

Aug. 15, 1961

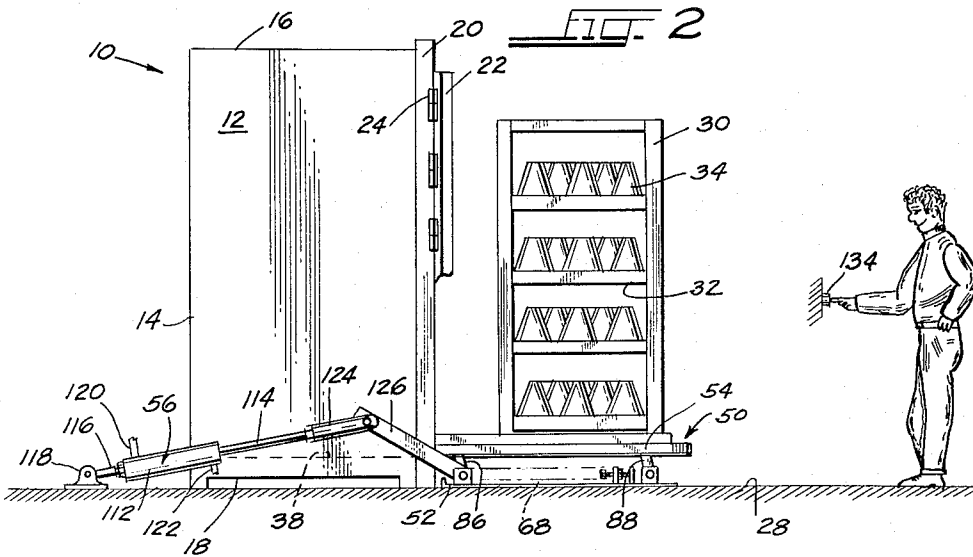
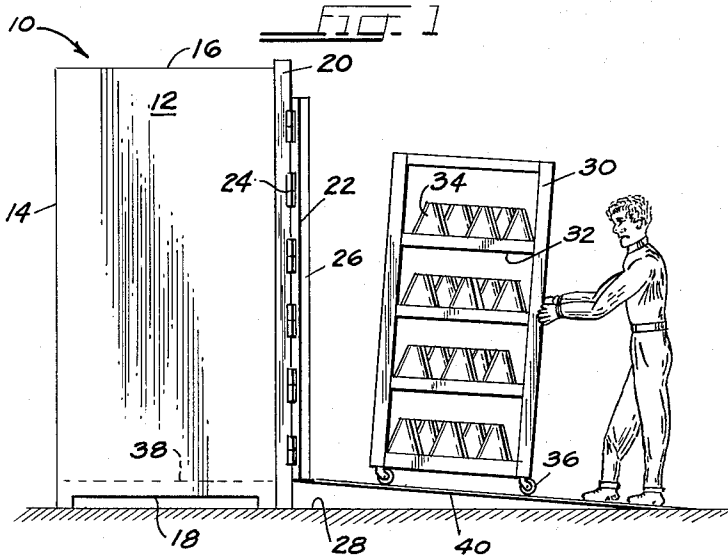
W. BROWN

2,996,200

LOADING MECHANISM FOR YARN CONDITIONER

Filed Oct. 13, 1958

2 Sheets-Sheet 1



INVENTOR.

WALTER BROWN

BY *Prangley, Baird, Clayton, Miller & Vogel*
ATTYS.

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2 Sheets-Sheet 2

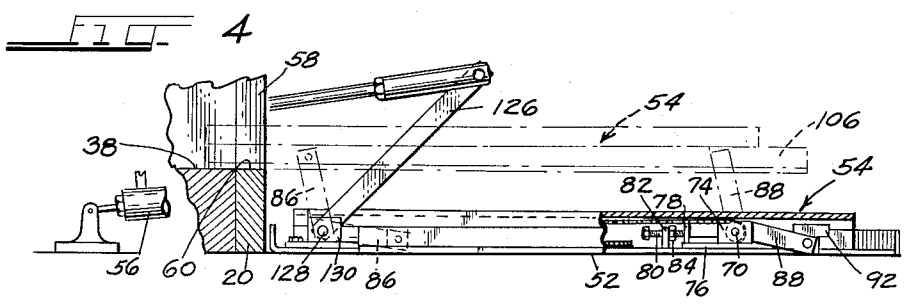
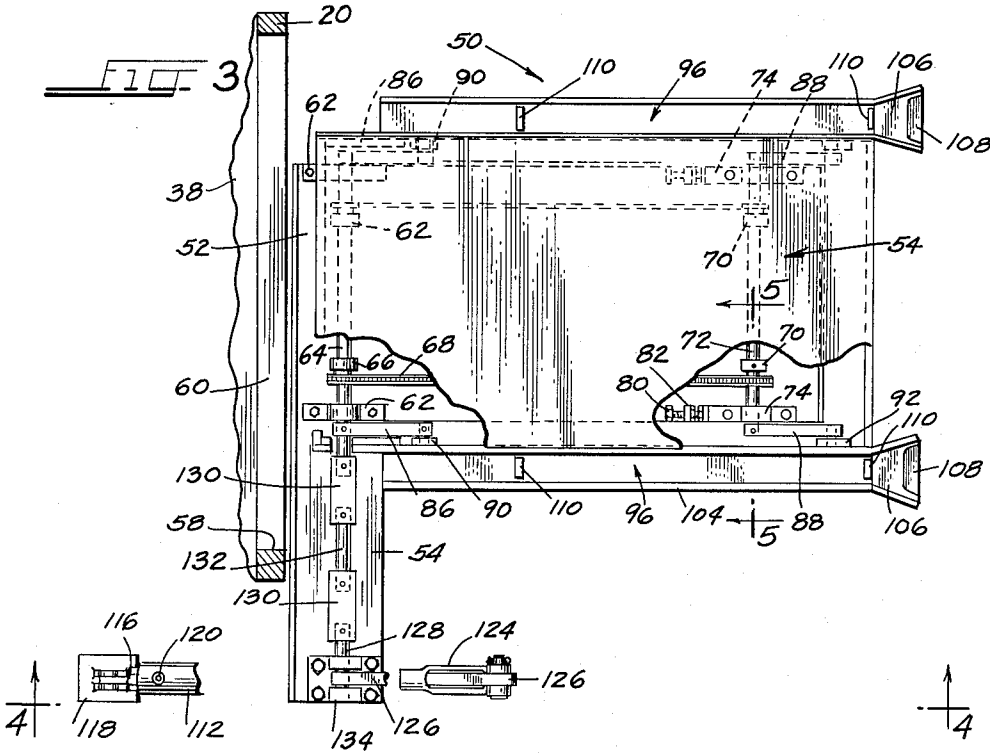
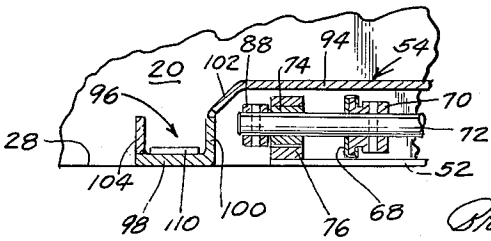


FIG. 5



INVENTOR.

WALTER BROWN

BY

Strangley, Baird, Clayton, Miller & Vogel

ATTYS.

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2,996,200
LOADING MECHANISM FOR YARN
CONDITIONER

Walter Brown, Columbus, Ohio, assignor to Paramount
Textile Machinery Co., Kankakee, Ill., a corporation of
Illinois

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This invention relates to an improvement in yarn conditioners and particularly to an elevator to aid in loading cones of yarn into the yarn conditioner.

The elevator of the present invention is particularly useful in connection with a yarn conditioner of the type having an enclosed cabinet providing a treating chamber, the cabinet having an opening or doorway in one wall closed by a hinged door. The conditioning operation consists of subjecting cones of yarn to steam under pressure and at high temperatures to obtain a uniform distribution of moisture content throughout the cones of yarn and thereafter to subject the yarn to a vacuum to reduce the moisture content to the desired level. In order to obtain the necessary and desirable hermetic sealing of the door with respect to the cabinet and particularly the associated front wall around the doorway, it is necessary that the lower edge of the doorway be raised above the adjacent floor and further that the floor of the conditioner on the inside of the cabinet be likewise raised above the adjacent support or factory floor.

In order to give ready access of the steam and the vacuum condition to the yarn on the cones, it is customary to stack the cones on hand truck provided with shelves to receive the cones and with rollers or wheels to facilitate movement of the truck along a support surface. The fully loaded hand truck weighs approximately 200 pounds and, accordingly, is moved only with difficulty and by the exertion of substantial effort. Heretofore, an inclined ramp has been provided extending from the factory floor upwardly to the lower edge of the doorway whereby to permit the loaded truck to be pushed therealong upwardly onto the floor of the treating cabinet. Such movement of the loaded truck has required considerable strength and effort on the part of the operator and, furthermore, the inclined ramp has occupied a substantial amount of factory floor space.

Accordingly, it is an important object of the present invention to provide a yarn conditioner equipped with an improved apparatus to load the cones of yarn therein through the elevated doorway.

Another object of the invention is to provide an elevator for use in conjunction with yarn conditioners having an elevated doorway whereby the loaded trucks carrying the cones of yarn can be more easily and more conveniently loaded into the conditioner cabinet and removed therefrom.

Yet another object of the invention is to provide an elevator for use with a yarn conditioner of the type set forth which is power actuated whereby to relieve the operator of a substantial portion of the physical burden of loading a truck of yarn cones into the treating cabinet.

Still another object of the invention is to provide an elevator for yarn conditioners of the type set forth which is safe in operation and is constructed so as to prevent inadvertent falling thereof while supporting a loaded truck in case of failure of power for the elevator.

Further features of the invention pertain to the particular arrangement of the elements of the elevator whereby the above-outlined advantages and additional operating features thereof are attained.

The invention, both as to its organization and method of operation, together with further objects and advan-

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tages thereof, will best be understood by reference to the following specification taken in connection with the accompanying drawings, in which:

FIGURE 1 is a side elevational and diagrammatical view showing the apparatus and method utilized heretofore for moving a loaded yarn cone carrying truck into the treating cabinet of a yarn conditioner;

FIG. 2 is a view similar to FIG. 1 and showing in association with the yarn conditioner an elevator embodying the present invention and made in accordance therewith;

FIG. 3 is an enlarged plan view with certain portions broken away of the elevator of the present invention;

FIG. 4 is a side elevational view with certain portions broken away of the elevator of FIG 3; and

FIG. 5 is an enlarged fragmentary view in vertical section through the elevator substantially as seen along the line 5-5 of FIG. 3.

There is shown in FIG. 1 of the drawings a yarn conditioner generally designated by the numeral 10 of the type with which the elevator of the present invention is particularly useful, the apparatus and method of loading yarn cones therein used heretofore being illustrated in conjunction therewith. The yarn conditioner 10 includes a pair of side walls 12, a rear wall 14, top and bottom walls 16 and 18 and a front wall 20. The front wall 20 is provided with an opening or doorway therein which can be closed and hermetically sealed by means of a door 22 hingedly mounted on the front wall 20 as at 24 and having a locking mechanism 26. The walls 12, 14, 16, 18 and 20 form an airtight treating chamber when the door 22 is locked and sealed. The treating cycle may consist of injecting steam under pressure and at a high temperature into the cabinet defined by the walls whereby to surround cones disposed in the treating cabinet with a high humidity atmosphere under pressure which tends to distribute moisture through the yarn of the cones in a uniform manner. After impregnating the cones of yarn with moisture, the steam pressure is removed and a vacuum is applied to the treating chamber thereby to reduce the moisture content of the yarn to a predetermined value.

If proper operation of the yarn conditioner 10 is to be achieved, the door 22 must firmly and completely seal the doorway in the front wall 20 and to this end the doorway is spaced upwardly from the bottom of the front wall 20 and from the supporting factory floor 28 so as to accommodate a suitable seal between the lower edge of the doorway on the front wall 20 and the lower edge of the door 22.

The yarn cones to be treated are customarily placed on a hand truck 30 provided with a plurality of shelves 32 to support a number of cones of yarn 34 in a suitable stacked and spaced-apart relationship to permit ready access of the steam thereto and ready removal of excess moisture therefore during the vacuum portion of the treating cycle. A set of wheels or rollers 36 is provided in the bottom of the truck 30 so that an operator can conveniently move the truck from one machine to another along the factory floor 28. The fully loaded hand truck with the yarn cones thereon may weight 200 pounds or more and, accordingly, it is not possible manually to lift the truck 30 over the ledge at the bottom of the doorway onto the inner floor 38 of the yarn conditioner 10, particularly in view of the fact that the upper edge of the ledge and the floor 28 may be located 4 to 5 inches or more above the factory floor 28.

It has been customary heretofore therefore to provide an upwardly inclined ramp 40 which is arranged with the upper end thereof resting on the ledge of the doorway and the other end thereof resting on the factory floor 28 whereby the loaded hand truck 30 can be pushed up the

inclined ramp 40 and onto the floor 28 of the yarn conditioner. In order to reduce the strength and the effort needed to move the loaded truck along the ramp 40, the ramp 40 is normally rather long and may be as much as twice as long as the yarn conditioner is deep whereby to occupy a substantial amount of space on the factory floor 28.

In accordance with the present invention, the yarn conditioner 10 is provided with an elevator generally designated by the numeral 50 adjacent to the front wall 20 thereof whereby the elevator 50 is utilized to lift the loaded hand truck 30 to a position such that it can be rolled along a horizontal path onto the floor 38 of the yarn conditioner. The details of construction of the elevator 50 can be best seen from FIGS. 3 through 5 of the drawings wherein it will be seen that the elevator comprises generally a base 52, a platform 54 connected to the base 52 for movement upwardly therefrom, and an actuating mechanism in the form of a hydraulic motor 56 of the expansion-contraction type.

Referring to FIG. 3 of the drawings, it will be seen that the base 52 is generally rectangular in form and has a laterally directed extension 54. The base 52 is mounted directly upon the factory floor 28 and has one end thereof adjacent to the front wall 20 of the conditioner 10 and extends outwardly and forwardly therefrom and in general alignment with the doorway 58 in the front wall 20 and below the ledge 60 on the front wall 20.

Mounted upon the base 52 is a first pair of bearings 62, the bearings 62 supporting a main drive shaft 64 which extends parallel to the front wall 20 and is spaced outwardly therefrom and below the ledge 60. There is fixedly secured to the shaft 64 between the bearings 62 a pair of sprockets 66 which engage and drive a pair of chains 68. Each of the chains 68 also engages a sprocket 70 mounted upon an idler shaft 72 mounted adjacent to the other or outer end of the base 52. More specifically, the shaft 72 is supported at each end thereof by a bearing 74 mounted on a slide 76 which is shiftable toward and away from the front wall 20 of the yarn conditioner. The slide 76 carries an upstanding arm 78 which abuts against an adjusting screw 80 threadedly received in an upstanding ear 82 on the base 52. By turning the screw 80 with respect to the ear 82 any desired adjusted position of the bearing 74 can be obtained and that position retained by tightening a lock nut 84 on the screw 80. The movable bearing 74 provides for shifting of the shaft 72 toward and away from the drive shaft 64 whereby to tighten or loosen the drive chains 68 as required.

The platform 54 is connected to the shaft 64 by a pair of levers 86 and to the idler shaft 72 by means of a second pair of levers 88. One end of each of the levers 86 receives the drive shaft 64 therethrough, the levers 86 being positioned outwardly from the bearings 62 and fixedly secured to the shaft 64. The other end of each of the levers 86 is pivotally connected to the platform 54 by means of trunnions 90 fixedly mounted on the underneath side of the platform 54. The other set of levers 88 is also fixedly connected to the associated shaft 72 and is, accordingly, movable therewith upon movement of the adjusting screw 80. The other end of each of the levers 88 is connected to a trunnion 92 which is slidably mounted upon the underneath side of the platform 54 adjacent to the outer end thereof. The sliding connection between the trunnion 92 and the platform 54 therefore accommodates the shifting of the idler shaft 72 and the attached levers 88 during the tightening of the chains 68.

The platform 54 is generally rectangular in shape and is disposed over the base 52 and overlies the side edges thereof. The central portion of the platform 54 is raised to provide a top 94 overlying the shafts 64 and 72 and the associated actuating mechanism and the top 94 is supported in that raised position by a pair of downwardly extending U-shaped tracks 96 which are formed integral with the lateral side edges of the top 94. Each of the

tracks 96 includes a bottom wall 98 which may rest on the factory floor 28 when the platform 54 is in the lowered position. A first side wall 100 extends upwardly from the bottom wall 98 and is formed integral with a downwardly inclined edge 102 on the top 94. A second side wall 104 is connected to the bottom wall along the outer edge thereof to engage and to retain the wheels 36 within the track 96.

As may be best seen in FIG. 3 of the drawings, the tracks 96 extend in a direction perpendicular to the front wall 20 and are disposed inwardly from the side edges of the doorway 58 whereby when the platform 54 is raised to the upper position, a hand truck can be readily moved along the tracks 96 onto the floor 38 of the conditioner 10 or outwardly therefrom. In order to assist in guiding a loaded hand truck onto and off of the tracks 96, the outer ends of the tracks, i.e., the ends disposed away from the yarn conditioner, are provided with widened track portions 106 which also are inclined or bevelled downwardly as at 108 to a point such that only a small thickness of material is disposed above the factory floor 28. In addition the tracks 96 are provided with a pair of upstanding positioning and stop members 110, a pair of the members 110 being disposed adjacent to the widened track portions 106 and the other pair of stop members 110 being disposed toward the yarn conditioner 10. The stop members 110 are adapted to provide ready reference points for positioning and holding the hand truck in a lateral position during the lifting and the lowering of the platform 54 whereby to prevent inadvertent rolling movement of the hand truck therealong and therefrom.

In order to raise the platform 54 from the lower or receiving position as illustrated by solid lines in FIG. 4 to the upper position illustrated by dashed lines therein, it is necessary to turn the shaft 64. To this end the hydraulic motor 56 has been provided, the motor 56 being of the expansion-contraction type and preferably being powered by air under pressure. The motor 56 includes the usual cylinder 112 having a shiftable piston thereon carrying a piston rod 114 extending from the forward end of the cylinder 112. The rear end of the cylinder 112 carries a rod 116 which is pivotally mounted by means of a bracket 118 fixedly secured to the factory floor 28. Air for actuating the motor 56 is admitted to the cylinder 112 and is withdrawn therefrom through the lines 120 and 122 communicating with the rearward and forward ends of the cylinder, respectively.

The forward end of the piston rod 114 is connected to a yoke 124 which is pivotally connected to the upper end of an actuating lever 126. The lower end of the actuating lever 126 is fixedly connected to a stub shaft 128 which is in turn rotatably supported by a bearing 130 mounted upon the outer end of the base extension 54 (see FIG. 3 particularly). The inner end of the stub shaft 128 is connected to the driving shaft 64 by means of pair of universal joints 130 interconnected by a short shaft 132. By this connection the motor 56 can be utilized to turn the shaft 64 whereby to raise and lower the platform 54.

The operation of the motor 56 to raise and lower the platform 54 will now be described in detail. Assuming that the platform 54 is in the lower position as illustrated by solid lines in FIG. 4, a truck 30 can be readily loaded thereon up the inclined track portions 106 and onto the main tracks 96. The slightly raised stops 110 will serve properly to position the truck 30 along the tracks 96 and will also prevent inadvertent rolling of the truck 30 along the tracks during the raising and the lowering of the platform 54. A remote control such as the control 134 diagrammatically illustrated in FIG. 2 may be provided to control the flow of air to the cylinder 112 from any desired convenient location. With the truck 30 in position on the platform 54, air is admitted through the line 122 whereby to cause the motor 56 to contract and to pivot the lever 128 toward the conditioner 10 and in a counterclockwise direction as viewed in FIGS. 2 and 4.

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Such movement of the lever 126 will also turn the shaft 64 in a counterclockwise direction and through the chains 68 likewise turn the idler shaft 72 in a counterclockwise direction. Both sets of levers 86 and 88 will move upwardly and in a counterclockwise direction as viewed in FIGS. 2 and 4 toward the front wall 20 of the yarn conditioner. The levers 86 and 88 will carry with them the platform 54 whereby to raise the platform 54 and the truck thereon upwardly and above the upper edge of the ledge 60 in the cabinet wall 20, as may be seen from the dashed line position of the levers 86 and 88 in FIG. 4. The upper ends of the levers pass beyond dead center with respect to the associated shafts 86 and 88 and finally assume a position inclined toward the yarn conditioner whereby to rest the end of the platform 54 disposed toward the wall 20 upon the ledge 60. This insures that the platform 54 will remain in the raised position even though air pressure is lost in the motor 56.

The operator can now conveniently roll the truck 30 over the stops 110 and onto the floor 38 of the yarn conditioner 10. Thereafter air is admitted to the cylinder 112 through the line 120 whereby to move the platform 54 away from the conditioner 10 and again rest it upon the factory floor 28. The operator then closes the door 22 in the usual manner and securely locks it in preparation for the yarn conditioning cycle during which the yarn is alternately subjected to steam and vacuum.

If it is desired to remove the truck 30 from the conditioner 10, the door 22 is opened and the platform 54 is moved to the raised position resting upon the ledge 60 in the floor 38 by admitting air under pressure through the line 122. The truck 30 having the treated cones of yarn thereon now can be conveniently rolled out of the yarn conditioner 10 and onto the platform 54, the truck 30 being properly positioned and held upon the platform 54 and along the tracks 96 by means of the stops 110. The operator then admits air pressure through the line 120 into the cylinder 112 thereby to move the platform 54 upwardly and away from the conditioner and thereafter downwardly to rest upon the floor 28 as is illustrated by solid lines in FIG. 4. The truck 30 can now conveniently be rolled from the tracks 96 over the stops 110 and down the inclined track portions 106 onto the factory floor 28 for transport to the next processing station.

From the above description it will be seen that the levers 86 and 88 comprise a parallel linkage mechanism which is operative to raise and lower the platform 54 while holding the platform 54 in a substantially horizontal position at all times during the raising and lowering thereof. The movement of the parallel linkage mechanism past the dead center point serves to rest the weight of the platform 54 and any load thereon upon the ledge 60 and the conditioner floor 38 whereby to provide the safety features described above in the event that air pressure is lost in the motor 56.

In view of the foregoing, it is apparent that there has been provided an elevator for a yarn conditioner of improved construction and arrangement that is characterized by the ability to lift a loaded truck upwardly from the factory floor to a level in alignment with the raised floor of the conditioner whereby the truck can be conveniently and safely transferred from the main factory floor into the yarn conditioner with a minimum of effort.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. In combination with a yarn conditioner adapted to be mounted on a substantially horizontal flat support surface and comprising a cabinet provided with a door and a door opening in a front wall thereof and having a

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lower edge of said opening disposed upwardly above the support surface, an inner floor in said cabinet arranged at a height substantially in alignment with the lower edge of said door opening and adapted to receive a truck thereon, an elevator including a base mounted on and supported by the support surface adjacent said front wall of said cabinet, a pair of transverse parallel shafts rotatably mounted on said base, a pair of levers fixed on each of said shafts, a platform pivotally connected to said levers and adapted to be elevated thereby, said platform including a generally planar top overlying and covering said base and said levers and said shafts, and including a pair of tracks on opposite edge portions of said top and disposed downwardly therefrom, power means for simultaneously rotating said shafts to pivot said levers through an unobstructed angular path from a lowered terminal position, wherein said levers extend from said shafts in a direction away from said cabinet, through a top vertical dead-center position and to an over-center position wherein said levers extend diagonally upwardly with respect to said support surface and toward said cabinet, said top being disposed below the level at said door opening and said tracks being in alignment with said opening and resting on said support surface when said levers are in said lowered terminal position, the end portions of said tracks adjacent said cabinet projecting through said door opening and overlying and resting upon said inner floor of said cabinet when said levers are in said over-center position, whereby said door may be opened and a truck may be rolled from said support surface onto said tracks when said levers are in their said lowered terminal position and said truck may be raised and then rolled from said tracks onto said inner floor when said levers have been moved from said lowered terminal position to said over-center position, the engagement of said end portions of said tracks with said inner floor serving to support said tracks and prevent collapse of said elevator in the event of failure of said power means, the movement of said levers through said vertical dead-center position preventing inadvertent return of said levers from said over-center position to said lowered terminal position.

2. In combination with a yarn conditioner adapted to be mounted on a substantially horizontal flat support surface and comprising a cabinet provided with a door and a door opening in a front wall thereof and having a lower edge of said opening disposed upwardly above the support surface, an inner floor in said cabinet arranged at a height substantially in alignment with the lower edge of said door opening and adapted to receive a truck thereon, an elevator including a base mounted on and supported by the support surface adjacent said front wall of said cabinet, a pair of transverse parallel shafts rotatably mounted on said base, a pair of levers fixed on each of said shafts, a platform pivotally connected to said levers and adapted to be elevated thereby, said platform including a generally planar top overlying and covering said base and said levers and said shafts and including a pair of tracks on opposite edge portions of said top and disposed downwardly therefrom, power means for simultaneously rotating said shafts to pivot said levers through an unobstructed angular path greater than 90 degrees from a lowered terminal position, wherein said levers are substantially parallel to said support surface and extend from said shafts in a direction away from said cabinet, through a top vertical dead-center position and to an over-center position wherein said levers extend diagonally upwardly with respect to said support surface and toward said cabinet, said power means including drive chains drivingly interconnecting said shafts and hydraulic actuating mechanism connected to one of said shafts, said top being disposed below the level of said door opening and said tracks being in alignment with said opening and resting on said support surface when said levers are in said lowered terminal position, the end portions of said

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tracks adjacent said cabinet projecting through said door opening and overlying and resting upon said inner floor of said cabinet when said levers are in said over-center position, whereby said door may be opened and a truck may be rolled from said support surface onto said tracks when said levers are in their said lowered terminal position and said truck may be raised and then rolled from said tracks onto said inner floor when said levers have been moved from said lowered terminal position to said over-center position, the engagement of said end portions of said tracks with said inner floor serving to support said tracks and prevent collapse of said elevator in the event of failure of said power means, the movement of said

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levers through said vertical dead-center position preventing inadvertent return of said levers from said over-center position to said lowered terminal position.

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