third rows are once again aligned without offset. Similarly, the spacing C between adjacent rows is smaller by a preselected amount than the stirring diameter B. This is also shown in FIG. 2.

FIG. 3 shows a variation of a stirring element 9 according to the invention having an additional fan vane 14 spaced above the stirring blade 13. This fan vane 14 is angled relative to the respective stirring blade 13 and serves to create a stream of air or blowing effect directed toward the foraminous floor 8.

In the embodiment of FIG. 5 the stirring element also has a fan blade 14 which however is oriented generally parallel to the stirring blade 13. In addition the stirring element 9 is surrounded at least near the fan blade 14 by a tubular wall 22. The double-headed arrow in FIG. 5 shows how the fan blade 14 and/or the tube 22 are vertically adjustable. This means that for example a spacing x of the fan blade 14 from the stirring blade 13 can be set or adjusted. To this end the fan blade 14 is movable or slidable on the axle 12 of the stirring element 9 and can be fixed thereon. In this manner the desired stream of air which is produced by the fan blade 14 can be appropriately influenced and controlled.

In the embodiment of FIG. 1, underneath the particle conveyor 1, that is on the side of the particle conveyor 1, opposite the foraminous floor 8, there is a suction box 15 that produces a flow of air from the foraminous floor 8 to the particle conveyor 1 so that

particles are pulled onto the particle conveyor, that is onto the foraminous belt 1.

FIG. 4 shows an alternative embodiment with several suction boxes 15' underneath the particle conveyor 1. Here there are a plurality of suction boxes 15' arranged one after the other in the belt-advance direction and each extending generally perpendicular to the belt-advance direction. They are for example of generally triangular or trapezoidal cross-section. It is furthermore possible that several suction boxes are lined up not only in belt-advance direction, but perpendicular to the belt-advance direction. This is not shown in the drawing.

In any case, the suction boxes 15 are connected to one or more suction lines so that the suction effect of the individual vacuum lines or the individual suction boxes 15' can, for example, be set by throttle valves 21. This makes it possible to control the suction effect of the suction boxes 15' or of the entire suction system over its length and/or width so as to accommodate to requirements. When suction boxes 15' are used which extend over the belt width, it is advantageous to connect them to several suction lines distributed over the suction box width, with respective valves for individual control.

In the exemplary embodiments, the distributing head 7 is provided at its downstream end with an outfeed device 16 extending transverse to the conveying direction F or the travel direction of the particle conveyor 1 for extra chips or coarse particles and excess material. This outfeed device is shown simply as a feed auger 16. FIG. 2 shows that the overall width S of the distributing head 7 is

greater by a preselected amount than a width P of the panels to be made.

Furthermore, between adjacent stirring elements 9 of each row 11 as well as along the outer edges of the distributing head, there are partitions or side walls 17 that extend from row to row generally along the entire length of the distributing head 7 and that form feed passages 18 extending generally in the transport direction F. The partition walls 17 are shaped and positioned to fit around the stirring elements 9, so that they form as seen in top view sinusoidal or undulated passages 18. As a result the particles are moved along a wavy line in the individual feed passages 18 so as to produce a particularly homogenous particle distribution, both parallel and transverse to the conveying direction F. FIG. 2 also shows in part how filler segments 20 can be connected to the partition walls 17 at the stirring zone interstices 19, which essentially cover or fill the stirring zone interstices.

In the exemplary embodiment, the stirring elements 9 are driven with generally the same rotation rate or angular speed. The rotation rate is preferably between 300 RPM and 900 RPM. The system is set up such that, seen in top view, two adjacent stirring elements are in different angular positions at each point in time, that is one stirring element is ahead of or behind the adjacent stirring elements. Thus even if the stirring elements 9 are packed rather closely together there will be no problems caused by the interfitting stirring elements 9. It is also simply possible when the angular positions of the stirring elements 9 are carefully coordinated and a constant rotation speed is used to set the spacing between the stirring elements 9

smaller than the stirring diameter B, when of course there are no partitions between the stirring elements 9. This is however not shown in the figures.

It is also possible to set the spacings between the stirring elements 9 or the stirring blades 13 and the foraminous floor 8 individually, by row, by column, in groups and/or all together. In this manner the output of the distributing head can be specifically controlled.

FIGS. 1 and 4 further show the mat M formed on the particle conveyor 1, with its thickness increasing continuously in the belt-advance direction. The distributing head 7 works preferably such that its entire length is used for mat formation, that is the desired mat thickness is essentially reached only at the downstream end of the distributing head 7.

Finally FIGS. 6 through 10b show various further embodiments of stirring elements 9. FIG. 6 shows an embodiment of a stirring element 9 where the stirring blade 13 is formed on its lower face with grooves 23 extending transverse to the longitudinal direction of the blade. The lower face here is the face of the stirring blade 13 facing the foraminous floor 8. The grooves 23 are of generally triangular cross-section. Principally, other cross-sectional shapes are possible. In any case, the grooves create a turbulence in the particles or the fibers created on the mesh surface so that the particles are distributed in a particularly uniform manner on the particle conveyor without the formation of clumps. This is in particular true when as shown in FIG. 6 the grooves 23 are staggered on the stirring element. Staggered here means that the grooves 23 to one

side of the axle 12 have a different spacing from the axis 12 than the grooves 23 on the other side. The grooves 23 could also be distributed asymmetrically.

Another preferred embodiment of the stirring elements 9 is characterized in that the stirring blades 13 and/or the axles 12 carry one or more guide elements for the particles, e.g. shaped as guiding plates. FIGS. 7a and 7b show by way of example an embodiment wherein the lower face of the stirring blade 13 carries a plurality of spaced apart guide plates 24. These guide plates 24 are formed as square or rectangular plates that are positioned perpendicular to the lower face of the stirring blade 13 and parallel to one another. Furthermore the guide plates 24 are set at a predetermined angle of e.g. 30° to 60° to the longitudinal axis of the stirring blade 13. This makes it possible to mount the guide plates 24 either rigidly fixedly on the lower faces of the stirring blades. It is also however possible to make the guide plates 24 adjustable or rotatable on the stirring blades 13. This is shown in FIG. 7b in broken lines. Thus for example the guiding plates on one side of the stirring blade can be set at a different angle from those on the other side of the axle. In any case the guide plates 24 produce a uniform distribution of the fibers over the respective stirring diameter.

FIG. 8 shows another embodiment wherein guide plates 24a and 24b are provided. They are positioned on both sides of the stirring blade 13 and are each generally perpendicular to the stirring blade 13, whereby the stirring plates 24a and 24b are inclined relative to the horizontal or to the adjacent foraminous floor 8. To this end the guide plates 24a and 24b are secured to the axle 12 or the

stirring blade 13 at generally the same level as the stirring blade 13. The angle of inclination of the guide plates 24a and 24b relative to the foraminous floor 8 can be identical or different to both sides of the stirring blade 13. An angle of 30° to 60° to the horizontal is preferable. In any case the result is agitation of the fibers and pushing of the fibers through the foraminous floor.

A further embodiment of the guide plates is shown in FIGS. 10a and 10b. Here each side of the axle 12 carries a respective guide plate 24a or 4b at a predetermined spacing above the stirring blade 13. The guide plates 24a and 24b thus as shown in FIG. 10b extend generally orthogonally to the stirring blade 13 or the axle 12. FIG. 10a shows that the guide plates 24a and 24b are inclined as in the embodiment of FIG. 8 relative to the horizontal or to the foraminous floor 8. The guide plate 24a is set at an angle opposite that of the guide plate 24b that is mounted on the opposite side of the axle 12. The overall length of the two guide plates 24a and 24b corresponds generally to the overall length of the stirring blade 13. In addition it is possible that the guide plates 24a and 24b are fixed angularly adjustable to the axle 12. This is not shown in the drawing. The angle of the guide plates to the horizontal or to the foraminous floor 8 is e.g. 30° to 60° .

In the above-described embodiments (see in particular FIGS. 5 to 8 and 10) the stirring blades 13 is always formed as a one-part double blade 13. In contrast FIGS. 9a to 9c show embodiments wherein the stirring blade is formed of two individual arms 13a and 13b which form the double blade 13. The individual arms 13a and 3b are secured eccentrically, that is at a spacing to the rotation axis of

the stirring element to the axle 12 of the stirring element 9. FIG. 9a shows an embodiment wherein the individual blades are formed as straight bars extending parallel to each other. In contrast, FIG 9b shows two arms 13a and 13b which are arced oppositely to each other, each being shaped as an arcuate or curved blade. The radius of curvature of the two individual arms 13a and 13b is identical. The two arms 13a and 13b each have as shown in FIG. 9b an opposite curvature while the individual arms 13a and 13b in the embodiment of FIG. 9c have as shown in top or bottom view the same direction of arc. These different embodiments of the arms 13a and 13b produce different movements in the particles. This is shown by arrows in FIGS. 9b and 9c. Finally it is possible to make the two individual arms 13a and 13b of different lengths b and b' . FIG. 9a shows an embodiment where the length b' of the arm 13b is smaller than the length b of the other arm 13a. The length b of the arm 13a is thus equal to about $B/2$, that is half of the stirring diameter of the double-arm length B . In contrast the length b' of the arm 13b is about half the length b of the arm 13a so that the length b' of the arm 13b is equal to about $B/4$. An embodiment where the lengths b and b' of the arms 13a and 13b are identical is also shown in FIG. 9a in dot-dash lines.

Patent claims

1. An apparatus for spreading particles, in particular glue-coated wood chips, fibers or the like on a conveyor belt (1) to form a particle mat used for making chipboard, fiberboard, or the like structural wood panels, having a particle supply (2) with a feeding unit (3) comprised of at least one feed belt (4) and if necessary one or more feeding and/or separating rollers (5) for spreading the particles to a distributing head (7) mounted at an end of the feeding unit (3) above the conveyor belt (1), characterized in that the distributing head (7) is formed as a sifter with a foraminous floor (8) and a plurality of stirring elements spaced above the foraminous floor (8) and each having a predetermined stirring diameter (B).

2. The spreading apparatus according to claim 1, characterized in that the distributing head (7) has a plurality of rows (11) spaced apart in and extending transverse to a travel direction (F) of the particle conveyor and each holding a plurality of the stirring elements (9).

3. The spreading apparatus according to claim 1 or 2, characterized in that the stirring elements (9) each comprise a rotatable axle extending generally perpendicular to the foraminous floor (8) and carrying a stirring blade (13) of the predetermined stirring diameter (B).

4. The spreading apparatus according to claim 3, characterized in that the stirring blade (13) has two arms that define the stirring diameter (B).

5. The spreading apparatus according to claim 3 or 4, characterized in that the stirring blade (13) is one piece or has two separate arms (13a and 13b).

6. The spreading apparatus according to one of claims 2 to 5, characterized in that the stirring elements (9) of each row all rotate in the same direction.

7. The spreading apparatus according to one of claims 2 to 6, characterized in that the stirring elements (9) in each row rotate oppositely to the stirring elements (9) in adjacent rows.

8. The spreading apparatus according to one of claims 2 to 7, characterized in that a spacing (A) between adjacent stirring elements (9) in each row (11) generally corresponds to the stirring diameter (B) of the stirring elements (9).

9. The spreading apparatus according to one of claims 2 to 8 that the stirring-element rows (11) are staggered by a predetermined offset distance (V) to one another crosswise to the travel direction (F).

10. The spreading apparatus according to claim 9, characterized in that the distance (V) of offset of adjacent rows is generally equal to half the stirring diameter (B).

11. The spreading apparatus according to claim 9 or 10, characterized in that a distance (C) between adjacent rows (11) is slightly less than the stirring diameter (B).

12. The spreading apparatus according to one of claims 1 to 11, characterized in that the stirring elements (9) each have at last one fan blade (14) spaced from the stirring blade (13).

13. The spreading apparatus according to claim 12, characterized in that a spacing (x) between each fan blade (14) and the respective stirring blade (13) is adjustable.

14. The spreading apparatus according to claim 12 or 13, characterized in that the fan blade (14) is angled seen from the side relative to the stirring blade (13).

15. The spreading apparatus according to one of claims 1 to 14, characterized in that a suction box (15 or 15') is provided on a side of the foraminous floor (8) opposite the particle conveyor (1).

16. The spreading apparatus according to one of claims 1 to 15, characterized in that the distributing head (7) is provided at its downstream end with an outfeed device (16) extending perpendicular to the travel direction (F) or the belt-advance direction, e.g. an outfeed auger or aspirating device, for coarse particles and/or excess material.

17. The spreading apparatus according to one of claims 1 to 16, characterized in that a spreading width (S) of the distributing head (7) is slightly larger than a width (P) of the mat being produced.

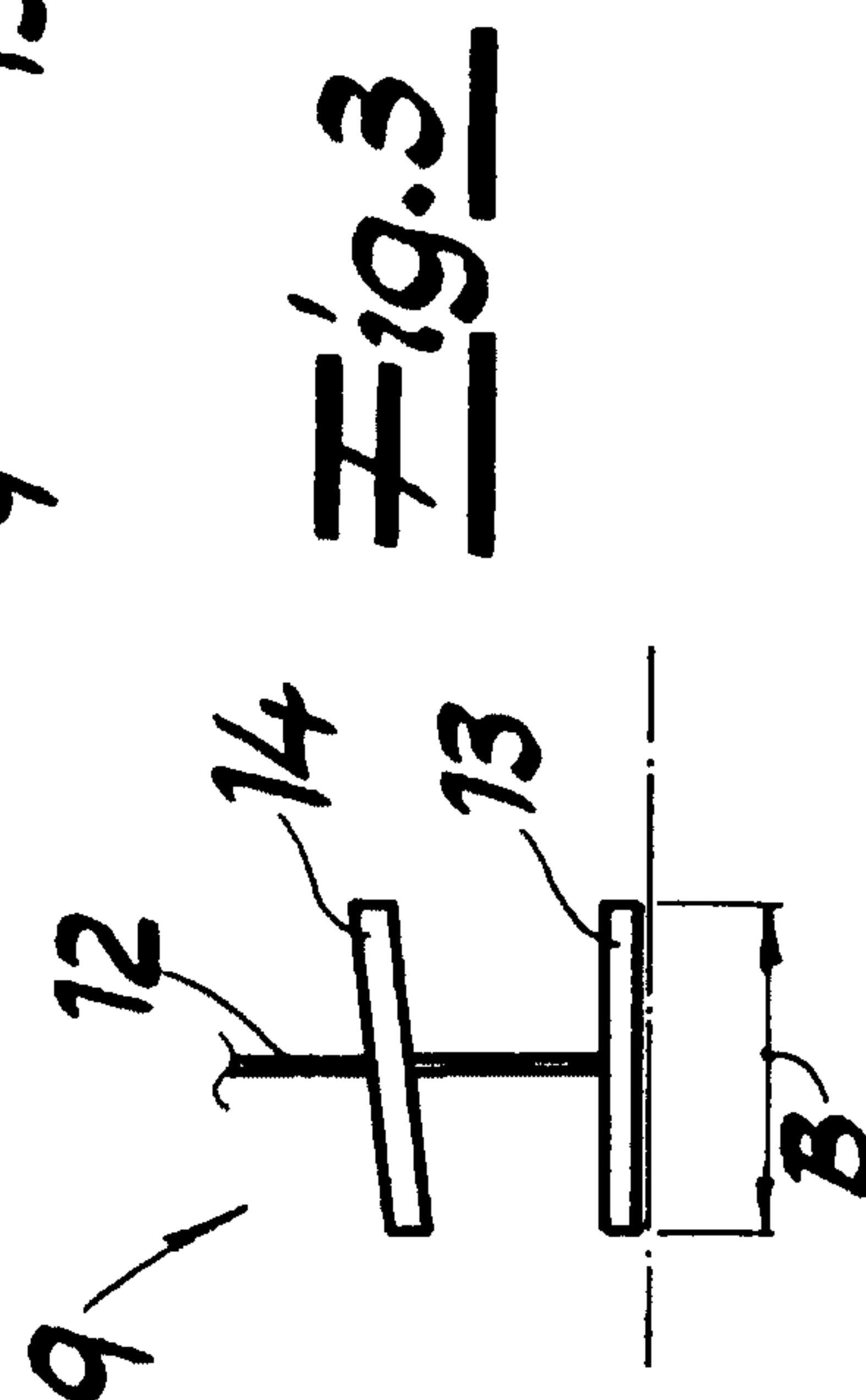
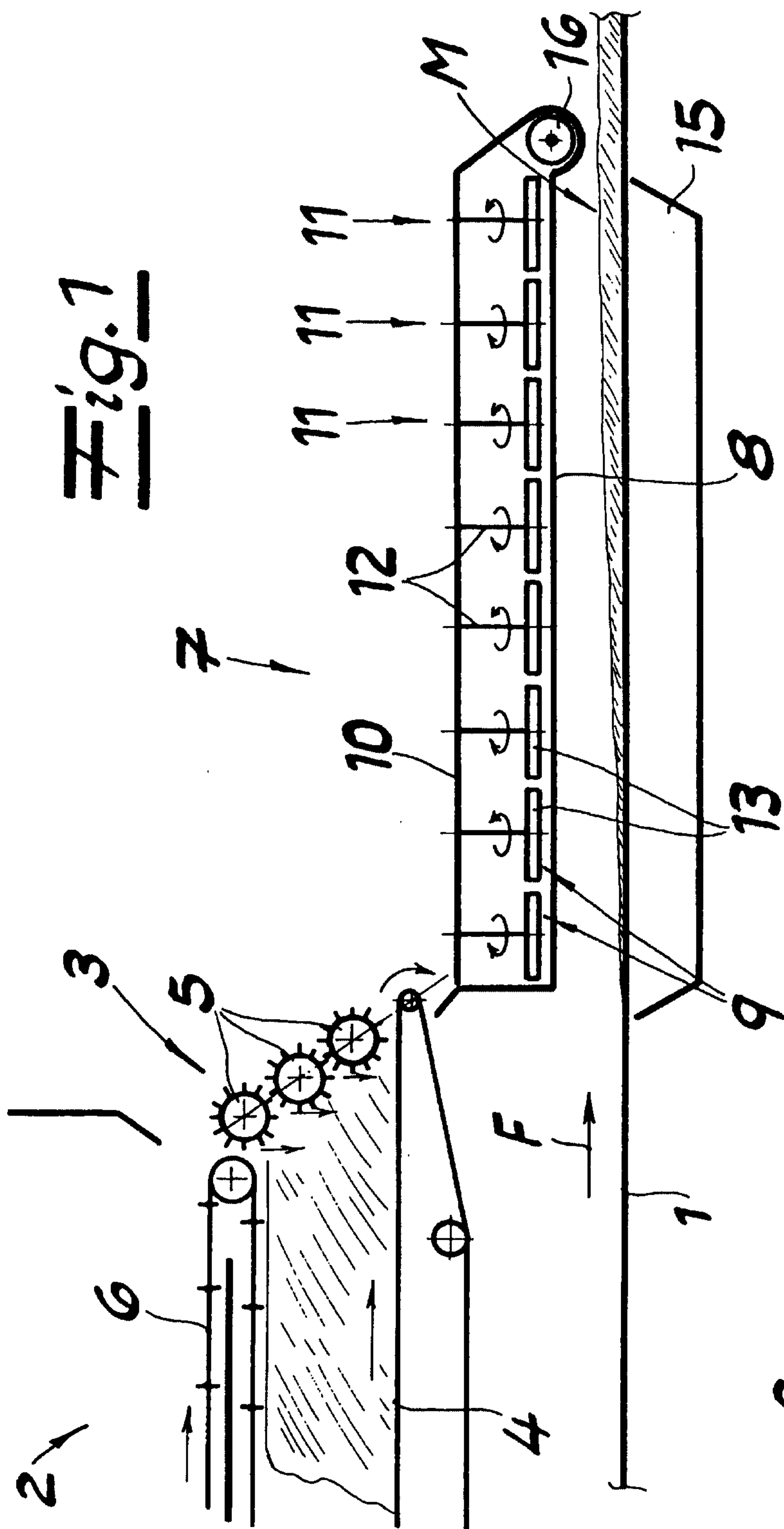
18. The spreading apparatus according to one of claims 2 to 17, characterized in that partitions (17) are provided between adjacent stirring elements (9) of a row (11) that form feed passages (18) extending generally in the travel direction (F) or belt-advance direction.

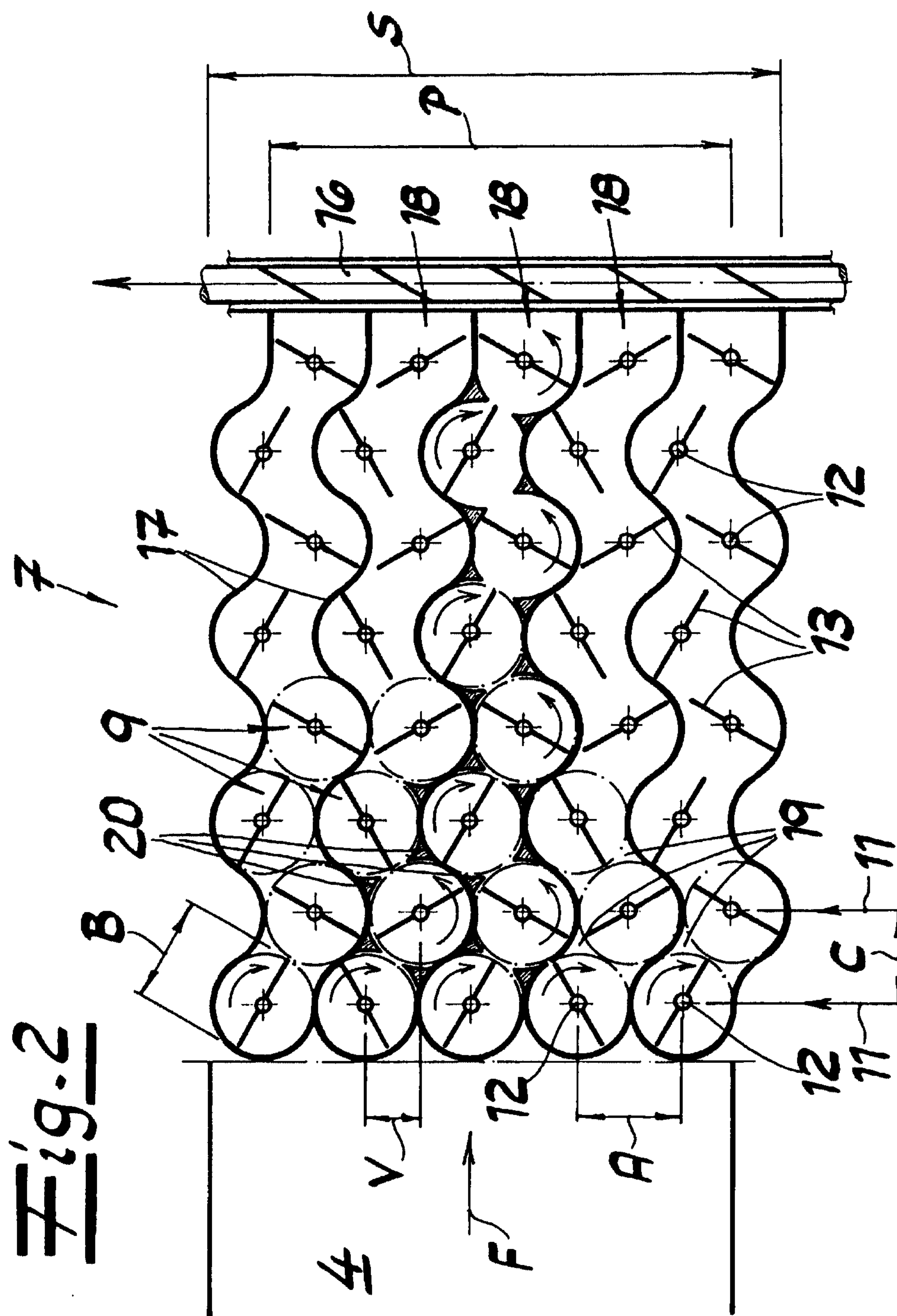
19. The spreading apparatus according to claim 18, characterized in that the partitions (17) and/or the feed passages (18) are sinusoidal seen from above.

20. The spreading apparatus according to claim 18 or 19, characterized in that the partitions (17) have filler segments (20) at stirring-zone corners (19) that generally fully cover or fill up the stirring-zone corners (19).

21. The spreading apparatus according to one of claims 3 to 20, characterized in that the stirring blades (13) have downwardly open formations, e.g. diametral grooves (23).

22. The spreading apparatus according to one of claims 3 to 21, characterized in that agitating elements (24, 24a, 24b) for the particles, e.g. stirring plates, are provided on the stirring blades (13) and/or on their axles (12).





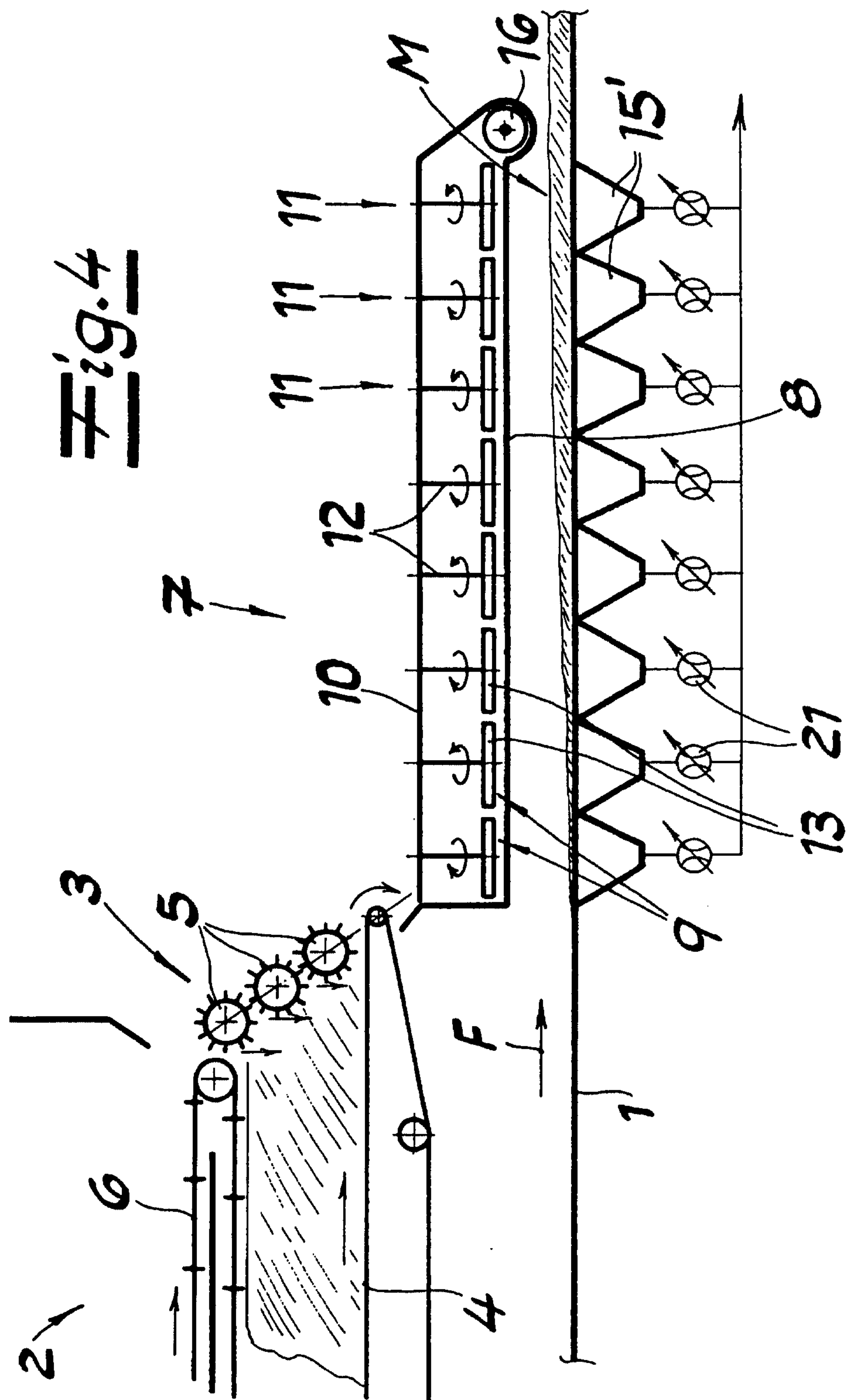


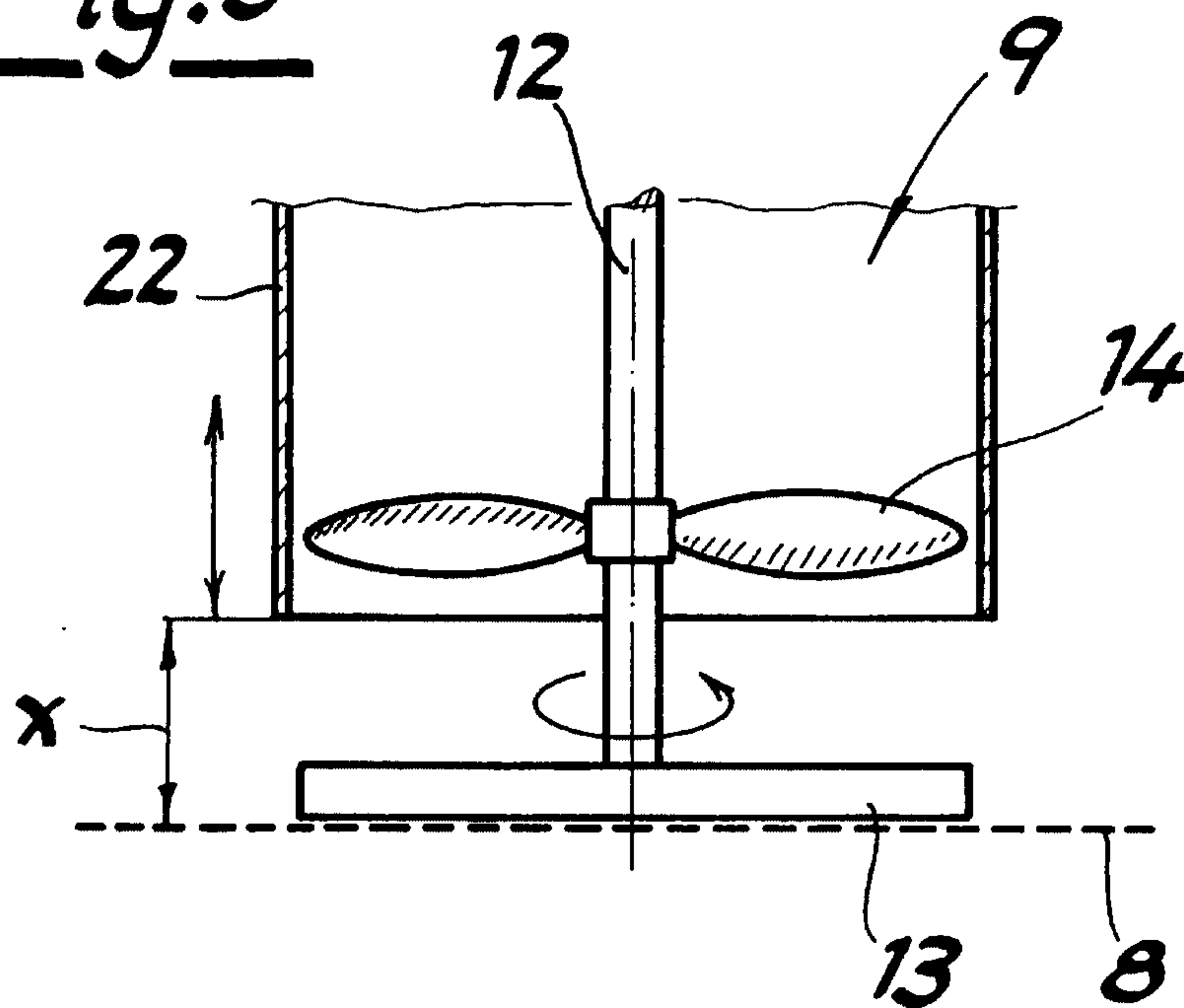
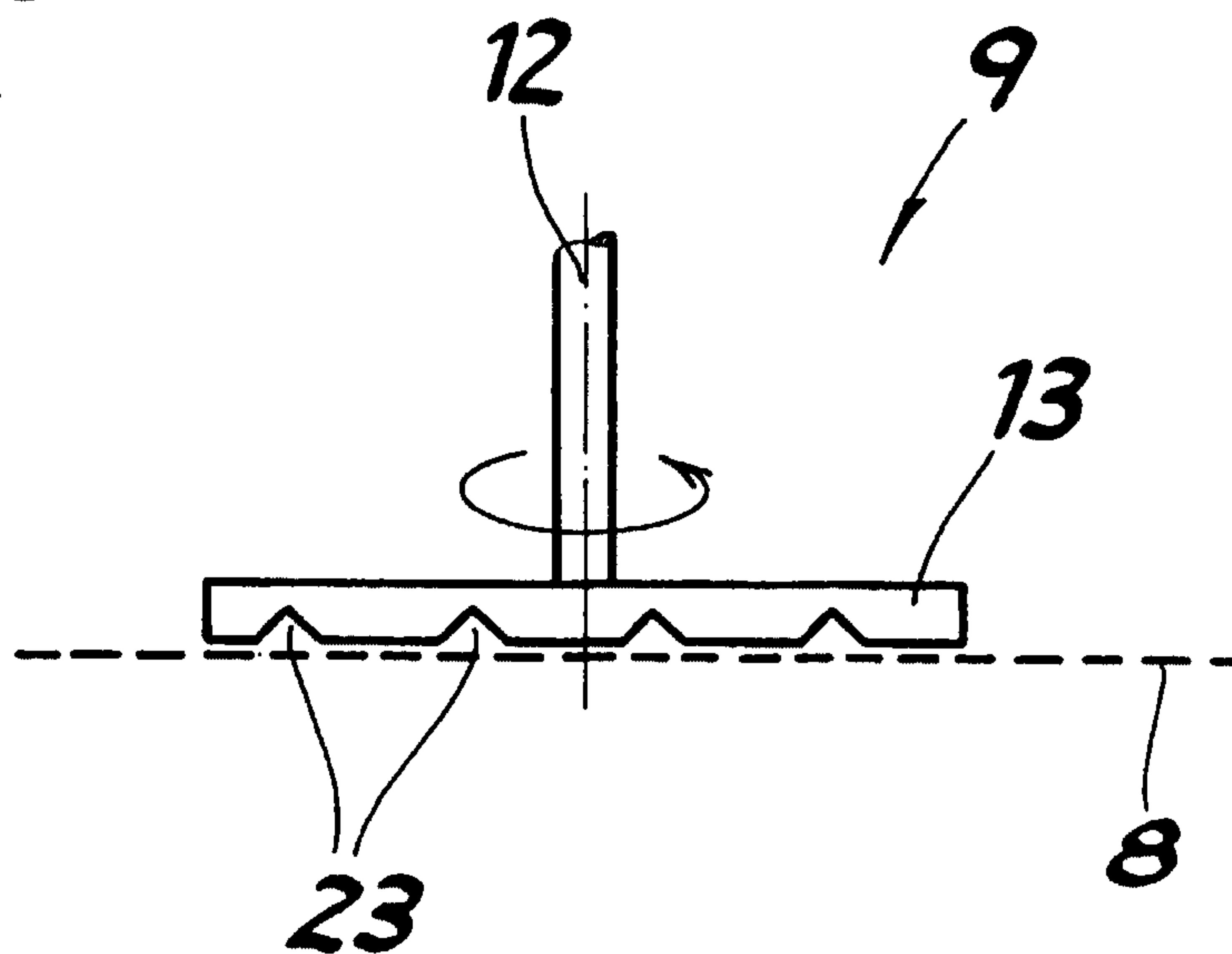
Fig. 5Fig. 6

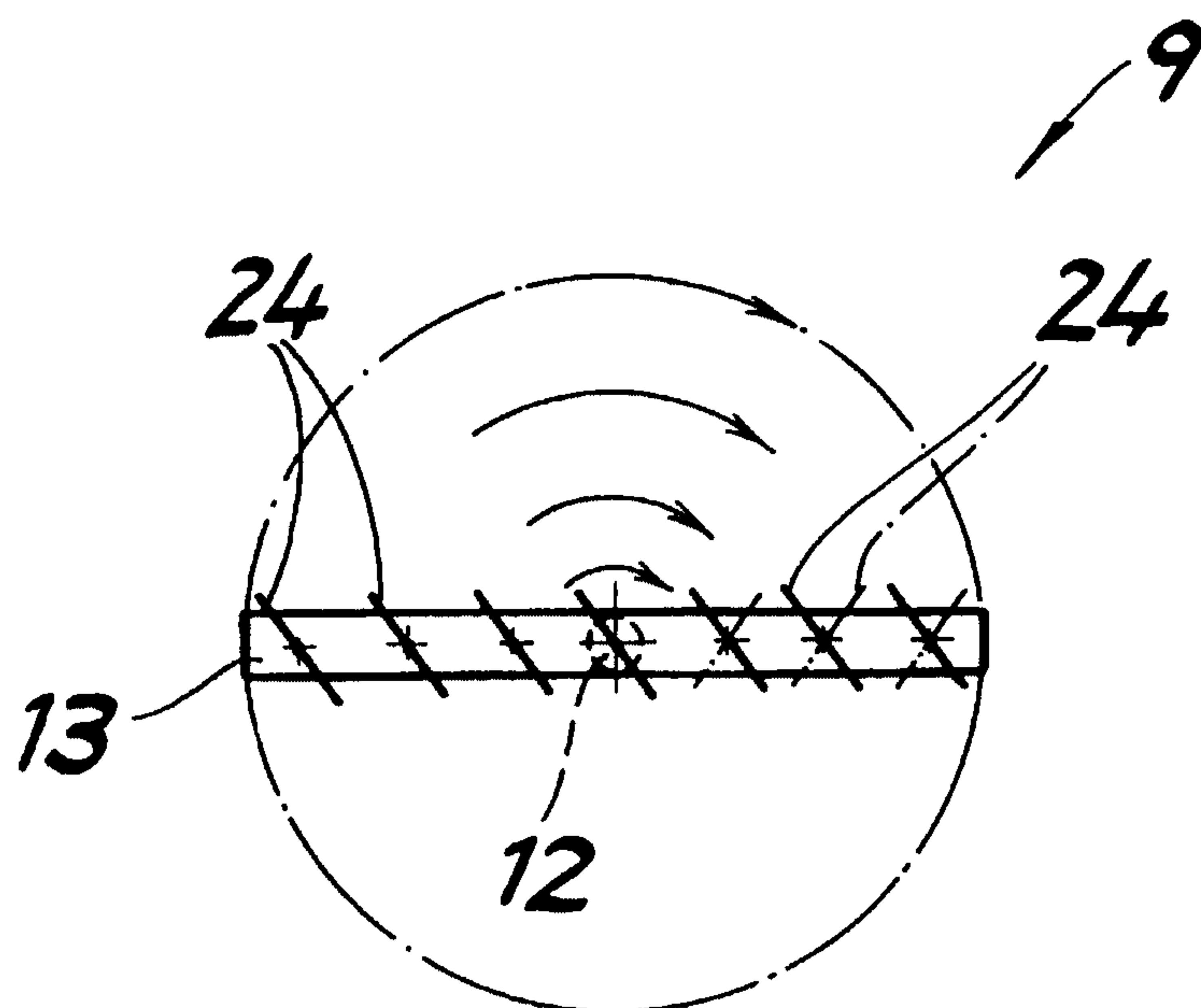
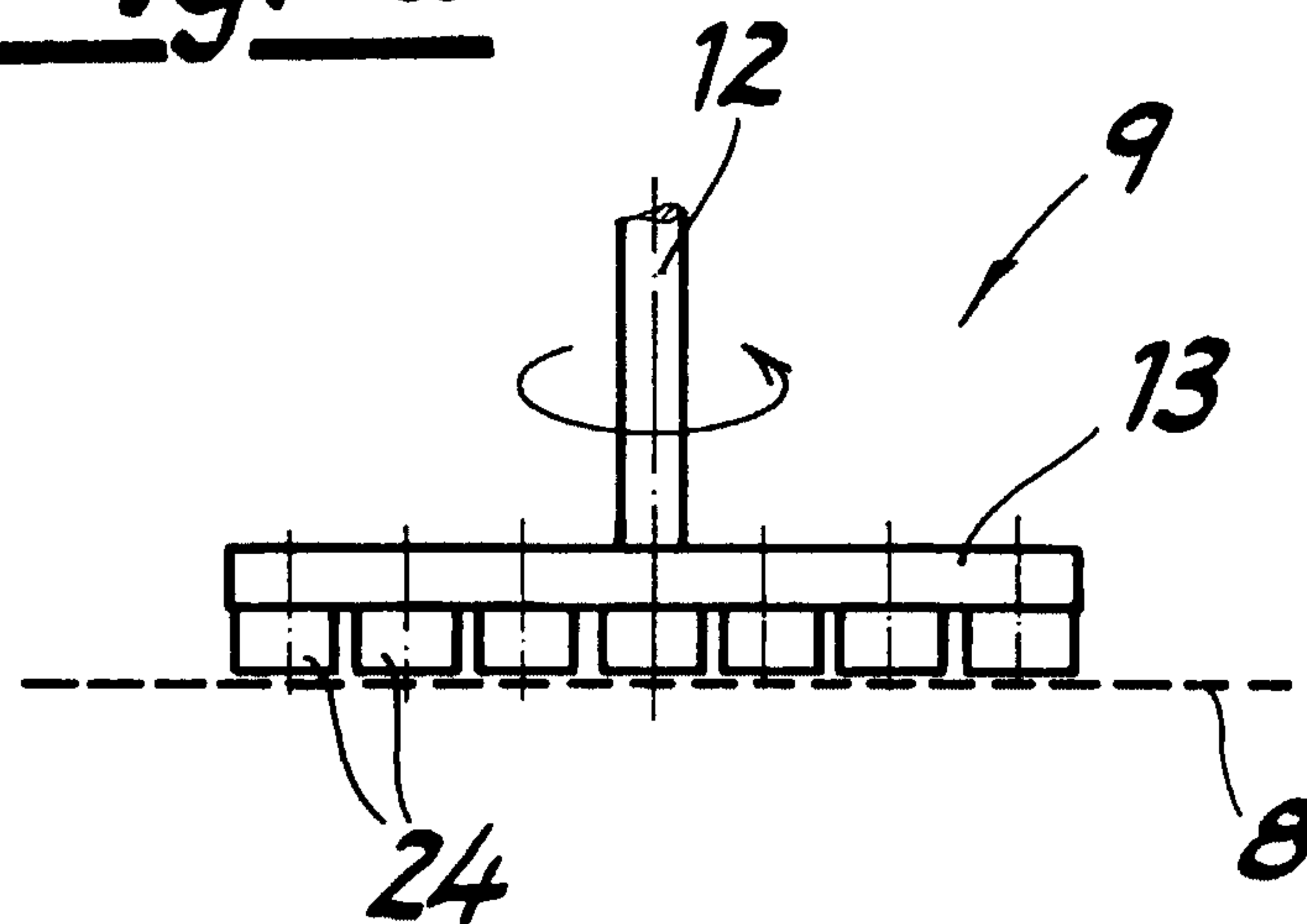
Fig. 7aFig. 7b

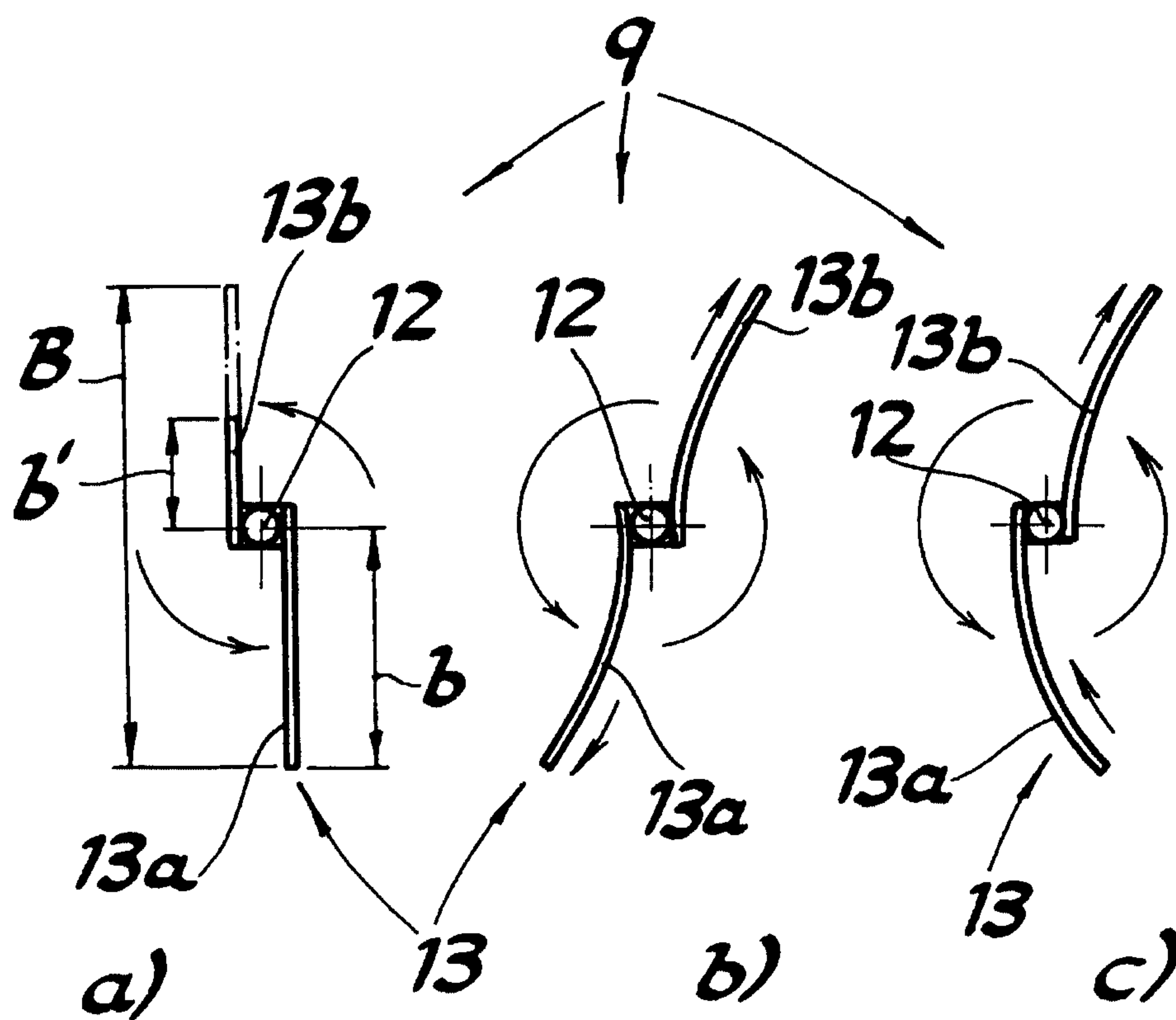
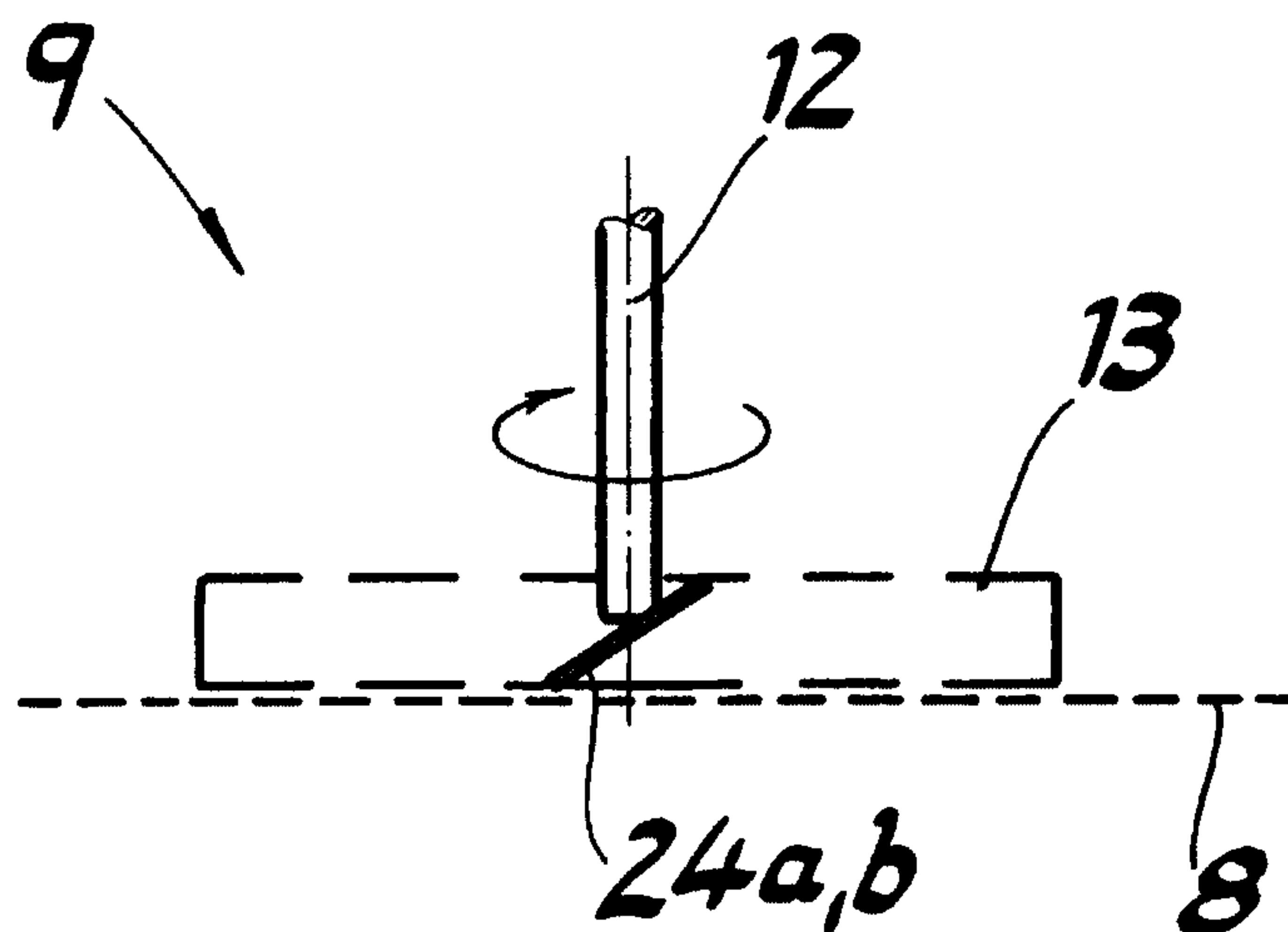
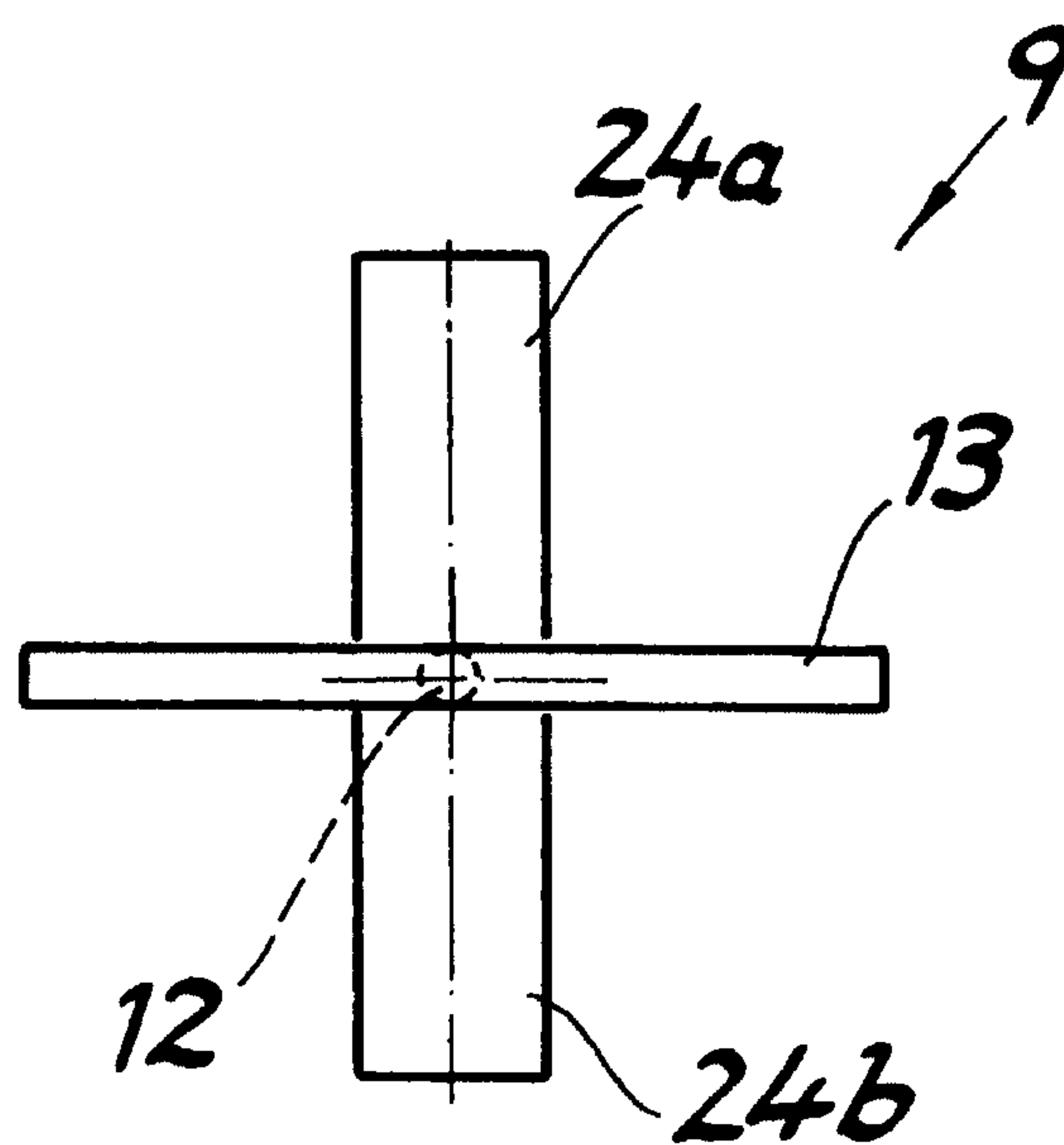
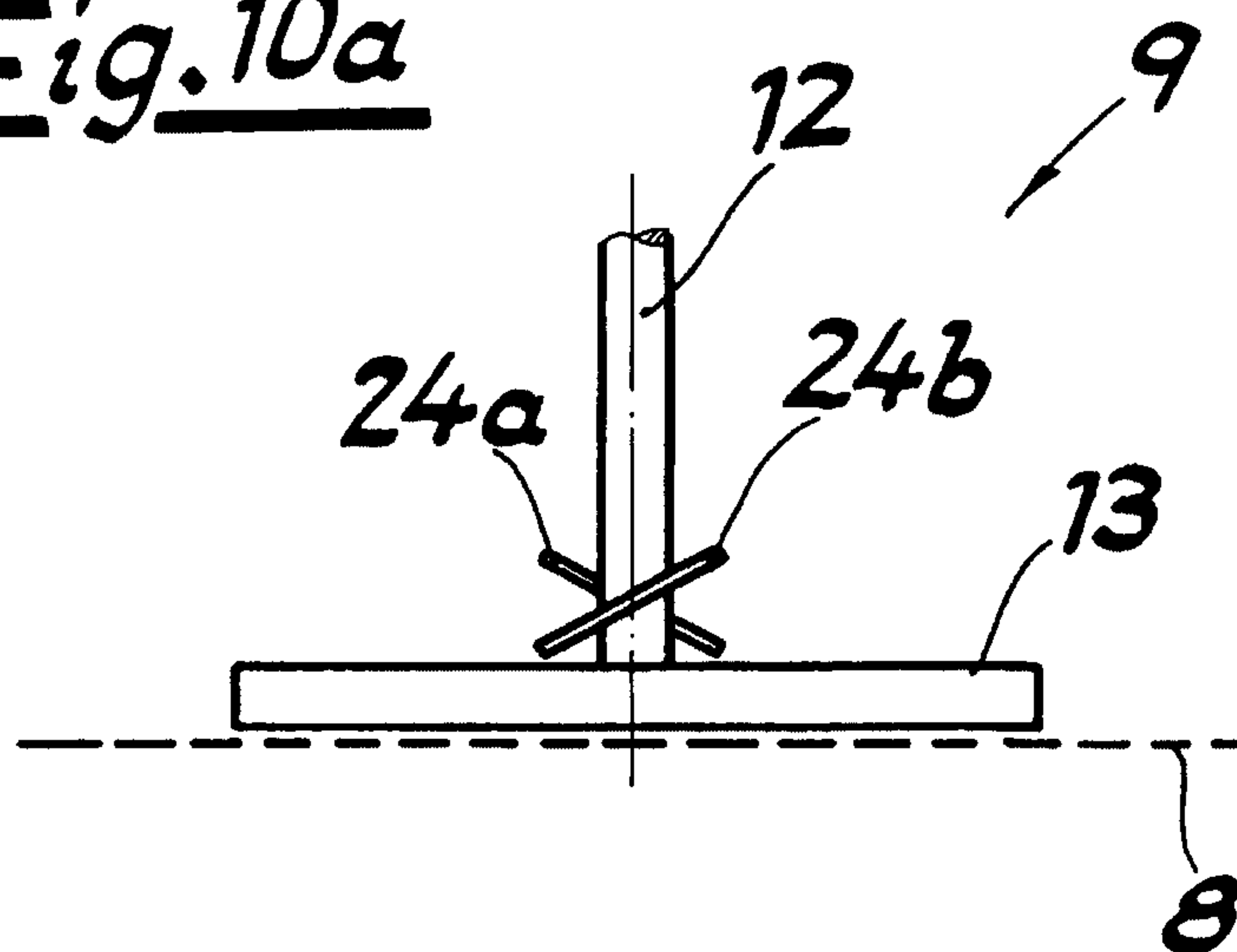
Fig. 8Fig. 9

Fig. 10aFig. 10b

