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(54) **Device for separating and validating coins**

(57) A device for separating and validating coins (1) that comprises a tray for inserting coins (2), at least one receptacle (3), a coin recognition assembly (4), a coin separator (5), and at least one tray for collecting coins (6), which are mutually arranged in cascade and designed to be accommodated inside machines (7) which are preferably of the money-changing type.

The separator (5) comprises at least three openings (8).

Furthermore the tray (6) is constituted by at least three containers (9), arranged mutually side by side, each of which is connected, by way of conveyor means (10), directly to a respective opening (8) for storing different types of coin (M).

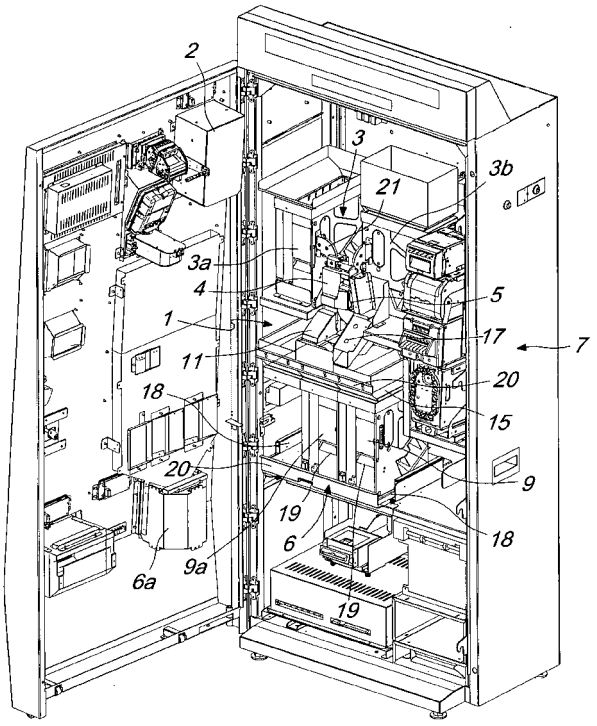

Fig. 1

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Description

[0001] The present invention relates to a device for separating and validating coins which is designed to be accommodated inside a machine, preferably a money-changing machine.

[0002] Devices for separating and validating banknotes are known, which allow the separation of banknotes by separating valid banknotes from non-valid banknotes, in order to prevent the insertion of false banknotes, and further subdividing the valid banknotes according to their different denominations.

[0003] Devices for separating and validating coins are also known, which allow the separation of coins, introduced in bulk, by separating valid coins from non-valid coins, in order to prevent the insertion of false coins or disk-shaped metal objects other than coins.

[0004] These devices are constituted by a recognizer which has two exits, which are connected, by means of a suitable duct, respectively to a storage receptacle and to the outside of the machine.

[0005] Coins that are recognised as non-valid are thus expelled from the machine, while valid coins are stored in the suitable receptacle.

[0006] There are also devices which are made up of a recognizer and a separator, arranged in cascade and mutually connected.

[0007] The valid coins, when they exit from the recognizer, are sent directly into the separator.

[0008] The separator performs a further subdivision of the valid coins, and consequently stores them in two different receptacles. Usually this further subdivision is used to separate coins from tokens, but it can also be used to subdivide the coins according to two different denominations (different values and/or different formats), for example one-euro coins and two-euro coins.

[0009] On the market there are machines, generally known as change machines, which have devices for separating and validating coins and also devices for separating and validating banknotes, but which operate independently of each other.

[0010] One of the limitations of these types of machine is that for their correct operation they require frequent maintenance, both to empty the receptacles where the coins and banknotes are stored and also in order to refill the supply containers that contain the coins and banknotes that the machine dispenses to the user during the money-changing operation.

[0011] The aim of the present invention is to solve the above-mentioned drawbacks, by providing a device for separating and validating coins which is capable of subdividing the valid coins according to a number of denominations (different values and/or different formats) that is greater than two.

[0012] Within this aim, an object of the invention is to provide a device for separating and validating coins that makes it possible to reuse the coins stored in the various different receptacles to resupply the machine, and which will therefore be dispensed to the user during the money-changing operation.

[0013] Another object of the invention is to provide a device for separating and validating coins that reduces the number of maintenance interventions necessary for its operation to the minimum.

[0014] A further object of the present invention is to provide a device for separating and validating coins that simplifies the execution of maintenance interventions and makes them faster.

[0015] A further object of the present invention is to provide a device for separating and validating coins that has a low cost, is easily and practically implemented and safely applied.

[0016] This aim and these objects, as well as others which will become better evident hereinafter, are achieved by a device for separating and validating coins which comprises a tray for inserting coins, at least one receptacle, a coin recognition assembly, a coin separator, and at least one tray for collecting coins, which are mutually arranged in cascade and designed to be accommodated inside machines which are preferably of the money-changing type, characterized in that said separator comprises at least three openings, said at least one tray is constituted by at least three containers arranged mutually side by side, each of said containers being connected directly to a respective opening for storing different types of coin.

[0017] Further characteristics and advantages of the invention will become better apparent from the detailed description that follows of a preferred, but not exclusive, embodiment of the device for separating and validating coins, according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a device for separating and validating coins, according to the invention, missing some components for better clarity and inserted in a money-changing machine;

Figure 2 is a perspective view of a detail of the device for separating and validating coins, according to the invention, with the various different paths taken by the coins highlighted;

Figure 3 is a partially sectional perspective view of a detail of the device for separating and validating coins, according to the invention, with a first path of the coins highlighted;

Figure 4 is a partially sectional perspective view of a detail of the device for separating and validating coins, according to the invention, with another path of the coins highlighted;

Figure 5 is a partially sectional perspective view of a detail of the device for separating and validating coins, according to the invention, with a different path of the coins highlighted;

Figure 6 is a schematic perspective view of a detail of the device for separating and validating coins, ac-

cording to the invention, with the path of the invalid coins highlighted;

Figure 7 is a plan view from above of a detail of the device for separating and validating coins, with some components of the device shown in dotted lines for greater clarity.

[0018] With reference to the figures, the reference numeral 1 generally indicates a device for separating and validating coins that comprises a tray for inserting coins 2, through which coins M in bulk are introduced by the user, at least one receptacle 3, a coin recognition assembly 4, a coin separator 5, and at least one tray for collecting coins 6, which are mutually arranged in cascade and designed to be accommodated inside machines 7 which are preferably money-changing machines.

[0019] According to the invention, the separator 5 comprises at least three openings 8 from which the coins M exit once they have been subdivided according to the various different denominations (different values and/or different formats).

[0020] Preferably the tray 6 is constituted by at least three containers 9, arranged mutually side by side, each of which is connected, by way of suitable conveyor means 10, directly to a respective opening 8 for storing different types of coin M.

[0021] The conveyor means 10 are constituted by separation partitions 11 and by a series of conveyor chutes 12, which are arranged according to different inclinations.

[0022] Conveniently, the separation partitions 11 are aligned and proximate to the surface 13 which is comprised between the openings 8 that are arranged on the separator 5.

[0023] The partitions 11 therefore define mandatory and different paths for the coins M, in order to prevent them, when they exit from different openings 8 of the separator 5, from being accidentally mixed up again.

[0024] Advantageously, on the upper edge 14 of each of the containers 9 a cover 15 is engaged, which has at least one passage 16 for the introduction of the coins M.

[0025] The cover 15 has a surface which slopes towards the passage 16, in order to prevent the coins M from accidentally being deposited on it and so remaining stuck, thus requiring the intervention of the operator.

[0026] The partitions 11 are arranged substantially above one of the three containers 9. On one container 9a there is a cover 15a which is provided with a series of conveyor chutes 12 that deviate the path of the coins M which come from the separator 5 to the appropriate container 9.

[0027] A second tray 6a is connected to a respective inlet 4a of the coin recognition assembly 4, by means of a corresponding rejection channeling 17, which permits the expulsion of the coins M that are detected as non-valid from the recognition assembly 4.

[0028] Furthermore, the containers 9 are provided with guide means 18 which allow a horizontal translational movement of the containers towards the outside of the machine 7 independently of each other.

[0029] The containers 9 are provided, in a lower region, with an outlet 19, which is connected to the tray 6a, for dispensing the coins M.

[0030] The vertical extension of the conveyor means 10 is limited substantially to between 5 cm and 40 cm.

[0031] This makes it possible to position the tray 6a, for dispensing the coins M, in a raised and therefore more comfortable position for the user who, in order to retrieve the coins M, does not have to bend over double to do so.

[0032] Furthermore the containers 9 are provided with locking means 20 which oppose the accidental translational movement outwards thereof.

[0033] More specifically, the receptacle 3 is constituted by two components 3a and 3b.

[0034] A first supply receptacle 3a is interposed between the tray for inserting coins and the recognition assembly 4, and it in turn is connected to the recognition assembly 4 by means of a connection conduit 21, and the second stock receptacle 3b is connected directly to the rejection channeling 17.

[0035] In the initial moments of the machine's operation the containers 9 might be empty, and therefore the machine would be prevented from dispensing coins M during the money-changing operation.

[0036] The second stock receptacle 3b thus makes it possible to compensate for this possible insufficiency by supplying the required coins M in output, through the rejection channeling 17, which in turn is connected to the tray 6a.

[0037] The stock receptacle 3b is usually refilled by the operator, during the machine's maintenance step.

[0038] The operation of the device 1 for separating and validating coins, according to the invention, consists in the user's inserting coins in bulk into the coin insertion tray 2.

[0039] The coins M, once introduced into the machine 7 by means of the tray 2, pass through the supply receptacle 3 and then, through the connection conduit 21, into the recognition assembly 4.

[0040] Inside the recognition assembly 4 each individual coin M, if recognized as valid, is sent to the separator 5, which, depending on the input sent by the recognition assembly 4, routes it to a different opening 8, where thanks to the separation partitions 11 and the series of conveyor chutes 12, it arrives at the appropriate container 9.

[0041] When a coin M is identified by the recognition assembly 4 as non-valid, it is sent, through the inlet 4a, to the rejection channeling 17, at the end of which, falling by gravity, it arrives at the tray 6a below.

[0042] During its functioning the machine, in order to perform money-changing operations, uses the coins stored in the containers 9.

[0043] If the containers 9 are empty, the machine proceeds to use the coins contained in the stock receptacle 3b, which, by means of the rejection channeling 17, converge toward the tray 6a, and are dispensed externally

therefrom.

[0044] In practice it has been found that the device 1 for separating and validating coins, according to the invention, fully achieves the set aim, since it makes it possible to subdivide the valid coins M according to a number of denominations (different values and/or different formats) that is greater than two.

[0045] Indeed, the presence of the conveyor means 10 makes it possible to define as many different paths as there are containers 9 where the coins M are to be stored.

[0046] Moreover, the containers 9 are provided with an outlet 19 which makes it possible, during the money-changing operation, to dispense the coins M which were previously stored in the different containers 9, and hence to use them to resupply the machine.

[0047] Another advantage of using the previously-stored coins M to resupply the machine is to reduce the number of maintenance interventions necessary for its operation to the minimum.

[0048] Furthermore, the fact that the containers 9 are provided with guide means 18, which allow their horizontal translational movement towards the outside of the machine 7, independently of each other, simplifies and speeds up the execution of maintenance activities.

[0049] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. In addition, all the details may be replaced by other, technically equivalent elements.

[0050] In the exemplary embodiments illustrated, individual characteristics shown in relation to specific examples may in reality be interchanged with other, different characteristics, existing in other exemplary embodiments.

[0051] Moreover, it should be noted that anything found to be already known during the patenting process is understood not to be claimed and to be the subject of a disclaimer.

[0052] In practice the materials employed, as well as the dimensions, may be any according to requirements and to the state of the art.

[0053] Where the technical features mentioned in any claim are followed by reference numerals and/or signs, those reference numerals and/or signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference numerals and/or signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference numerals and/or signs.

Claims

1. A device for separating and validating coins which comprises a tray for inserting coins (2), at least one receptacle (3), a coin recognition assembly (4), a coin separator (5), and at least one tray for collecting coins (6), which are mutually arranged in cascade and designed to be accommodated inside machines (7) which are preferably of the money-changing type, **characterized in that** said separator (5) comprises at least three openings (8), said at least one tray (6) is constituted by at least three containers (9) arranged mutually side by side, each of said containers being connected directly to a respective opening (8) for storing different types of coin (M).

2. The device for separating and validating coins according to claim 1, **characterized in that** said at least three containers (9) are connected to said separator by way of conveyor means (10).

3. The device for separating and validating coins according to claim 2, **characterized in that** said conveyor means (10) are constituted by separation partitions (11) and by a series of conveyor chutes (12) which are arranged according to different inclinations.

4. The device for separating and validating coins according to the preceding claims, **characterized in that** said separation partitions (11) are aligned and proximate to a surface (13) which is comprised between said at least three openings (8) of said separator (5).

5. The device for separating and validating coins according to claim 1, **characterized in that** on the upper edge (14) of each of said containers (9) a cover (15) is engaged, said cover (15) having at least one passage (16) for the introduction of the coins.

6. The device for separating and validating coins according to one or more of the preceding claims, **characterized in that** said partitions (11) are arranged substantially above one container (9a) of said at least three containers (9), said one container (9a) of said containers comprising a cover (15a) which is provided with said series of conveyor chutes (12).

7. The device for separating and validating coins according to claim 1, **characterized in that** the vertical extension of said conveyor means (10) is limited substantially to between 5 cm and 40 cm.

8. The device for separating and validating coins according to claim 1, **characterized in that** it comprises a second tray (6a) which is connected to a respective inlet (4a) of said coin recognition assembly (4) by means of a corresponding rejection channeling (17) for expelling non-valid coins (M) detected by the recognition assembly (4).

9. The device for separating and validating coins according to claim 3, **characterized in that** said at

least three containers (9) are provided with guide means (18) that are adapted to allow a horizontal translational movement of said containers (9) towards the outside of the machine (7) independently of each other.

10. The device for separating and validating coins according to claim 3, **characterized in that** said at least three containers (9) are provided in the lower region with an outlet (19) which is connected to said tray (6a) for dispensing the coins (M).

11. The device for separating and validating coins according to claim 3, **characterized in that** said at least three containers (9) are provided with locking means (20) which prevent the accidental translational movement outwards of the containers (9).

12. The device for separating and validating coins according to claim 1, **characterized in that** said at least one receptacle (3) comprises a first supply receptacle (3a) which is interposed between said tray for inserting coins and said recognition assembly (4) and a second stock receptacle (3b) which is directly connected to said rejection channeling (17).

13. The device for separating and validating coins according to claim 1, **characterized in that** said first receptacle (3a) is connected to said recognition assembly (4) by means of a connection conduit (21).

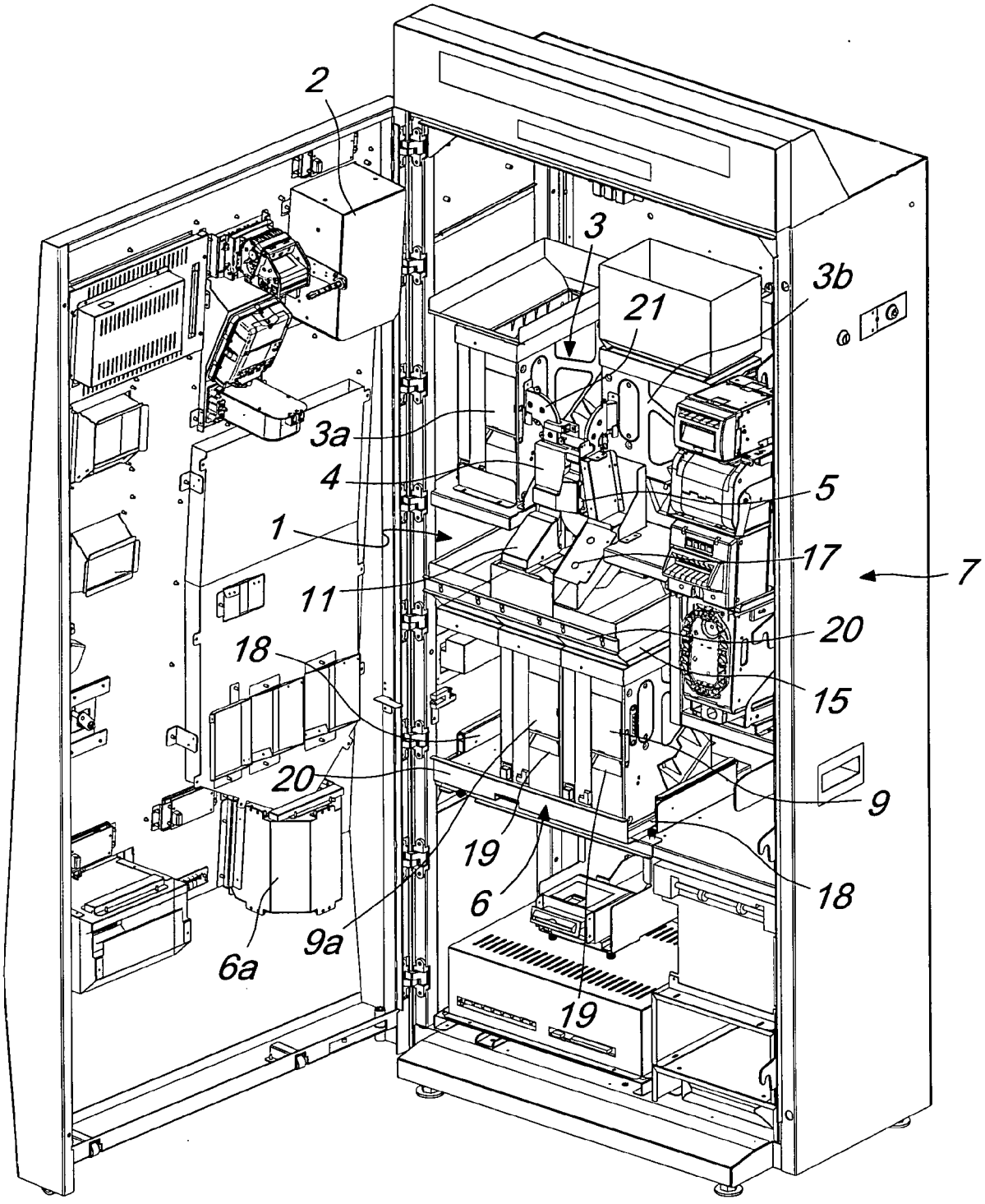

Fig. 1

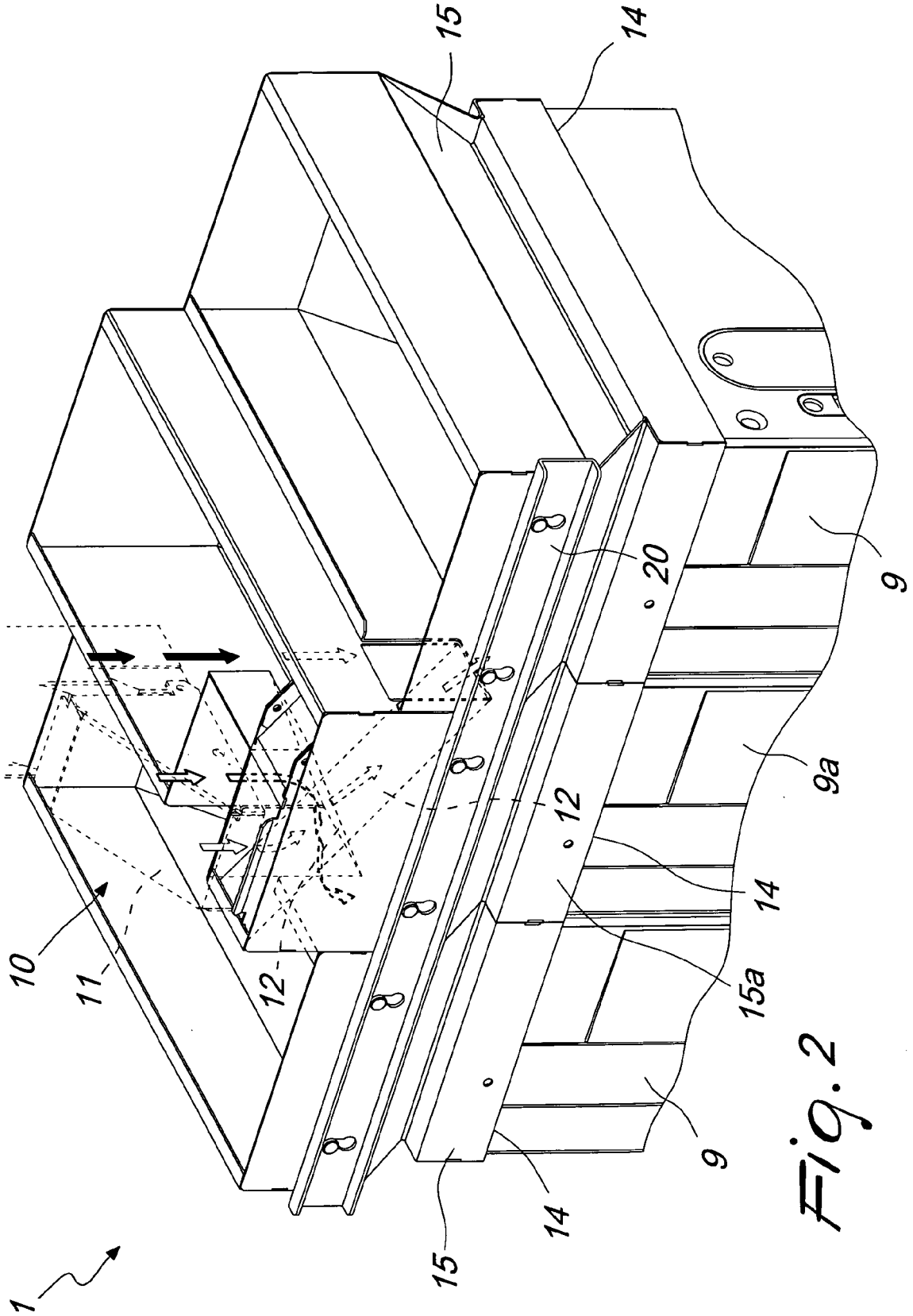

Fig. 2

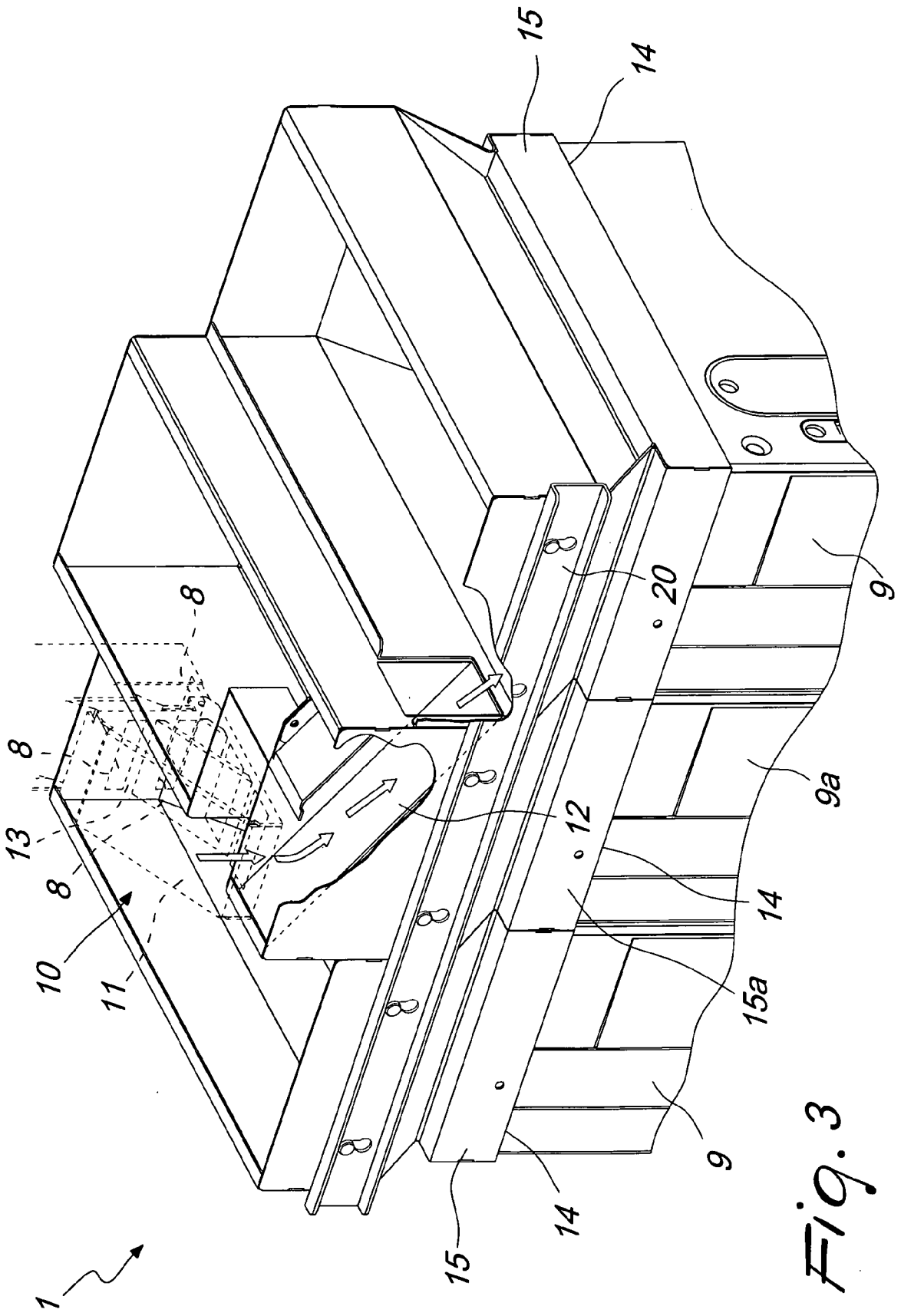

Fig. 3

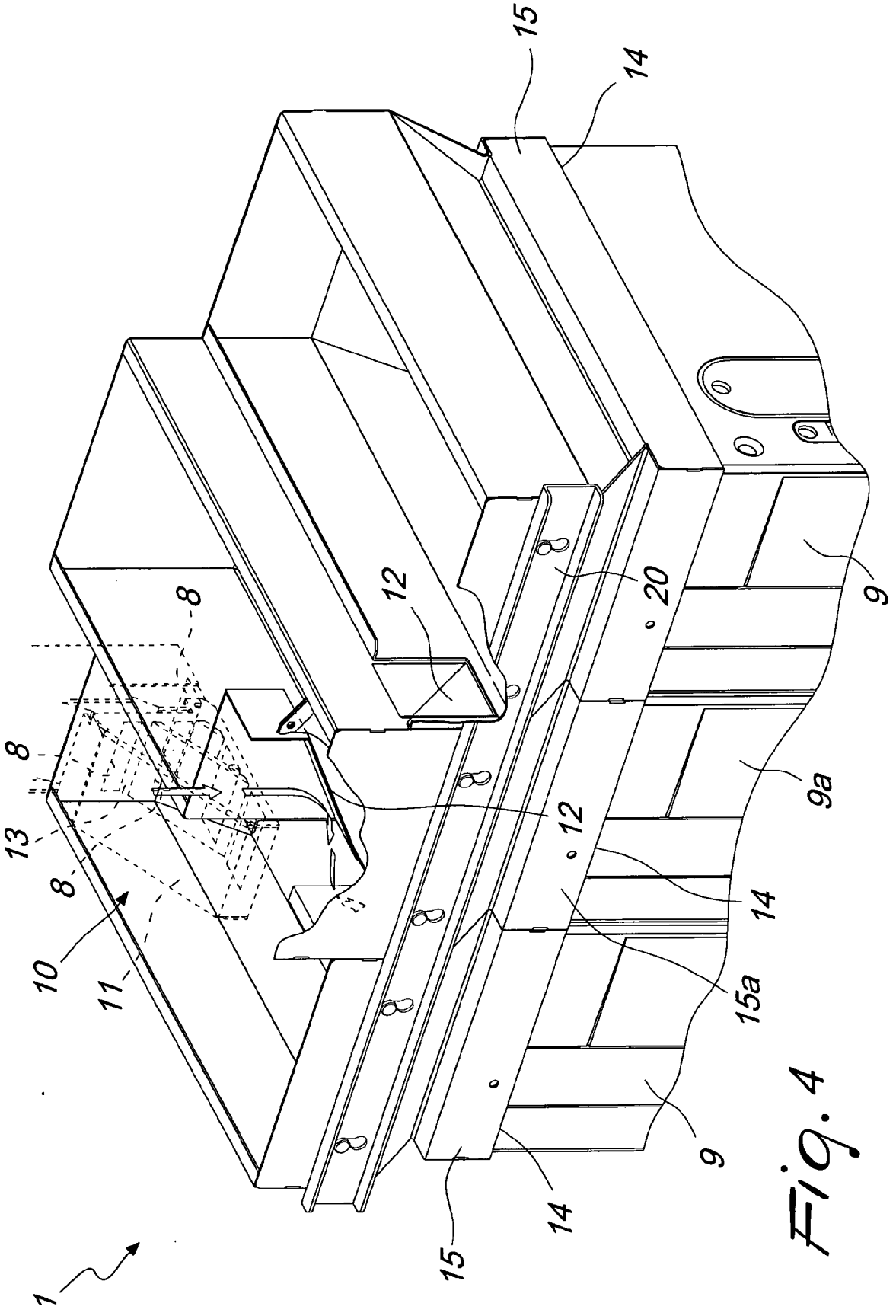

Fig. 4

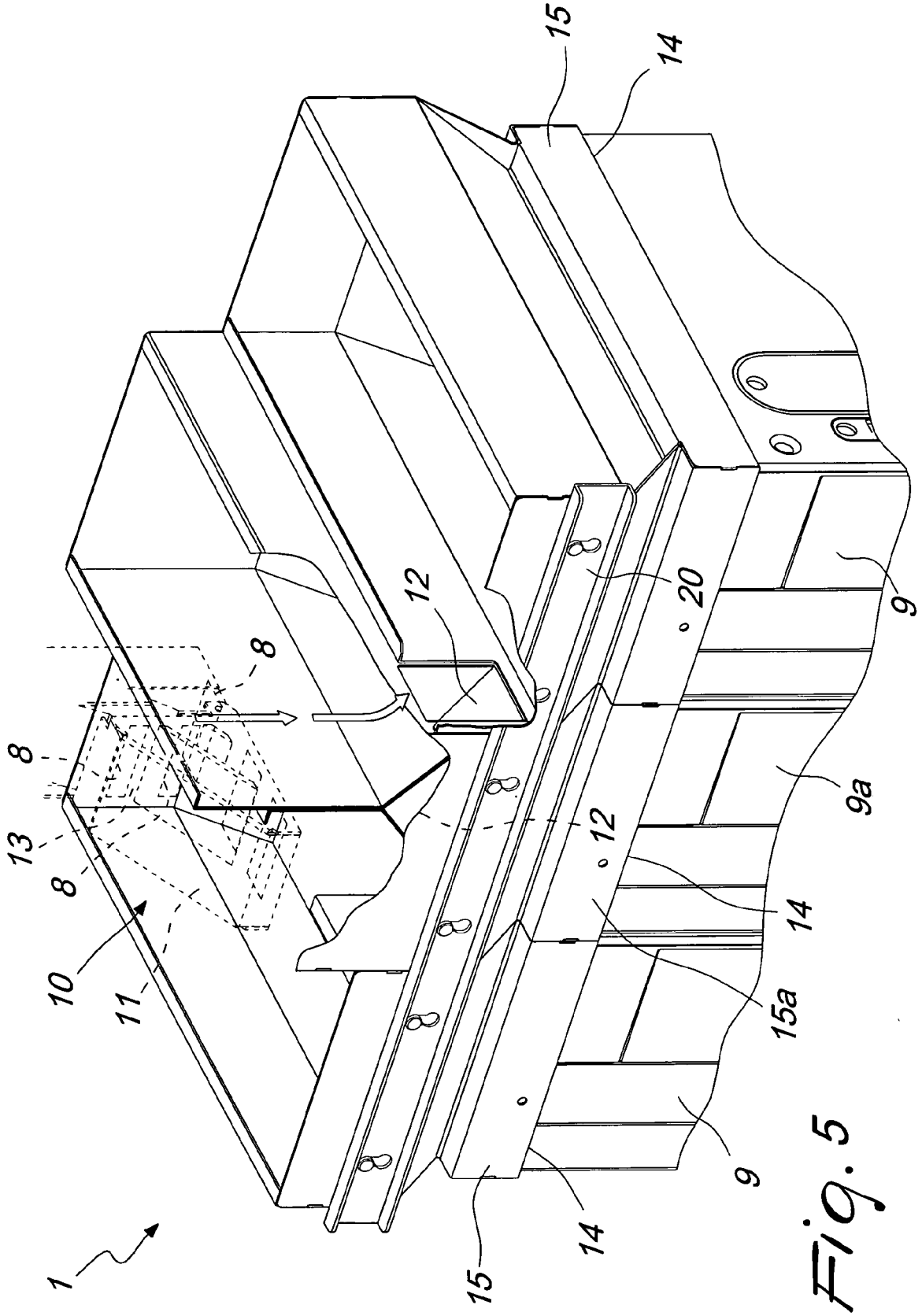

Fig. 5

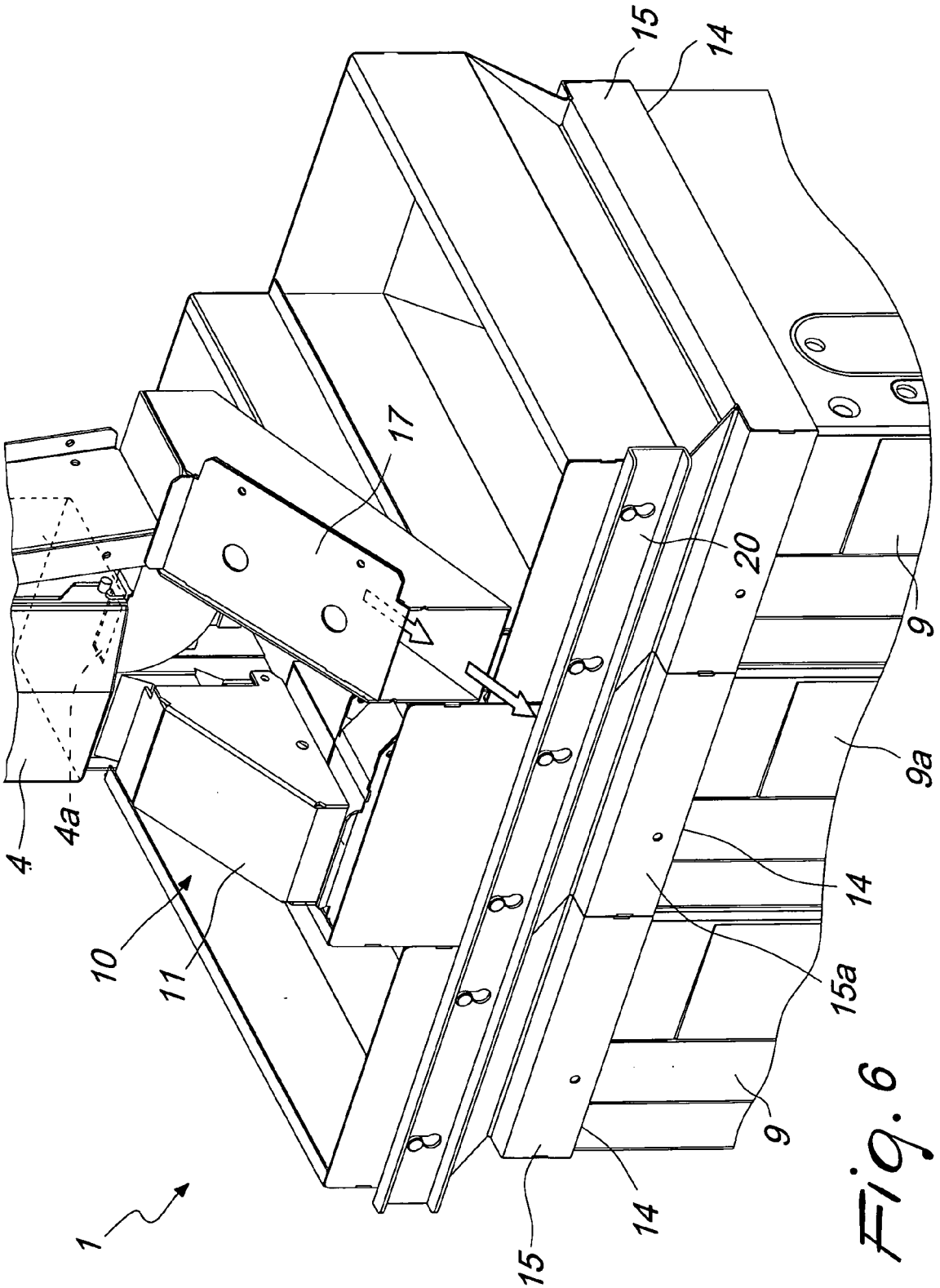

Fig. 6

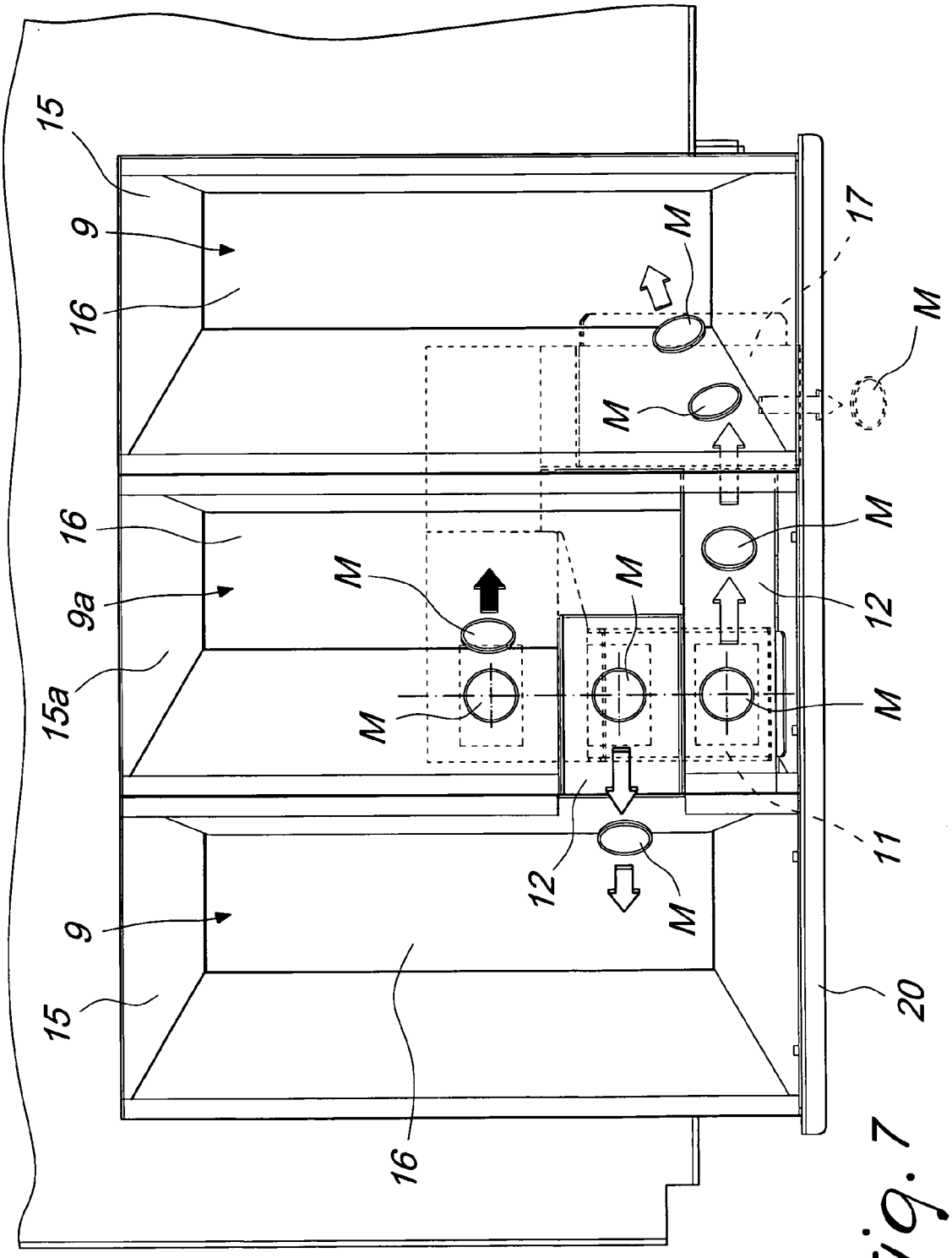

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 11 42 5011

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 June 2011	Lavin Liermo, Jesus

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EUROPEAN SEARCH REPORT

Application Number
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