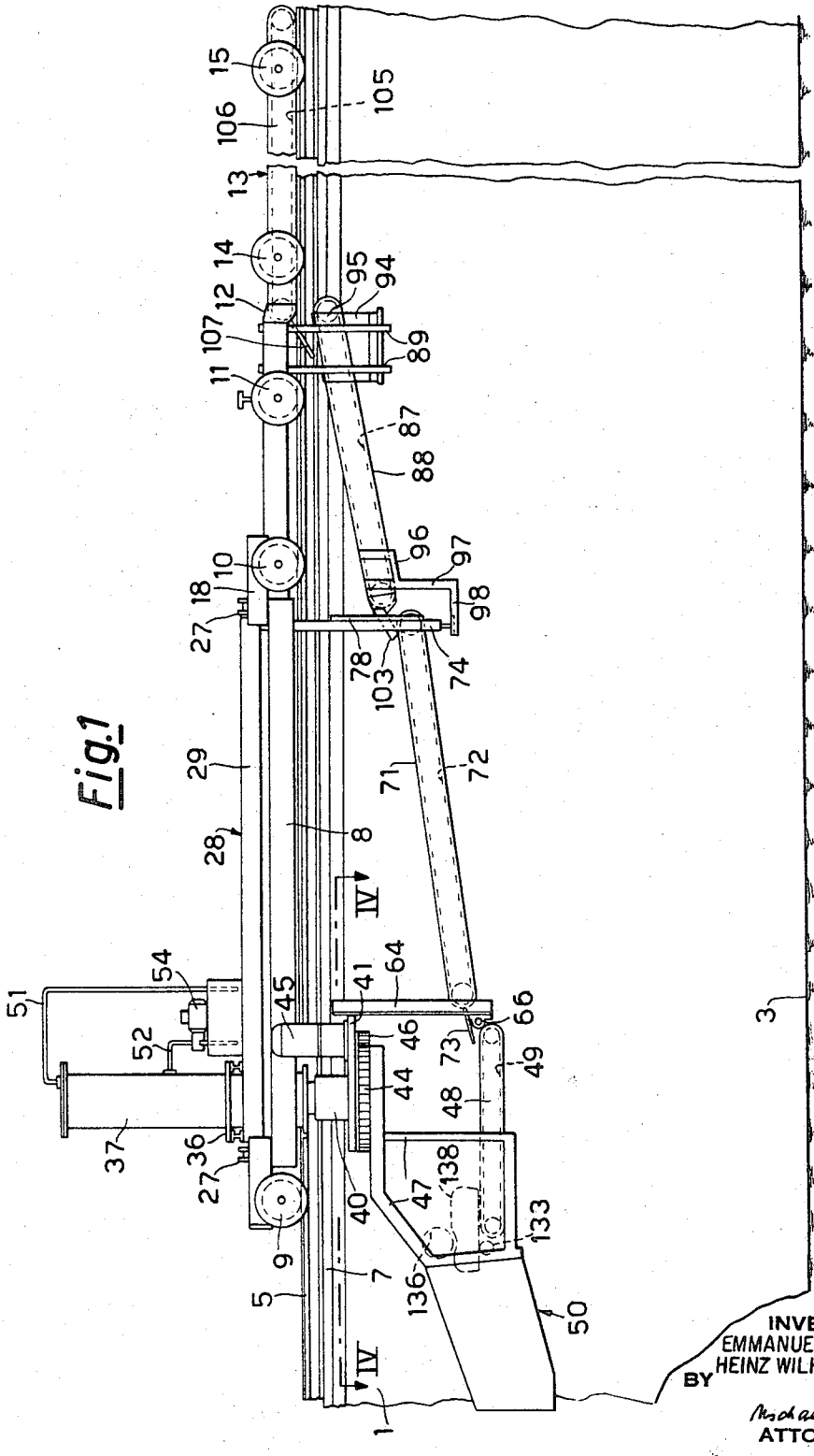
Dec. 17, 1968 E. GUALANDRIS ET AL 3,416,674

DEVICE FOR ARRANGING AND STACKING OBJECTS ON A CHARGING FLOOR

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Fig.1



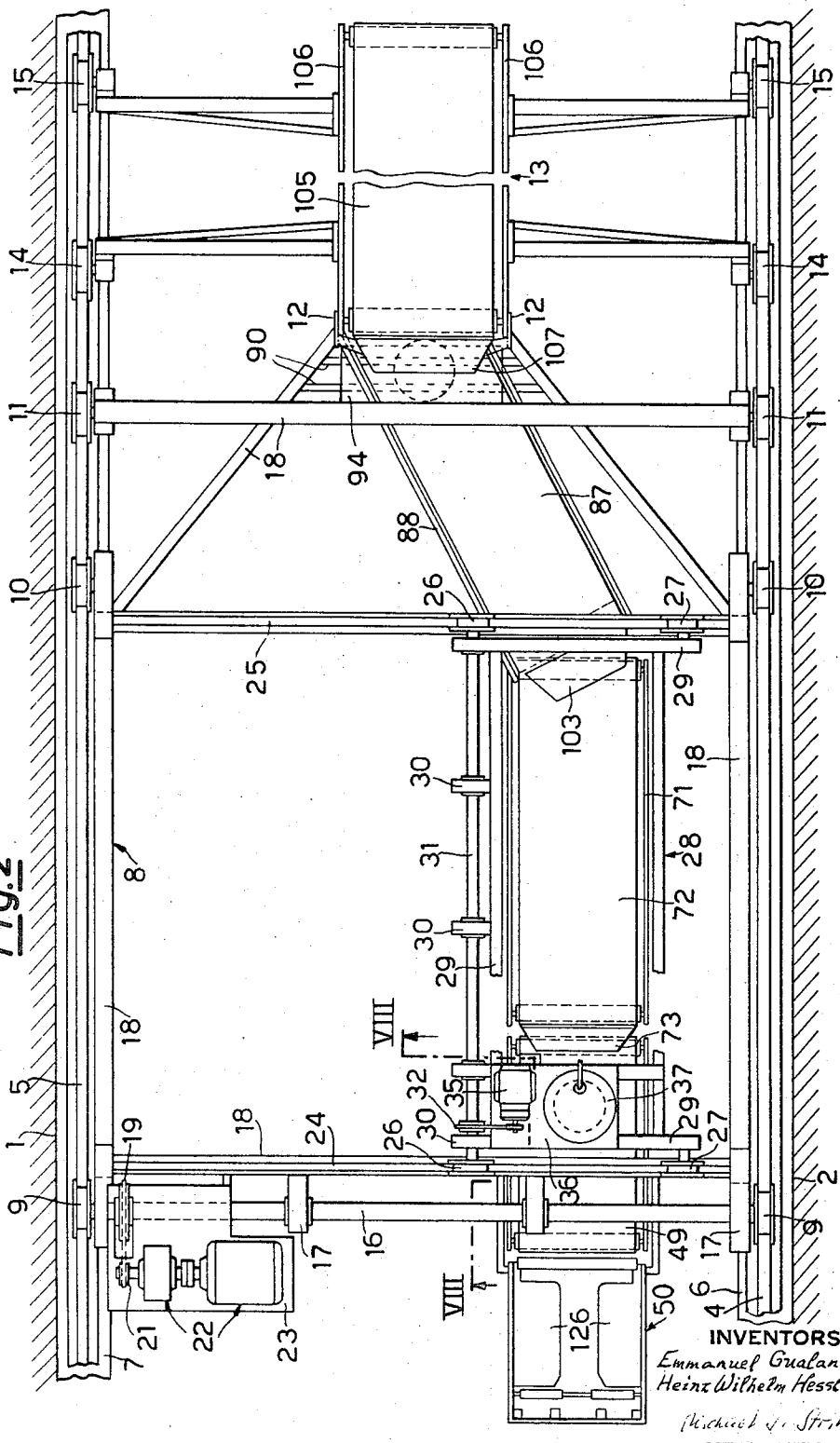
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DEVICE FOR ARRANGING AND STACKING OBJECTS ON A CHARGING FLOOR

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Fig.2



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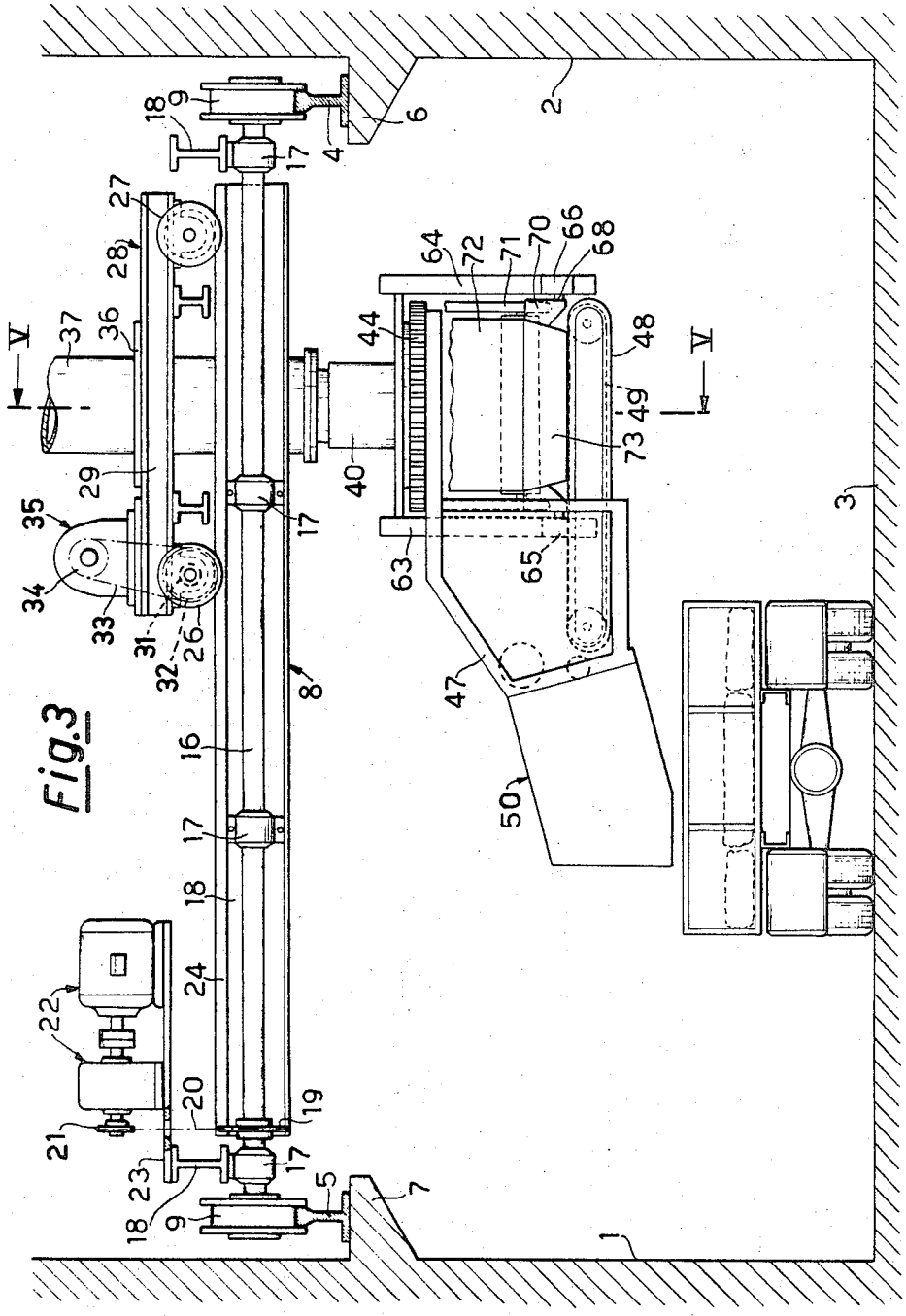


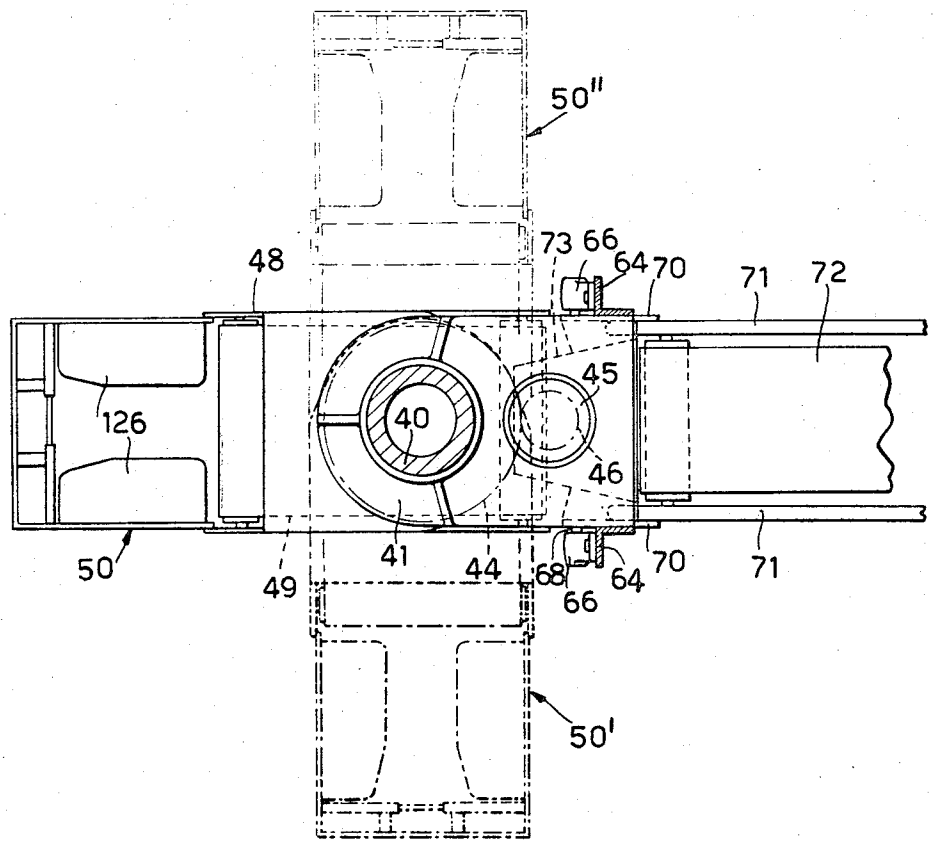
Fig.3

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DEVICE FOR ARRANGING AND STACKING OBJECTS ON A CHARGING FLOOR

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Fig. 4

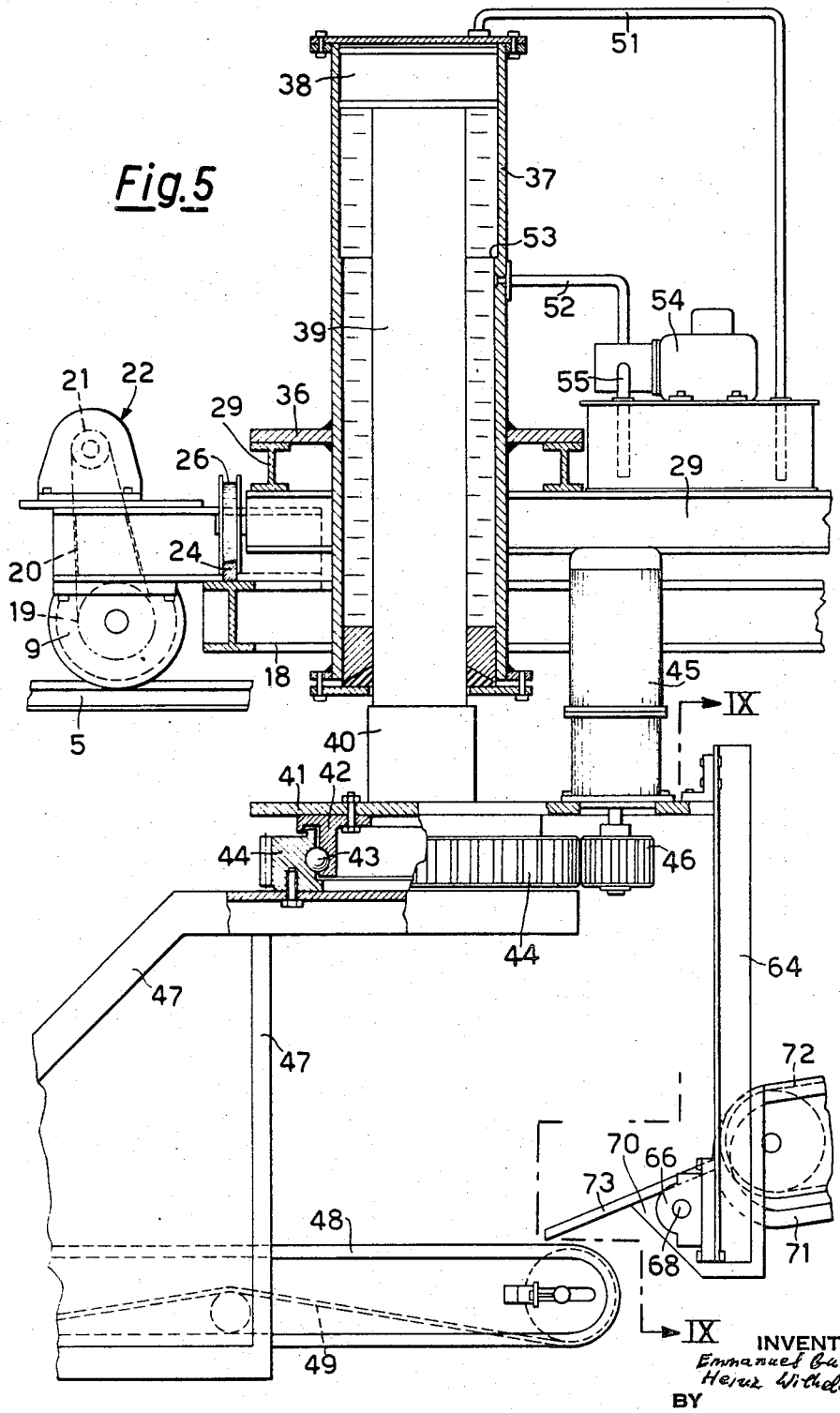


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DEVICE FOR ARRANGING AND STACKING OBJECTS ON A CHARGING FLOOR

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Fig.5



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Fig.6

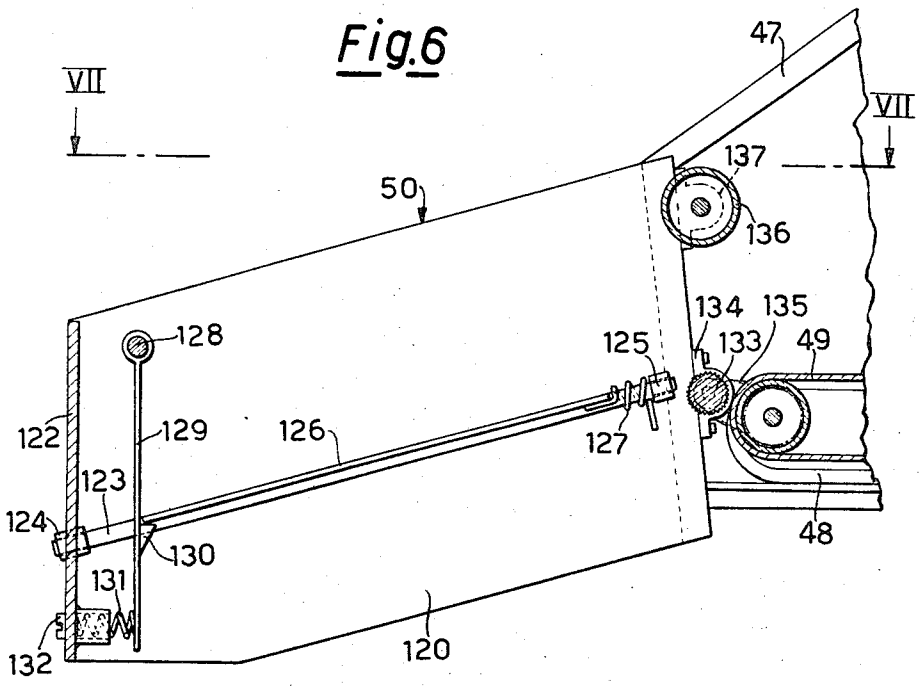
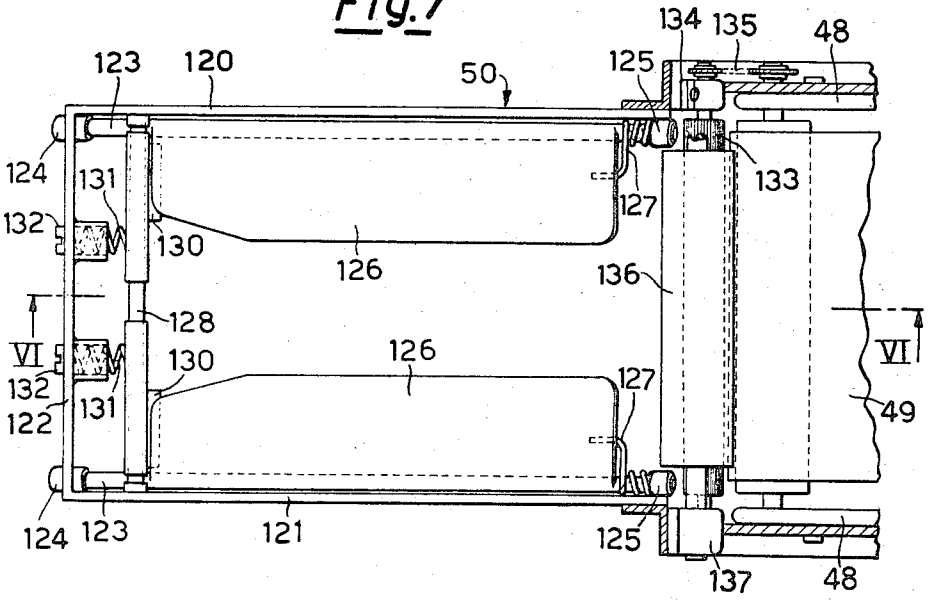


Fig.7



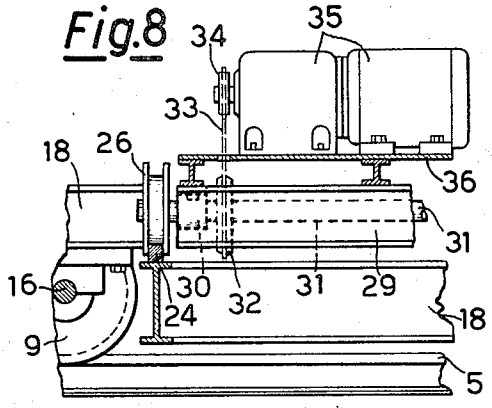
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DEVICE FOR ARRANGING AND STACKING OBJECTS ON A CHARGING FLOOR

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Fig.8



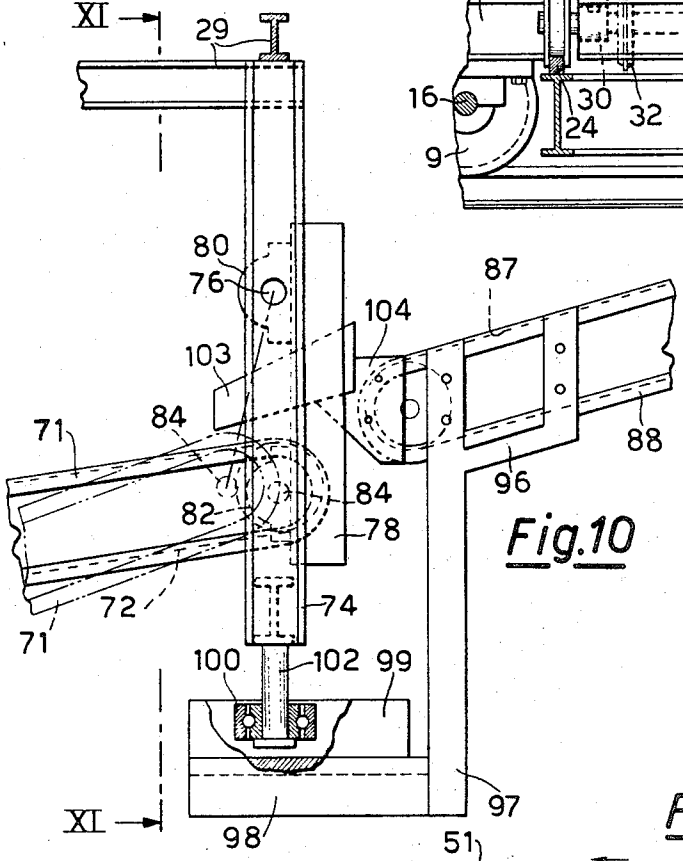
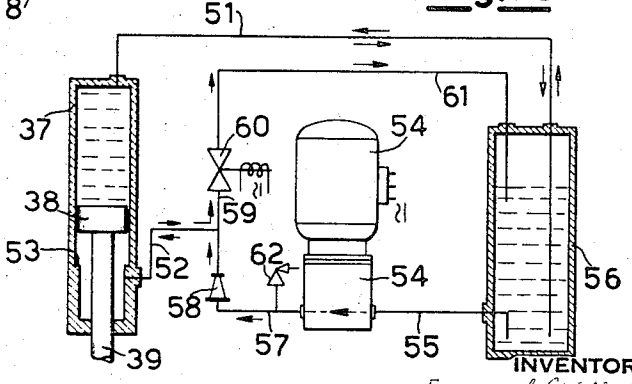


Fig.10

Fig.16



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DEVICE FOR ARRANGING AND STACKING OBJECTS ON A CHARGING FLOOR

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Fig.9

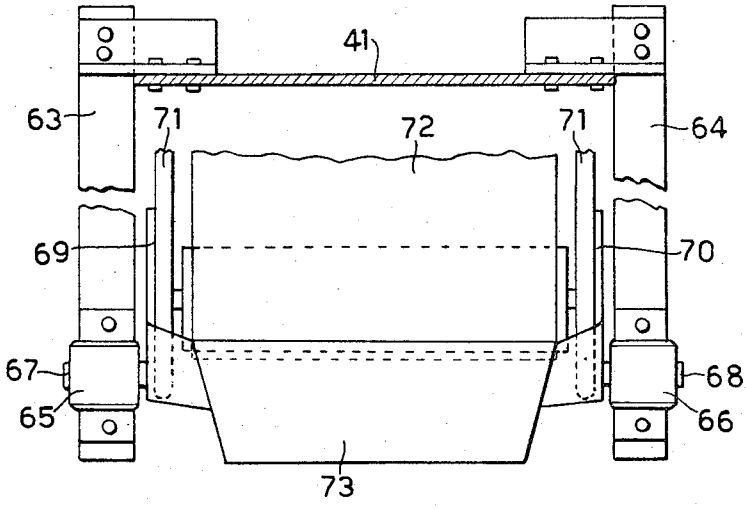
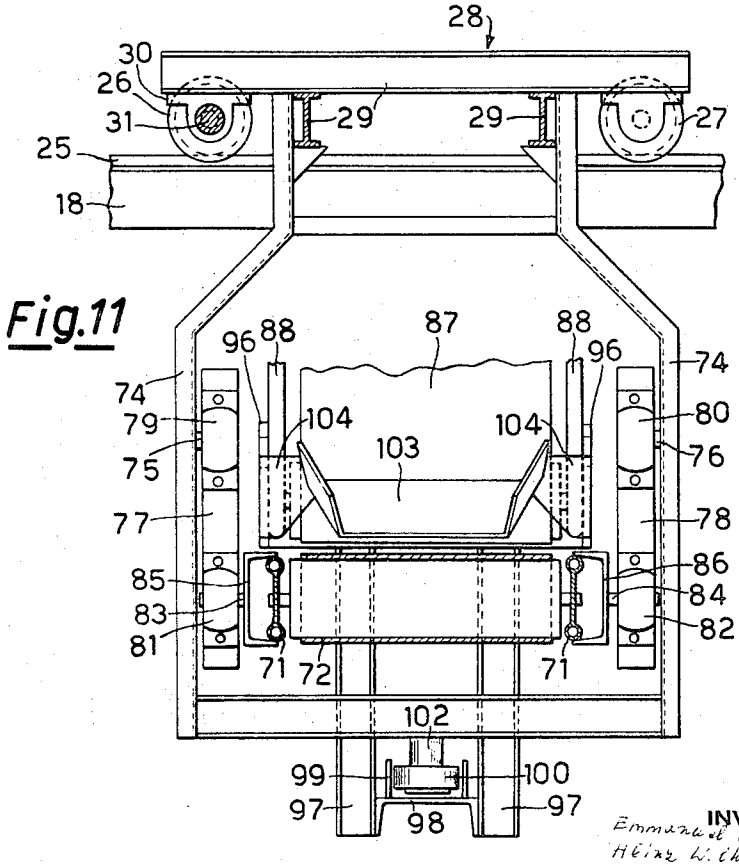


Fig.11



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DEVICE FOR ARRANGING AND STACKING OBJECTS ON A CHARGING FLOOR

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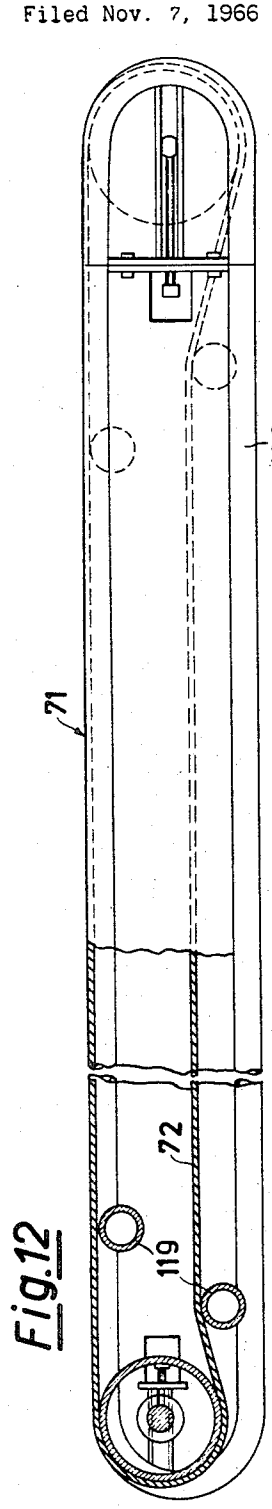


Fig.12

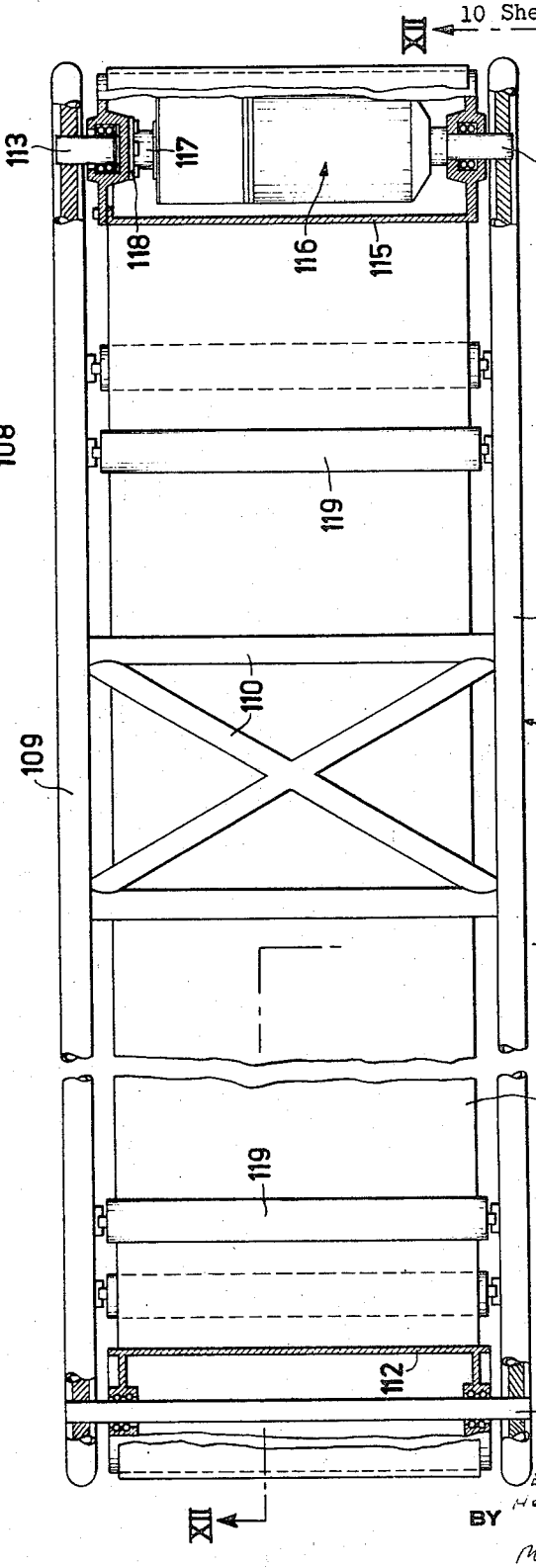


Fig.13

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DEVICE FOR ARRANGING AND STACKING OBJECTS ON A CHARGING FLOOR

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Fig.14

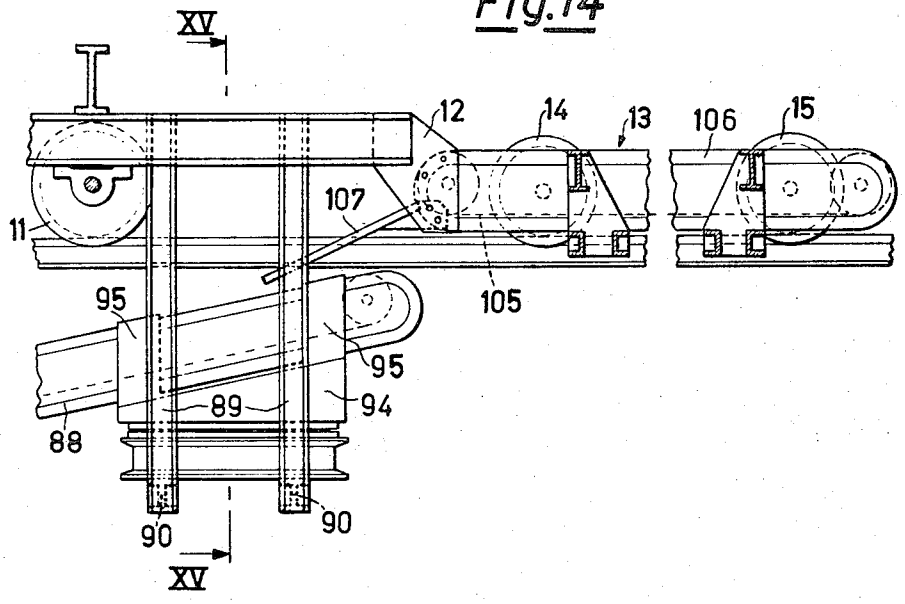
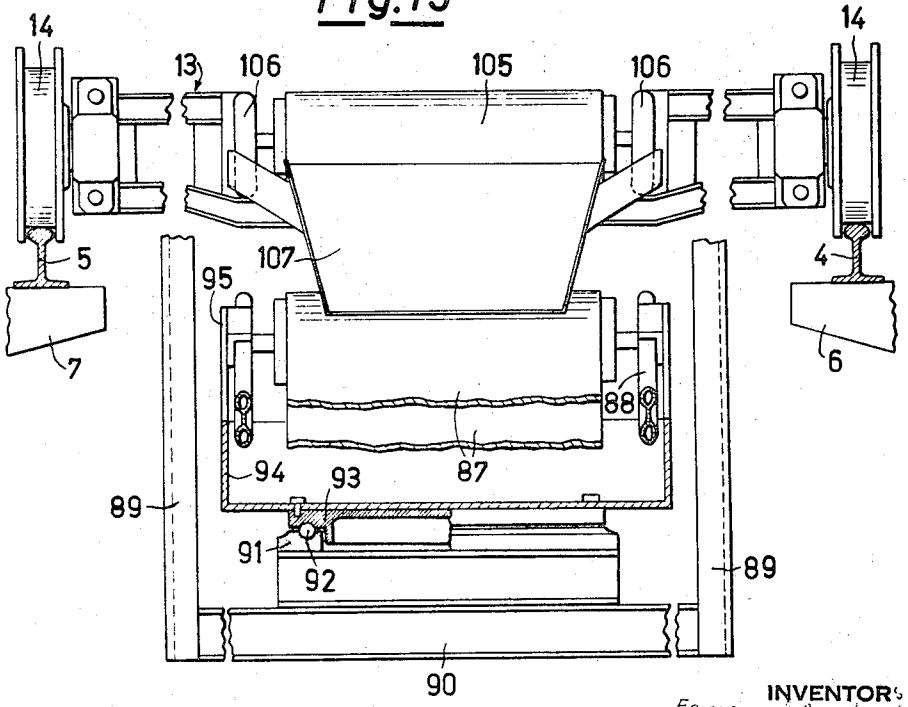


Fig.15



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3,416,674

DEVICE FOR ARRANGING AND STACKING OBJECTS ON A CHARGING FLOOR

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Claims priority, application Italy, Nov. 9, 1965, 10,976/65
12 Claims. (Cl. 214—6)

ABSTRACT OF THE DISCLOSURE

This invention is directed toward an apparatus for arranging and stacking articles on a charging floor and comprises a supporting structure which carries a set of conveyor belts, each of which is adapted to receive said articles at one end and to unload them at the opposite end onto a subsequent conveyor belt so as to make up a continuously interlinked line of conveyance of the articles from a loading spot to an unloading spot and a loader-stacker arranged at the unloading end of the ultimate conveyor belt.

This invention relates to a device for arranging and stacking objects on a charging floor.

The term "charging floor" as used herein is intended to connote any flat surface having certain dimensions and to which free access can be had from above, such as, for example, the charging floor of any transportation means such as goods wagons, trucks, trailer, and the like, lift truck pallets and the like.

The articles to be arranged and stacked have generally a uniform size and could be sacks, crates, boxes and the like. Said articles could come, for example, from a baling or sack-filling machine.

An object of the invention is to provide a device capable of receiving at one of its ends said articles, to deliver them at the opposite end on said charging floor in more superposedly and orderly arranged layers.

Another object is to provide a device of the kind referred to, which need not undergo any manipulation for unloading and marshalling the articles as desired on the charging platform.

Still another object is to provide an installation capable of automatically carrying out with great accuracy the marshalling and stacking of said articles on said charging floor so as to fill the available surface completely and to ensure an exact superimposition of the upper layers to the lower ones.

Other objects and advantages will become apparent from the ensuing description of an installation made according to the present invention.

Therefore, the present invention has, as its subject matter, a device for the arrangement and stacking of articles on charging floors, which comprises a supporting structure, which carries a set of conveyor belts, each of which is adapted to receive said articles at one end and to unload them at the opposite end onto a subsequent conveyor belt so as to make up a continuously interlinked line of conveyance of the articles from a loading spot to an unloading spot, means for transversely shifting at least the last two conveyor belts with respect to said supporting structure, means for rotating the ultimate conveyor belt about a vertical axis, and a loader-stacker arranged at the unloading end of the ultimate conveyor belt so as to follow all of the displacements of said end while receiving the articles unloaded therefrom, said loader-stacker consisting of a box-like container open at its top and at the side thereof facing said end of said ultimate conveyor belt, each sidewall of said container being hingeably connected to a bottom member which can be dumped downwardly, each bottom member undergoing the bias of resilient means intended to keep it in a position in which the container is closed, a disengageable detent member being provided for each bottom member so as to retain the attendant member in said closure position, means being further provided for individually unhooking and disengaging each bottom member.

The invention will be disclosed in the following in connection with an exemplary, non-limiting embodiment thereof relating to an installation for arranging and stacking filled sacks on loading platforms, reference being had to the accompanying drawings, wherein:

FIGURE 1 is an overall view of the installation, in diagrammatical side elevation,

FIGURE 2 is a diagrammatical plan view of the installation.

FIGURE 3 is an enlarged front elevation of the installation as seen in direction from the left-hand side of FIG. 1 looking towards the right, but with the loader shifted through 90 degrees with respect to the position shown in FIGS. 1 and 2.

FIGURE 4 is a plan view, taken along the line IV—IV of FIG. 1 of the loader in several possible positions.

FIGURE 5 is a view on an enlarged scale of the means for rotating and lifting the ultimate conveyor belt, partly in section along the line V—V of FIG. 3, but with the ultimate conveyor belt rotated into the position shown in FIG. 1.

FIGURES 6 and 7 show a detail of the loader, in FIG. 6 in a vertical cross-sectional view taken along the line VI—VI of FIG. 7, and in FIG. 7 in a plan view, partly in section, taken along the line VII—VII of FIG. 6.

FIG. 8 shows a detail in vertical sectional view taken along the line VIII—VIII of FIG. 2.

FIGURE 9 shows another detail view taken along the broken line IX—IX of FIG. 5.

FIGURE 10 is illustrative of a detail of the connection between two adjoining conveyor belts of the installation, shown in side elevation.

FIGURE 11 is an elevational view taken along the line XI—XI of FIG. 10.

FIGURE 12 shows, in side elevation and partly in section taken along the broken line XII—XII of FIG. 13, a detail of a conveyor belt as used in the device.

FIGURE 13 shows said conveyor belt of FIG. 12 in plan view.

FIGURE 14 shows a detail of the connection between two adjoining conveyor belts of the device in side elevation.

FIGURE 15 is a view, partly in vertical section, taken along the line XV—XV of FIG. 14, and

FIGURE 16 is a hydraulic layout for the actuation of the lifting means provided for the ultimate conveyor belt.

It should be noticed, at the outset, that in the accompanying drawings the size proportions of the several component parts of the device shown therein have not always been respected, in the interest of a clearer showing. It is possible, then, to find discrepancies of showing between a certain figure and any other, said discrepancies having, however, no practical bearing, inasmuch as like component parts are connoted in the several drawings with like numerals.

As can be seen in FIGURE 3, the device is positoned, in the case shown herein, between two vertical walls **1** and **2**. At a certain level above the floor **3**, a pair of longitudinally extending rails **4**, **5** is laid on brackets **6**, **7** affixed to the vertical walls **1** and **2**.

Upon said longitudinal rails **4** and **5** is slidably mounted a carriage generally shown at **8**, by means of wheels **9**, **10** and **11**, said carriage **8** being connected, in its rear portion, by means of connecting plates **12**, to a second car-

riage, generally shown at 13, which can slide by means of two pairs of wheels 14 and 15, upon the same longitudinal rails 4 and 5.

The front wheels 9 of the carriage 8 are driving wheels as they are keyed to a shaft 16 journalled in bearings 17 solid with the framing 18 of the carriage 8. To the shaft 16 is keyed a gear 19 (see FIGS. 2 and 3) connected, via a chain 20, to a pinion 21 borne by the output shaft of a reducing and driving gear 22 equipped with a brake. The reducing and driving gear 22 is mounted on a supporting plate 23 solid with the framing 18 of the carriage 8.

The carriage 8 has two rails 24, 25 arranged transversely with respect to the direction of travel of the carriage, and on said rails a further carriage, generally shown at 28, is slidable by means of pairs of wheels 26, 27. The framing 29 of the carriage 28 has supporting members 30 which freely rotatably support a shaft 31, the latter having at its two respective ends the motive wheels 26 of said carriage 28. Shaft 31 solidly carries a gear 32 connected via a chain 33 to the output pinion 34 of a driving and reducing gear 35 equipped with a brake, said reducing gear being supported by a plate 36 affixed to the framing 29 of the carriage 28 (see FIG. 8).

By means of the reducing gear 22, the carriage 8 and the carriage 13 rigid therewith, can be displaced along the rails 4, 5 and, by virtue of the brake embodied in the driving unit, it is possible to stop the whole assembly in any desired position.

Carriage 28 can likewise be displaced transversely on the rails 24, 25 of the carriage 8 by means of the reducing and driving gear 35 and can be stopped at any desired location by virtue of the brake contained in the driving unit.

To the plate 36, which is rigid with the framing 29 of the carriage 28, there is affixed a hydraulic ram 37 whose axis is vertical and which is passed through said plate at right angles, so as to be positioned partly above and partly below said plate.

As best seen in FIGURE 5, the ram 37 contains a piston 38 with a stem 39, the latter coming in a sealtight manner out of the bottom of the ram cylinder. To the enlarged end 40of stem 39, outside the cylinder of the ram 37, a plate 41 is fastened which carries, in turn, solidly affixed to its lower portion, the inner ring 42 of a ball bearing 43 whose outer ring 44 is peripherally toothed. On the plate 41, moreover, there is mounted a driving and reducing gear 45 incorporating a brake, vertically positioned and whose output shaft carries a pinion 46 meshing with the peripheral crenellations of the ring 44. The reducing and driving unit 45 can thus cause the ring 44 to rotate about its own vertical axis and, by virtue of the brake incorporated therein, is adapted to stop said ring in any angular position desired.

The rotatable ring 44 carries, rigid with its lower portion, a rigid frame portion 47 (see FIGS. 1, 3 and 5) which in turn solidly supports a framing 48 for the ultimate conveyor belt 49 and the loader-stacker, generally indicated at 50 in FIGS. 1, 2, 3 and 4. The frame member 48 with the ultimate conveyor belt 49 projects from the rear along about one half of its length and in an overhanging fashion, from the framing 47.

It is obvious that the framing 47 with the ultimate belt 49 and the loader-stacker 50 rotate as an entity with the ring 44 about the vertical axis thereof, when the latter is actuated by the reducing and driving unit 45. In practice, said rotation is comprised within an arc of 180 degrees, that is to say 90 degrees in one direction and 90 degrees in the opposite one, starting from the central position illustrated in FIGS. 1 and 2. Thus, the loader-stacker 50 can be brought to any angular position comprised between the two extreme positions shown in FIG. 4 in dotted lines and connoted by the reference numerals 50′ and 50″.

The whole assembly borne by the enlarged end 40 of the stem 39 can be depressed by its own weight and lifted by actuating the ram 37 with a pressurized fluid, such as oil, from beneath the piston 38 through a duct 52 by simultaneously causing oil to be discharged from above the piston through a duct 51 (see FIGS. 1, 5 and 16). The stroke of the piston 38 in the cylinder of ram 37 is limited upwardly by the upper lid of the cylinder, from which the duct 51 opens, and is limited downwardly by a shoulder 53 formed in the inner wall of the cylinder and below which the duct 52 opens.

As can be seen from the hydraulic circuitry shown in FIG. 16, a motorized pump 54 is connected via a pipe 55 to an oil tank 56 from which said pump can draw oil to send it, via a pipe 57 and a one-way valve 58, into the duct 52. Duct 51 extends from the upper lid of the cylinder 37 to the tank 56 and terminates near the bottom of the tank. From the conduit 52 a pipe 59 is branched off, which leads to a magnetic cutoff valve 60 connected on the opposite side via a pipe 61 to the tank 56.

When it is intended to depress the piston 38 and the whole assembly carried thereby, it suffices to open the cutoff valve 60 and the piston is lowered due to its own weight and the weight of the assembly carried thereby, thus causing oil to be ejected from the cylinder of ram 37 and into the tank 56 through the conduit 52, the pipe 59, the valve 60 and the pipe 61, said oil being prevented from returning to the pump by the presence of the one way valve 58. At the same time, piston 38 draws a corresponding quantity of oil into the cylinder 37 through the duct 51. By closing the cutoff valve 60, the piston 38 can be stopped at any desired intermediate position before the end of its stroke as defined by the shoulder 53.

When it is intended to lift the piston 38, the cutoff valve 60 is left closed and the pump 54 is actuated which, drawing oil from the tank 56, delivers it under pressure via the pipe 57, the one-way valve 58 and the duct 52 into the cylinder 37 below the piston 38. Simultaneously, a corresponding quantity of oil is ejected from the cylinder 37 via the duct 51. When the pump 54 is stopped, the piston 38 and the assembly carried thereby are arrested at the desired position. A safety valve 62 is connected to the delivery pipe 57 of the pump 54.

To the plate 41 are affixed two uprights 63, 64 (see FIGS. 1, 3, 5 and more particularly FIG. 9) which carry, solid therewith and near their lower ends, supporting members 65, 66 which support, rotatable about a common horizontal axis, pins 67 and 68 which are solid with plates 69, 70 laterally affixed to the front portion of the framing 71 of a conveyor belt 72. Said front portion of the framing 71 solidly carries an inclined-plane slideway 73 for shifting the articles conveyed by the belt 72 towards the ultimate belt 49.

The framing 71 of the belt 72 is suspended, pendelumwise, at its own rear end in a way which will be described later in connection with FIGURES 10 and 11.

The framing 29 of the carriage 28 carries, in its rear portion, a portal frame 74 which is vertically positioned as shown in detail in FIG. 11. Within the framing 74 are suspended, by means of two pivots 75, 76 having a common horizontal axis, two levers 77, 78 which can swing about said horizontal axis. Said pins 75, 76 are affixed to the uprights of the framing 74 and the levers 77, 78 solidly carry supporting members 79, 80 via which they are rotatably supported by said pins. The levers 77, 78 carry, near their free ends, two further supporting members 81, 82 in which pivots 83, 84 are freely rotatably supported, the latter pivots 83, 84 being solid with U-shaped pieces 85, 86. These pieces, in turn, are laterally affixed to the rear end of the framing 71 of belt 72.

As can be seen, the framing 71 with the conveyor belt 72 is entirely suspended from the carriage 28 and thus follows the transverse displacements thereof. The rear end is at a fixed level (defined by the portal frame 74) but is allowed to swing about the horizontal axis defined by the pivots 75, 76 and is rotatable about the parallel axis de-

fined by the pivots 83, 84. The front end of the framing 71 is pivoted to the uprights 63, 64 solid with the plate 41, and thus can either be lifted or depressed by means of the piston 38 of the hydraulic ram 37. Just to allow for these vertical displacements the framing 71 is pivoted both at its front and its rear end and, in addition, is pendularly suspended at its rear end.

The conveyor belt 72 receives the articles to be forwarded from another conveyor belt 87 which is borne by a framing 88 (see FIGS. 1 and 2). Said framing 88 is in turn borne by the carriage 8 as described below.

To the rear portion of the framing 18 of carriage 8 are affixed four uprights 89 which, by means of crossties 90 solid with the lower ends thereof (see FIGS. 14 and 15), support the outer ring 91 of a ball bearing 92 whose inner rotatable ring 93 solidly carries a box-like member 94. Said member 94 has, on its sidewalls, upwardly protruding members 95 between which is arranged and to which is affixed the rear end of the framing 88 of belt 87. As clearly seen in FIGS. 1 and 14, the framing 88 is supported at its rear end only so as to take a tilted position with respect to the horizontal plane; the rear end is at a level higher than that of the front end.

At the front end of framing 8 there is affixed a forked member 96 (see FIGS. 1, 10, 11) with two uprights 97 connected at their lower ends by a horizontal beam 98 which overhangingly carries a guideway 99. Said guideway 99 houses a roller 100 which is freely rotatably carried, by means of a ball bearing 101, by a vertical pivot 102 affixed at its lower end to said portal frame 74. It should be noted that the connection between the front portion of the frame 88 and the portal frame 74 is intended only to guide said frame 88 so as to have the same following the transverse movements of the frame 74 as the carriage 28 is moved. On the other hand, the frame 88 is supported only at its rear portion wherein it is allowed to rotate about the vertical axis of the rings 91–93. The frame 88 is solidly affixed to a slideway 103 by means of supports 104 so that the articles dumped from the conveyor belt 87 are switched to the conveyor belt 72.

The conveyor belt 87 receives the articles from a further conveyor belt 105 supported by a framing 106 (see FIGS. 1, 2, 14, 15) supported by the structure of the carriage 13 which is connected to the carriage 8. To the front portion of the frame 106 is affixed a slideway 107 which guides the articles unloaded from the belt 105 onto the subsequent belt 87.

All of the conveyor belts of the device are assembled, supported and actuated in the same way, so that only one of them, for example the conveyor belt 72, needs to be described.

FIGURES 12 and 13 are illustrative of said belt 72 with its supporting frame 71, independently of the connections of said frame to the other component parts of the installation. The frame substantially comprises two metal plates 108 and 109 edged by closed-loop tubular members and positioned substantially in parallelism, said plates being rigidly connected to one another by spreading and stiffening members 110. The two plates 108 and 109 support, near their ends, a fixed transversal shaft 11 about which a roller 112 is freely rotatable by means of ball bearings. Near their other ends, the two plates 108 and 109 carry two coaxial fixed pivots 113 and 114 parallel to the shaft 11, a second roller 115 being freely rotatable by means of ball bearings about said pivots. The pivot 144 overhangingly supports, within the hollow roller 115, a driving and reducing unit 116 whose output shaft 117 is connected via a flange 118 to the front wall of the roller 115. The electric connection for the driving and reducing unit 116 passes through the fixed hollow pivot 114. It is now apparent how the driving and reducing unit 116 actuates the roller 115. Both rollers 112 and 115, on which the endless conveyor belt 72 is held taut, are equipped with tensioning devices intended to hold taut the belt which, in addition, passes over guiding and supporting idlers 119. The number of said idlers 119 supported at their ends by the plates 108 and 109 can be varied according to the length of the belt and FIGS. 12 and 13 show, by way of exemplary illustration, four of these idlers.

It is clear that each conveyor belt of the installation is independently actuated so that no connection or mechanical transmissions from the outside are necessary.

As outlined in the foregoing the rigid frame 47 carries, in addition to the frame 48 of the ultimate belt 49, also the loader-stacker 50. The latter will be described in more detail with reference to FIGS. 6 and 7. It has generally the shape of a container adapted to receive the articles dumped from the ultimate belt 49 and comprises two sidewalls 120 and 121 and a front wall 122. The container is open at its top and also on the side facing the discharge end of the belt 49. The sidewalls 120 and 121 are affixed to the frame 47. To each sidewall and within the container a pivot 123 is provided, which is rotatably supported at its ends by fixed supporting members 124, 125. The axes of said two pivots lie on a plane which is near a median plane of the container. Each pivot is rigid with a bottom member 126 of sheet metal or the like, which can be tilted 90 degrees approximately downwardly about the axis of the pivot 123. At one end of the pivot 123 of each member 126 a coil spring 127 is wound about said pivot and has an end abutting the associated sidewall whereas the other end of said spring abuts the associated bottom member 126. Said springs 127 are calibrated so as to restore the members 126 to the position in which they partially close the container (as shown in the drawings) and maintain them therein. To avoid that members 126 may project downwardly of the container when they are tilted downwardly, the sidewalls 120 and 121 are suitably extended downwardy as clearly seen in FIG. 6.

In the neighbourhood of the front wall 122 of the container there is provided a fixed transversal pivot 128 to which are suspended in a freely rotatable way two plates 129 each of which has a detent hook 130 adapted to engage the associated bottom member 126. A spring 131, adjustable by a screw 132, is interposed between each plate 129 and the front wall 122 and operates to keep the respective hooks 130 in engagement with the associated bottom member.

It is important to notice that two separte plates are provided, one for each bottom member, which are separately hinged on the fixed transversal pivot 128. The springs 131 are adjusted by the screws 132 according to the weight of the articles to be loaded and stacked, for example 50 kgms., 75 kgms., 100 kgms. sack etc. Obviously, the biasing force exerted by the springs 127 should be greater than that of the springs 131 so as to ensure the return of the bottom members 126 to their container-closing position. Between the unloading end of the ultimate belt 49 and the input of the loader-stacker 50 there is provided a roller 133, having a ruled or knurled surface and being freely rotatably supported by supporting members 134 affixed to the frame 47. Said roller 133, which is nearly at an extension of the belt 49, is rotatably driven about its own axis by means of a chain 135 which connects two pinions: one of these latter is fixed to the pin of the roller 133 and the other is affixed to the idler of belt 49, the gear ratio being preferably such that the surface speed of the roller 133 is greater than the linear translational speed of the belt 49.

Nearly above the roller 133 another idler 136 is arranged, supported in supports 137 solid with the frame 47. Said upper roller 136, in the case of stacking sacks 138 (as diagrammatically shown in FIG. 1), more particularly when valved sacks are involved, causes the sacks to be flattened, which often is a particular advantage if paper bags are to be stacked.

The installation operates as follows:

The articles to be stacked, for example bags, arrive at intervals and spaced apart from one another on the

conveyor belt **105**, wherefrom they are subsequently unloaded on the belts **87**, **72** and **49**. By displacing the carriage **8** and the carriage **29** along their respective rails and rotating, if and when necessary, the rotatable ring **44** with the frame **47**, the point at which an individual article is intended to be unloaded on the charging floor, e.g. the bed of a truck (see FIG. 3), is determined. It is apparent that by so doing, any desired point of said charging floor can be within the reach of the loader-stacker.

The stacking level, contrarywise, is adjusted by lifting or depressing movements of the hydraulic-arm piston **38** together with the assembly borne by its stem **39**. When simple installations are involved which are intended for use with small sized articles or with articles requiring a limited stacking height, the lifting assembly could be dispensed with. On the other hand, the lifting assembly could also be embodied by different mechanical, hydraulic, pneumatic and like means, such as, for example, pantograph-beams, leverages, horizontal pistons and the like.

The article unloaded from the belt **72** through the slideway **73** onto the belt **49** travels at the speed imparted to said belt towards the loader-stacker **50**. Before entering the loader-stacker **50**, the speed of travel of the article is accelerated by the roller **133** and, in the case of a bag, the latter is also squeezed by the upper roller **136**. The article then enters the loader-stacker **50** and is positioned on the bottom members **126** held closed by the detent hooks **130** of the swingable plates **129**.

By virtue of the kinetic energy of the article which entered the loader-stacker and the impact of the article against the plates **129**, the detent hooks **130** are automatically disengaged from the bottom members **126** which, due to the weight of the overlying article, are swung open downwardly, thus causing said article immediately to drop. As outlined above, the disengagement or unhooking of the bottom members **126** can be adjusted by suitably adjusting the force of the springs **131** acting on the plates **129**. As soon as the article is dropped from the loader-stacker, the bottom members **126** are immediately restored to their closing position by the bias of the springs **127** and are automatically hooked up again by the detent hooks **130** of the plates **129**. It is of vital importance that each bottom member **126** has its own detent member to prevent the occurrence of troubles when said members are either engaged or disengaged.

It should be noticed that the loader-stacker **50** is mounted, with advantage, at an angle of about 8–10 degrees for the bottom members **126** with respect to the horizontal plane. The resulting slope, which can clearly be seen in FIG. 6, serves not only to ensure that an article may slide into the loader-stacker against the plates **129**, but fulfills also the function of causing the article to be fed into the loader-stacker by dropping with a slight slope rather than truly horizontally, this being of particular advantage with bags of paper or plastic materials which thus do not burst open as they are dropped.

While the present disclosure refers to a specific embodiment of the invention, it is understood that any modification within the scope thereof, within the purview of those skilled in the art, may be introduced therein.

Thus, for example, the unhooking of the bottom members **126** of the loader-stacker **50**, instead of being controlled by the articles themselves as they enter therein, can be controlled either mechanically, hydraulically or electromagnetically. For example, contacts sensitive to the presence of an article and capable of accordingly controlling the disengagement of the bottom members, can be provided in the container.

The several motive means for displacing the carriages in order to rotate the front assembly which carries the loader-stacker, and for actuating the control pump for lifting said assembly, can be controlled from a single control station, no further manual operation being required for loading and stacking the articles on the preselected planes. It is apparent that the several commands can be performed also by a programming device which, consistent with the surface area of the loading floor and the size of the individual articles, as well as with the number of layers which it is intended to stack, can be made to perform the several movements in any desired sequence and in a fully automated fashion.

The articles are loaded, as a rule, in orderly arranged layers, that is a first layer is initially laid on the charging floor, then the second layer and so forth. However, this rule is in no way compulsory, it being also possible to load several articles at a time, simultaneously, for example two superposed bags.

What is claimed is:

1. An installation for arranging and stacking articles on charging floors, comprising a supporting frame; a set of conveyor belts thereon, each belt adapted to receive objects at one end and to unload them at the opposite end on the subsequent belt so as to make up a continuously interlinked conveyance line for said articles from a loading point to an unloading point; means for transversely displacing at least the last two conveyor belts with respect to said supporting structure; means for rotating the ultimate conveyor belt about a vertical axis and a loader-stacker arranged at the discharge end of said ultimate conveyor belt so as to follow all the displacements of said end to receive the articles discharged therefrom, said loader-stacker being formed by a boxlike container open at its bottom and at its wall facing said discharge end of said ultimate belt, to each sidewall of said container being hingedly connected a bottom member adapted to be dumped downwards, each bottom member undergoing the action of resilient means biasing it towards the closing position of said container, a disengageable detent member being provided for each bottom member so as to hold the same in its closing position; and means being further provided for unhooking and disengaging each individual bottom member.

2. An installation according to claim **1**, wherein means are further provided for vertically displacing the ultimate conveyor belt and the loader-stacker.

3. An installation according to claim **1**, wherein said supporting structure is longitudinally moveable on rails, and wherein the last two conveyor belts and said loader-stacker are carried by a carriage which can be transversely displaced on said first named carriage.

4. An installation according to claim **1**, wherein a transverse pivot is provided near the front wall away from the side facing said ultimate conveyor belt, two plates being swingably suspended to said pivot, each plate having a detent hook capable of engaging one of said bottom members, each plate undergoing the bias of a resilient means tending to maintain said detent hook in engagement with its attendant bottom member.

5. An installation according to claim **4**, wherein said resilient means are arranged between the front wall of said container and said plates and wherein means are provided for adjustably regulating the load of said resilient means.

6. An installation according to claim **1**, wherein a supporting frame is provided for the ultimate conveyor belt and said loader-stacker, the latter being positioned upon said frame so that said members, as they are in their closure position, have slopes of 8–10 degrees with respect to a horizontal plane, the front end of the loader-stacker being at a level lower than that of the rear end thereof.

7. An installation according to claim **1**, wherein a rotatable ring is provided which can rotate about a vertical axis, a frame solid with said ring and carrying the ultimate belt and the loader-stacker, and means for causing the rotation of said ring.

8. An installation according to claim **7**, wherein said rotatable ring is mounted by means of ball bearing on

another ring affixed to the stem of a vertically mounted hydraulic piston.

9. An installation according to claim **1**, comprising a motive roller between the discharge end of the ultimate conveyor belt and the input of the loader-stacker, said motive roller being adapted for accelerating the conveyance of the articles into said loader-stacker.

10. An installation according to claim **1**, comprising a roller above the discharge end of said ultimate conveyor belt for seizing the articles to be transferred into the loader-stacker.

11. An installation for arranging and stacking articles on a charging floor, comprising a first pair of spaced apart rails located on the loading station; a first carriage displaceable over said first pair of rails; brake-furnished motive means for controlling the displacement of said first carriage and the stoppage thereof at preselected points; a second pair of spaced apart rails on said first carriage and positioned transversely to the direction of travel thereof; a second carriage displaceable on said second pair of rails; brake-furnished motive means for controlling the displacement of said second carriage and the stoppage thereof at preselected points; a first conveyor belt supported by said first carriage with a direction of travel parallel to the direction of travel of said first carriage; means for controllably moving said first conveyor belt; overhanging supporting means solid with said first carriage near the discharge end of said first conveyor belt; a ring rotatable about a vertical axis with respect to said supporting means; a second conveyor belt; a supporting frame therefor; means for fixedly securing said supporting frame to said rotatable ring at the loading end of said second conveyor belt; an overhanging structure solid with said second carriage; means for linkedly connecting said frame of said second conveyor belt to said overhanging structure at the discharge end of said conveyor; a third conveyor belt; a supporting frame therefor; suspension means for suspending said supporting frame of said third belt at the loading end thereof to said overhanging structure solid with said second carriage; means for suspending the front portion of the frame of said third conveyor belt to said second carriage; means for shifting said articles from said second to said third conveyor belt; a supporting member rotatable about a vertical axis and mounted on said second carriage; means for causing said rotatable supporting member to rotate; an overhanging frame solid with said rotatable supporting member; a fourth conveyor belt; means for shifting said articles from said third to said fourth conveyor belt; a supporting frame thereof, said supporting frame being mounted on said overhanging frame so that the loading end of said fourth conveyor belt is always beneath said means for shifting the articles from said third to said fourth conveyor belt irrespective of the rotational position of said rotatable supporting member; a loader-stacker solid with said overhanging supporting member and capable of receiving the articles discharged from said fourth conveyor belt, said loader-stacker consisting of two sidewalls, a front wall away of the side at which it receives said articles from said fourth conveyor belt and two bottom members hingedly connected to said sidewalls and capable of being dumped downwards, resilient means for positioning said bottom members at a position in which they close said loader-stacker in the bottom portion thereof, detent means for said members to hold them in said position and means for disengaging said bottom members so as to allow the dumping thereof under the weight of an article unloaded by said fourth conveyor belt and the consequent drop of said article.

12. An installation according to claim **11**, further comprising a vertical-axis hydraulic ram mounted on said second carriage, a piston in said ram, means for displacing the piston in said cylinder, a stem solid with said piston and passing in a sealtight manner through the bottom of said cylinder, a plate solid to the free end of said stem, said plate solidly carrying the means for frontally suspending the framing of said third conveyor belt, on said plate being mounted the rotatable supporting member for said suspended framing and the means for inducing rotations of said rotatable supporting member, the framing of said third conveyor belt being likedly connected both to the front suspension members and the rear ones, the latter being pendularly connected to said suspended structure solid with said second carriage.

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