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(54) **Vibrating machine, particularly for the mass drying of metallic bodies, with automatic unloading of the dried parts.**

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Description

The present invention relates to a vibrating machine for the mass drying of metallic bodies, with automatic unloading of the dried parts.

As known, vibrating machines are currently commercially available which are predominantly used for drying metallic parts and comprise a tank body provided with vibrating means and associated with a supporting frame through the interposition of anti-vibration means.

A circular bottom is provided inside the tank body and has a ramp-like portion which conveys the items being processed together with the loose material, which can be constituted by abrasive elements, polishing elements and drying elements, to a selection plane which has an initial fixed portion, which in practice separates the parts being processed from the loose material, and an openable central portion which can be connected to a terminal unloading portion.

In known solutions, the openable central portion is in practice constituted by a grid which is pivoted, at the edge which is contiguous to the terminal portion to be moved, to a raised position which allows the parts being processed to fall inside the tank.

When unloading is to be performed, the central portion or grid is arranged so as to continue the fixed initial portion, consequently conveying the parts outward.

With this arrangement, when the openable central portion is closed, i.e. when it is aligned with the fixed initial portion, the presence of an operator is required to make sure that items being processed do not remain trapped between the edge of the central openable portion and the edge of the fixed initial portion.

With this arrangement it has consequently not been possible to automate the process steps and in particular it has not been possible to automate the unloading start step, due to the requirement of the presence of the operator.

Even the solution of pivoting the openable central part to the fixed initial portion has been found to be not possible, since in normal processes it would be necessary for the openable central portion to be folded downward and in this case, due to its relatively large width in the direction of circulation of the parts being processed, it would cause an obstacle inside the tank, preventing the free circulation of the parts.

The aim of the invention is to solve the above described problem by providing a vibrating machine for the mass drying of metallic bodies which allows the unloading steps to be carried out automatically, since the presence of the operator is not required even in the step of passage from the operative condition with recycling to the unloading condition.

The vibrating machine should allow to move the openable central portion without running the risk in any way of clamping or trapping parts being processed, during the various operative steps of passage from one working condition to another and to achieve the automation with extremely simple means which are easy to use.

Not least object of the present invention is to provide a vibrating machine which can be easily obtained starting from commonly commercially available elements and materials and which is furthermore competitive from a merely economical point of view.

The above described aim, the objects mentioned and others which will become apparent hereinafter are achieved by a vibrating machine, for the mass drying of metallic bodies, with automatic unloading of the dried parts, according to the invention, which comprises a tank body provided with vibrating means and associated with a supporting frame by means of the interposition of anti-vibration means, said tank body having, on the inside, a bottom defining a ramp-shaped portion leading to a selection plane having an initial fixed portion, an openable central portion and a terminal unloading portion, characterized in that said openable central portion comprises a first wing pivoted to said initial fixed portion and a second wing hinged to said terminal unloading portion, said wings being rotatable to place them in a working position, whereat said first wing is rotated downward for causing material to fall into said tank body, and in an unloading position, whereat said first wing and said second wing are mutually aligned for outwardly conveying dried parts.

The advantages will become apparent from the description of a preferred embodiment of a vibrating machine for the mass drying of metallic bodies, with automatic unloading of the dried parts, illustrated in the accompanying drawings, wherein:

figure 1 is a schematic elevation view of a vibrating machine according to the invention;

figure 2 is a top plan view of a vibrating machine;

figure 3 is a sectional view of a vibrating machine taken along a diametral plane;

figure 4 is a view of the selection plane in working position;

figure 5 is a view of the initial step of passage from the working position to the unloading position;

figure 6 is a view of an intermediate step of the passage from the working position to the unloading position;

figure 7 is a view of the selection plane in the position for unloading the dried parts;

figure 8 is a schematic view of the passage from the unloading position to the working position.

With reference to the above described figures, the vibrating machine for the mass drying of metallic bodies, with automatic unloading of the dried parts, according to the invention, comprises a tank body generally indicated by the reference numeral 1 which

is provided with vibrating means and is associated with a base supporting frame 2 with the interposition of conventional anti-vibration means which are not described herein in detail.

The tank body 1 internally defines a bottom 3 with a substantially circular extension which has a ramp-like portion 4 leading into a selection plane generally indicated by the reference numeral 10.

Said selection plane 10 is provided with an initial portion 11, advantageously of the grid-shaped kind, which is arranged above electric heating resistors 12 which have the function of heating and drying the grit or loose material which is intermixed between the various parts being processed.

An openable central portion, generally indicated by the reference numeral 13, and a terminal unloading portion, indicated by the numeral 14, are provided on the continuation of the fixed initial portion.

The peculiarity of the invention is constituted by the fact that the central openable portion 13 is constituted by a first wing 20 with a grid-shaped configuration, which is pivoted at the edge contiguous to the initial portion 11, and by a second wing 21 which is in turn pivoted at the edge contiguous to the terminal portion 14.

Advantageously but not necessarily, the first wing has a width, in the direction of passage of the material, which is smaller than the second wing 21.

As illustrated in figures 4 to 8, the wings 20 and 21 are rotatable about their pivoting axis to assume different positions for the passage from the working position to the unloading position and vice versa.

The rotation of the wings 20 and 21 is advantageously performed by means of a first and second cylinder, respectively indicated at 22 and 23, which act on the pivoting pin and perform the rotation.

As illustrated in figure 4, in the working position, i. e., in the position in which the various parts are continuously re-inserted into the tank, the first wing 20 is in a lowered position, i.e., directed towards the bottom of the tank, whereas the second wing 21 is in raised position, i.e., directed upwardly.

In these conditions, the material carried by the vibration onto the selection plane creates a first selection with separation of the grit and loose material which falls onto the electric resistors 12, whereas the various parts being machined, indicated by the reference numeral 15, are re-inserted toward the bottom of the tank.

For the passage from the working position to the unloading position, the first wing is first rotated upward (figure 5), thus creating a temporary barrier for the passage of the parts being processed, which are thus retained.

The second wing 21 is simultaneously rotated downward until it engages a stop abutment 30; the second wing 22 moves to align with the terminal portion 14.

Once the second wing has been positioned, the first wing 20 is rotated downward and becomes arranged in alignment with the second wing, thus defining a continuous selection plane (figure 7) which allows the outward unloading of the parts.

It should be furthermore added that the first wing and the second wing are provided, at the edges of mutual contact, with opposite shaped portions, indicated by the reference numerals 31 and 32, which allow to provide a rabbet-like coupling, with the first wing in practice resting on the edge of the second wing.

Once the parts have been unloaded, the first wing is rotated upward, thus releasing the second wing, which is rotatable upward, whereas the first wing is rotated downward, thus returning to the working conditions illustrated in figure 4.

With the described arrangement it is possible to automate the passage from the working position to the unloading position since it is not possible to trap the parts during the movement of the openable central portion.

It is furthermore possible to rotate the first wing downward, since its width is relatively small and consequently does not hinder the free circulation of the material on the bottom of the tank.

From what has been described it can thus be seen that the invention achieves the proposed aim and objects; in particular, the fact is stressed that the substantial splitting in two of the openable central portion of the selection plane allows to completely automate the operation of the vibrating machine which can be time-controlled, so as to perform the process for a certain presettable time period and then automatically perform the step of unloading the dried parts without running the risk of trapping the parts during the movement of the openable central portion.

The presence of the related abutment wings provided on the coupling edges of the wings 20 and 21 allows to provide a precise rest position for the first wing on the second wing which ensures the continuity of the selection plane so as to achieve easy unloading of the product toward the outside of the machine.

All the details may furthermore be replaced with other technically equivalent elements.

In practice, the materials employed, so long as compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to the requirements.

Claims

1. Vibrating machine, for the mass drying of metallic bodies, with automatic unloading of the dried parts, which comprises a tank body (1) provided with vibrating means and associated with a supporting frame (2) by means of the interposition of

anti-vibration means, said tank body (1) having, on the inside, a bottom (3) defining a ramp-like portion (4) leading to a selection plane (10) having an initial fixed portion (11), an openable central portion (13) and a terminal unloading portion (14), characterized in that said openable central portion (13) comprises a first wing (20) pivoted to said initial fixed portion (11) and a second wing (21) hinged to said terminal unloading portion (14), said wings (20, 21) being rotatable to place them in a working position, whereat said first wing (20) is rotated downward for causing material to fall into said tank body (1), and in an unloading position, whereat said first wing (20) and said second wing (21) are mutually aligned for outwardly conveying the dried parts (15).

2. Vibrating machine, according to the preceding claim, characterized in that said first wing (20) has a width, in the direction of unloading of the dried parts (15), which is smaller than the width of said second wing (21).

3. Vibrating machine, according to the preceding claims, characterized in that it comprises a stop abutment (30) which can be engaged by said second wing (21) for positioning it in alignment with said terminal unloading portion (14).

4. Vibrating machine, according to one or more of the preceding claims, characterized in that it comprises, on the mutually adjacent edges of said first wing (20) and said second wing (21), abutment wings (31, 32) for at least partially superimposing said first wing (20) on said second wing (21).

5. Vibrating machine, according to one or more of the preceding claims, characterized in that it comprises cylinders (22, 23) which act on the pivoting axis of said wings (20, 21) to rotate them.

6. Vibrating machine, according to one or more of the preceding claims, characterized in that in order to pass from said working position to said unloading position said first wing (20) is first rotatable upward to provide a barrier for causing temporary stoppage of dried parts (15), said second wing (21) being then rotatable to arrange it in alignment with said terminal portion (14), said first wing (20) being subsequently rotatable to arrange itself in alignment with said second wing (21).

Patentansprüche

1. Vibrationsgerät für die Massentrocknung metallischer Körper, mit automatischer Entladung der getrockneten Teile, welches einen mit Vibrationsmitteln versehenen Behälter (1) aufweist und unter Zwischenschaltung von Anti-Vibrationsmitteln mit einem Traggestell verbunden ist, wobei der Behälter in seinem Inneren einen Boden (3) aufweist, der einen rampenartigen Bereich (4) begrenzt, der zu einer Auswahlebene (10) führt, die einen festen Anfangsbereich (11), einen zu öffnenden zentralen Bereich (13) und einen Endbereich zur Entladung (14) aufweist,
dadurch gekennzeichnet,
daß der zu öffnende zentrale Bereich (13) einen ersten Flügel (20) umfaßt, der an dem festen Anfangsbereich (11) angelenkt ist und einen zweiten Flügel (21), der an den Endbereich zur Entladung (14) angelenkt ist, wobei die Flügel (20, 21) schwenkbar sind, um sie in Arbeitslage zu bringen, in der der erste Flügel (20) nach unten verschwenkt ist, um zu veranlassen, daß das Material in den genannten Behälter (1) fällt und in eine Entladeposition, in der der erste Flügel (20) und der zweite Flügel (21) wechselseitig miteinander fluchten für ein nach außen erfolgendes Fördern der getrockneten Teile (15).

2. Vibrationsgerät nach dem vorangehenden Anspruch, dadurch gekennzeichnet,
daß der erste Flügel (20) in Entladerichtung der getrockneten Teile (15) eine Abmessung aufweist, welche kleiner ist als die Abmessung des zweiten Flügels (21).

3. Vibrationsgerät nach den vorangehenden Ansprüchen, dadurch gekennzeichnet,
daß es einen Stoppanschlag (30) aufweist, an den sich der zweite Flügel (21) für dessen Positionieren in Fluchtstellung mit dem Endbereich zur Entladung (14) anlegen kann.

4. Vibrationsgerät nach einem oder mehreren der vorangehenden Ansprüche,
dadurch gekennzeichnet,
daß es auf einander benachbarten Kanten des genannten ersten Flügels (20) und des genannten zweiten Flügels (21) Anschlagflügelbereiche (31, 32) für eine mindestens teilweise Überlagerung des genannten ersten Flügels (20) auf dem genannten zweiten Flügel (21) aufweist.

5. Vibrationsgerät nach einem oder mehreren der vorangehenden Ansprüche,
dadurch gekennzeichnet,
daß es Zylinder (22, 23) aufweist, welche auf die Schwenkachse der genannten Flügel (20, 21) für deren Drehung einwirken.

6. Vibrationsgerät nach einem oder mehreren der

vorangehenden Ansprüche,
dadurch gekennzeichnet,
daß für einen Übergang von der genannten Arbeitslage zu der genannten Entladeposition der genannte erste Flügel (20) zunächst aufwärts schwenkbar ist, um eine Barriere zur Schaffung eines zeitweiligen Stops für die getrockneten Teile (15) zu bilden, wobei der genannte zweite Flügel (21) dann schwenkbar ist für eine Anordnung in Flucht mit dem genannten Endbereich (14), und der genannte erste Flügel (20) anschließend schwenkbar ist für seine Anordnung in Flucht mit dem genannten zweiten Flügel (21).

Revendications

1. Machine vibrante pour le séchage en masse de pièces métalliques, à déchargement automatique des pièces séchées, qui comprend un corps formant réservoir (1) muni de moyens d'entraînement en vibration et associé à un châssis de support (2) avec interposition de moyens antivibrations, ledit réservoir (1) comprenant à l'intérieur un fond (3) définissant une portion en forme de rampe (4) conduisant vers un plan de sélection (10) comportant une portion initiale fixe (11), une portion centrale ouvrable (13) et une portion terminale de déchargement (14), caractérisée en ce que ladite portion centrale ouvrable (13) comprend une première aile (20) montée de façon pivotante sur ladite portion initiale fixe (11) et une seconde aile (21) articulée sur ladite portion terminale de déchargement (14), lesdites ailes (20, 21) pouvant être tournées pour être placées dans une position de travail dans laquelle ladite première aile (20) est tournée vers le bas pour amener les pièces à tomber dans ledit réservoir (1) et une position de déchargement dans laquelle ladite première aile (20) et ladite seconde aile (21) sont mutuellement alignées pour acheminer les pièces séchées (15) vers l'extérieur.

2. Machine vibrante selon la revendication 1, caractérisée en ce que ladite première aile (20) a une largeur dans la direction du déchargement des pièces séchées (15) qui est plus petite que la largeur de ladite seconde aile (21).

3. Machine vibrante selon les revendications précédentes, caractérisée en ce qu'elle comprend une butée d'arrêt (30) pouvant venir en engagement avec ladite seconde aile (21) pour la mettre en alignement avec ladite portion terminale de déchargement (14).

4. Machine vibrante selon une ou plusieurs des revendications précédentes, caractérisée en ce qu'elle comprend, sur les bords mutuellement adjacents de ladite première aile (20) et de ladite seconde aile (21), des ailes de butée (31, 32) permettant de superposer au moins en partie ladite première aile (20) sur ladite seconde aile (21).

5. Machine vibrante selon une ou plusieurs des revendications précédentes, caractérisé en ce qu'elle comprend des vérins (22, 23) agissant sur les axes de pivotement desdites ailes (20, 21) pour les faire tourner.

6. Machine vibrante selon une ou plusieurs des revendications précédentes, caractérisée en ce que pour passer de ladite position de travail à ladite position de déchargement, ladite première aile (20) est d'abord tournée vers le haut pour constituer une barrière et provoquer l'arrêt temporaire des pièces séchées (15), ladite seconde aile (21) étant ensuite tournée pour l'amener en alignement avec ladite portion terminale (14), ladite première aile (20) étant ensuite tournée pour venir en alignement avec ladite seconde aile (21).

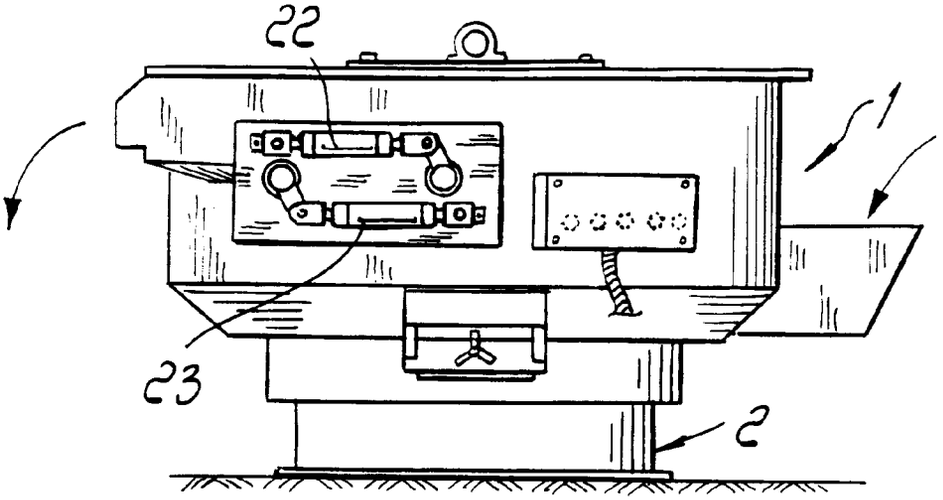

Fig. 1

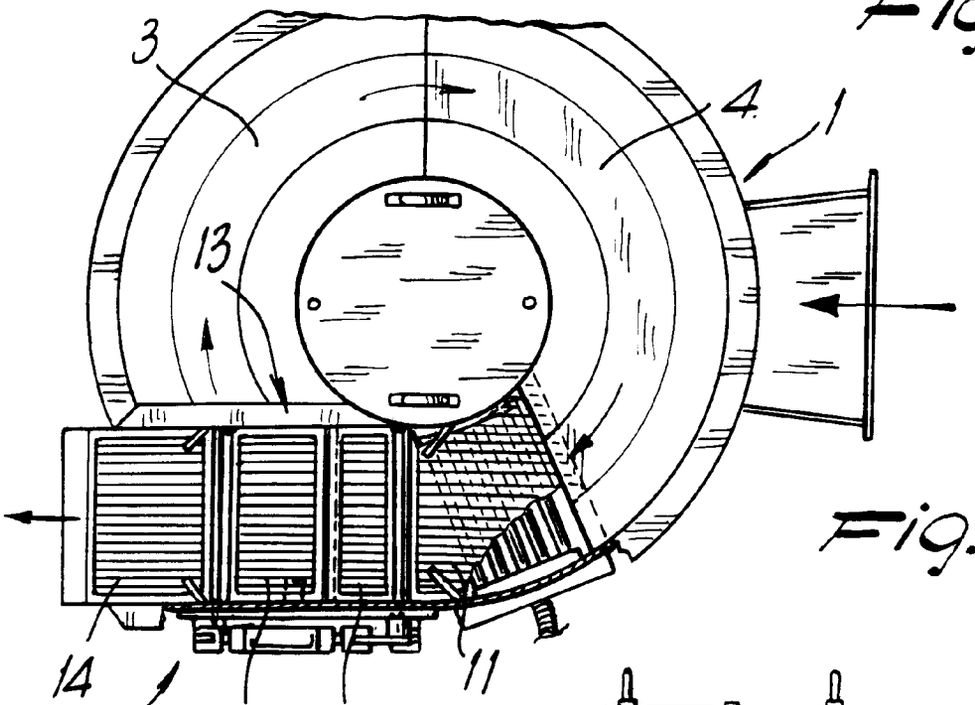

Fig. 2

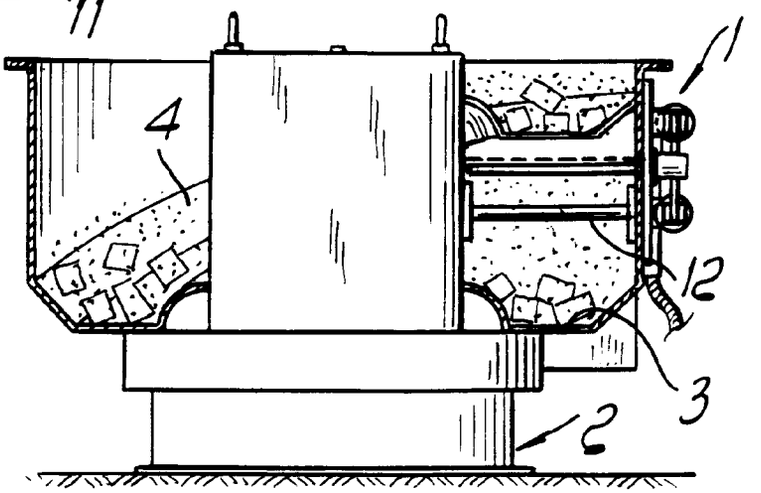

Fig. 3

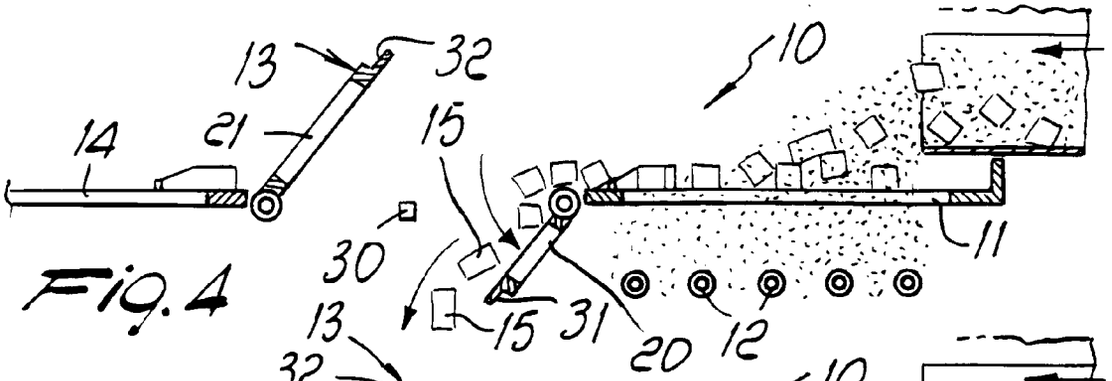

Fig. 4

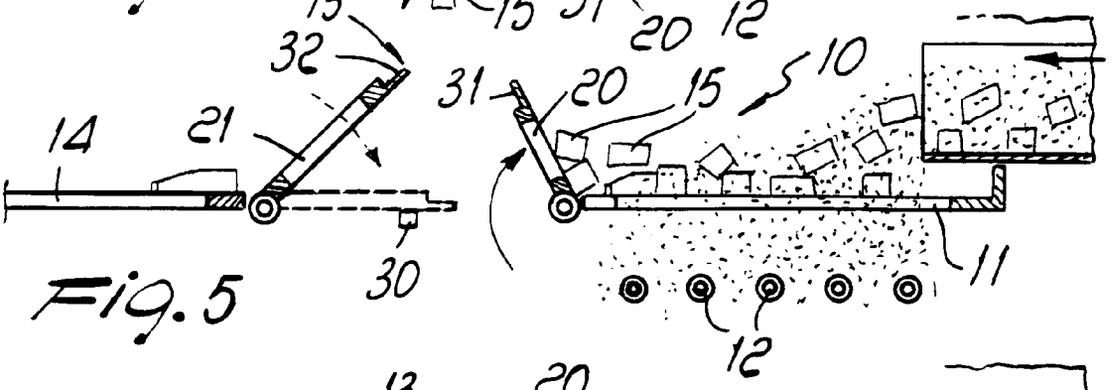

Fig. 5

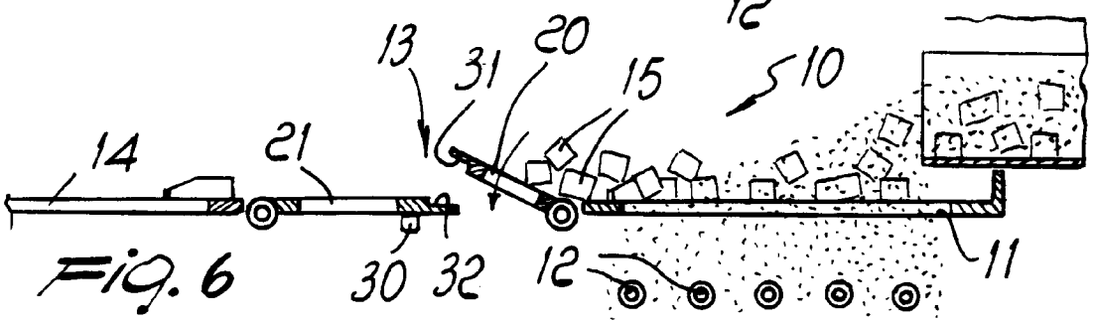

Fig. 6

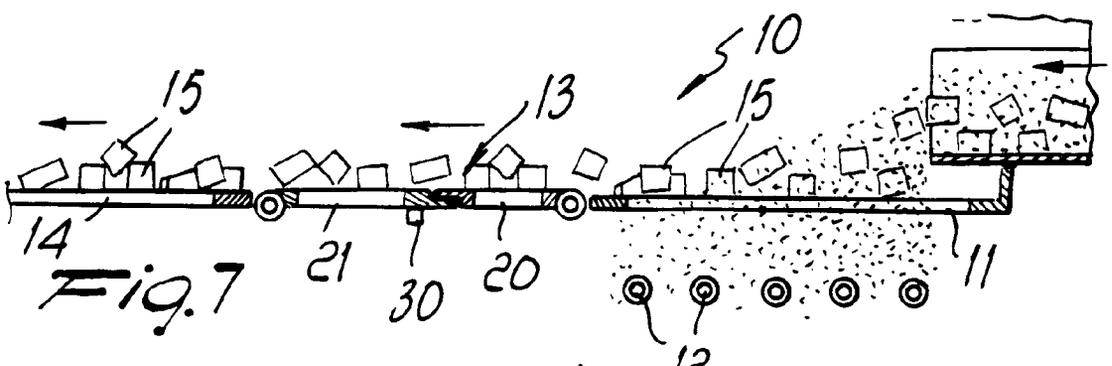

Fig. 7

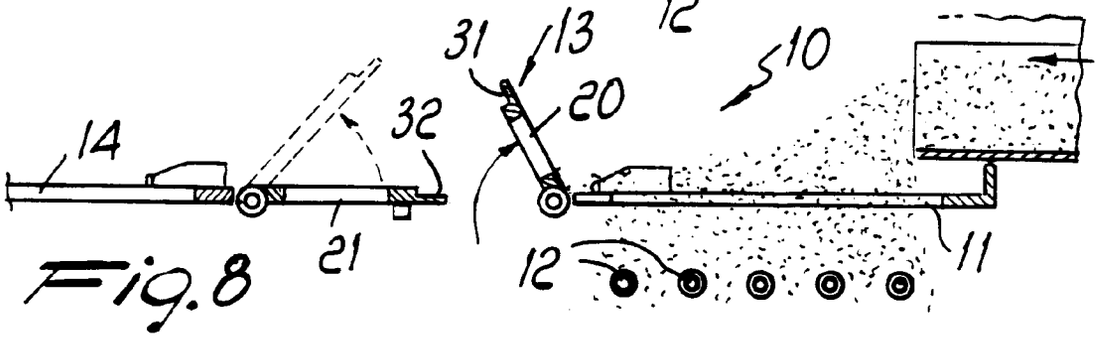

Fig. 8