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(54) **Arrangement for sorting garbage**

Vorrichtung zum Sortieren von Abfall

Dispositif pour trier des déchets

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(56) References cited:
US-A- 5 373 948

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Description

[0001] The invention relates to an arrangement for sorting garbage, comprising a cylindrical sieve rotating while in operation, on one axial end provided with a fill opening for accepting unsorted garbage, on a second axial end provided with an outlet opening for discharging at least substantially coarser garbage and provided with holes along its outer surface for discharging finer garbage, further comprising obstruction means, provided at some distance outside the cylindrical sieve and moving together with the cylindrical sieve, to cover the holes, such that finer garbage can pass the holes and long, slender garbage is prevented to fall through the holes.

[0002] An arrangements of this kind is known from US 5 373 948. In this known arrangement the holes in the sieve are covered by plates, in such a way that finer garbage can leave the cylindrical sieve via the holes, but that long, slender garbage does not get stuck.

[0003] The arrangement according to the invention is based on the assumption that long, slender garbage will substantially exclusively fall through the holes in the lowest part of the cylindrical sieve and that it therefore suffices to locate obstruction means underneath the cylindrical sieve. It is therefore characterized in that the obstruction means comprise a transport belt, moving underneath the cylindrical sieve in a radial direction.

[0004] A favourable embodiment of the arrangement according to the invention provided with additional obstruction means is characterized in that the cylindrical sieve comprises a first cylindrical sieve and a second cylindrical sieve, enclosing the first cylindrical sieve, with both sieves having holes at corresponding places, and tubes, connecting the edges of corresponding holes. An additional advantage is that a cylindrical sieve constructed in this way is very robust and may yet have a relatively low weight.

[0005] A favourable embodiment is characterized in that the transport belt is provided with ribs, disposed orthogonally to a transport direction of the transport belt. The ribs provide a good contact between the transport belt and the cylindrical sieve, while still leaving clearance for finer garbage that passes the holes to be collected and removed. Moreover the ribs reduce the risk of long, slender garbage that has passed a hole of being caught between the additional transport belt and the cylindrical sieve.

[0006] The invention will now be further explained with reference to the following figures, in which:

Fig. 1 schematically represents in front view a known cylindrical sieve provided with plates;

Fig. 2 schematically represents in side view a known cylindrical sieve provided with single plates;

Fig. 3 schematically represents in side view a known cylindrical sieve provided with axially extending plates;

Fig. 4 schematically represents in side view a known cylindrical sieve provided with radially extending plates;

Fig. 5 schematically represents in side view a known double cylindrical sieve;

Fig. 6 schematically represents in front view a cylindrical sieve according to the invention provided with an additional transport belt.

[0007] Fig. 1 schematically represents in front view a known cylindrical sieve 1 which can be rotated with the aid of a drive means 2, for example a system of transport wheels which in turn are rotated by an electromotor, further not shown. On one side garbage 3 is fed into cylindrical sieve 1, the coarser components of which leave the cylindrical sieve at an opposite side. The finer components will leave cylindrical sieve 1 via a system of holes 4. These finer components then for example fall on a transport belt 5, passing underneath cylindrical sieve 1. Cylindrical sieve 1 may be slightly tilted in an axial direction in order to facilitate the transport of garbage. Alternatively, cylindrical sieve 1 may be internally provided with sloping or spirally shaped ribs. On the outside cylindrical sieve 1 is provided with plates 6, for preventing rods, tubes, stakes or any other long and slender object from protruding from a hole 4 or from getting stuck. Plates 6 may be welded to cylindrical sieve 1, but preferably they are connected in such a way that they are easily detached. It is then possible to loosen an object that gets occasionally stuck from the outside, without entering cylindrical sieve 1. Moreover, a vibrator device is provided, here embodied as a wheel 7, connected to a movable arm 8, rotatable around an axis 9, and mounted for running on the outside of cylindrical sieve 1. While running, wheel 7 is successively lifted up by each of the plates 6 passing by and then dropped into the space between the plates, which causes a powerful vibration. Objects that are possibly stuck in the holes 4 will be loosened by it.

[0008] Fig. 2 shows schematically in side view a known cylindrical sieve 1, provided wit drive means 2 and a non-rotating hopper 10 that connects to fill opening 11. During operation the cylindrical sieve 1 is positioned such that it slopes from left to right, such that coarser garbage that is poured into cylindrical sieve 1 will eventually be discharged at outlet opening 12, because of the rotating movement of cylindrical sieve 1. Cylindrical sieve 1 is on substanti-ally its entire surface provided with holes 4, and each hole 4 is individually covered by a single plate 6. Plates 6 are located at some distance of cylindrical sieve 1, such that finer garbage that can pass the holes 4 will fall on a transport belt 5 and will be removed. The arrangement of plates 6 forms, as it were, a second cylindrical sieve 13, rotating together with cylindrical sieve 1 and enclosing it. The mutual distance between the plates can be chosen freely. An obvious choice is to make the distance such that garbage that has passed holes 4, will practically unhindered fall onto transport belt 5. One can also select the mutual

distance between the plates to be very small, such that finer garbage gets caught between cylindrical sieve 1 and cylindrical sieve 13, until this finer garbage can leave cylindrical sieve 13 at an additional outlet opening 14. Very fine garbage may, however, find its way between plates 6 and will be collected on transport belt 5. In this way the garbage is separated into three components.

[0009] The single plates 6 are preferably attached to cylindrical sieve 1 with a bolt. The advantage is that, if an object gets stuck it can be easily removed, because only one bolt has to be loosened and the single plate is easy to handle. The disadvantage is that many attachments are needed and that coarser garbage, especially when the distance between the plates 6 is chosen to be small, is seriously hindered by all the attachments that are in its way towards the additional outlet opening 14.

[0010] It is also possible to employ plates 6 such that they cover more than one hole, for example rectangular plates 6, covering four holes each, provided with only one central connection.

[0011] Fig. 2 moreover shows that at the interface with the drive means 2 cylindrical sieve 1 is not provided with holes. This is not mandatory, but it prevents drive means 2 from rapidly becoming dirty. Moreover it should be noted that cylindrical sieve 1 may as well be rotated via an axially disposed rotation axis on which a drive means act. In that case the entire cylindrical sieve 1 may be covered with holes.

[0012] Fig. 3 shows schematically in side view a known cylindrical sieve 1 provided with holes 4 and with a system of axially disposed plates 4, again for preventing long slender objects from leaving cylindrical sieve 1 via the holes 4. If the distance between the plates 6 is chosen to be small, at least smaller than the diameters of the holes 4, the plates 6 again form a second cylindrical sieve 13, enclosing cylindrical sieve 1. In this way the garbage can again be separated into three components. Is the mutual distance large, a separation into two components takes place. The plates 6 can be manufactured easily and need a limited number of attachments compared with the embodiment described with reference to Fig. 2. This is especially advantageous if the plates are mounted with a small mutual distance, for the separation of garbage in three components. Although the plates 6 in Fig. 3 are represented such that they cover in width only one hole 4, it is also possible to give plates 6 a larger width, such that they cover more holes. The advantage is that a smaller number of attachments will suffice.

[0013] Fig. 4 schematically shows in side view a known cylindrical sieve 1, provided with holes 4 and with a system of radially disposed plates 6. Plates 6 have a limited number of attachments, which is advantageous if the plates 6 are mounted with a small mutual distance, for separating the garbage into three components. The plates shown in Fig. 4 can be given a larger width, such that they cover more holes in an axial direction. The advantage again is that fewer attachments are needed.

[0014] The embodiments as shown in Fig. 3 and Fig. 4 are equivalent, the first embodiment adding to the strength of the apparatus in an axial direction and the second embodiment adding to the strength in radial direction.

[0015] Fig. 5 shows in side view a known cylindrical sieve 1, enclosed by a second cylindrical sieve 13, made in one piece. Here cylindrical sieve 13 is provided with holes 15 which do not correspond to the holes 4; holes 15 again provide for the separation of very fine garbage. In this embodiment the second cylindrical sieve 13 adds to the strength of the arrangements in both directions.

[0016] Fig. 6 shows schematically in front view a cylindrical sieve 1 according to the invention, the bottom of which is enclosed by an additional transport belt 16. Cylindrical sieve 1 and additional transport belt 16 have corresponding speeds and are each individually driven by known means, not shown here. Via holes 4 in cylindrical sieve 1 finer garbage can reach the space between cylindrical sieve 1 and additional transport belt 16 and next be put down onto transport belt 5, which may now be chosen relatively narrow as compared to the embodiments mentioned in Fig. 1-5, because the finer garbage is delivered more concentrated. Moreover, additional transport belt 16 covers the holes 4 as described with reference to the previous figures, in order to prevent long, slender objects from falling through.

[0017] By providing additional transport belt 16 with ribs, not shown in Fig. 6 but running orthogonally to the transport direction, one can attain a situation in which there is on one hand a well-defined space between cylindrical sieve 1 and additional transport belt 16, and on the other hand the remote possibility of a long, slender object getting stuck. As there is moreover a well-defined physical contact between cylindrical sieve 1 and additional transport belt 16, it is generally sufficient to provide either cylindrical sieve 1 or additional transport belt 16 with drive means.

[0018] Especially when separating very coarse garbage, like rubble, it is of major importance that cylindrical sieve 1 is made very robust. One may chose for a cylindrical sieve 1 with a large wall thickness, but this implicates a large weight, too. One may also opt for a cylindrical sieve 1 with a double wall 17,18, where the holes 4 are realized as tubes, connecting the walls 17,18 and moreover giving way to smaller garbage. An additional advantage of this embodiment is that the chance of clamping a long, slender object is reduced even further.

[0019] Moreover, it is possible to provide cylindrical sieve 1 with holes of different diameters, for example the first three meters measured from funnel 10 with holes of 50 millimetre diameter and the following three meters with holes of 150 millimetre diameter, which again provides for a separation into more fractions. If additional transport belt 16 is used, one may chose for one common additional transport belt 16 or for separate additional transport belts 16 for removing the fractions.

Claims

1. Arrangement for sorting garbage, comprising a cylindrical sieve (1) rotating while in operation, on one axial end provided with a fill opening (11) for accepting unsorted garbage, on a second axial end provided with an outlet opening (12) for discharging at least substantially coarser garbage and provided with holes (4) along its outer surface for discharging finer garbage, further comprising obstruction means (6), provided at some distance outside the cylindrical sieve and moving together with the cylindrical sieve, to cover the holes, such that finer garbage can pass the holes and long, slender garbage is prevented to fall through the holes, **characterized in that** the obstruction means comprise a transport belt (16), moving underneath the cylindrical sieve (1) in a radial direction.

2. Arrangement according to claim 1, **characterized in that** the cylindrical sieve (1) comprises a first cylindrical sieve (17) and a second cylindrical sieve (18), enclosing the first cylindrical sieve (17), with both sieves having holes (4) at corresponding places, and tubes connecting the edges of corresponding holes (4).

3. Arrangement according to claim 1, **characterized in that** the transport belt (16) is provided with ribs, disposed orthogonally to a transport direction of the transport belt (16).

Patentansprüche

1. Vorrichtung zum Sortieren von Abfall, welche Vorrichtung ein im Gebrauchszustand rotierendes, zylindrisches Sieb (1) umfasst, an einem ersten, axialen Ende mit einer Füllöffnung (11) zur Aufnahme von unsortiertem Abfall und an einem zweiten axialen Ende mit einer Abfuhröffnung (12) zur Abfuhr von zumindest im Wesentlichen grobem Abfall versehen, und am Umkreis mit Löchern (4) zur Abfuhr von feinerem Abfall versehen, welche Vorrichtung weiterhin Sperrmittel (6) umfasst, die in einer bestimmten Entfernung an der Außenseite des zylindrischen Siebes positioniert sind und sich zusammen mit dem zylindrischen Sieb bewegen, um die Löcher in einer solchen Weise abzudecken, dass der feinere Abfall die Löcher passieren kann und verhindert wird, dass langer, schlanker Abfall durch die Löcher hindurch fällt, **dadurch gekennzeichnet, dass** die Sperrmittel ein unter dem zylindrischen Sieb (1) in radialer Richtung verlaufendes Transportband (16) umfassen.

2. Vorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** das zylindrische Sieb (1) ein erstes zylindrisches Sieb (17) und ein zweites zylindrisches Sieb umfasst, welches das erste zylindrische Sieb (17) in radialer Richtung umfasst, wobei beide Siebe an übereinstimmenden Stellen mit Löchern (4) versehen sind, und wobei die Ränder übereinstimmender Löcher mit Hilfe von Rohren miteinander verbunden sind.

3. Vorrichtung gemäß einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** das Transportband (16) mit senkrecht zur Transportrichtung verlaufenden Rippen versehen ist.

Revendications

1. Dispositif pour cribler des ordures, comprenant une grille cylindrique (1), en mode de fonctionnement tournante, à un bout axial prévu d'une ouverture de remplissage (11) pour accepter des ordures variées, à l'autre bout axial prévu d'une sortie (12) pour décharger au moins sensiblement des ordures grosses et prévue de trous (4) dans sa surface extérieur pour décharger des ordures fin, de plus comprenant des moyens d' obstruction (6), placées à faible distance de la surface extérieur du grille cylindrique et ce déplaçant en liaison avec le grille cylindrique, pour couvrir les trous, tellement que les ordures fin peuvent passer les trous et des ordures longue et maigre sont prévues de tomber à travers les trous, **caractérisée en ce que** les moyens d'obstruction comprennent un convoyeur (16), mouvant sous le grille cylindrique (1) dans une direction radiale.

2. Dispositif selon la revendication 1, **caractérisée en ce que** le grille cylindrique (1) comprend une première grille cylindrique (17) et une deuxième grille cylindrique (18), renfermant la première grille cylindrique (17), avec les deux grilles prévues des trous (4) aux points correspondants, et tubes pour connecter les bords des trous (4) correspondants.

3. Dispositif selon la revendication 1, **caractérisée en ce que** convoyeur (16) est prévu de nervures, disposées perpendiculaire sur une direction de transport du convoyeur (16).

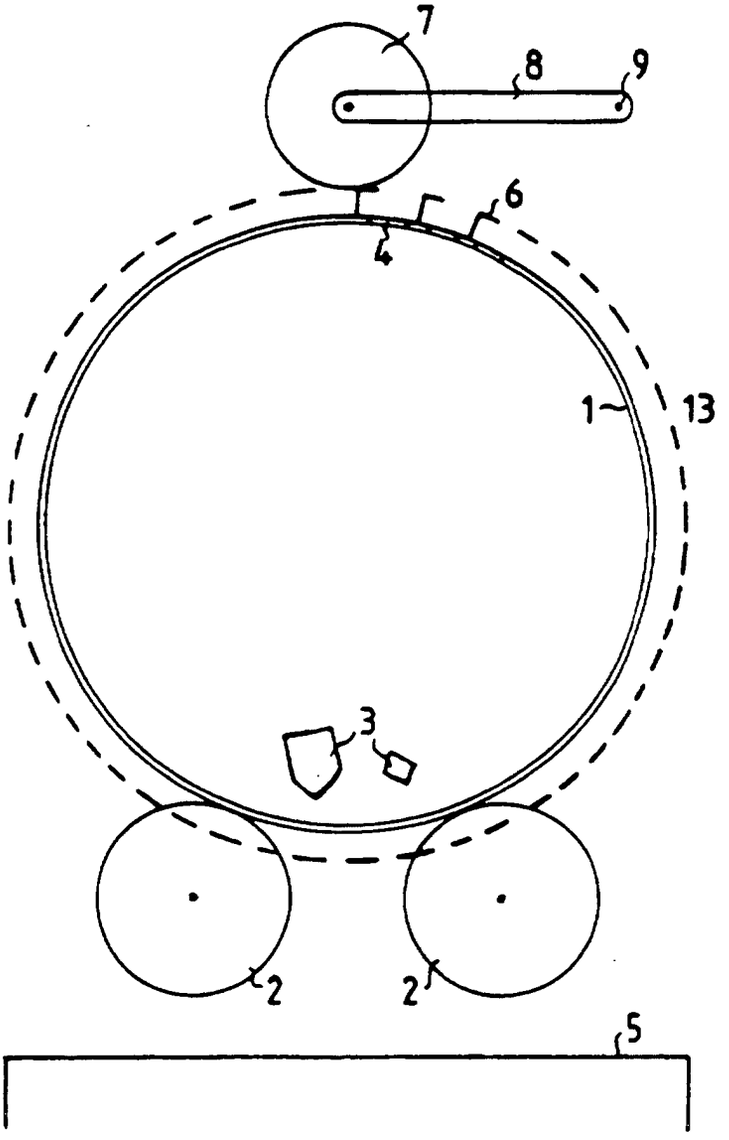


Fig. 1

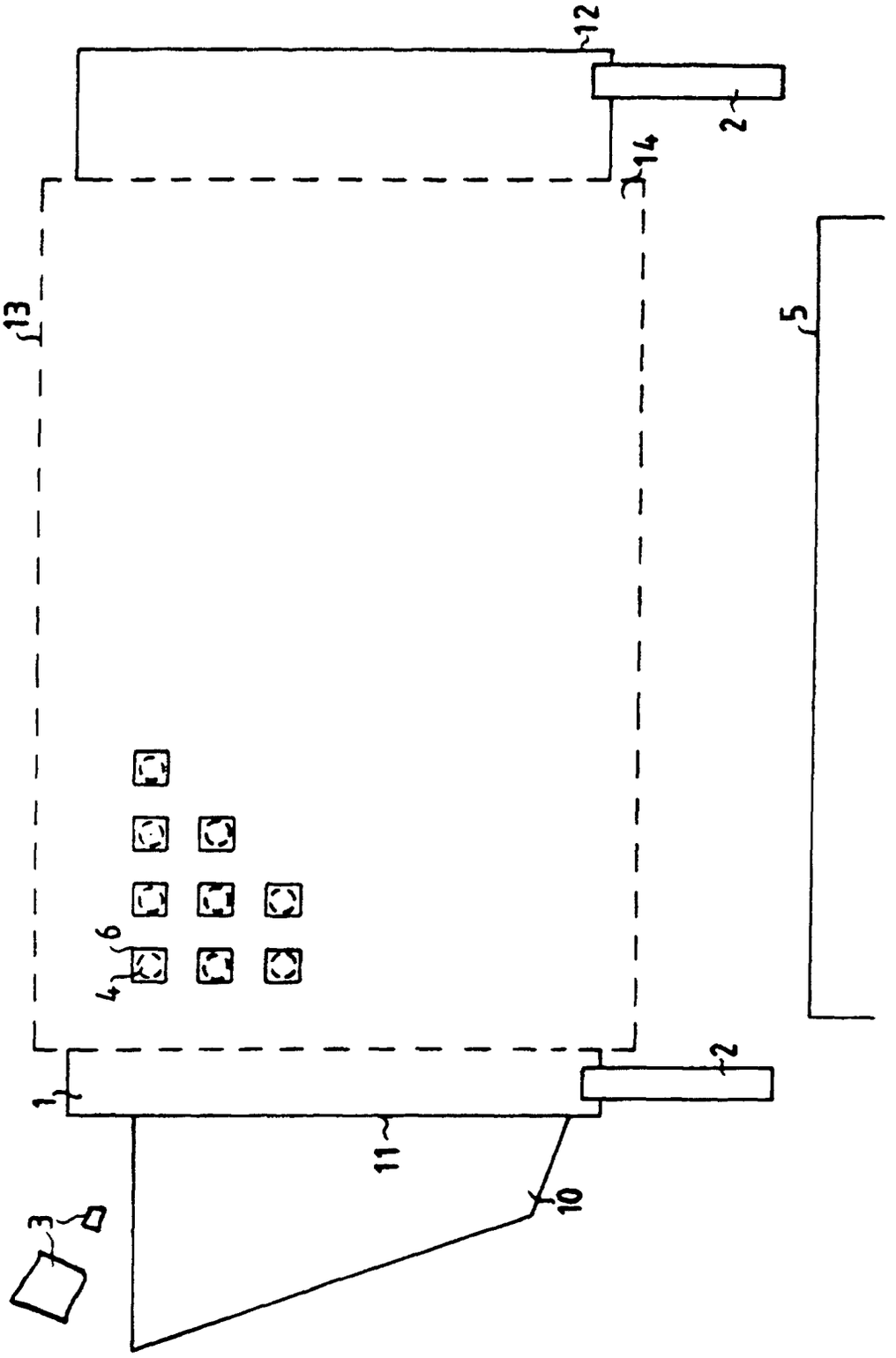


Fig. 2

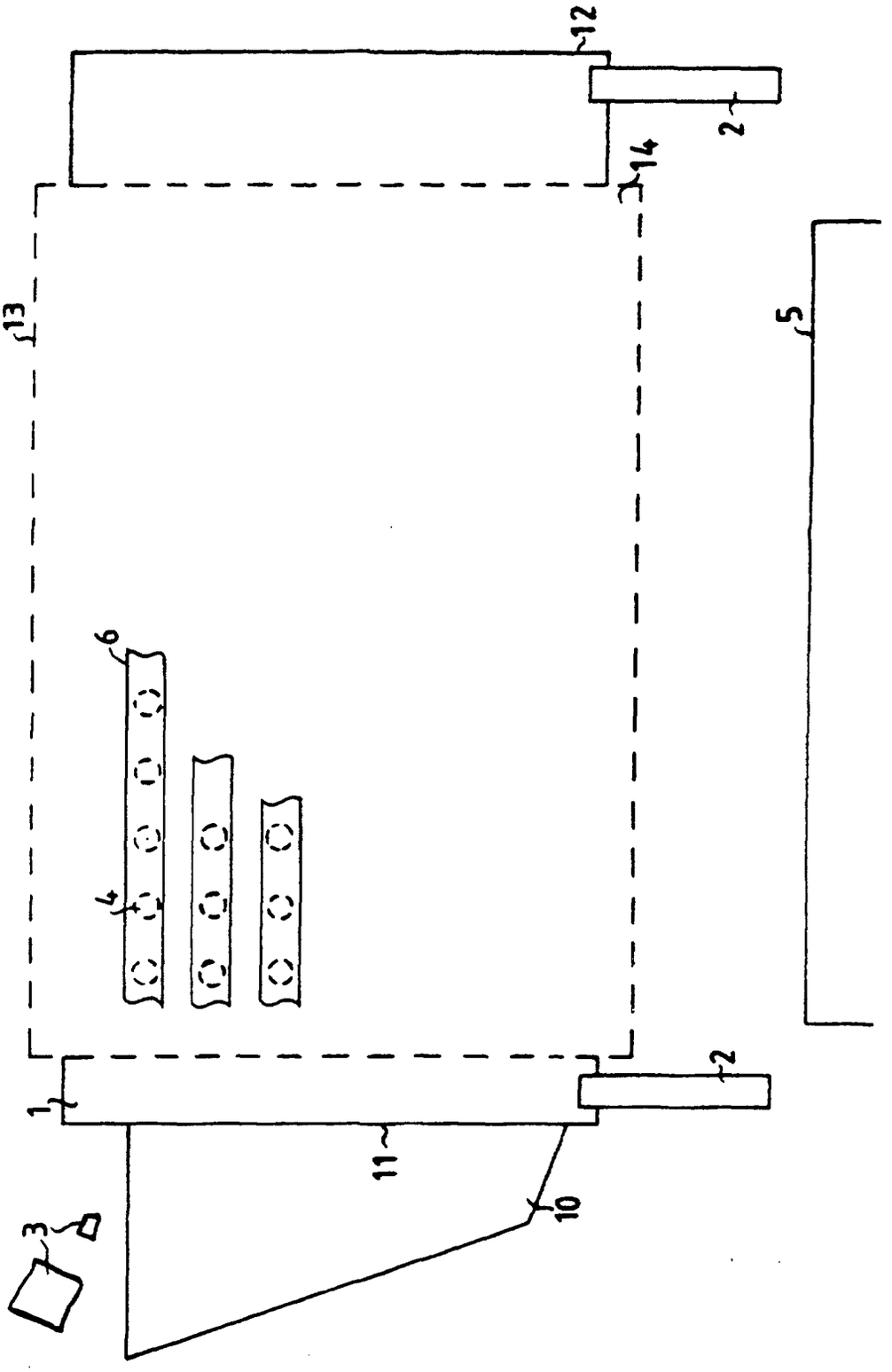


Fig. 3

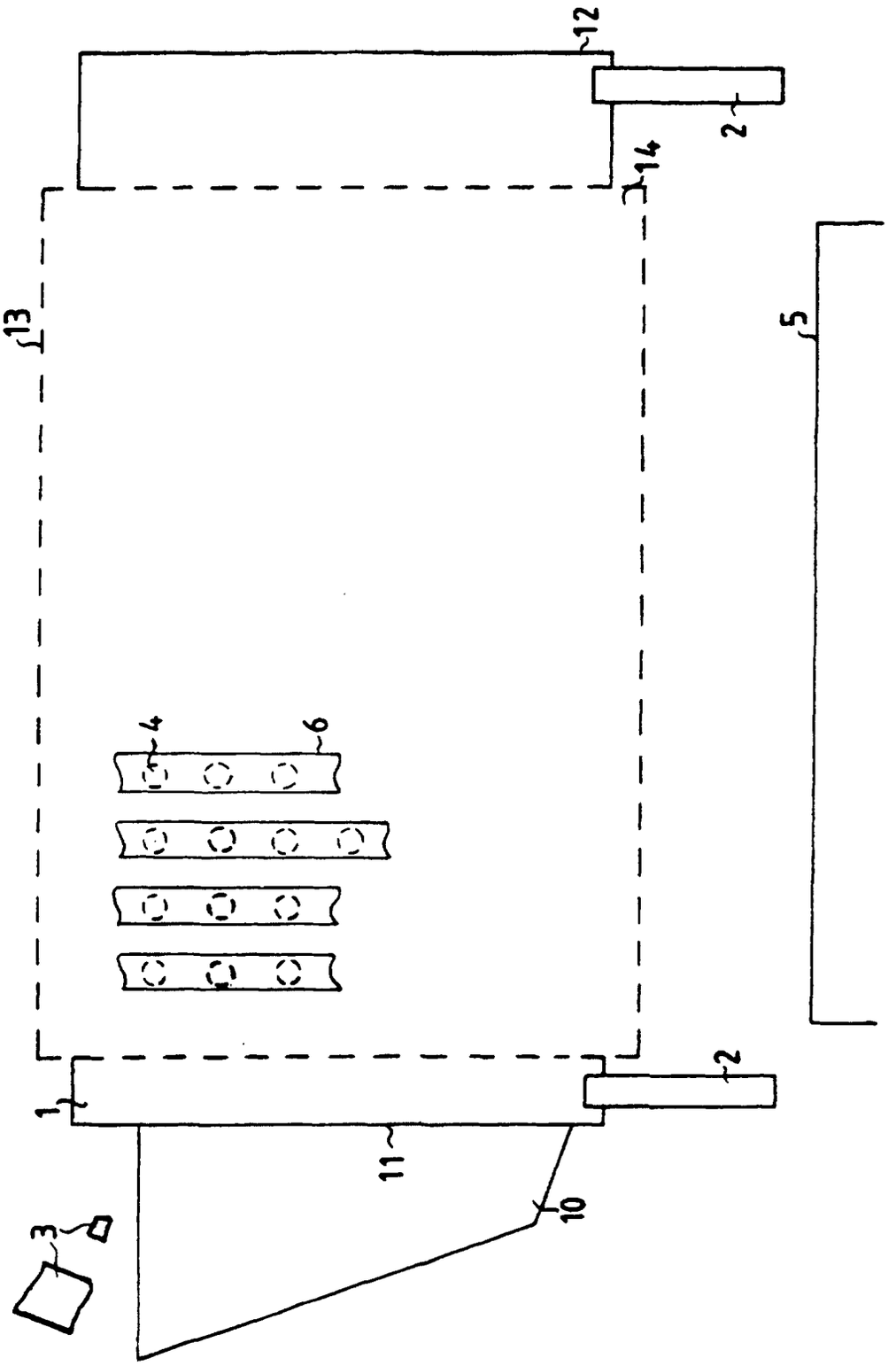


Fig. 4

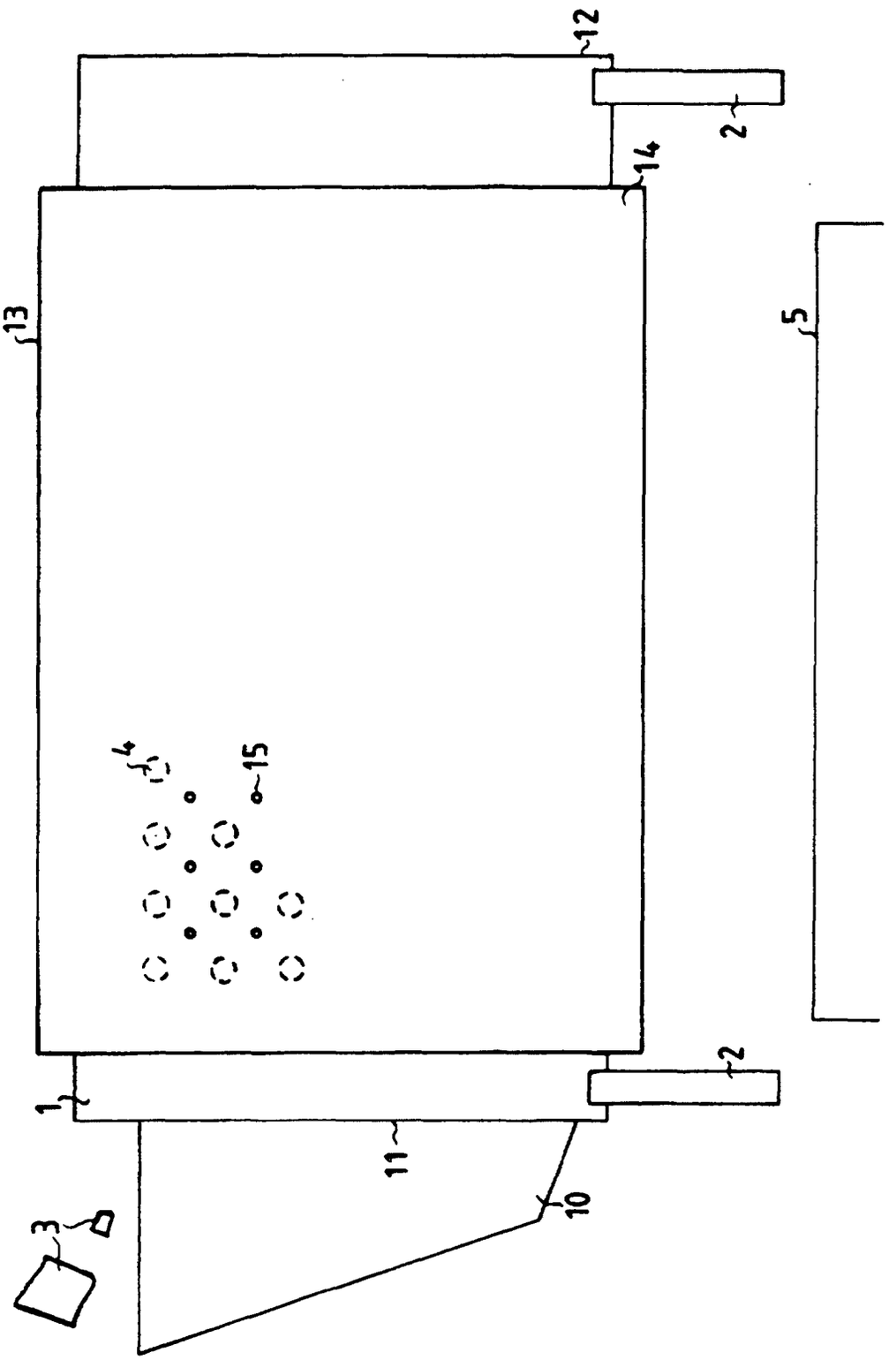


Fig. 5

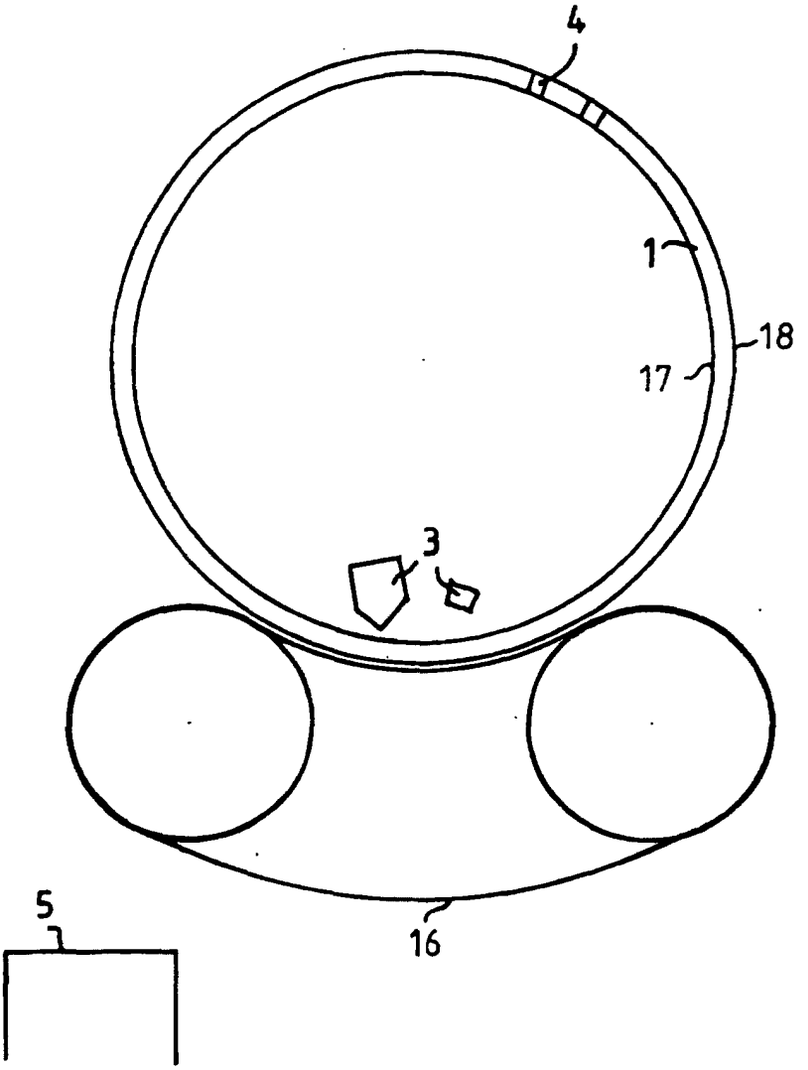


FIG. 6