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54 **Pipe handling equipment and method.**

57 A pipe handling apparatus (1) conveys pipes (5) singly, via a screw feed mechanism (11) having a flat entry portion (12) which ensures singulation, to a pipe bundling mechanism (21). The mechanism (21) has movable side portions (22, 23) which form the pipes (5) into a hexagonal bundle before they are secured together and discharged from the mechanism (21).

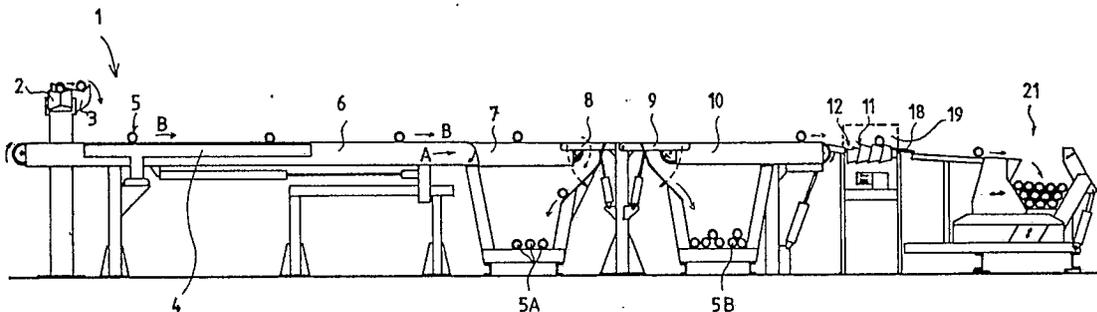


FIG. 1.

Description**PIPE HANDLING EQUIPMENT AND METHOD**Background of the Invention

This invention relates to improvements in and relating to pipe handling equipment and more particularly but not exclusively to such equipment which is able to bundle a plurality of pipes together for subsequent transportation.

In the past, pipes have commonly been bundled together into a cylindrical or a hexagonal bundle before being strapped together by the use of suitable strapping material. Hexagonal bundles have become generally accepted as being preferable in that they are easier to store and transport due to a reduced tendency to roll. Bundling machines have however generally been inefficient and/or expensive.

It is therefore an object of one embodiment of the invention to provide a pipe handling apparatus which facilitates the speedy and efficient handling of pipes. Further objects of this invention will become apparent from the following description.

According to one aspect of the present invention there is provided a pipe handling apparatus having a pipe handling means for sequentially feeding pipes from a pipe input end to a pipe output end, a pipe bundling means being provided at said pipe output end to receive and bundle together a plurality of said pipes, characterised in said pipe bundling means comprising a framework having a substantially open upper end and with base and side framework portions, at least one side framework portion being movable so as to adjust its transverse spacing from an opposite side framework portion, the internal surfaces of said base and side framework portions defining a space of a desired size and cross-sectional configuration for a bundle of said pipes and wherein a plurality of pipes are sequentially received within said framework to at least substantially fill said space to be formed into a bundle of said desired size and configuration for subsequent securement together.

According to a further aspect of the present invention there is provided a pipe handling apparatus as above defined characterised in said pipe handling means comprising a screw feed conveying means having at least one rotatable screw member having an external screw profile with, at an input end thereof, a substantially flat portion adapted to sequentially receive thereon a single pipe which, with the rotation of said screw member, is then transferred along said screw member to said output end.

Further aspects of this invention which should be considered in all its novel aspects will become apparent from the following description given by way of example of possible embodiments thereof and in which reference is made to the accompanying drawings wherein:-

DESCRIPTION OF THE DRAWINGS

Figure 1: shows diagrammatically a side view of a pipe handling apparatus according to one possible embodiment of the invention;

Figure 2: shows diagrammatically a screw conveying means for use in the handling apparatus of Figure 1;

Figure 3: shows diagrammatically a side view of a pipe bundling apparatus forming part of the apparatus of Figure 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention in one embodiment thereof seeks to provide a pipe handling apparatus which overcomes or at least obviates disadvantages in such equipment proposed or available to the present time.

Referring firstly to Figure 1 of the accompanying drawings, a diagrammatic side view of one embodiment of the present invention shows an input end 1 for pipes 5. The pipes 5 are received individually from a source of supply along transversely disposed rollers 2 before being fed to a pipe take-off 3 for dropping onto a preferably inclined bed 4 and then to conveyor belt 6. Alternatively, a plurality of pipes 5 may be dropped onto an inclined bed 4 and by the action of their rolling downwardly along the bed 4 can be separated out so as to form a single layer of pipes which can then be transferred from the bed 4 onto the moving conveyor belt 6. The conveyor belt 6 can be an endless conveyor formed from a plurality of discrete conveyor pads which frictionally engage with an individual one of the pipes 5 to carry it along as the conveyor 6 moves generally in the direction indicated by arrow A thus tending to move the pipes 5 in the direction indicated by arrow B. An area referenced generally by arrow 7 at the end of the conveyor 6 is an inspection area where the size or quality of the pipes can be assessed so that by operation of dumping arms 8 and 9 a sub-standard pipe 5A can be dumped for subsequent scrapping while a poor quality or perhaps wrong sized pipe 5B can be subsequently dumped for use as required. A subsequent conveyor 10 then conveys pipes 5 which are not dumped to a screw conveying means 11 described in greater detail with respect to Figure 2. As seen in Figure 2 the conveying means 11 comprises a plurality of axially parallel screw members 13 one of which is shown in figure 2 and across which the pipes are received. At its input end each screw member 13 has a flat portion 12 which can sequentially receive a single pipe 5. As the screw conveying means 11 rotates the pipe 5 will then be transferred along the screw members 13 for exit at the output end 14. The flat portion 12 provided at the input end of each screw member 13 is thus seen to

act to single the pipes 5 for subsequent transference singly along the external surface of the screw members 13 so as to ensure that a multiplicity of pipes 5 are not transferred together along the apparatus. The outer ends of the pipes 5 can be engaged with a guide member 19 so as to ensure that all the ends of the pipes 5 are correctly aligned one with another. An additional advantage of this screw conveying means 11 is that whenever the conveying means 11 is stopped from rotating the movement of the pipes 5 therealong is correspondingly terminated. An individual pipe 5, as shown, will then rest against the nearest part of the profile of the respective screw members 13.

It is pointed out here that there may be three or more of the screw members 13 provided across the width of the apparatus and a corresponding number of conveyors and other items of equipment 6, 10, etc. In the side views of the apparatus shown in the accompanying drawings only a single item of equipment has been shown in each case.

A common drive to the plurality of screw members 13 is provided, as shown, by a motor 15 driving gears or pulleys 16 through a common chain or belt drive 17.

Referring now to Figures 1, 2 and 3, the pipes 5 leaving the screw conveyor 11 are shown passing downwardly along a downwardly facing platform 18. At or near this point the ends of the pipes 5 (at one or both sides of the apparatus, and if required also at intermediate parts of the apparatus) can pass over a marking station, suitably a paint impregnated pad or the like, which will identify each pipe of a bundle as being of a particular size, quality or type.

The pipes 5 are then shown passing into a bundling framework shown by arrow 21. The framework 21 is shown comprising a movable frame member 22 which can be moved inwardly towards an outer frame member 23 until a required separation of members 22 and 23 will have been achieved. The control of this movement can be by means of suitable micro-switches or the like which may suitably be associated directly with the member 22 or could alternatively be part of a computerised or other control of the drive means for the member 22 itself. The member 22 is shown associated with a pointer 24 movable over a scale 25 so as to indicate its position relative to the frame member 23. The scale 25 could indicate the dimensional size for example of the resulting bundle of pipes resulting from a particular setting.

The movable member 22 is shown having an internal face 26 defining two sides of a hexagon as well as a base portion 27 forming the base side of the hexagon. The generally fixed member 23 is shown providing a further two side portions 28 of the hexagon while an open upper end 29 defines the remaining side of the hexagon.

In use therefore the movable member 22 will be moved relative to the member 23 to the required setting and the plurality of pipes 5 will be received sequentially so as to form the substantially hexagonal shape defined between the members 22 and 23. The positioning of the pipes 5 relative to each other can be facilitated by an operator manually vibrating

the pipes within the framework or alternatively it is envisaged that a vibrating mechanism could be used for a similar purpose. Once the framework is full, and the hexagonal bundle of pipes has been formed, the conveyors, including the screw conveyor 11, can then be stopped and strapping or the like can be engaged about the bundle of pipes 5. This strapping can be applied manually or automatically and will generally involve the wrapping around the bundle of pipes, at least at each end, of a steel or other strong strapping material. At a far end of the apparatus, substantially in line with the framework 21, may be a set of rollers which on rotation can cause the withdrawal of the bundle of pipes transversely of the apparatus for subsequent transportation or storage. It is mentioned here that after securement of the bundle of pipes the movable member 22 may also conveniently be withdrawn transversely so as to facilitate the discharge of the bundle from the apparatus. The member 23 can be moved back by operating means 30 as indicated by arrows C. The opening movement of both the members 22 and 23 may facilitate the lifting of the completed bundle by means of a crane or gantry or the like.

While a hexagonal shaped bundle has been shown in the accompanying drawings as being formed, it is of course appreciated that other cross-sectional shapes of bundles could be achieved if required by the appropriate formation of the inner surfaces of the frame members 22 and 23 and the like.

Where in the foregoing description reference has been made to specific components or integers of the invention having known equivalents then such equivalents are herein incorporated as if individually set forth.

Although this invention has been described by way of example and with reference to possible embodiments thereof it is to be understood that modifications or improvements may be made thereto without departing from the scope of the invention as defined in the appended claims.

Claims

1. A pipe handling apparatus having a pipe handling means (2, 3, 4, 6, 7, 10, 11) for sequentially feeding pipes (5) from a pipe input end (1) to a pipe output end, a pipe bundling means (21) being provided at the pipe output end to receive and bundle together a plurality of said pipes (5), characterised in that said pipe bundling means (21) comprising a framework having a substantially open upper end (29) and with base (27) and side frame portions (22, 23), at least one of said side frame portions (22) being movable so as to adjust its transverse spacing from an opposite side frame portion (23), the internal surfaces of said base (27) and side frame portions (22, 23) defining a space of a desired size and cross-sectional configuration for a bundle of said pipes whereby when a sufficient number of pipes are sequentially received within said framework to at least substantially fill said space of said desired size

and cross-sectional configuration they can be subsequently secured together.

2. A pipe handling apparatus as claimed in claim 1, characterised in that said pipe handling means (2, 3, 4, 6, 7, 10, 11) comprises a screw feed conveying means (11) having at least one rotatable screw member (13) having an external screw profile with, at an input end thereof, a substantially flat portion (12) adapted to sequentially receive thereon a single pipe (5) which, with the rotation of said screw member (13) is then transferred along said screw member (13) to said output end.

3. A pipe handling apparatus as claimed in claim 2, characterised in that a plurality of said rotatable screw members (13) having their respective flat portions (12) substantially aligned transversely across said apparatus are provided whereby said single pipes (5) can be received across said flat portions (12) for transfer to said output end with the common rotation of said screw members (13).

4. A pipe handling apparatus as claimed in any preceding claim, characterised in that said base (27), said movable side frame portion (22) and said side frame portion (23) define with said open upper end (29) a hexagonal space, said side frame portion (23) being movable away from said side frame portion (22) after said pipes have been secured together into said bundle.

5. A pipe handling apparatus as claimed in any preceding claim, characterised in that said pipe handling means further comprises a dropping means (3) which drops pipes (5) individually onto a pipe receiving bed (4).

6. A pipe handling apparatus as claimed in any one of claims 1 to 3, characterised in that said pipe handling means further comprises an inclined bed (4) onto which a plurality of said pipes (5) are dropped together and which are then separated out so as to form a single layer of pipes (5) by the action of their rolling downwardly along the said bed (4).

7. A pipe handling apparatus as claimed in any one preceding claim, characterised in that said pipe handling means further comprises a conveyor belt (6) formed from a plurality of discrete conveyor pads which frictionally engage with an individual one of the said pipes (5).

8. A pipe handling apparatus as claimed in any one preceding claim, characterised in that said pipe handling means comprises dumping means (8, 9) for dumping sub-standard or wrongly sized pipes (5A, 5B) before they reach said output end.

9. A method of bundling a plurality of lengths of pipe together for efficient handling during transportation which comprises feeding the pipes to a bundling machine and strapping the bundled pipes together, characterised in that the pipes are fed one-by-one to a framework (21) having a substantially open upper end (29) and base (27) and side frame portions (22, 23), at least one of said side frame portions (22)

being moved to set its transverse spacing from an opposite side frame portion (23) so that the internal surfaces of said base (27) and side frame portions (22, 23) define a space of the size and cross-sectional configuration of the desired bundle, in that pipes are sequentially fed into said framework (21) to at least substantially fill said space and in that the pipes making up the bundle so formed are then secured together prior to removing from the framework (21).

10. A method as claimed in claim 9, characterised in that following formation of the bundle of pipes at least one of the side frame portions (23) is moved to increase the size of the space defined in the framework (21) to facilitate removal of the pipe bundle therefrom.

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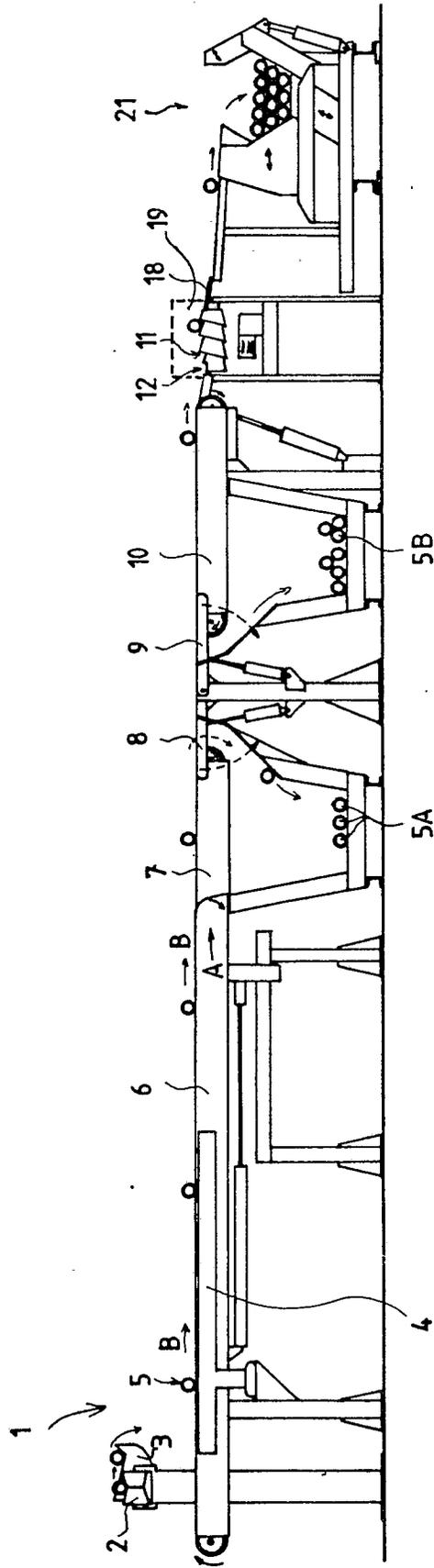


FIG. 1.

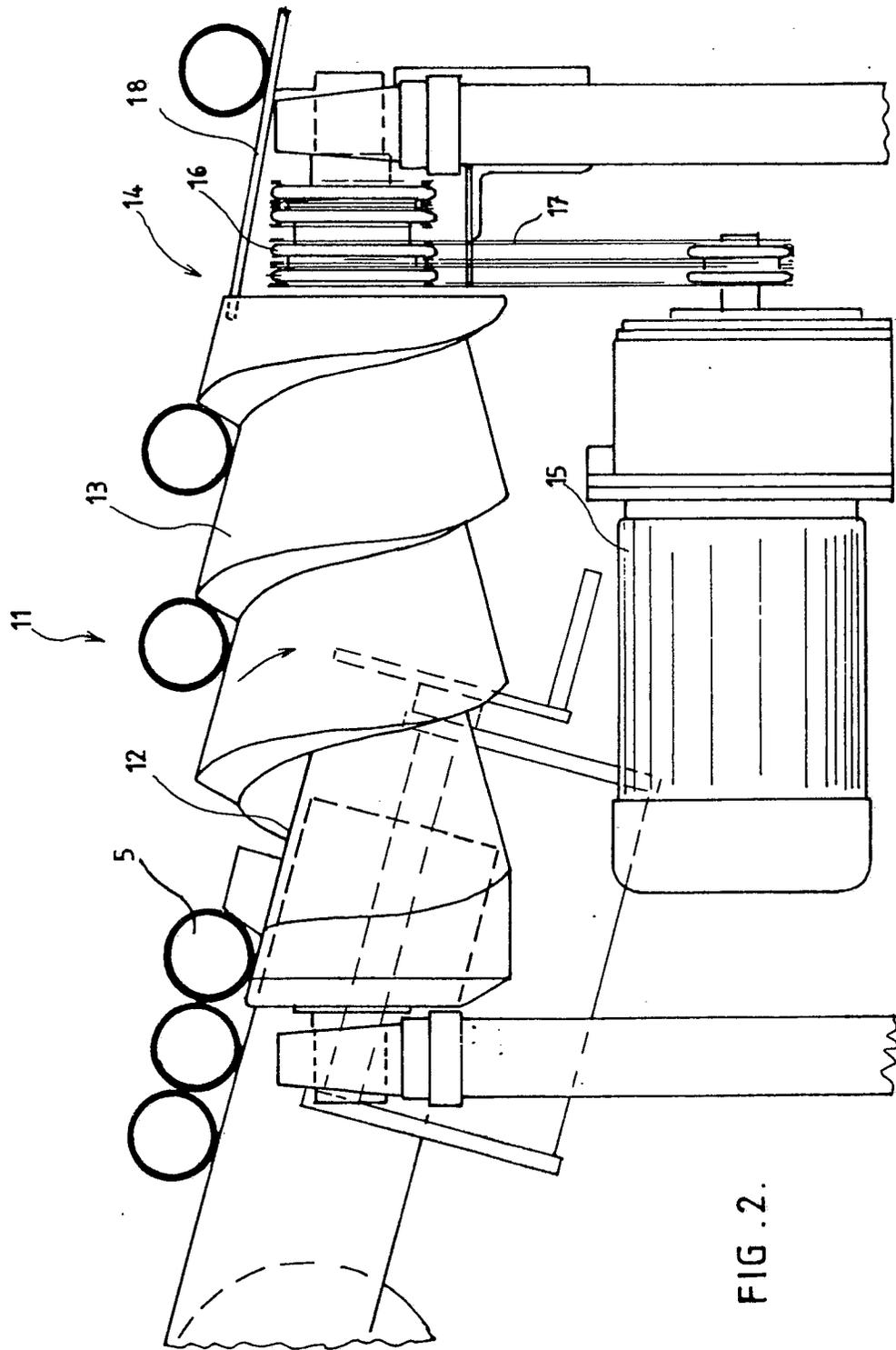
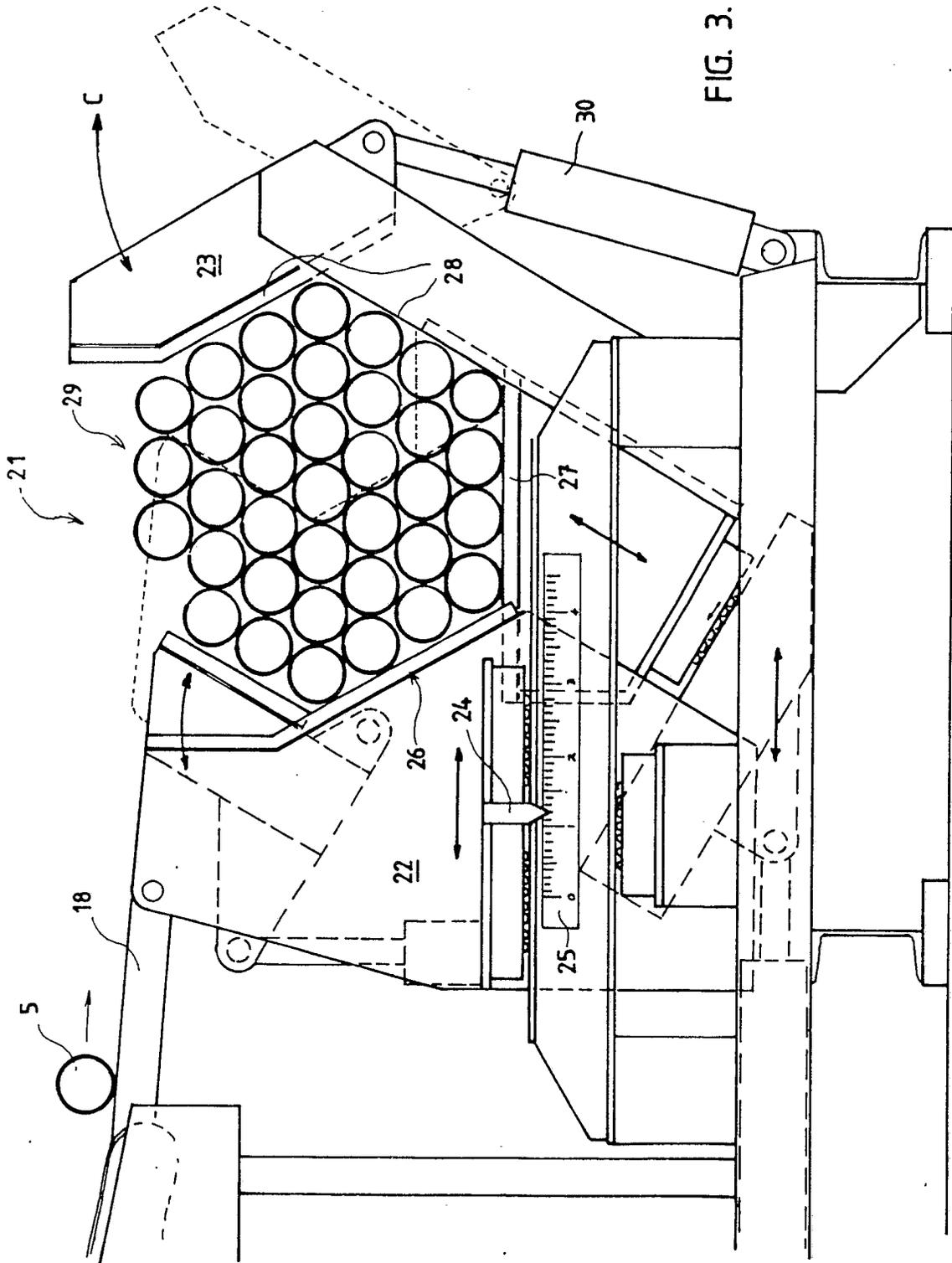


FIG. 2.





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	DE-A-2 118 523 (F. KOCKS) * Page 4, line 1 - page 5, line 16; figure *	1-4, 6, 9, 10	B 65 B 27/10
Y	---	5, 7, 8	
Y	GB-A- 871 913 (LOEWY ENGINEERING) * Page 3, lines 13-38; figure 2 *	5	
Y	DE-A-3 343 408 (GEOMATIC) * Page 5, lines 28-38; figure 3 *	7	
Y	US-A-3 768 669 (A. MOORE) * Column 3, lines 31-59; column 8, lines 20-53; figure 2 *	8	
A	US-A-3 127 829 (J. ROSSI) ---		
A	FR-A-2 426 632 (INNOCENTI SANTEUSTACCHIO) -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 65 B B 65 G
Place of search	Date of completion of the search	Examiner	
THE HAGUE	11-04-1989	JAGUSIAK A. H. G.	
CATEGORY OF CITED DOCUMENTS		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	
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			