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(54) Classification and/or recovery system for non-ferric metals.

(57) The wastes coming from fragmentation plants are classified in terms of some determined values, preferably dimensional, by means of screens, from where they are led to a vibrating conveyor device which situates them lined up in a row, on at least one classification conveyor belt.

Along this belt there are different detectors of the types of metals to be recovered, each one of which activates the corresponding displacement device, or pusher, preferably pneumatic, which draws that metal towards an outlet mouth.

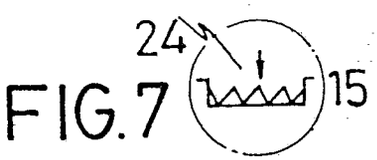

FIG.7

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Description

CLASSIFICATION AND/OR RECOVERY SYSTEM FOR NON-FERRIC METALS

The present invention refers to a classification and/or recovery system for metals, preferably non-ferric metals, such as aluminum, copper, zinc and alloys such as brass, stainless steel, etc.

More particularly, the invention refers to an installation which serves to classify and recover non-ferric metals from waste coming from fragmentation plants, such as for example, vehicles, electrical appliances, etc.

In the known installations, once the ferric material and sterile materials, such as textiles, rubber, plastic, have been separated, along of them coming fromseats, wheels, upholstery, etc. of cars, electrical appliances or any product of breaking, the non-ferric material is separated for the recovery thereof.

There are installations which use as means of separation, flotation systems, by means of water and using the different density of the elements, the non-ferric metallic materials are separated from the sterile material.

This separation and recovery system has different inconveniences.

Upon using water as the means of separation, a costly installation which requires some complicated filtering elements becomes necessary. Besides, it is necessary to prepare the water to use it as a separating element furnishing the same with a series of substances such as silicones to subsequently stir the water, this all determining a certain time for preparing the installation, for which reason the installation cannot start to operate at the desired time.

It also becomes necessary to decant mud to eliminate the sludge.

Besides, aside from the volume that this type of installation has, use thereof is limited due to problems of space.

On the other hand, there are products included in the waste such as stones, which have a density similar to that of some of the non-ferric metals, specifically aluminum, thus the latter cannot be separated from the former.

The installation object of the invention eliminates the above mentioned inconveniences, permitting a classification and total recovery of the non-ferric metallic materials. It may start to operate whenever it is desired and its cost is much lowere than that of traditional systems.

It has also foreseen a distribution of the parts which is particularly advantageous which makes it possible to obtain a high profitability in the recovery of non-ferric metals with a minimal energy cost and taking up a minimal amount of space.

In accordance with the invention, the system comprises means of selecting and classifying materials in terms of some determined values preferably dimensional,which are sent to a vibrating device which deposits the materials lined up in rows on a main classification belt, along which there are some detector and/or catcher elements which in terms of the specific features of the different metallic materials activate other displacement systems which push each one of the metals to their corresponding selection mouth and thus are deposited on their respective outlet belt.

There are, therefore, and at least the same number of detectors as different metallic materials whose recovery is desired.

The use of one or several catchers may be incorporated into the system when great precision is needed in the selection and classification of metals with very similar features.

In accordance with a preferential feature of the invention, the displacement systems are pneumatic.

More in particular, the pneumatic systems can be nozzles facing selection and outlet mouths,through which pressurzed air which displaces the metallic bodies to said mouths comes out.

Likewise, the pneumatic displacement systems may be some pneumatic cylinders which push the metallic bodies to the selection and outlet mouths, when they are activated.

In accordance with a particularly advantageous distirbution, a screen or similar means has been foreseen as preparation, gaging and selection elements of the material to be treated according to their dimensional values. The similarity or proximity in size of the bodies to be treated, improves and perfects the response and precision of the detector elements located in the main classification belt. The bodies thus selected and classified according to groups, by the screen,are lead to some vibrating conveyor belts, which deposit them lined up in a row on a main classification belt in continuous movement. Along this belt there are detector elements which activate the above described displacement systems.

In accordance with other characteristics of the invention the vibrating conveyor belts have several channels where the material bodies are distributed, having foreseen that each channel has an outlet hole so that each vibrating conveyor belt can feed several main classification belts.

The distribution channels of the vibrating conveyor belts are preferably V section.

Now, to facilitate a better understanding of this specification and forming an integral part thereof, there are some sheets of drawings in whose figures 1 and 2 the elements and systems which make up the simplified instal,lation object of the invention are simply and schematically represented.

Figure 3 also schematically shows a distribution of the elements and systems which make up a high yield and high production installation.

Figure 4 is complementary of figure 3 and shows another schematic view of the same installation.

Figure 5 is a plan view figure of a vibrating apparatus as indicated in figure 4.

Figures 6 and 7 are both enlarged details of the vibrating apparatus.

According to these figures and in accordance with

the invention, the installation comprises a screen (1) in which the material to be treated is introduced, which preferably (though not necessarily) comes from fragmentation plants of automobiles, electrical appliances, etc. The material is mainly made up of a mixture of non-ferric metallic material, non-magnetic ferric material such as stainless steel and all sterile materials such as rubber, plastic, stones, wood, textiles, glass, etc., because the magnetic ferric material has already been separated and industrially recovered in the fragmentation plants. The possible remainding ferric material is separated and recovered on a belt with a magnetic drum before feeding the screen (1.)

The screen (1) may be of any type, rotating, linear, vibrating, etc. and its function consists of preparing, gaging and selecting the material in terms of some determined dimensions.

Then the material thus selected is conveyed or preferably falls by gravity to some vibrating hoppers (2) which in turn feed in doses the conveyor belts (3) and (4), preferably of vibrating system.

The vibrating conveyor belts (3) and (4) distribute and deposit the bodies of material lined up in rows, in other words, one by one on one or several main classification belts (5.)

On the main classification belt (5) there are incorporated the elements which proceed to detect, classify, separate and recover the different metals.

Transversally along the belts (5) in any of the top, bottom or side areas of the same, there are some detector and/or catcher elements (6) of the metallic bodies in such a way that upon these bodies facing the detectors (6) the latter are activated and put into operation some displacement systems which push each different metal body to its corresponding selection mouths (9) which empty into the outlet belts (10) and thus the different already classified metals are collected on each belt.

The selection mouths (9) can be situated on one or both sides of the belt (5.)

The displacement systems may be preferably of a pneumatic type, but likewise they may be of any other type such as hydraulic, mechanical, electric etc.

In the drawing of figure 2 one schematically sees the use of a pneumatic system which basically corresponds to some nozzles (7) which when a determined detector (6) checks the passing along the belts (5) of a body of a determined metal, it is activated by sending a controlled air current which pushes said metallic body through the corresponding mouth (9) facing th e nozzle (7.)

They may also individually or in combination with the nozzles (7) include some pneumatic cylinders (8) which, either in their forward movement or in the backward movement push the bodies of different metals through their corresponding selection mouths (9.)

The number of detectors (6) is at least equal to the different metallic materials whose recovery is desired separately through each one of the corresponding selection mouths (9.)

Each different metallic material falls to its respective outlet belt (10) or (12) etc., separated from each other, for a separate recovery of each metal.

The bodies of sterile non-metallic material, such as rubber, plastic, textiles, stones, glass, wood, etc. continue in movement along the belt (5) the already recovered metallic bodies also remaining separate.

In figures 3 and 4 there is a schematic representation of a distribution of the different means, systems and elements which make a high yield and high production installation possible and which basically comprises a multiple screen (22) which is fed through a conveyor belt (not represented) with the material to be treated which basically consists of a mixture of non-ferric metallic material, non-magnetic ferrric material such as stainless steel and sterile materials such as rubbers, plastics, textiles, stones, glass, wood, etc.

The multiple screen (22) classifies the bodies in function of some determined dimensional values, and distributes them by sizes or gages.

The material thus distributed by sizes falls to several vibrating hoppers (13.) These hoppers deposit the material bodies, in a dosed manner on some vibrating conveyor belts (14) and the latter in turn deposit them on other special vibrating conveyor belts (15.)

According to a preferred embodiment and in accordance with figures 6 and 7, the conveyor belts (14) have a single plane channel (23) and the conveyor belts (15) have various channels (25) in "V" , which produces a distribution effect of the bodies of materials in several rows.

Each channel 'in "V". dumps the bodies on a classification belt (16) in such a way that by the continuous movement of these belts, there is a lining up of the bodies which make up the treated material, the same remaining separated from each other. Thus, they are transported "one by one" and at a certain distance by said classification belts (16.)

Preferably the dropping of the material bodies from the channels in "V" of the conveyor belts (15) to the classification belts (16) is effected through some gaged outlet holes (18) which empty into said belts.These gaging holes prevent certain bodies which are too elongated from obstructing the selection and outlet mouths (9.)

Figures 3 and 4 schematically represent 2 or 4 channels in "V" in each vibrating conveyor belt (15) and therefore 4 classification belts (16) for each conveyor belt.

In this same way it is possible to increase the number of channels in "V" and in the same proportion the number of classification belts (16) to proportonally increase the production capacity of the plant.

Along each one of the classification belts (16) and in any of the different areas of a transversal plane, in other words, top, bottom or sides of said belts there are some detector and/or catcher (6) elements which detect and/or catch the passing of the bodies of different metallic materials, activating each one its corresponding displacement system (7) and/or (8) described above and preferably of a pneumatic type, which displace or move the metallic bodies towards their corresponding selection mouths (9) and through them are deposited in their corresponding

and different outlet belts (19.) In this way, it is obtained that the bodies of different metal are classies and grouped each one in their respective outlet belt (19.)

The bodies of sterile material, upon not being metallic are conveyed to the end of the belts (16) and dumped on a sole removal belt (20.)

Claims

1. CLASSIFICATION AND/OR RECOVERY SYSTEM FOR NON-FERRIC METALS, preferably from waste coming from fragmentation plants, characterized by comprising some means of classification of the materials in terms of some determined values, and which are led to a vibrating device which deposits the material lined up in a row on a classification belt, of continuous movement , along which there are some detector elements of the passing of all the metallic material, there being, at least, one detector per metallic material to be recovered, in such a way that each detector element activates a displacement means which pushes the material towards some outlet mouths.

2. CLASSIFICATION AND/OR RECOVERY SYSTEM FOR NON-FERRIC METALS, all in accordance with claim one, characterized because the displacement means are preferably of a pneumatic type.

3. CLASSIFICATION AND/OR RECOVERY SYSTEM FOR NON-FERRIC METALS, all in accordance with claim 2, characterized because the displacement means comprise some nozzles facing the outlet mouths where pressurized air which pushes the metallic materials through said outlet mouths comes out.

4. CLASSIFICATION AND/OR RECOVERY SYSTEM FOR NON-FERRIC METALS, all in accordance with claim two, characterized because the displacement means comprise some pistons which either push forward or push backward the metal,lic materials through the outlet mouths when they are activated.

5. CLASSIFICATION AND/OR RECOVERY SYSTEM FOR NON-FERRIC METALS, all in accordance with the previous claims, characterized because the classification means comprise a screen which selects and classifies the materials in terms of some dimensional values, conveniently grouping them to send them to different vibrating apparatus which deposit the materials on the corresponding classification belts.

6. CLASSIFICATION AND/OR RECOVERY SYSTEM FOR NON-FERRIC METALS, all in accordance with claim 5, characterized because it has been foreseen that some vibrating apparatus have some distribution channels, each one of which has a removal hole, in order to deposit, by means of a sole vibrating apparatus the materials on several classification belts.

7. CLASSIFICATION AND/OR RECOVERY SYSTEM FOR NON-FERRIC METALS, all in accordance with claim 6, characterized because the channels have a "V" section.

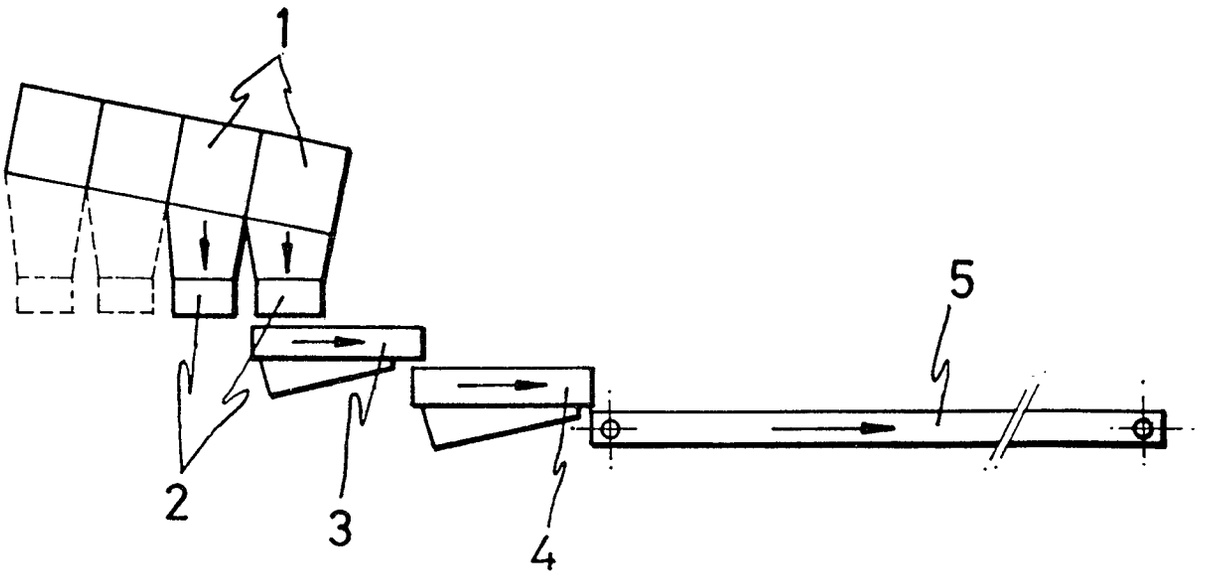

FIG.1

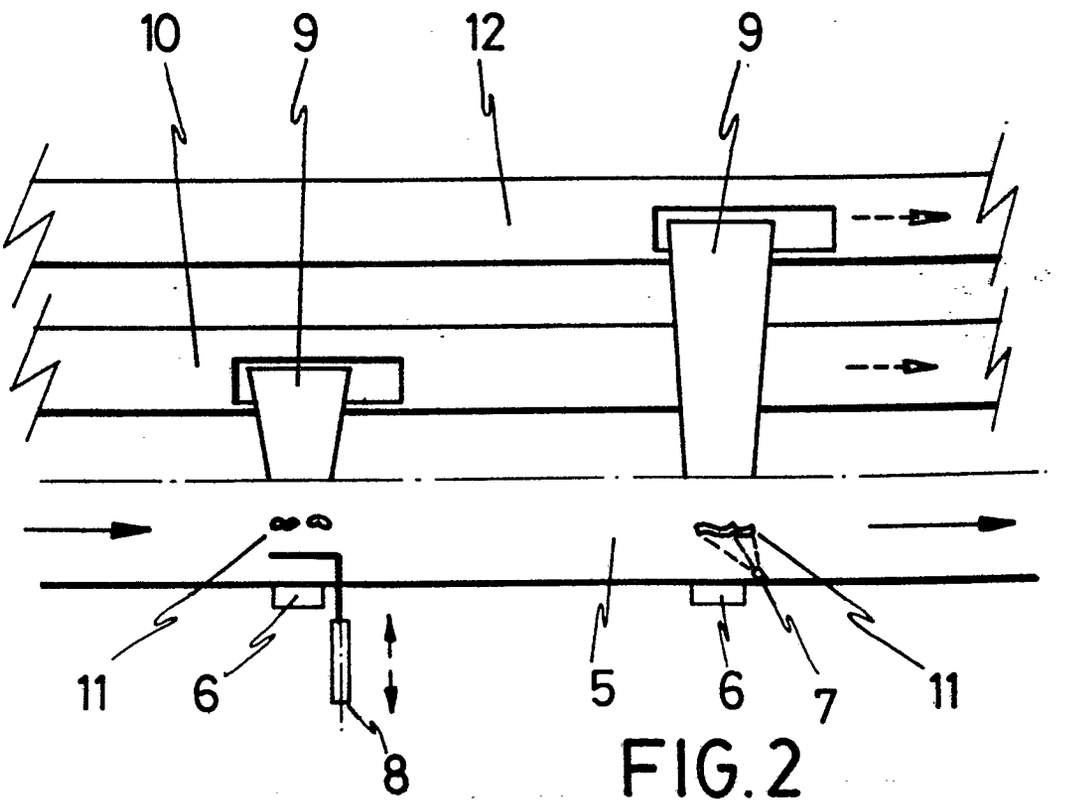

FIG.2

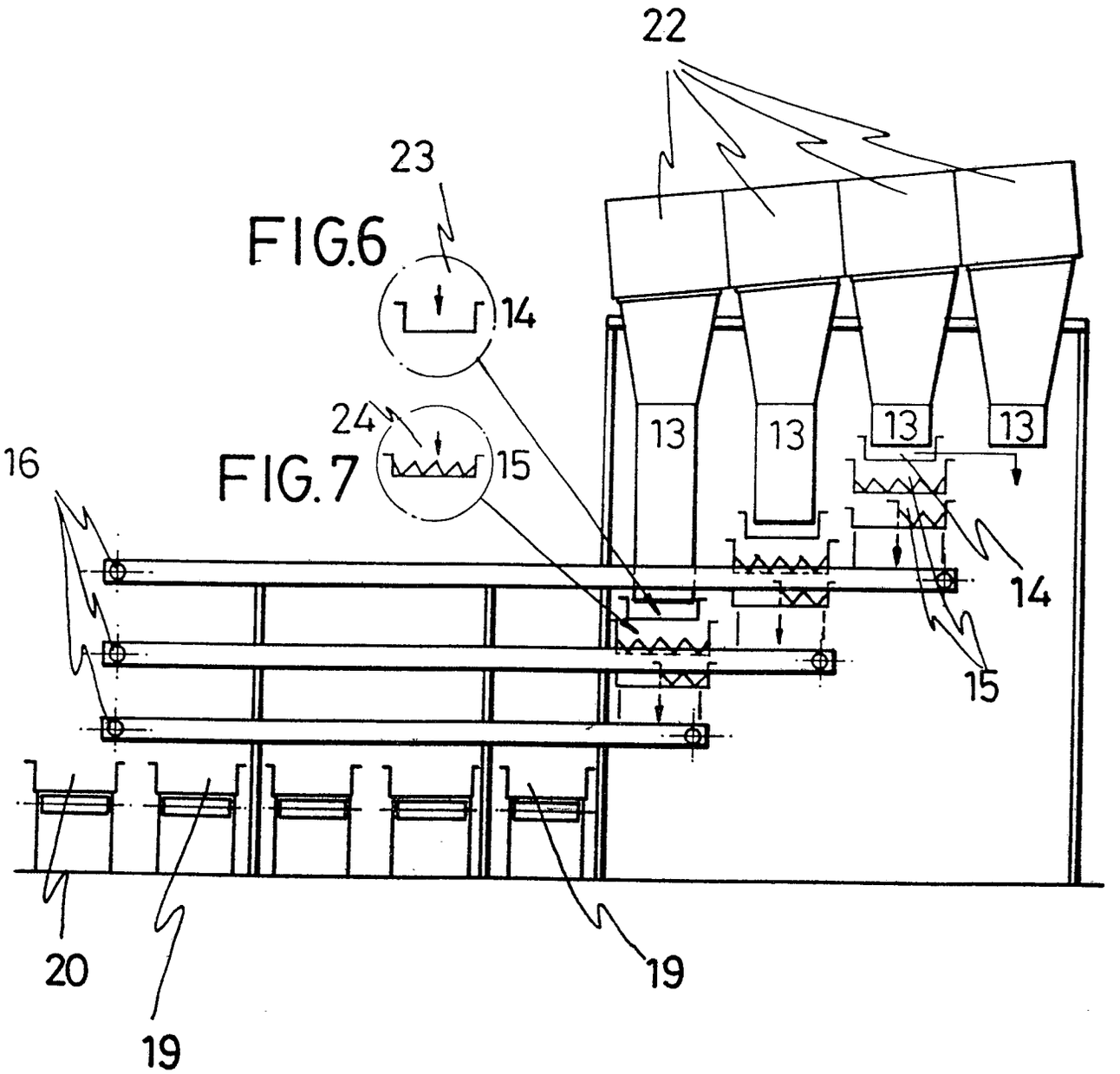

FIG.3

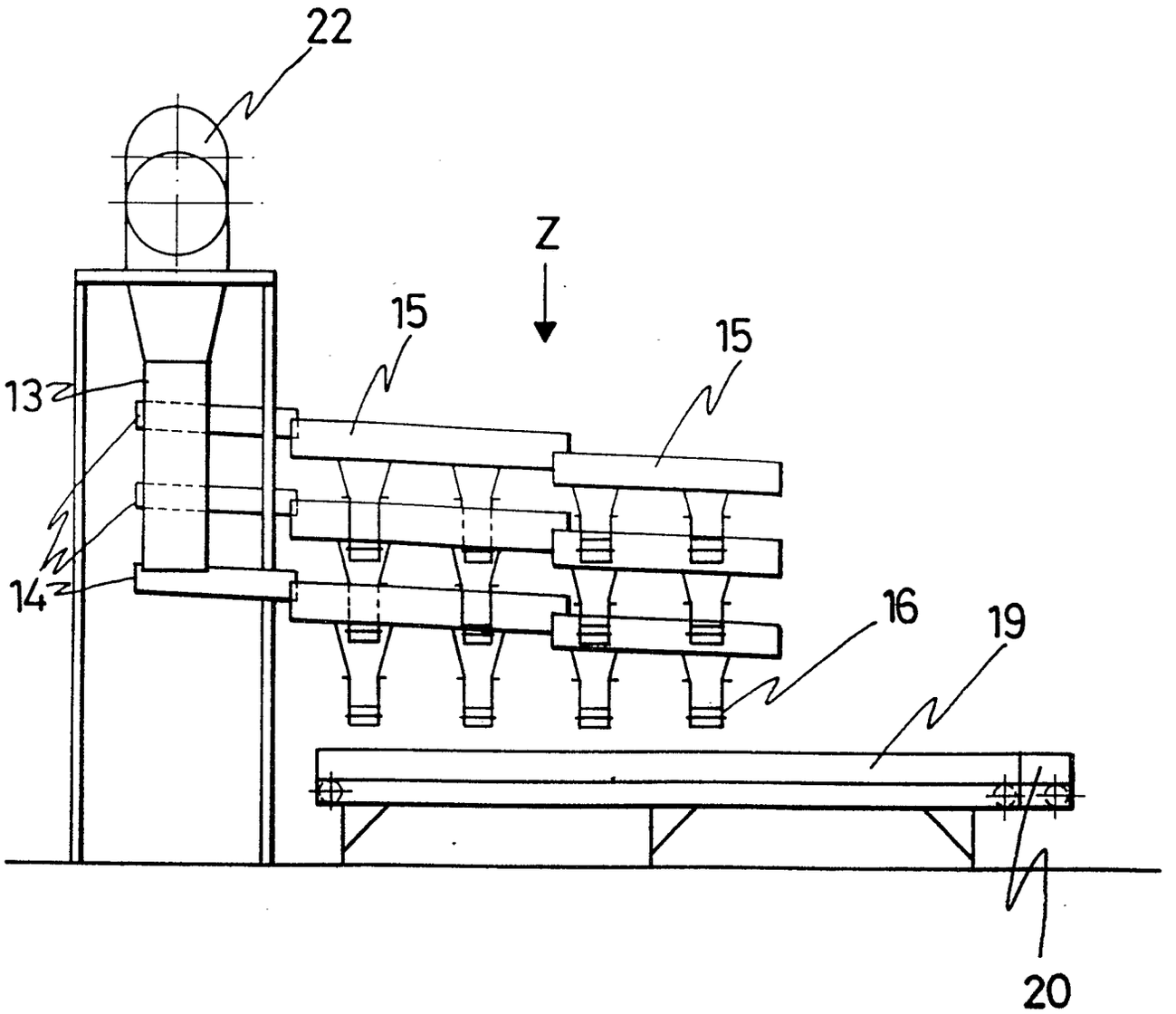

FIG.4

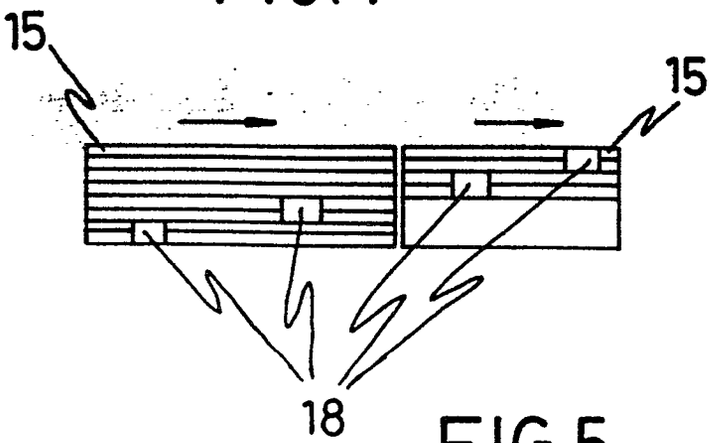

FIG.5