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(12) # EUROPEAN PATENT APPLICATION

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(71) Applicant: **BLENDLOCK LIMITED**
12 Union Street
Stratford-upon-Avon Warwickshire(GB)

(72) Inventor: **Roderick, John Kenneth**
5 Burnell Close
Bidford-on-Avon Warwickshire(GB)

(74) Representative: **Massey, Alexander et al,**
MARKS & CLERK Scottish Life House Bridge Street
Manchester, M3 3DP(GB)

(54) **A method of and apparatus for bagging granular or pulverulent materials.**

(57) A method of bagging bulk granular or pulverulent material comprising the steps of conveying a bagging apparatus to a location adjacent bulk granular material to be bagged, delivering a quantity of the granular material to a dispensing head of the bagging apparatus, fitting a bag onto the dispensing head, inflating the bag and feeding a weighed quantity of the granular material into the bag, and thereafter removing the filled bag from the dispensing head and sealing same.

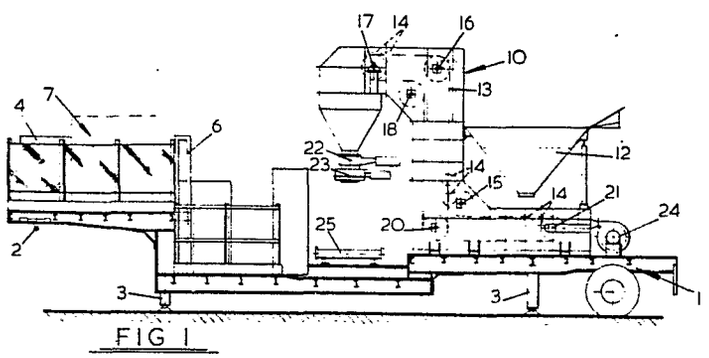

FIG 1

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The present invention relates to a method of and apparatus for bagging granular or pulverulent materials.

The provision of a permanent bagging facility at a location is not always practicable by virtue of the cost of such a bagging facility and/or the degree of usage which could be made of such a bagging facility. By way of example, smaller ports where bulk granular materials are landed generally do not have bagging facilities, which makes the handling and dispersal of such bulk material extremely difficult and expensive.

It is an object of the present invention to provide bagging facilities at such locations which by virtue of being mobile are cheap to use and easily set up on location.

According to the present invention there is provided a method of bagging bulk granular or pulverulent material comprising the steps of conveying a bagging apparatus to a location adjacent bulk granular material to be bagged, delivering a quantity of the granular material to a dispensing head of the bagging apparatus, fitting a bag onto the dispensing head, inflating the bag and feeding a weighed quantity of the granular material into the bag, and thereafter removing the filled bag from the dispensing head and sealing same.

Also, according to the present invention there is provided apparatus for bagging bulk granular or

pulverulent material, the apparatus being vehicle mounted, or adapted for vehicle mounting, and comprising at least one material dispensing head, means for fitting a bag to the head, bag inflation means and means for weighing the bag.

The bagging apparatus may be height-adjustable so that it can be used in locations with restricted headroom, and/or reduced in height for transportation purposes.

The bagging apparatus is preferably mounted on a fixed vehicle or a vehicle trailer unit but may be mounted in a container which is vehicle transportable.

The vehicle preferably but not essentially has a low level bed on which the bagging apparatus is mounted, and bagging operations may be effected with the apparatus mounted on the vehicle or temporarily free-standing on the ground.

The bagging apparatus may be carried by a height-adjustable framework to permit it to be set at an appropriate height for, say restricted headroom locations, transport or to suit the delivery equipment feeding material from the bulk supply to the apparatus.

The bags to be filled may have two straps for hooking onto the support arms of a dispensing head and an inlet collar into which the dispensing head extends for filling purposes.

It will be appreciated that the dispensing head and weighing arrangement are suitably operatively

associated so that the dispensing head is caused to close when a predetermined weight of material is contained in a bag.

The power for operating the bagging apparatus may be provided by an independent prime mover forming part of the bagging facility, by a power take-off from the vehicle, or by a prime mover provided at the bagging site.

In use, the bagging apparatus is driven to the bagging site where it is disposed adjacent the bulk material to be bagged.

A range of bagging apparatus to fill bags of capacity from 5 kilos to 3000 kilos is envisaged.

An embodiment of the present invention will now be described by way of example, with reference to the accompanying drawings, in which:

Fig.1 is a side view of a vehicle trailer on which is mounted apparatus embodying the present invention;

Fig. 2 shows an end view of the vehicle trailer and apparatus of Fig. 1;

Fig. 3 is a top view of the vehicle trailer and apparatus of Fig. 1;

Fig. 4 is a sectional view along lines I-I of Fig. 1 showing the bag loading hoppers and bag conveyor belts;

Fig. 5 is a schematic view of a conveyor belt on which material to be bagged is carried to one

of the loading hoppers; and

Fig. 6 is a perspective view of a bucket used on the conveyor belt.

Referring to Figs. 1 to 4 there is shown a vehicle trailer 1 on which is mounted apparatus for bagging granular or pulverulent materials. The trailer 1 is adopted to be connected to a towing vehicle at 2 and comprises legs 3 on which it can be supported when the towing vehicle is disengaged from it. As a result it will be appreciated that the bagging apparatus is completely mobile and may be set up on any site accessible by road.

Also mounted on the trailer 1 are the generators 4 and compressor 5 for powering the bagging apparatus. These are mounted on a platform above the bagging area and are accessible by means of an access ladder 6. Storage areas 7 and 8 are also provided on the trailer for bags to be transported on the trailer. These bags may be empty bags being carried to the site for use or filled bags to be transported to a storage depot etc.

The bagging apparatus mounted on the vehicle trailer 1 comprises two discrete, identical bagging systems 9 and 10 respectively, which are mounted adjacent each other on the trailer 1. The provision of two discrete bagging systems side by side enables a pair of operators to operate the bagging apparatus with minimum discontinuity of operation as will be

described later hereinbelow. Since the bagging systems 9 and 10 are identical for the purpose of explanation only one will be described hereinbelow.

Granular or pulverulent materials to be bagged are inpurt to both bagging systems 9 and 10 by means of a common reservoir hopper 11 which once filled can be occasionally topped up to keep the bagging apparatus operating continuously. Any convenient means may be used to load the material into the hopper 11, for example, a dumper truck. To prevent undue spillage of material as it is loaded into the hopper 11 a spill tray is provided at the loading edge of the hopper 11.

Towards its bottom reservoir hopper 11 devides into two funnels 12 each of which opens over a respective one of the material conveyor belts 13 of the bagging systems 9 and 10. Each conveyor belt 13 (shown in detail in Fig. 5) comprises a plurality of buckets 14 (shown in detail in Fig. 6) pivotally attached to it around its complete length. The buckets 14 are orientated so as to receive material to be bagged as they pass under the open nozzle of funnel 12 from which the material is trickling. The buckets 14 are carried on the conveyor belt 13 around guide wheels 15, 16 and 17 to the top of the bagging apparatus where as each bucket passes around guide wheel 17 it is tipped upside down to empty its contents into a bag filling hopper 18.

The hopper 18 like hopper 11 provides a reservoir of material to be bagged ensuring that each bag to be filled with the material is filled without undue waste of time. Once emptied each bucket 14 is returned on the conveyor belt 13 to the bottom of the bagging system around guide wheels 19, 20 and 21. As each bucket 14 travels around guide wheel 21 it returns to its right side up position and is accordingly ready to be filled again as it passes under the nozzle of funnel 12. Because the flow of material from the nozzle of funnel 12 is continuous the buckets 14 are mounted on the conveyor belt 13 so as to form a virtual continuous container as they pass beneath the nozzle of funnel 12. This minimises the loss of material between the buckets 14.

Located beneath the nozzle of the hopper 18 is a pneumatic valve mechanism 22 and a bag securing mechanism 23. The bag securing mechanism serves to secure the opening of a bag to be filled with material around an extension of the nozzle of hopper 18. The pneumatic valve mechanism 22 is adapted to open and close the extension of the nozzle of hopper 18 to permit or prevent the flow of material into the bag held in position by the securing mechanism 23. The pneumatic valve mechanism 22 also provides a supply of compressed air to inflate the bag prior to opening the extension to the nozzle of hopper 18. The compressed air is supplied to the pneumatic valve

mechanism 22 through ducting not shown from fans 24. Inflating the bags prior to filling ensures even filling of the bag.

In order to ensure that each bag to be filled is filled with the correct weight of material a weighing mechanism 25 is provided beneath the nozzle of hopper 18. Each bag to be filled is supported on the weighing mechanism 25 whilst being filled with material running from the hopper 18. In order to ensure that each bag is accurately filled to the required weight the weighing mechanism 25 is connected up to the pneumatic valve mechanism 22 so that when the required weight of material is reached the extension to the nozzle of hopper 18 is closed. The pneumatic valve is opened though by the operator once he has positioned a bag.

Once filled with material the bag is disengaged from the bag securing mechanism 23 and moved clear of the hopper 18 so that it can be picked up and stowed as appropriate. Conveniently conveyor belts 26 are used to move the bag clear of the hopper 18. One conveyor belt 26 forms port of the weighing mechanism 25 and the other conveyor belt 26 is located adjacent the first and runs clear of the trailer 1. Any convenient means may be used to pick the bag up from the conveyor belts 26, for example, a fork lift truck.

Referring now to Figs. 5 and 6 the conveyor

belt for carrying material from the bottom to the top of the bagging system will be described. As previously explained the conveyor belt 13 and the buckets 14 pivotally connected thereto are guided by guide wheels 15, 16, 17, 19, 20 and 21. Each bucket 14 comprises a tab 27. As the buckets 14 travel between guide wheels 21, 15, 16 and 17 the tab remains clear of the conveyor belt 13, however as the conveyor belt 13 travels around guide wheel 17 it engages with tab 27 causing the bucket 14 to move with it. As a result as the bucket passes around guide wheel 17 it is tipped upside down. As the conveyor belt travels between guide wheels 17, 19, 20 and 21 the weight of the buckets acting down prevents the tab from disengaging with the conveyor belt 13 and thus keeps each bucket 14 upside down. However as the bucket 14 travels around guide wheel 21 the conveyor belt 13 engaging with the tabs 27 turn the buckets 14 the right way up. Thus the buckets are ready to be filled again.

In use the bagging apparatus described with reference to the accompanying drawings requires only two operators, one to position and fill the bags and the other to operate a fork lift truck or the like to lift the bags from the bagging apparatus and stow them.

The provision of two discrete bagging systems allows the virtually continous filling of bags to take

place. Whilst one operator is positioning and filling a bag at one of the bagging systems, the bag filling hopper of the other bagging system is being topped up and the other operator can remove and stow a bag previously filled at that bagging system.

CLAIMS

1. Apparatus for bagging bulk granular or pulverulent materials, the apparatus being vehicle mounted or adapted for vehicle mounting and comprising at least one material dispensing head, means for fitting a bag to the head, bag inflation means and means for weighing the bag.

2. Apparatus according to Claim 1, wherein material is carried to the said at least one dispensing head by means of a continuous belt carrying a plurality of buckets which are filled from a reservoir of material and emptied into the said dispensing head.

3. Apparatus according to Claim 2, wherein said reservoir of material comprises a hopper filled with said material, said plurality of buckets passing beneath the nozzle of the hopper to be filled.

4. Apparatus according to Claim 3 wherein said hopper comprises a nozzle in respect of and disposed above each continuous belt carrying said plurality of buckets.

5. Apparatus according to any preceding claim, wherein each dispensing head comprises a hopper, for storing said material to be dispensed, means for opening and closing the bag filling nozzle of the hopper to dispense said material and means for securing a bag to be filled to the bag filling nozzle of said hopper.

6. Apparatus according to claim 5 wherein the

means for opening and closing said nozzle comprises a pneumatic valve mechanism.

7. Apparatus acoording to claim 5 or 6, wherein said bag weighing means is connected to the means for opening and closing said nozzle, to close said nozzle when the bag is filled to the required weight.

8. Apparatus according to claim 7, wherein said weighing means supports the bag whilst being filled.

9. Apparatus according to any preceding claim, wherein means are provided for moving the bag clear of the bag filling nozzle to facilitate its removal from the bagging apparatus to storage.

10. Apparatus according to claim 9, wherein said means for moving the bag clear comprises a conveyor belt.

11. Apparatus according to any preceding claim wherein the bagging apparatus is mounted on a vehicle trailer.

12. Apparatus according to any preceding claim, wherein the apparatus is mounted on a height adjustable framework to permit it to be set to any appropriate height.

13. A method of bagging bulk granular or pulverulent material comprising the steps of conveying a bagging apparatus to a location adjacent bulk granular material to be bagged, delivering a quantity of the granular material to a dispensing head of the bagging apparatus, fitting a bag onto the dispensing head,

inflating the bag and feeding a weighed quantity of the granular material into the bag, and thereafter removing the filled bag from the dispensing head and sealing same.

14. Apparatus substantially as hereinbefore described with reference to the accompanying drawings.

15. A method of bagging granular or pulverulent materials substantially as hereinbefore described with reference to the accompanying drawings.

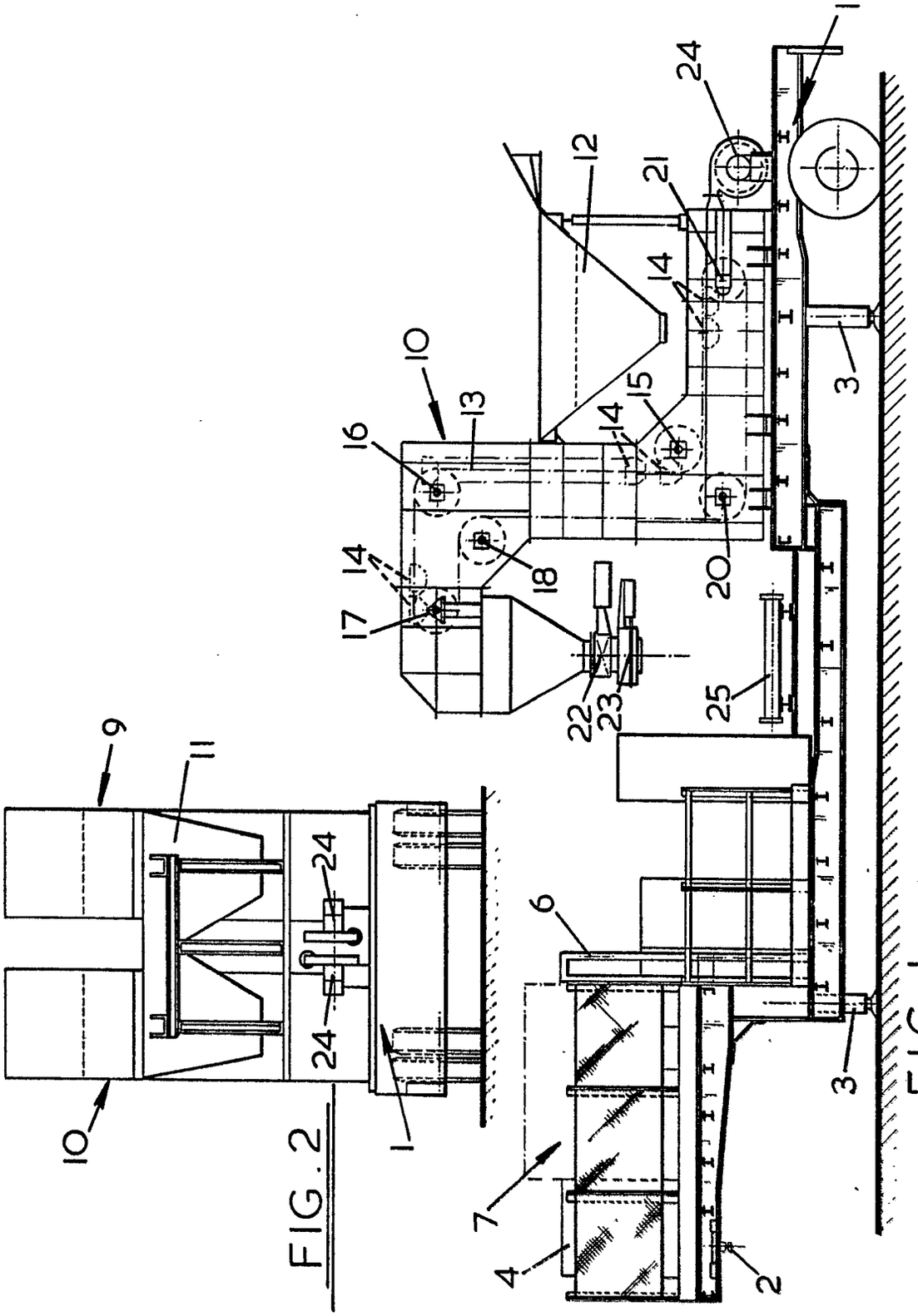

FIG. 1

FIG. 2

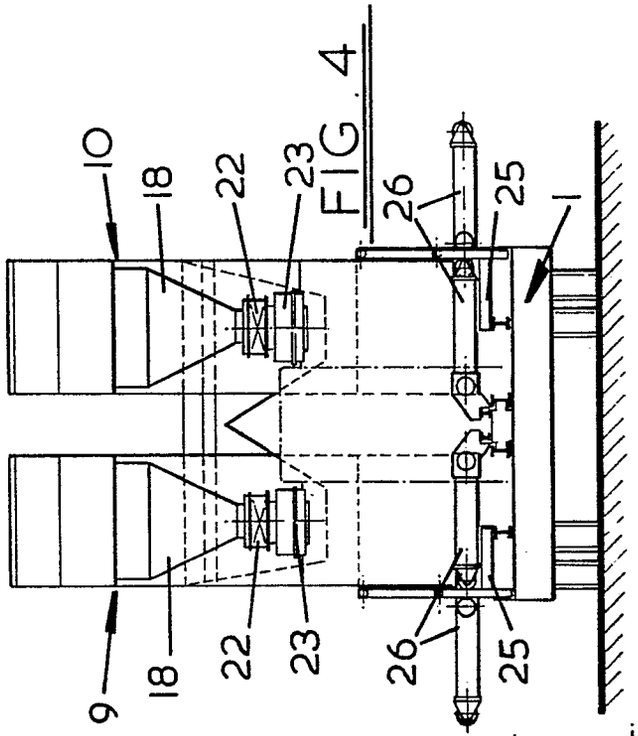

FIG. 4

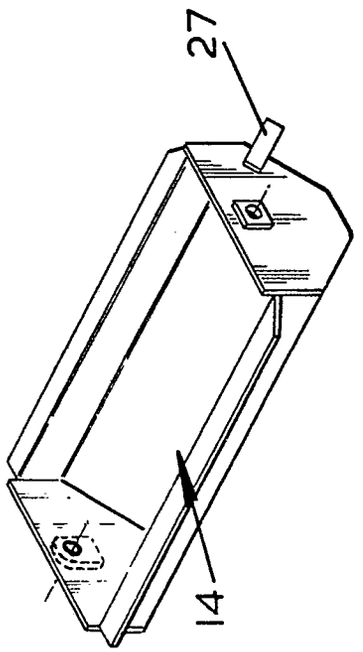

FIG. 5

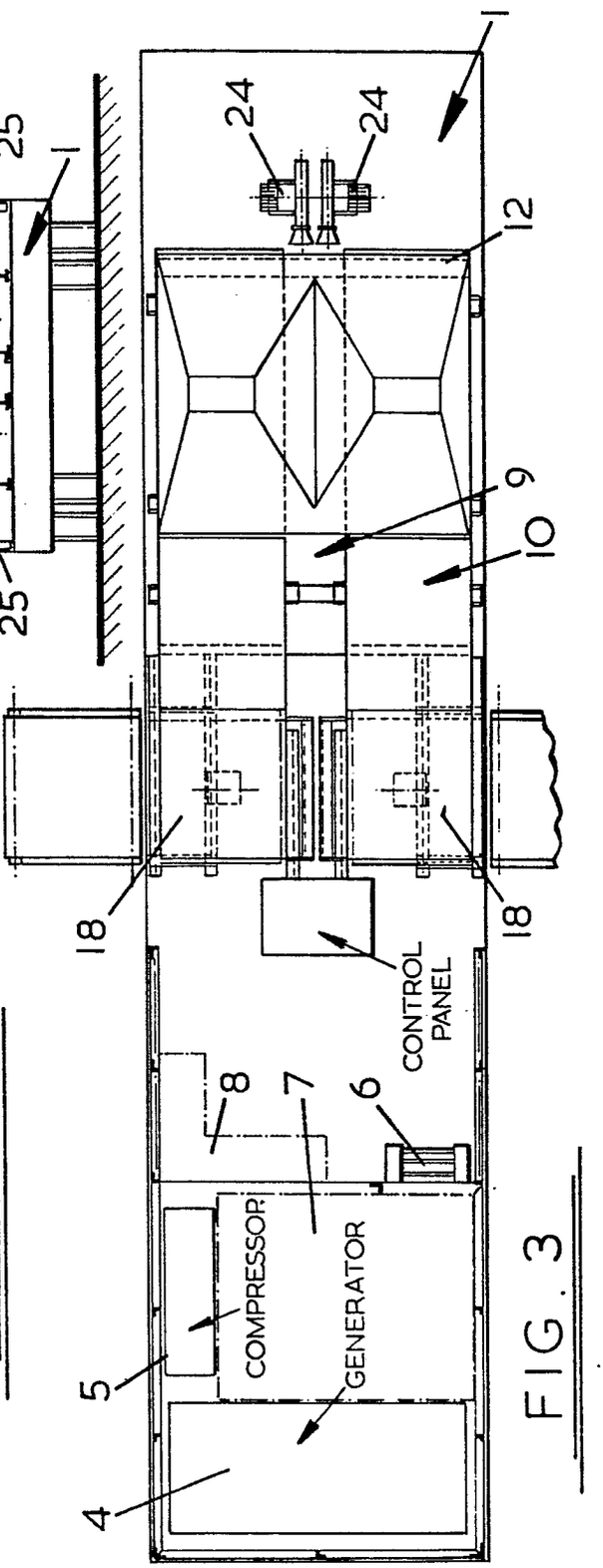

FIG. 3

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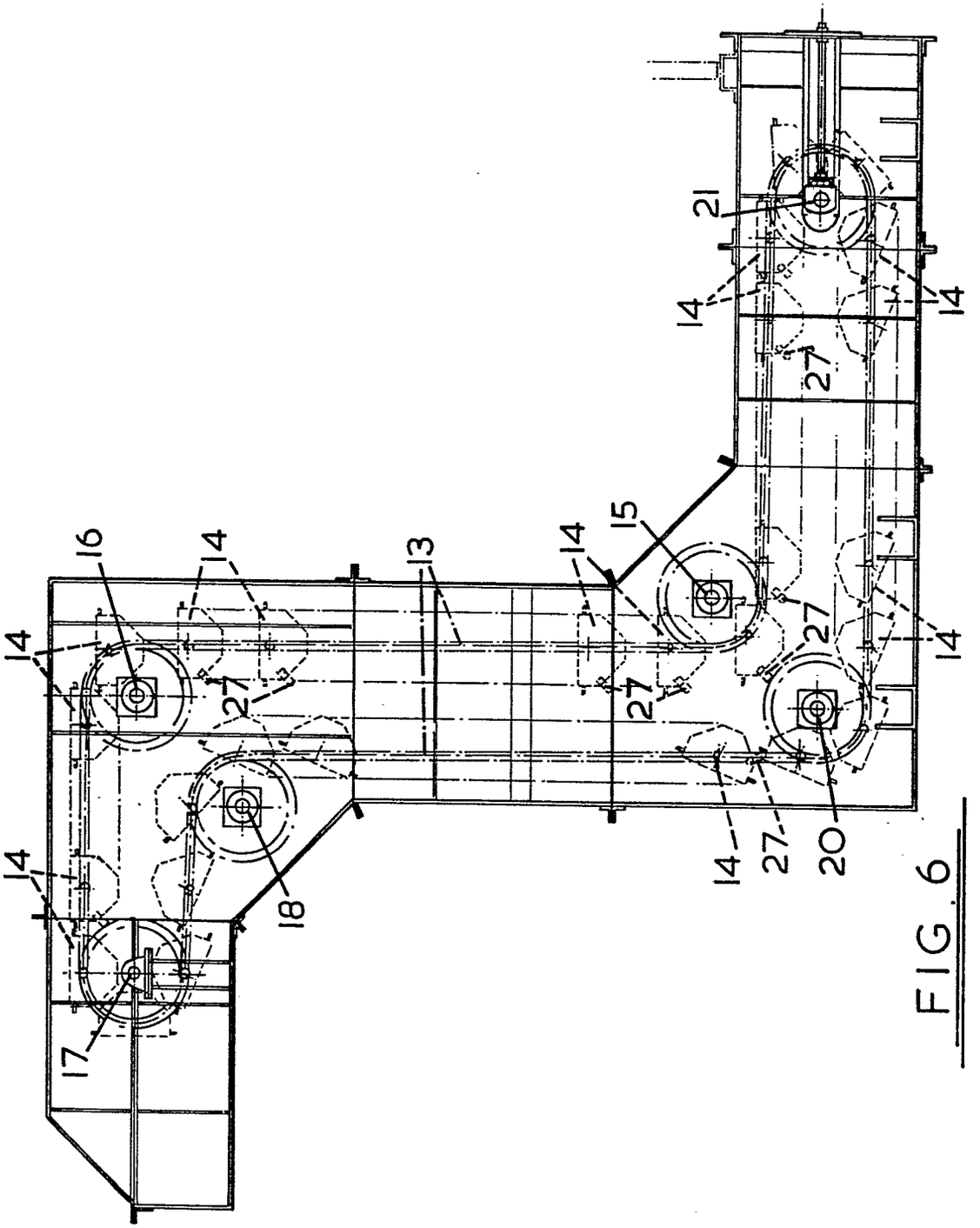

FIG. 6

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EUROPEAN SEARCH REPORT

Application number

EP 81 30 5210

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	FR - A - 471 572 (J. ADERS) * Page 1, line 24 - page 2, line 67; figures *	1-3,5, 7,11, 13-15
X	FR - A - 2 062 404 (VULCAAN) * Page 2, line 38 - page 4, line 5; figures *	1,2,5, 9-11, 13-15
A	US - A - 3 452 857 (A. STAMBERA) * Column 3, lines 16-23; figure 1 *	2-4
A	FR - A - 2 220 425 (PELZ & NAGEL) * Page 6, lines 8-26; figures 3,4 *	5,6,9, 10
A	US - A - 2 923 517 (A. WALLER) * Column 3, line 21 - column 4, line 2; figures *	5,7,8

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

B 65 B 1/32
43/36

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

B 65 B
B 65 G

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same category
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: earlier patent document, but published on, or after the filing date
D: document cited in the application
L: document cited for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	09-02-1982	JAGUSIAK