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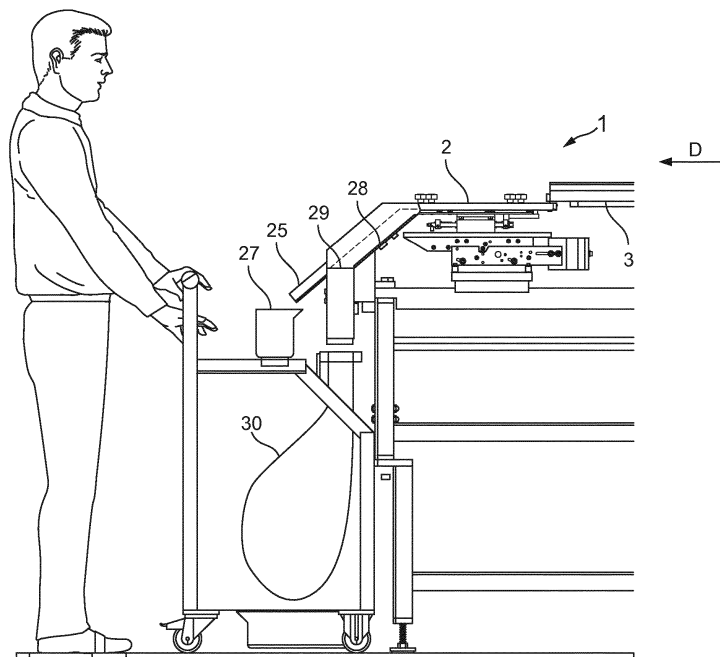
(54) **Tea leaves sieving apparatus**

(57) The invention concerns a tea leaves sieving apparatus (1) comprising :

- a sieving member (2) for treating tea leaves conveyed according to one direction (D) on the sieving member said sieving member comprising two perforated plates (21, 22) positioned one on the other and so that :
- each hole (22a) of the upper perforated plate (22) is

positioned above a hole (21a) of the lower perforated plate (21),

- the lower perforated plate (21) is out of line with the upper perforated plate (22) so that the superposing of said two perforated plates creates for each superposed holes (21 a, 22a) a step (23), said step ascending according to the conveying direction (D).



**FIG. 2b**

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## Description

### Field of the invention

[0001] The present invention relates to devices for sieving leaves, in particular tea leaves.

### Background of the invention

[0002] Nowadays it is known to prepare beverages like coffee, tea, hot chocolate drink, or the like by means of beverage preparation machines in which beverage capsules can be introduced. The beverage capsules usually comprise powders like roast and ground coffee, instant coffee, milk powder, soluble chocolate powder. The manufacture and in particular the filling of such capsules is easy to industrialise since a dose of powder has simply to be introduced in an opened side of the capsule before closing said side/opening with a lid.

[0003] Concerning the production of tea beverages with capsules, two types of tea raw material can be introduced in the capsules. First it is possible to prepare the beverage from instant tea powder. The manufacturing of such capsules is similar to capsules for other beverage powders like coffee, milk or chocolate and does not present any issue. Secondly it is possible to prepare the beverage from loose leaf tea. During the manufacturing of loose leaf tea capsules the filling of capsules can present issues different from powders. In particular some long tea leaves can present a length greater than the opened side/opening of the capsule : these leaves can overflow the internal volume of the capsule and prevent the correct placement of a lid on the opened side and consequently the correct closure of the capsule. At the industrialisation stage such an issue creates regular stops of the capsule manufacturing line. This problem is all the most important with particular high quality teas like Pai Mu Tan tea or Sencha Zhejiang tea which can comprise tea leaves of a size reaching 5 to 6 cm.

[0004] A solution to this problem can be to cut the tea leaves raw material so that tea leaves do not oversize a certain length that is less than the size of the capsule opening. Yet such a solution can affect the sensorial quality of the final tea beverage. For example high quality tea should not be cut. It is known that the handling of such leaves must remain gentle and non-intrusive e.g. throughout the packaging process to avoid breaking of the cell structure. This is needed because once the cell walls are physically broken, oxidation of the leaves quickens and the quality will be compromised. Moreover cutting influences the optimal extraction of tea leaves. Finally cutting action on the tea leaves raw material creates fines by cutting small leaves that have not to be cut leading to property issue in the manufacturing line and loss of raw material.

[0005] Another solution is to sieve the tea leaves raw material with a mesh presenting a size such that longest tea leaves are retained by the mesh. Yet for retaining tea

leaves presenting a length of at least 15 mm is not efficient. Actually it has been observed that during their transport along the mesh tea leaves are never fully positioned in parallel to the mesh. Long leaves are often obliquely positioned and if one end of one long tea leaf enters in a hole of the mesh then the whole leaf slides in the hole and is not eliminated by the sieving operation. Then such a sieving is not efficient. Yet the presence of one long tea leaf in a tea leaves production batch is not acceptable for filling capsules because it creates a risk of blocking the capsule manufacturing line.

[0006] The object of the present invention is to propose a solution for gently sieving tea leaves in order to remove the longest tea leaves.

[0007] Another object of the present invention is to propose a solution for gently sieving tea leaves in order to remove the longest tea leaves with the highest efficiency.

[0008] Another object of the present invention is to propose a solution for gently sieving tea leaves in order to remove the longest tea leaves with such an efficiency that tea leaves can then used for filling tea leaves capsules at an industrial scale.

### Summary of the invention

[0009] According to a first aspect, the invention concerns a tea leaves sieving apparatus comprising a sieving member for treating tea leaves conveyed according to one direction (D) on the sieving member said sieving member comprising two perforated plates positioned one on the other and so that :

- each hole of the upper perforated plate is positioned above a hole of the lower perforated plate,
- the lower perforated plate is out of line with the upper perforated plate so that the superposing of said two perforated plates creates for each superposed holes a step, said step ascending according to the conveying direction (D).

[0010] Contrary to the practice in the tea leaves industry the present apparatus implements perforated plates rather than meshes or grids. Meshes and grids are nettings made of fine metallic wires. They do not enable the implementation of the invention, in particular the formation of steps by superposing the holes of two meshes or grids.

[0011] According to the invention the both perforated plates are closely positioned one on the other so that there is no space in between in which a tea leaf could enter. Meanwhile the perforated plates should not be stuck one to the other so that at least one of the perforated can be made movable relative to the other without clipping each other.

[0012] Preferably all the holes of a same perforated plate present the same shape and size. Yet according to a variant, plates with holes presenting increasing or decreasing sizes according to the conveying direction can

be implemented.

**[0013]** Generally the perforated plates of the sieving member comprise circular holes.

**[0014]** Preferably the holes are positioned in staggered rows in the perforated plates. Staggered rows avoid the possibility for a tea leave to not be sieved.

**[0015]** Globally each hole of the upper perforated plate is positioned above a hole of the lower perforated plate.

**[0016]** According to the invention the lower perforated plate is out of line with the upper perforated plate so that the superposing of said two perforated plates creates a step in each space defined by the superposed holes. The step is positioned in said space on the downwards side according to the conveying direction (D).

**[0017]** Generally the size of the holes in the lower perforated plate and the spacing between said holes can present any size provided that when it is placed under the top perforated plate an ascending step is present.

**[0018]** According to the preferred embodiment of the present invention the two perforated plates of the sieving member are identical. They present the same size of holes and the same spacing between the holes.

**[0019]** The size of the holes in the upper perforated plate and the length of the ascending step are defined according to the properties of the tea leaves raw material (e.g. mean size, nature of the leaves) to be treated and the length of the tea leaves to be eliminated. For example starting from a raw material tea comprising tea leaves with length up to 60 mm and searching to eliminate tea leaves presenting a length greater than 15 mm then the following conditions can be applied :

- the diameter of the circular holes in the plates according to the conveying direction (D) can be comprised between 5 and 8 mm,
- the holes in the plates can be spaced by a distance comprised between 0,5 and 3mm, and
- the lower perforated plate is out of line with the upper perforated plate so that the length of the ascending step is of at least 1 mm.

**[0020]** In general the sieving member comprises a collecting plate under the two perforated plates. The collecting plate aims at gathering the sieved tea leaves and conveying them to the end of the sieving member. The collecting plate is generally positioned at a distance (d) from the lower perforated plate. According to the preferred embodiment the apparatus of the present invention comprises means for adjusting said distance (d) on the tea leaves raw material properties and/or the length of the tea leaves that have to be eliminated from the raw material. For example for the tea leaves exemplified hereabove a distance d of at most 6 mm can be fixed.

**[0021]** According to one preferred embodiment the apparatus comprises a translation device for translating at least one of the two perforated plates of the sieving member according to a back and forth translation movement relatively to the other perforated plate and along the con-

veying direction (D). Preferably only one perforated plate is translated and the other one remains fixed.

**[0022]** Preferably the translation device translates the lowest perforated plate.

**[0023]** Preferably the translation movement is configured so that the translated perforated plate totally closes the holes of the other perforated plate during its translation movement. Due to this closure of the holes the long tea leaves blocked in the holes can be cut to a smallest size.

**[0024]** The length of the translation movement can be determined according to the size of the holes and the space between the holes in the perforated plates in particular for getting a full closure of the holes during the translation.

**[0025]** Preferably the translation movement can be implemented periodically. The frequency can depend on the properties of the tea leaves raw material. For example for the tea leaves exemplified hereabove the translation movement can happen between every 10 seconds and every 30 seconds.

**[0026]** Generally the tea leaves sieving apparatus comprises a vibrator for vibrating the perforated plates so that tea leaves are conveyed according to the conveying direction (D). Generally the vibrator also vibrates the collecting plate. Then the vibrator enables simultaneously :

- the displacement of the tea leaves raw material on the upper perforated plate of the sieving member,
- the displacement of the longest tea leaves that have not been sorted to the end of the upper perforated plate, and
- the displacement of the sorted tea leaves on the collecting plate to the end of said collecting plate. These displacements are all made according to the conveying direction (D).

**[0027]** In general the vibrator for vibrating the perforated plates is a linear vibrator.

**[0028]** The apparatus of the present invention can also comprise a conveyor upstream to the sieving member in order to introduce tea leaves on the sieving member according to the conveying direction (D). The upstream conveyor aims also at spreading tea leaves on the upper perforated plate of the sieving member according to a homogeneous height. The upstream conveyor is a linear vibrator in general. For example a height of at most 0,5 cm can be preferred so that leaves can be homogeneously sieved with perforated plates presenting circular of about 6 mm diameter. The conditions are chosen generally so that the height is homogeneous and the flow of tea leaves on the sieving member is regular.

**[0029]** According to a particular embodiment the sieving apparatus can comprise a plurality of sieving members positioned next to the other perpendicularly to the conveying direction (D).

**[0030]** According to a second aspect the invention con-

cerns a process for sieving a raw material of tea leaves with an apparatus such as described hereabove comprising the steps of :

- conveying the tea leaves raw material on the sieving device,
- recovering the longest tea leaves at the end of the upper sieve according to the conveying direction (D),
- recovering the rest of the tea leaves under the sieving member.

**[0031]** It is preferred that at least one of the perforated plates of the sieving member is translated according to a back and forth translation movement relatively to the other sieve and along the conveying direction (D). The frequency of the translation movement depends on the nature of the tea leaves to be sieved. Preferably the lowest sieve is translated. Preferably the translation movement closes the hole of the upper perforated plate totally.

**[0032]** According to a third aspect the invention concerns a manufacturing line for producing beverage capsules said capsules comprising tea leaves wherein the manufacturing line comprises an apparatus such as described hereabove for sieving the tea leaves material before dosing and filling the capsules with sieved tea leaves.

**[0033]** According to a fourth aspect the invention concerns a process for manufacturing beverage capsules said capsules comprising tea leaves wherein said process comprises the steps of :

- sieving tea leaves raw material according to the process such as described hereabove, and
- filling the capsules with sieved tea leaves.

**[0034]** In the present application the terms "tea leaves" refer to loose leaf tea generally. Although the invention was described in relation to tea leaves sieving it could be applied to the sieving of any material comprising comparable long leaves like herbals.

#### **Brief description of the drawings**

**[0035]** The characteristics and advantages of the invention will be better understood in relation to the following figures in which :

- Figure 1 is a schematic diagram of a tea leaves capsule manufacturing line,
- Figure 2a is a perspective view of a tea leaves sieving apparatus according to the invention,
- Figure 2b is a side view of the sieving member of a tea leaves sieving apparatus such as described in Figure 2a,
- Figures 3a to 3d are schematic views of the perforated plates of the sieving member of the tea leaves sieving apparatus according to the invention during the sieving process,
- Figures 4 and 5 illustrate alternatives of the bottom

perforated plate,

- Figure 6 is a magnified view of the sieving member of Figure 2b,
- Figure 7 is a partially exploded view of the perforated plates, the collecting plate and the translation device of the sieving member of Figure 6,
- Figures 8a and 8b are views of the upper perforated plate of the sieving member of Figure 6,
- Figures 9a and 9b are views of the lowest perforated plate of the sieving member of Figure 6,
- Figure 10 is a view of the collecting plate of the sieving member of Figure 6,
- Figure 11 is a magnified view of the cooperation between the translation device and the lowest perforated plate of the sieving member of Figure 6.

#### **Detailed description of the drawings**

**[0036]**

**Figure 1** illustrates the different steps of the manufacture of tea leaves capsules. Each capsule 100 comprises an enclosure 101 configured for receiving tea leaves and then being closed by a cover 102. During the manufacturing tea leaves 6 are introduced in the opened enclosure and then the cover 102 is attached to the edge of the enclosure 101. If a tea leaf presents a length longer than the size of the enclosure, then this leaf tea protrudes out of the edge of the enclosure and prevents the positioning and the sealing of the cover on the enclosure. This leads to the stop of the manufacturing line which is not acceptable at an industrial scale.

**Figure 2a** illustrates a tea leaves sieving apparatus 1 according to the invention. The apparatus comprises a conveyor 3 for conveying tea leaves raw material from a starting end part 4 of the tea leaves sieving apparatus to two sieving members 2a, 2b according to a conveying direction D. The two sieving members 2a, 2b are placed one next to the other along the output of the conveyor 3. The conveyor enables the tea leaves to be homogeneously and regularly fed on the sieving members 2a, 2b, in particular in terms of height. The conveyor usually comprises a linear vibrator to displace the tea leaves according to direction D and to regulate the thickness of tea leaves going to the sieving members. Tea leaves are usually introduced on the linear vibrator through a hopper.

**[0037]** The presence of several sieving members 2a, 2b is of interest when the width of the sieving surface is important and if the sieving members are vibrated. The separation of the sieving operation on several sieving members avoids oscillation problems in the sieving apparatus.

**[0038]** On the sieving members 2a, 2b tea leaves are sieved. The longest tea leaves stay on the upper part of the sieving members. They are collected through a hop-

per 26 at the outlet of the sieving apparatus. The other leaves are collected on a collecting plate 24 on the lower part of the sieving members.

**[0039]** **Figure 2b** is a side view of the sieving member of a tea leaves sieving apparatus such as described in **Figure 2a**. It illustrates how the vibration conveyor 3 is positioned a little bit above the sieving member 2 in order to separate the vibration movements of the conveyor 3 and the sieving member 2. The tea leaves fall from the vibration conveyor 3 onto the upper plate of the sieving member 2 where they are sieved. The longest tea leaves stay on the upper plate and are conveyed to the end of the sieving member 2 according to direction D where an inclined plate 25 direct then to a collecting pot 27. The other tea leaves are collected on the collecting plate of the sieving member and directed through another inclined plate 28 and a tube 29 to a sack 30. The sack 30 and the collecting pot 27 can be supported by a trolley so as to move the sieved tea leaves to the manufacturing line easily.

**[0040]** **Figures 3a to 3d** are schematic views of the perforated plates of one sieving member during the sieving process. The sieving member comprises two perforated plates 21, 22, each plate presenting holes 21a, 22a. The lower perforated plate 21 is out of line with the upper perforated plate 22 so that the superposing of said two perforated plates creates for each superposed holes 21a, 22a a step 23, said step ascending according to the conveying direction D. In **Figures 3a to 3c** the both plates present holes of same size and presenting the same space between each hole (in particular according to direction D), yet as illustrated in **Figure 5**, the both plates can present holes of different sizes and spaces between holes of one same plate of different sizes with the condition that their superposition creates a step such as described hereabove. Of course the holes must be of sufficient size so as to enable a sieve to pass through. As illustrated in **Figure 3c** tea leaves 5 are moved according to direction D above the perforated plates. The shorter tea leaves 52 presenting a size inferior to the holes obtained by the superposition of the plates fall through said holes and are collected on the collecting plate 24. The longest tea leaves 51 presenting a size superior to the holes obtained by the superposition of the plates usually stay on the upper plate 22 since their dimension does not enable them to fall in the holes.

**[0041]** Yet as illustrated in **Figure 3b** an extremity 51a of such a long tea leaf can engage in a hole 22a of the upper plate. With a mesh of the prior art such a long tea leaf completely falls in the hole of the perforated plate and is collected and mixed with the short tea leaves 52. In the present invention the lower perforated plate creates a step 23 and the extremity 51a of long tea leaf entering in a hole 22a of the upper perforated plate remains blocked in the corner 23a of the step. Due to the continuous movement of tea leaves according to direction D, the new coming tea leaves 5 push the blocked long tea leaf 51 and force it to go out of the step. This

movement is amplified if the lowest perforated plate 21 is vibrated according to a back and forth translation movement relatively to the other perforated plate and along the conveying direction D. Said translation movement is configured for increasing the length l of the ascending step when the lowest perforated plate 21 moves according to the back direction  $D_b$ . **Figure 3c** illustrate the relative positions of the perforated plates 21, 22 due to this vibration. It is made apparent that the long tea leaf 51 is lifted up by the combination of the movement of its lower end according to the translation movement of the lower plate 21 according to the direction  $D_b$  and the movement of the other tea leaves according to direction D. Then this long tea leaf is moved forward according to direction D on top of perforated plate 22. Consequently the rate of sieving long tea leaves of the apparatus of the present invention is considerably improved compared to a simple perforated plate of the state of the art. It becomes rare that a long tea leaf 51 can enter in the hole obtained by the superposition of the holes 21a, 22a as illustrated in **Figure 3d**. In that case the distance d between the collecting plate 24 and the perforated plates 21 can be adjusted so that the long tea leaf 51 remains blocked in the hole. According to a preferred embodiment illustrated in **Figure 4** when the lowest perforated plate 21 reaches the end of its translation movement according to direction  $D_b$  the hole 22a becomes completely closed and the blocked tea leaves 51 is cut in two pieces. So the long tea leaves 51 that remain blocked in the hole can be cut. Due to the selection of the height d, the length of the cut pieces left on the collecting plate 24 can be controlled. After having reached the end of the translation movement the lowest plate is translated forward according to direction  $D_f$ .

**[0042]** The length L of the hole 22a in the upper perforated plate, the length l of the step 23 and the distance d between the collecting plate 24 and perforated plates 21 can be adjusted according to the length of tea leaves 51 that must be sieved from the tea leaves raw material. For example for eliminating tea leaves presenting a length above 15 mm an apparatus can comprise :

- perforated plates 21, 22 presenting holes between 5 and 8 mm and positioned one to the other to get a step length l of 1 mm, and
- a collecting plate 24 placed at 6 mm from the perforated plates.

**[0043]** With such an apparatus one sample tea leaves could be treated so that 100 % tea leaves presenting a length greater than 20 mm were eliminated from the raw material and 85 % of the tea leaves presenting a length greater between 15 mm were eliminated. Then the sieved raw material could be used safely in a manufacturing line for producing tea beverage capsules wherein the capsules present an opening greater than 20 mm.

**[0044]** **Figure 6** is a magnified view of the sieving member 2 of **Figure 2b**. The sieving member 2 has an assem-

bly of plates 200 comprising the two perforated plates and the collecting plate. The sieving member 2 comprises a translation device 7 that is configured for imparting a translation movement to the lowest perforated plate of the assembly 200. Then translation device 7 is connected to said lowest perforated plate and imparts a back and forth translation movement to said plate according to directions  $D_b$  and  $D_f$ . The assembly of plates 200 and the translation device 7 are supported by a vibrator 8. The vibrator 8 vibrates in order to impart a conveying movement according to direction D simultaneously:

- to the tea leaves dispensed on the upper perforated plate so that tea leaves are distributed on said plate and sieved and so that long tea leaves are conveyed to the end of the upper perforated plate and collected in the collecting pot, and
- and to the tea leaves collected on the collecting plate so that these tea leaves are conveyed to the end of the collecting plate and collected in the sack.

**[0045]** The vibrator is a conveying vibrator according to the state of the art. The speed of displacement of tea leaves depends on the vibration frequency and amplitude. Said features can vary depending on the nature of the tea leaves to be sorted.

**[0046]** **Figure 7** is a partially exploded view of the assembly of plates 200 and the translation and vibrator devices of the sieving member of **Figure 6**. The view is made from the end of the sieving member. The assembly 200 comprises the collecting plate 24 on which is freely positioned the lowest perforated plate 21 so that said plate 21 can slide on the collector plate 24. The assembly also comprises the upper perforated plate 22 which is fixed an attached to the collecting plate 24 through corresponding holes 221 and screws 241. The collecting plate is attached to the translation device 7 but is not made movable as will be further explained in relationship with **Figure 11**.

**[0047]** **Figures 8a and 8b** are views of the upper perforated plate 22. The plate comprises circular holes 22a in staggered rows.

**[0048]** **Figures 9a and 9b** are views of the lowest perforated plate 21. The plate comprises circular holes 21a in staggered rows. The lowest perforated plates 21 is identical to the upper perforated plate 22 of **Figures 8a, 8b** in terms of size of the holes and position of the holes on the plate surface. Then when the both plates are superposed each hole 21a in the lowest plate faces a hole 22a in the upper plate. When assembled in the assembly of plates 200 the plates 21, 22 are positioned so that the holes are slightly out of line and so that for each superposed holes 21a, 22a an ascending step 23 according to the conveying direction D is created as illustrated in **Figure 3a**. At one of its ends the lower plate 22 presents an excrescence with a stud 211 perpendicular to main plane of the plate and configured for cooperating with the translation device.

**[0049]** **Figure 10** is a view of the collecting plate 24 of the sieving member. It presents bars 242 on its lateral sides on which the perforated plate 21 rests. The bars presents a height d, consequently when the lowest perforated plate 21 is positioned on the collecting plate 24 a distance d separates the holes 21a from the collecting plate 24.

**[0050]** **Figure 11** is a magnified view of **Figures 2b and 6** showing the cooperation between the translation device 7 and the lowest perforated plate 21 of the sieving member of **Figure 6**. In the assembly 200 of the plates, the lowest perforated plate 21 is positioned between the upper perforated plate 22 and the collecting plate 24 so that its excrescence with the stud 211 bypasses the end of the other plates 22, 24. The stud is connected to an arm 71 of the translation device that is submitted to back and forth translation according to directions  $D_b$  and  $D_f$ . Consequently the movement described in **Figures 3d and 4** can be implemented. The translation device 7 comprises a jack 72 on which the arm 71 is raised. Any other translation device known from the state of the art can be implemented.

**[0051]** Although the illustrated embodiment describes a sieving member in which the lower perforated plate is translated, the invention also covers embodiments wherein the upper perforated plate is translated compared to the lower plate.

**[0052]** The apparatus of the present invention presents the advantage of guaranteeing the efficient sieving of tea leaves presenting a length such that it could block a capsule manufacturing line. It provides a higher rate for sorting tea leaves compared to usual technologies.

**[0053]** The apparatus present also the advantage of gently treating the tea leaves and limiting the cutting of tea leaves which would affect their sensory profile in the cup.

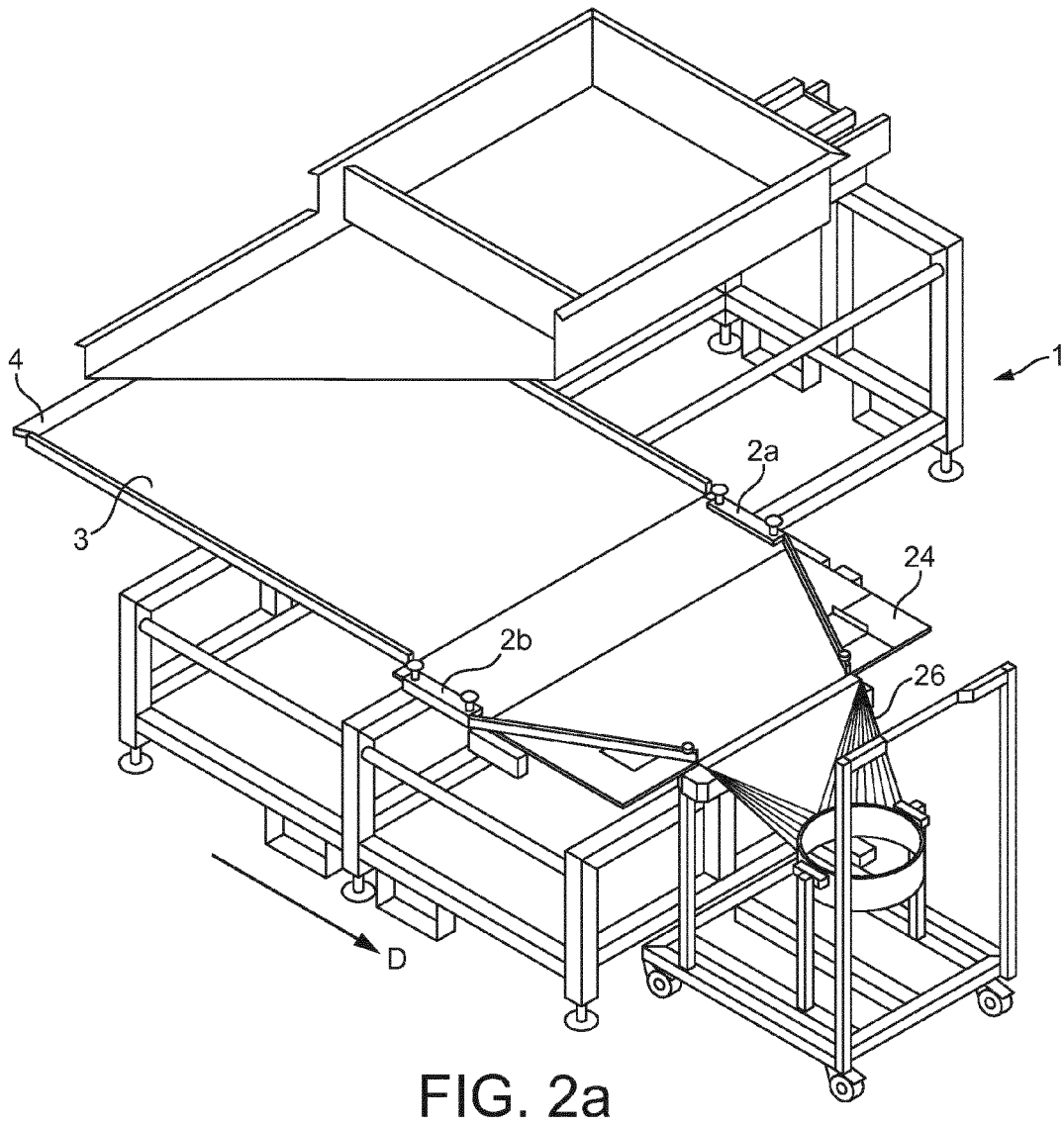
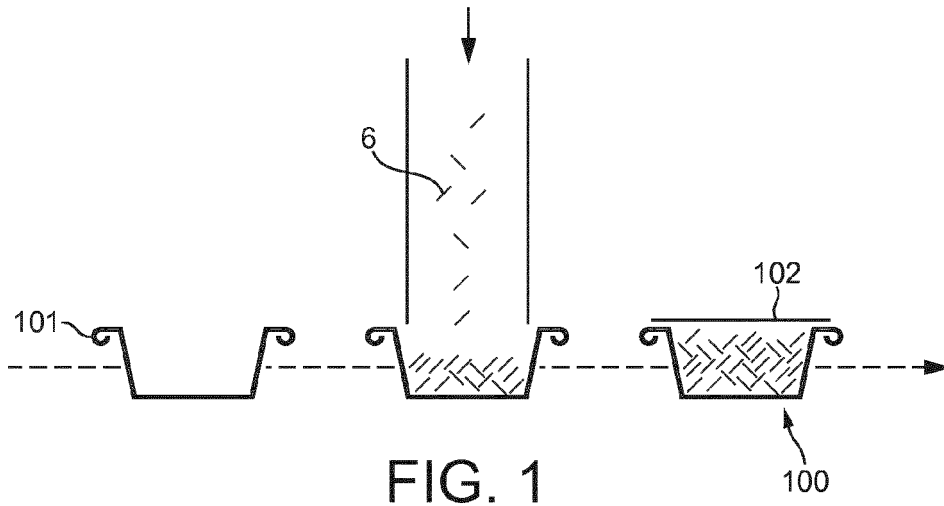
## Claims

1. A tea leaves sieving apparatus (1) comprising a sieving member (2) for treating tea leaves conveyed according to one conveying direction (D) on the sieving member said sieving member comprising two perforated plates (21, 22) positioned one on the other and so that :

- each hole (22a) of the upper perforated plate (22) is positioned above a hole (21a) of the lower perforated plate (21),
- the lower perforated plate (21) is out of line with the upper perforated plate (22) so that the superposing of said two perforated plates creates for each superposed holes (21a, 22a) a step (23), said step ascending according to the conveying direction (D).

2. A tea leaves sieving apparatus according to Claim

- 1 wherein the two perforated plates (21, 22) of the sieving member are identical.
3. A tea leaves sieving apparatus according to Claim 1 or 2 wherein the perforated plates (21, 22) of the sieving member comprise circular holes. 5
4. A tea leaves sieving apparatus according to any one of precedent claims wherein the holes are positioned in staggered rows in the perforated plates. 10
5. A tea leaves sieving apparatus according to any one of the precedent claims wherein the sieving member (2) comprises a collecting plate (24) under the two perforated plates (21, 22). 15
6. A tea leaves sieving apparatus according to any one of the precedent claims wherein it comprises a translation device (7) for translating at least one of the two perforated plates of the sieving member according to a back and forth translation movement relatively to the other perforated plate. 20
7. A tea leaves sieving apparatus according to Claim 6 wherein the translation device (7) translates at least one of the two perforated plates of the sieving member along the conveying direction (D). 25
8. A tea leaves sieving apparatus according to Claim 6 or 7 wherein the translation device (7) translates the lowest perforated plate (21). 30
9. A tea leaves sieving apparatus according to any one of Claims 6 to 8 wherein the translation movement is configured so that the translated perforated plate (21) closes the holes (22a) of the other perforated plate (22) during its translation movement. 35
10. A tea leaves sieving apparatus according to any one of Claims 6 to 9 wherein the translation movement is implemented periodically. 40
11. A tea leaves sieving apparatus according to any one of the precedent claims wherein it comprises a vibrator (8) for vibrating the perforated plates (21, 22) so that tea leaves are conveyed according to the conveying direction (D). 45
12. A tea leaves sieving apparatus according to Claims 5 and 11 wherein the vibrator (8) vibrates the collecting plate (24). 50
13. A tea leaves sieving apparatus according to any one of the precedent claims wherein it comprises a plurality of sieving members (2a, 2b) positioned next to the other perpendicularly to the conveying direction (D). 55
14. A process for sieving a raw material of tea leaves (5) with an apparatus according to any one of Claims 1 to 13 comprising the steps of :
- conveying the tea leaves raw material (5) on the sieving member (2),
  - recovering the longest tea leaves (51) at the end (22c) of the upper perforated plate according to the conveying direction (D),
  - recovering the rest of the tea leaves (52) under the sieving member.
15. A process according to the precedent claim wherein at least one of the two perforated plates of the sieving member is periodically translated according to a back and forth translation movement relatively to the other perforated plate and along the conveying direction (D)
16. Manufacturing line for producing beverage capsules said capsules comprising tea leaves wherein the manufacturing line comprises an apparatus according to any one of Claims 1 to 13 for sieving the tea leaves material before filling the capsules with sieved tea leaves.
17. Process for manufacturing beverage capsules said capsules comprising tea leaves wherein said process comprises the steps of :
- sieving tea leaves raw material according to any one of Claims 14 or 15,
  - filling the capsules with sieved tea leaves.



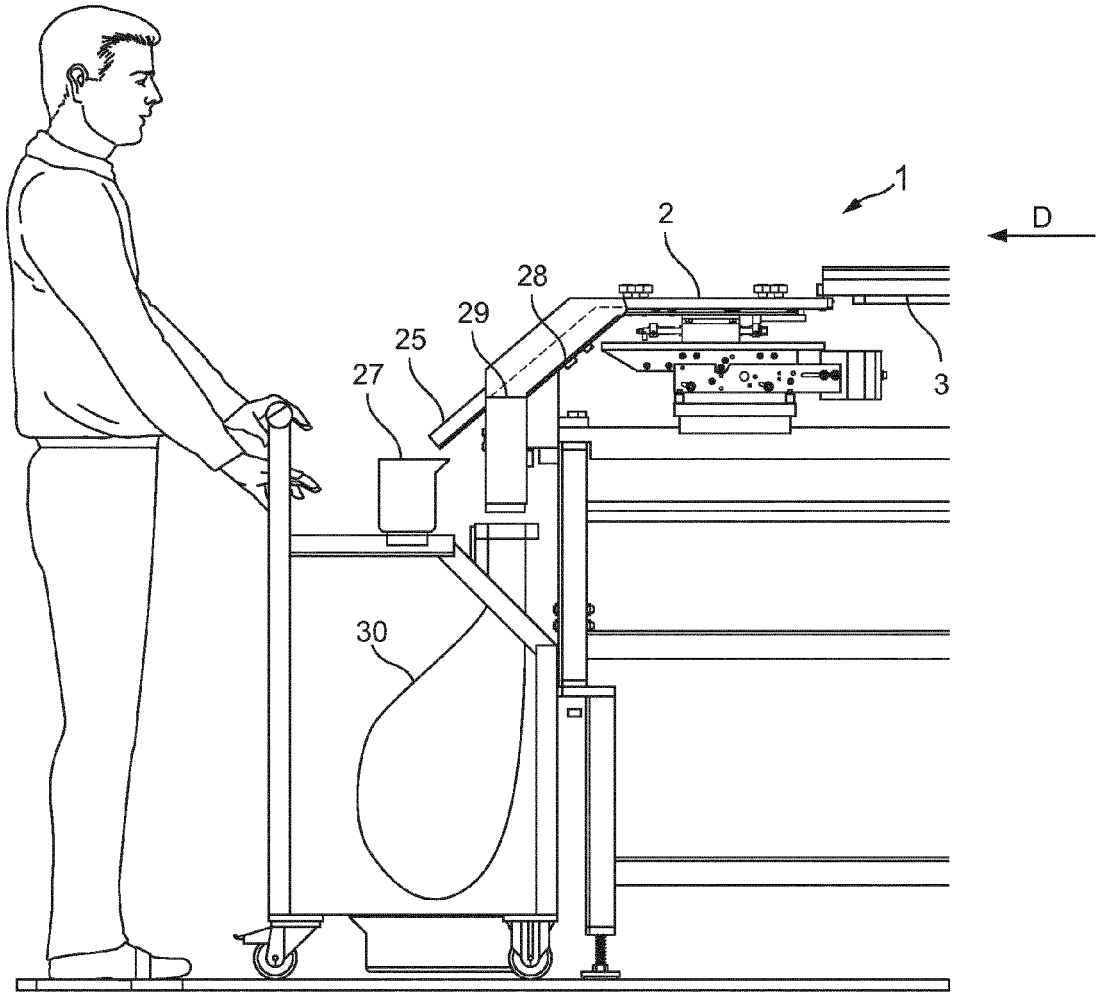


FIG. 2b

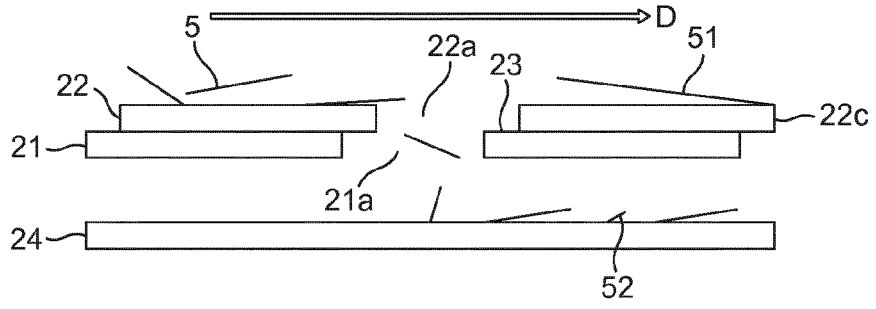


FIG. 3a

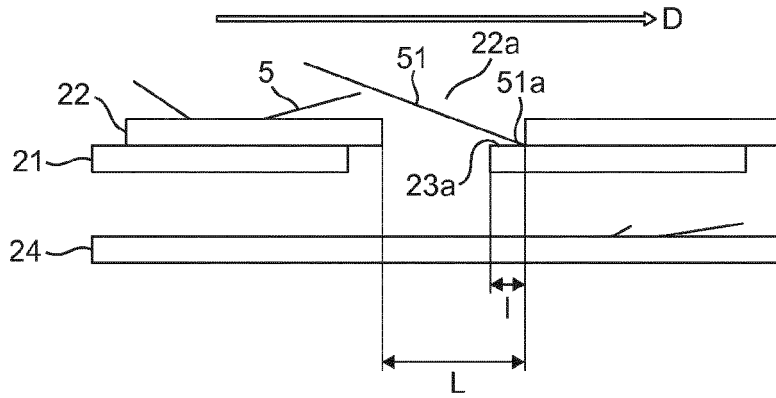


FIG. 3b

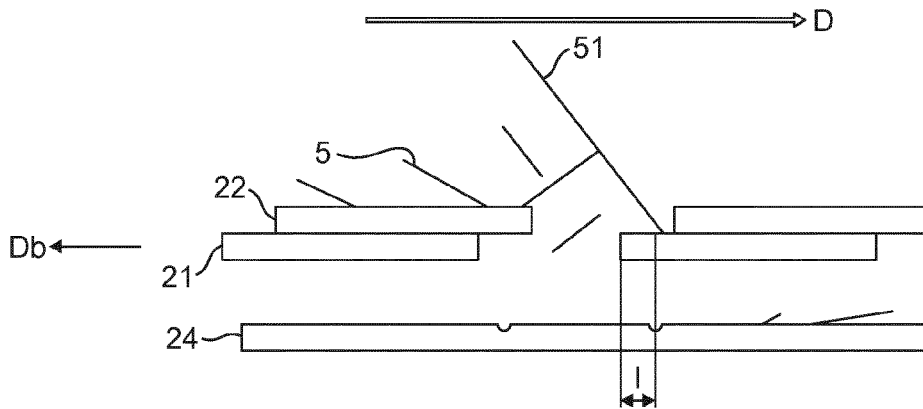


FIG. 3c

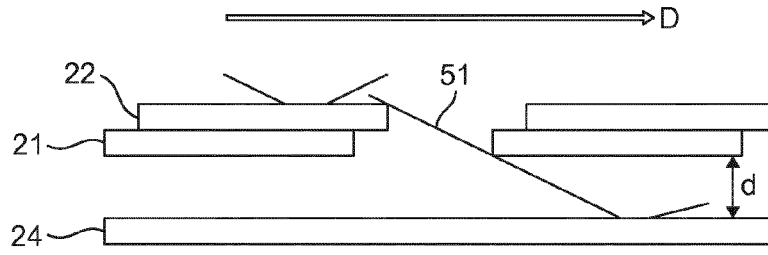


FIG. 3d

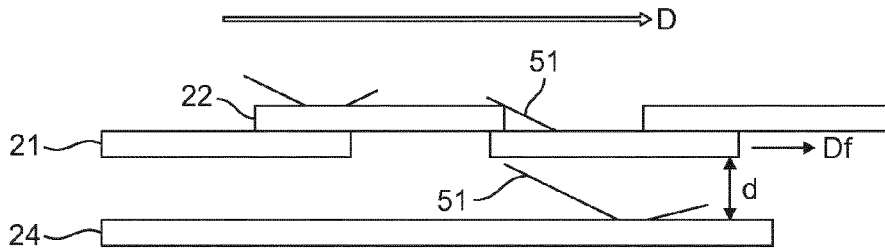


FIG. 4

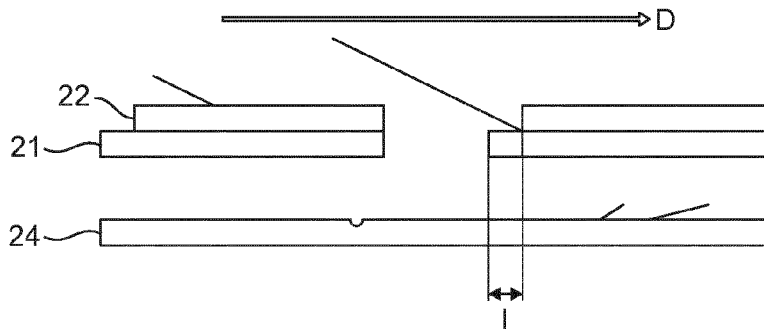


FIG. 5

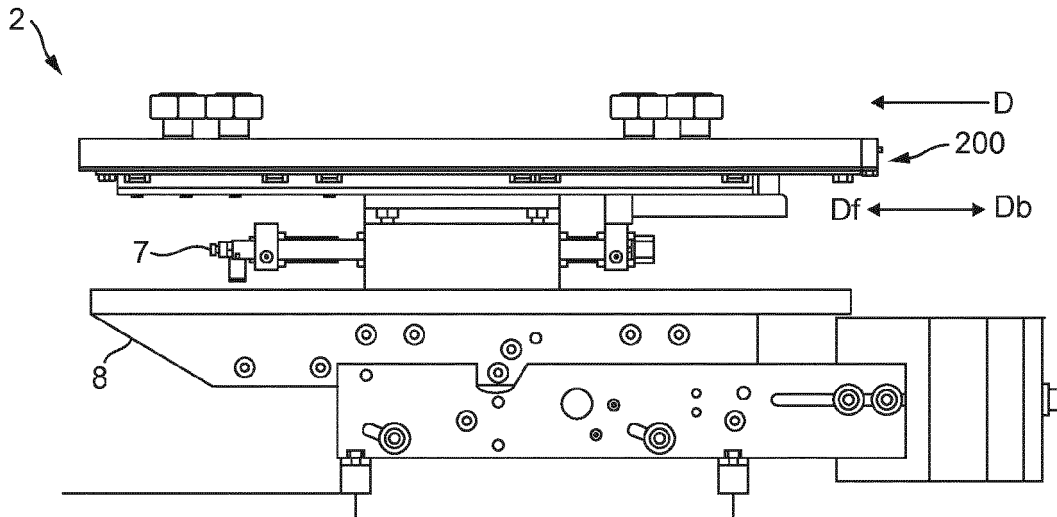


FIG. 6

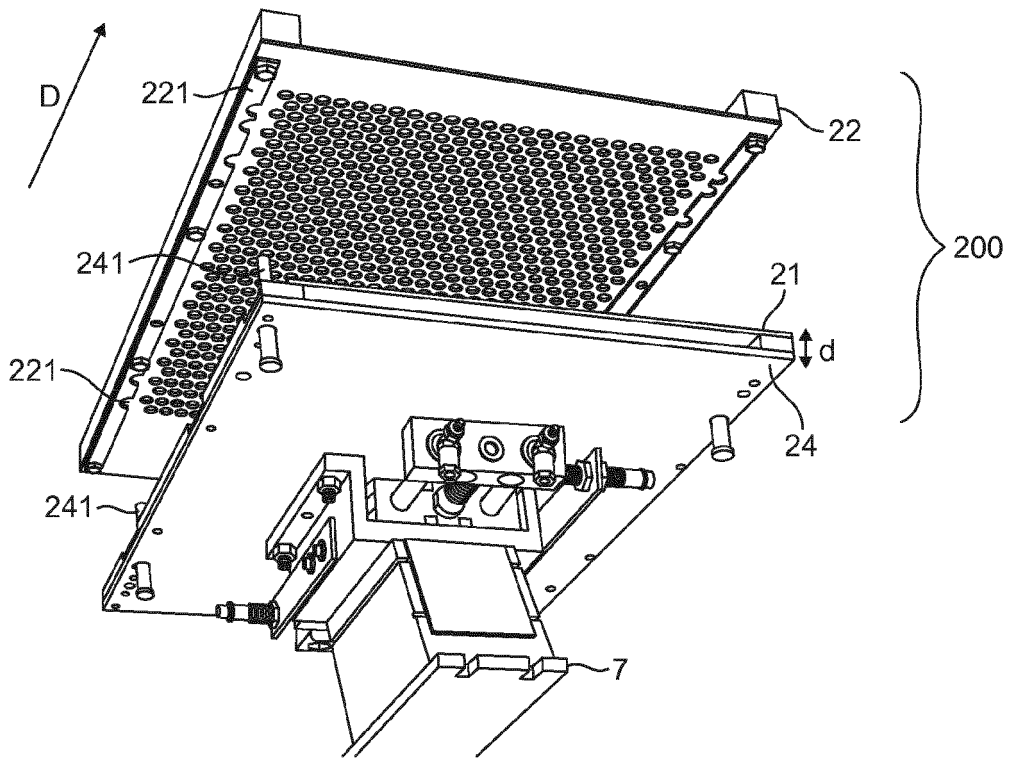


FIG. 7

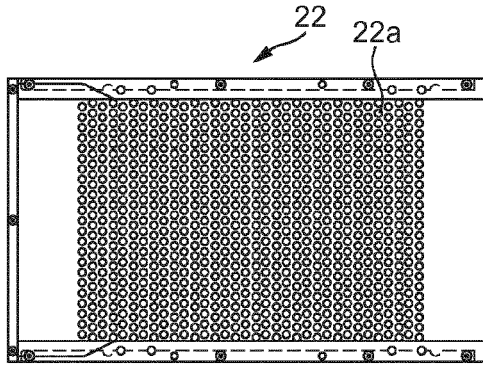


FIG. 8a

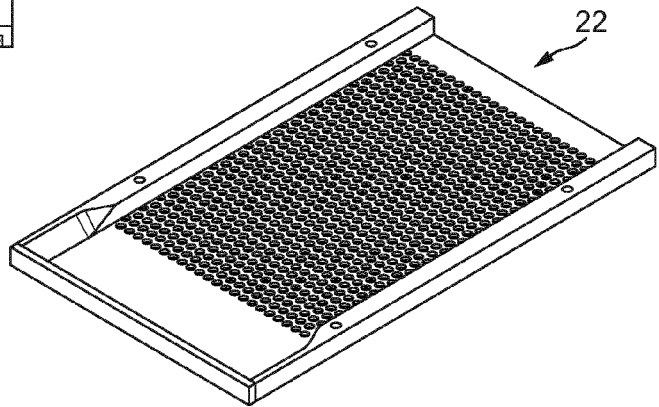


FIG. 8b

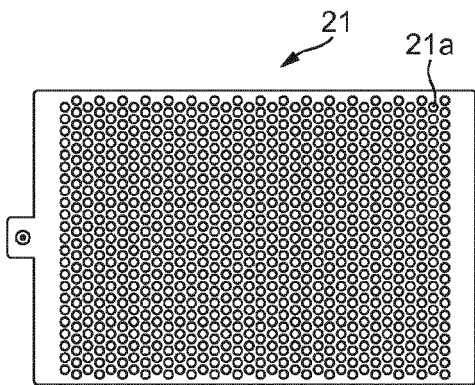


FIG. 9a

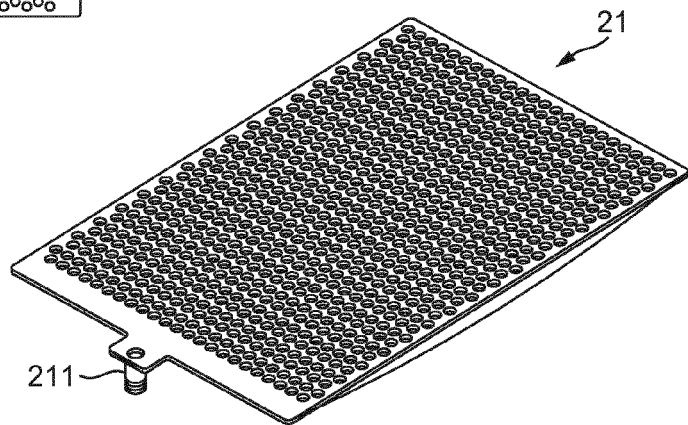


FIG. 9b

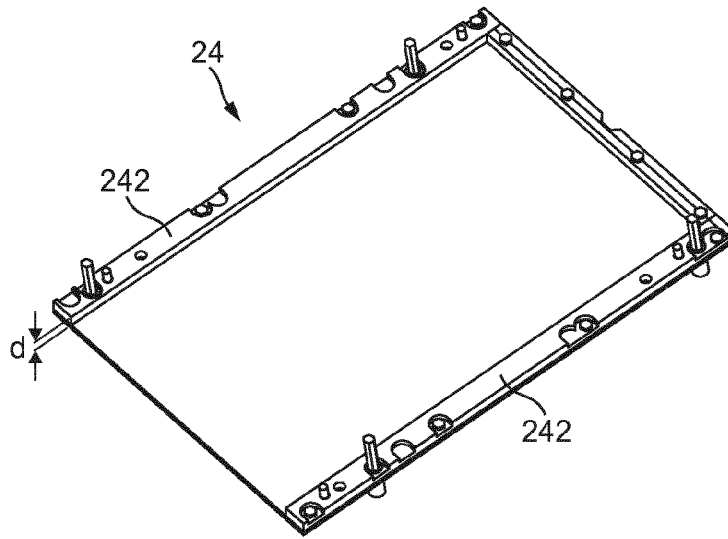


FIG. 10

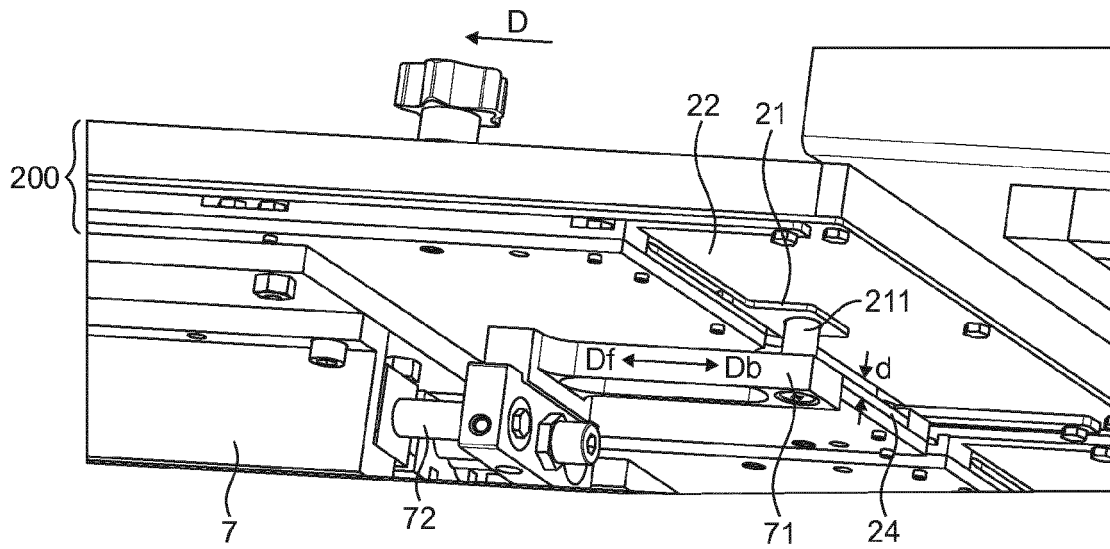


FIG. 11



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