Sept. 9, 1952 F. F. SUTHERLAND ET AL 2,609,954

TRANSPORT LIFT

Filed Feb. 2, 1949 4 Sheets-Sheet 1

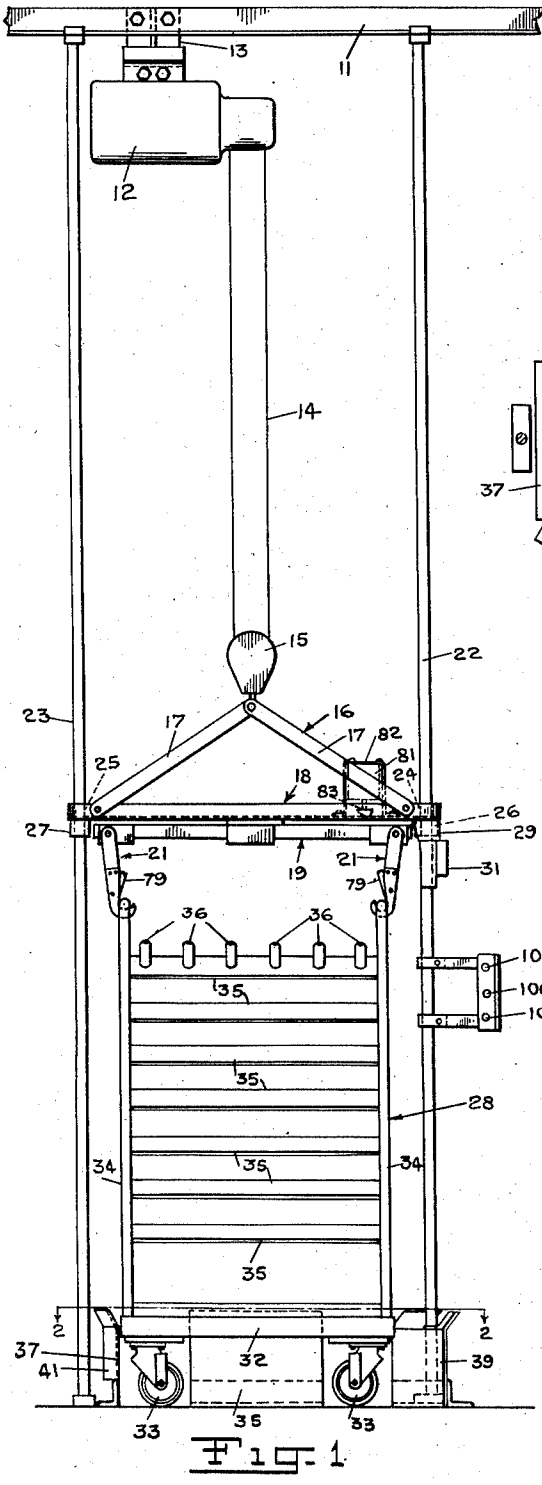


Fig. 1

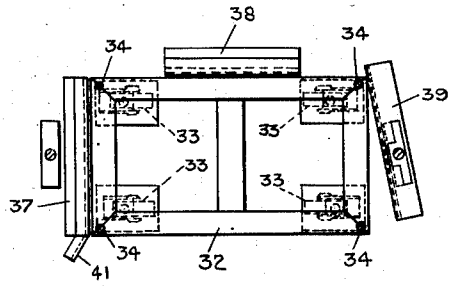


Fig. 2

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TRANSPORT LIFT

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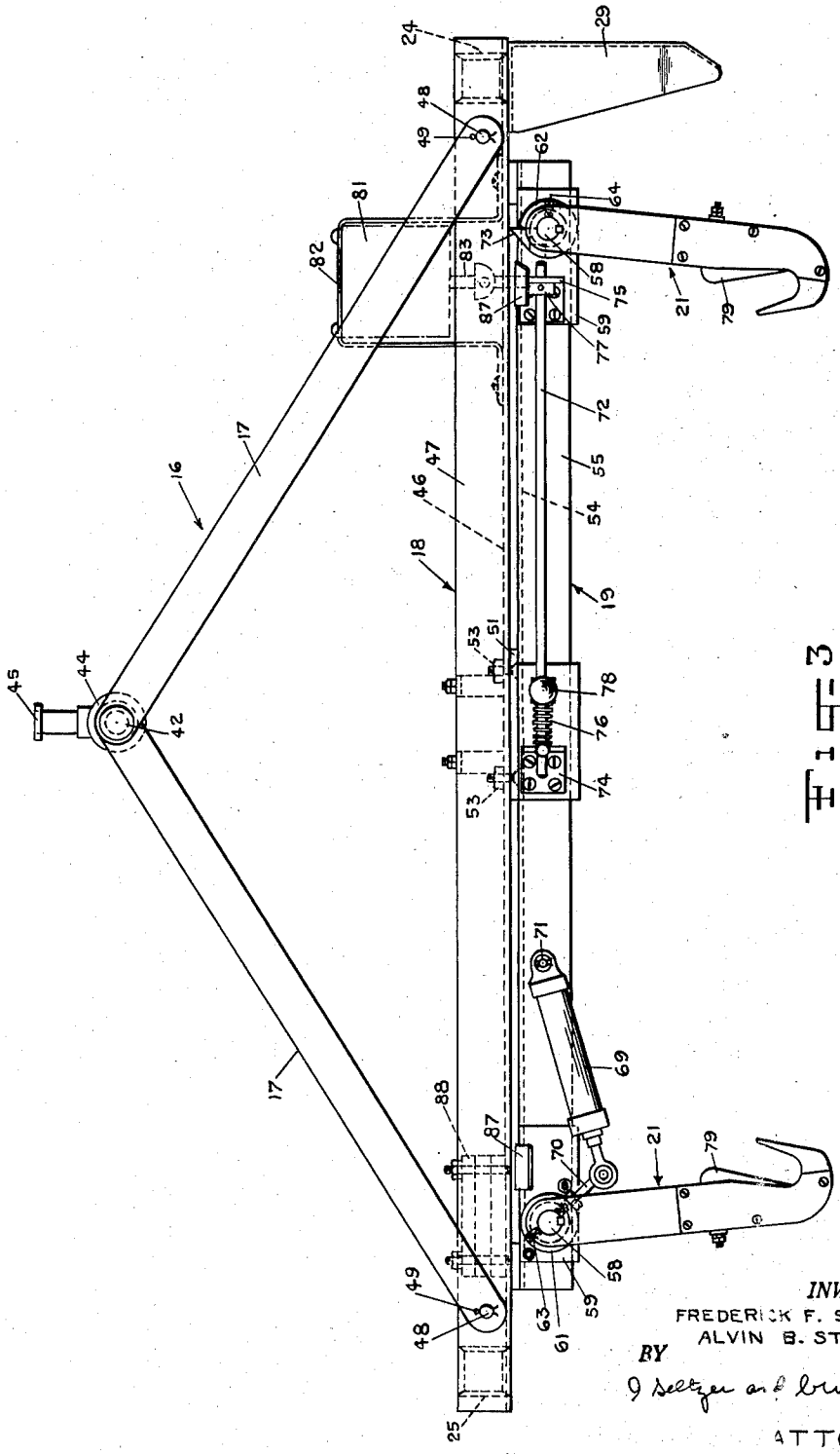


FIG. 3

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TRANSPORT LIFT

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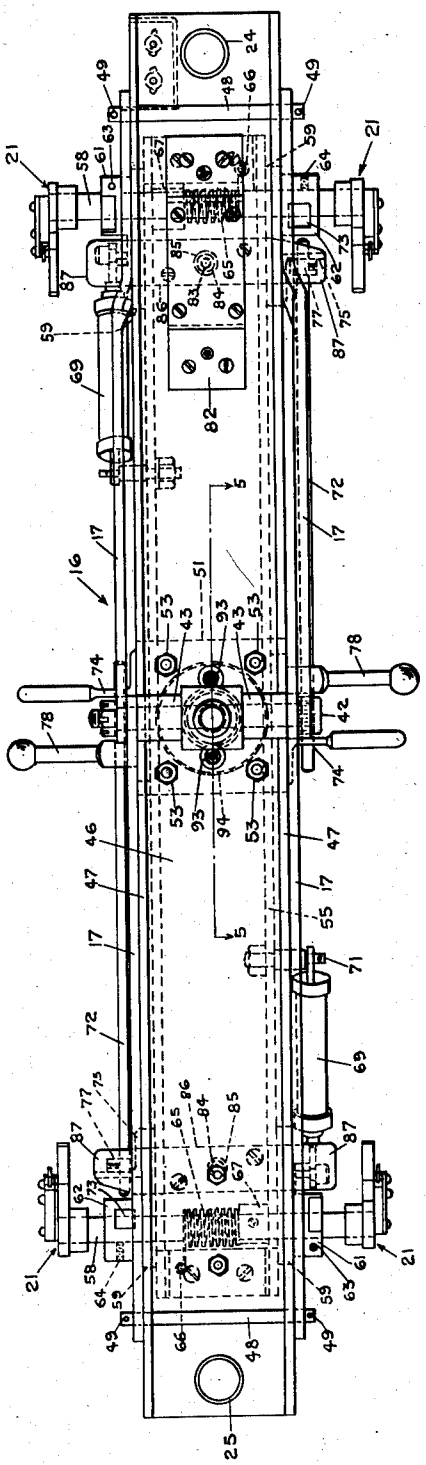


FIG. 4

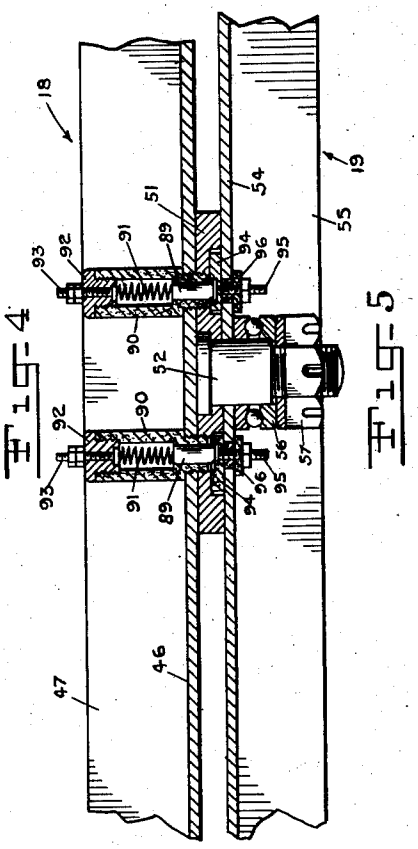


FIG. 5

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TRANSPORT LIFT

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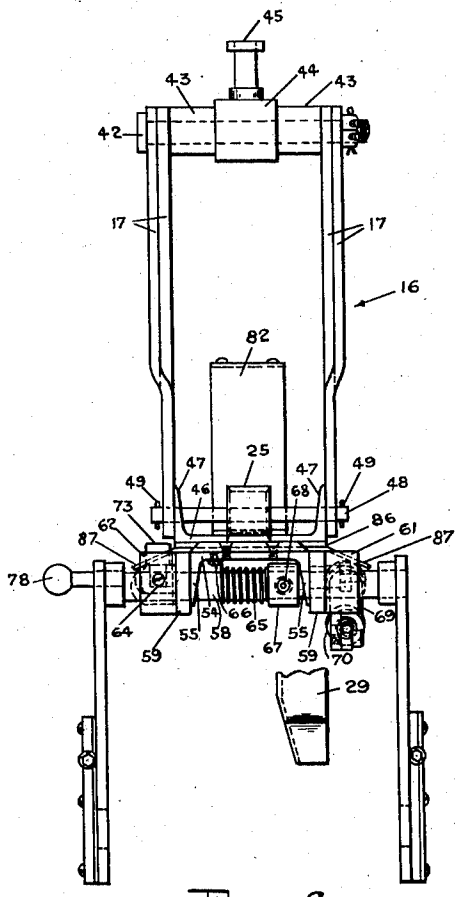


Fig. 6

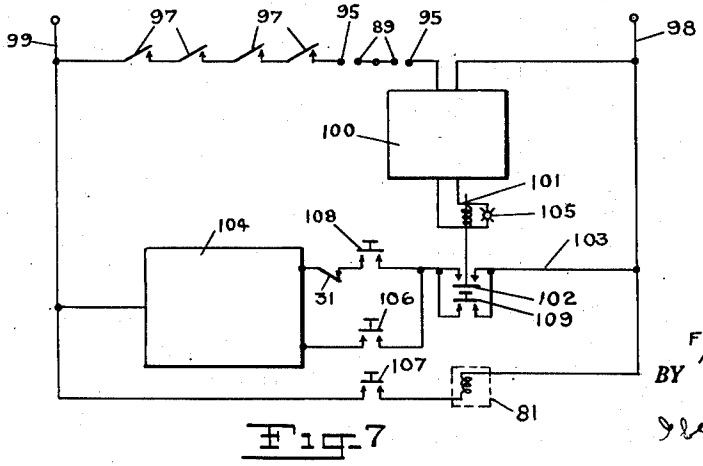


Fig. 7

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UNITED STATES PATENT OFFICE

2,609,954

TRANSPORT LIFT

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Application February 2, 1949, Serial No. 74,188

6 Claims. (Cl. 214—111)

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This invention relates to transport lifts, and relates more particularly to transport lifts adapted to permit the packages of yarn carried by a transport to be inspected without being removed from the transport.

Packages of yarn are normally moved from point to point in textile plants on transports comprising a framework mounted on wheels and provided with several rows of pins or spindles on each side thereof for receiving and supporting the packages of yarn. The usual inspection of the yarn packages before shipment is often effected while the packages are on the transport. However, since several of the rows of packages of yarn on a transport are below eye level, it has heretofore been customary, during this inspection, to remove the packages of yarn individually from the transport, examine them, and wrap them for shipment or return them to the transport. As is readily apparent, a large amount of labor is required to carry out an inspection in this manner, and the possibility is ever present that the yarn will be damaged by additional handling.

It is an important object of this invention to provide an apparatus which will permit of the inspection of the packages of yarn on a transport without the necessity of the manual handling of the yarn packages.

A further object of this invention is to provide a transport lift which will raise a transport so that the several rows of packages of yarn thereon are successively positioned at eye level and may be examined for defects without removing them from the transport or otherwise manually handling the same.

Other objects of this invention, together with certain details of construction and combinations of parts, will be apparent from the following detailed description and claims.

In accordance with our invention, we provide a transport lift which will raise a transport so that the several rows of packages of yarn thereon are successively at eye level. This permits the packages of yarn to be inspected for defects without being removed from the transport. After the transport has been raised to the maximum height required to inspect all the packages of yarn on one side thereof, it may be rotated through an angle of 180 degrees, permitting the packages of yarn on the other side thereof to be inspected as the transport descends.

A preferred embodiment of our invention is illustrated in the accompanying drawing in which

Fig. 1 is a front elevational view of a transport lift embodying our invention showing a transport in operative relation thereto,

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Fig. 2 is a view in section, taken on line 2—2 in Fig. 1 in the direction of the arrows, showing the manner in which the base of the transport is positioned with respect to the transport lift,

Fig. 3 is a front elevational view, on an enlarged scale, of the lifting assembly of the transport lift shown in Fig. 1,

Fig. 4 is a top plan view of the lifting assembly shown in Fig. 3,

Fig. 5 is a view in section, on an enlarged scale, taken on the line 5—5 in Fig. 4 in the direction of the arrows, showing the manner in which the lifting beams are fastened together,

Fig. 6 is an end elevational view of the lifting assembly shown in Fig. 3, and

Fig. 7 is a wiring diagram of the control circuit of the transport lift.

Like reference numerals indicate like parts throughout the several views of the drawings.

Referring now to the drawings, and more particularly to Figs. 1 and 2 thereof, the reference numeral 11 designates an overhead beam to which an electric hoist 12 is fastened by means of a bracket 13. The electric hoist 12 operates tackle 14 passing through a pulley block 15, which pulley block is secured to a lifting assembly indicated generally by reference numeral 16. The lifting assembly 16 comprises equalizing rods 17 to which is fastened an upper lifting beam indicated generally by reference numeral 18. A rotatable lower lifting beam, indicated generally by reference numeral 19, is fastened to the upper lifting beam 18, and is provided at its ends with lifting hooks, indicated generally by reference numeral 21.

The lifting assembly 16 may be raised and lowered as desired by operation of the electric hoist 12, and is guided during said motion by pipe rails 22 and 23 which pass through sleeves 24 and 25, respectively, fastened to the upper lifting beam 18. Adjustable stops 26 and 27 fastened to the pipe rails 22 and 23, respectively, limit the downward motion of the lifting assembly 16 to position the lifting hooks 21 properly with respect to a transport, indicated generally by reference numeral 28. As a safety measure, the upper lifting beam 18 carries a downwardly extending arm 29 which operates a limit switch 31 to cut off the power supply to the electric hoist 12 when the lifting assembly 16 has been lowered to the proper position.

The transport 28 comprises a base 32 mounted on casters 33, and tubular frame members 34 which are adapted to be engaged at their upper ends by the lifting hooks 21. Between the frame members 34 there are a number of shelves 35,

each of which is provided with a plurality of pins 36 to support packages of yarn (not shown).

The transport 28 is positioned properly with respect to the lifting assembly 16 by means of guides 37, 38 and 39 which contact the base 32. The guides 37 and 38 are positioned at right angles to each other, and the guide 39 is positioned at a slight angle with respect to the guide 37 so that the spacing between the guides 37 and 39 decreases in the direction of the guide 38. As the transport 28 is moved under the lifting assembly 16, the rear corner of the base 32 will strike the guide 39 and direct said base into firm contact with the guides 37 and 38. The guide 37 is also provided with a flange 41 extending at a slight angle with respect thereto, which serves to guide the transport 28 into the opening between the guides 37 and 39 for the proper positioning of the transport with respect to the lifting assembly 16.

Turning now to Figs. 3 to 6 of the drawings in which the construction of the lifting assembly 16 is shown in detail, it will be seen that the equalizing bars 17 are fastened together at their upper end by means of a bolt 42. Sleeves 43 mounted on the bolt 42 between the equalizing bars 17 serve to center a sleeve 44 to which is secured a bolt 45 for fastening the lifting assembly 16 to the pulley block 15.

The upper lifting beam 18, which comprises a web 46 provided with flanges 47, is fastened between the lower ends of the equalizing bars 17 by means of stub shafts 48 that are held in position by cotter pins 49. To support the lower lifting beam 19 on said upper lifting beam 18, a plate 51 carrying a king pin 52 is fastened to the web 46 centrally of the ends of the upper lifting beam 18 by means of screws 53. The lower lifting beam 19, which comprises a web 54 provided with flanges 55, is mounted for rotation on the king pin 52, with the web 54 resting on a ball bearing 56 held in position by a nut 57.

Stub shafts 58, to which the lifting hooks 21 are keyed, are journalled in plates 59 fastened to the flanges 55 of the lower lifting beam 19. Axial motion of the shafts 58 is prevented by collars 61 and 62 fastened to said shafts adjacent the flanges 55 with set screws 63 and 64, respectively. The lifting hooks 21 which are free to swing in a vertical arc are spring pressed downwardly by means of torsion springs 65 that encircle the shafts 58. One end of each of the torsion springs 65 is fastened to the web 54 with screws 66, and the other end thereof is held under tension by collars 67 that are adjustably fastened to the shafts 58 with set screws 68. Air cushions 69 fastened to the collars 61 by bolts 70 and to the flanges 55 by bolts 71 restrict the action of the torsion springs 65 on the hooks 21, permitting stronger and more positive spring with softer contact of said hooks on the transport frame 34.

Means are provided for holding the hooks 21 in a horizontal position, when they are raised, said means comprising rods 72 which engage lugs 73 on the collars 62. The rods 72 are slidably supported in brackets 74 and 75 fastened to the flanges 55 of the lower lifting beam 19, and are spring pressed in the direction of the lugs 73 by means of helical springs 76. The rods 72 move in the direction of the lugs 73 until collars 77 mounted on said rods strike the brackets 75. A hand lever 78 mounted on the rod 72 is employed for manually withdrawing said rod from the lug 73, allowing the torsion springs 65 to rotate the hooks

21 to a vertical position in contact with the frame members 34 of the transport 28. When the hooks 21 are in contact with the frame members 34, the switch operating fingers 79, whose function will be described in detail below, will be actuated.

To prevent inadvertent rotation of the lower lifting beam 19, a pull type solenoid 81 is mounted by means of a bracket 82 on the web 46 of the upper lifting beam 18. Plunger 83 of the solenoid 81 passes through an aperture 84 in the web 46 and engages an aperture 85 in the web 54 of the lower lifting beam 19 thus locking said beam in position. Straps 86 whose ends 87 are bent downwardly are mounted on the web 54 to raise the plunger 83 clear of said web when the lifting beams are rotated relative to each other and are approaching a parallel position. For smoother operation, the solenoid 81 is counterbalanced by means of weights 88 fastened to the upper lifting beam 18. To prevent the operation of the electric hoist 12 when the lifting beams 18 and 19 are not in parallelism, a pair of brushes 89 are slidably mounted in insulating bushings 90 which extend through the web 46 symmetrically of the king pin 52. The brushes 89 are pressed downwardly by means of conducting springs 91, which are located in the bushings 90 and are held in position with fiber plugs 92. The springs 91 bear against the heads of screws 93 that pass through the fiber plugs 92 permitting electrical contact to be established with the brushes 89. During the rotation of the lower lifting beam 19, the brushes 89 ride in a fiber ring 94. When the lifting beams 18 and 19 are brought into parallelism, the brushes 89 make contact with screws 95 that extend through the web 54, being insulated therefrom by means of fiber bushings 96.

In operating the transport lift for the examination of yarn packages, the lifting assembly 16 is normally in its lowermost position at the start, with the upper lifting beam 18 resting on the stops 26 and 27 and with the safety switch 31 open. The lifting hooks 21 to the operator's right are raised until the lug 73 engages the rod 72 to hold said hooks in horizontal position. A transport 28 having been moved under the lifting assembly 16, and directed into the desired position by guides 37, 38 and 39, the handle 78 is operated to disengage the rod 72 from the lug 73 permitting the spring 65 to rotate the hooks 21 into engagement with the frame members 34 of the transport. When the hooks 21 are properly engaged, the switch operating fingers 79 will close contacts 97 in the hooks 21 which are connected in series with each other. If, when the contacts 97 are all closed, the brushes 89 are in contact with the screws 95 a current will flow from the lines 98 and 99 through a relay 100 which will operate a solennoid 101 to close a switch 102 in line 103 to motor starter 104 connected to the electric hoist 12 in conventional manner. Simultaneously, a pilot light 105 will be energized indicating that the transport lift is ready for operation.

Push button switch 106 is then closed causing the motor starter 104 to operate the electric hoist 12 raising the transport 28. As the transport 28 moves upwardly, the operator inspects the packages of yarn carried by the pins 36 on each of the shelves 35. After all the packages of yarn on one side of the transport 28 have been inspected the push button switch 107 is closed, energizing the pull solenoid 81 to effect the release of the plunger 83 from the aperture 85. The transport is then rotated through an angle

of 180 degrees until the plunger 83 rides up the end 87 of the rod 86 and engages the aperture 85 on the opposite end of the lower lifting beam 19. During the rotation of the transport 28, the brushes 89 will be out of contact with the screws 95 and it will be impossible to operate the electric hoist 12 until the lifting beams are again in parallelism. Push button switch 108 is then closed causing the motor starter 104 to operate the electric hoist 12 to lower the transport 28. During this descent, the packages of yarn on the other side of the transport 28 are inspected. When the transport 28 reaches the floor, the hooks 21 to the operator's right are raised until the lug 73 engages the rod 72 to hold said hooks in horizontal position. At this point, the transport may be removed from the transport lift and another inserted in its stead. The entire operating cycle is then repeated.

A push button switch 109 is provided in parallel with the solenoid operated switch 102 to permit the transport lift to be operated in the event of an emergency without a transport 28 in position on the hooks 21, and with the lifting beams 18 and 19 not in parallelism.

It will be readily apparent that the transport lift of this invention permits of a large number of packages of yarn to be inspected in a short time with perfect safety, without undue handling of the same and with a minimum of labor.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of our invention.

Having described our invention, what we desire to secure by Letters Patent is:

1. A transport lift comprising an upper lifting beam, a rotatable lower lifting beam carried by said upper lifting beam, a plurality of lifting hooks mounted on said lower lifting beam, means, operative only when said upper and lower lifting beams are parallel to each other, for raising and lowering said lifting beams and automatically operating means for locking said lower lifting beam against rotation when in parallel relation to said upper lifting beam.

2. A transport lift comprising an upper lifting beam, a lower lifting beam rotatably suspended from said upper lifting beam, a plurality of lifting hooks mounted on said lower lifting beam, means, operative only when said upper and lower lifting beams are parallel to each other, for raising and lowering said lifting beams and automatically operating means for locking said lower lifting beam against rotation when in parallel relation to said upper lifting beam.

3. A transport lift comprising an upper lifting beam, a lower lifting beam rotatably suspended from said upper lifting beam, a plurality of lifting hooks mounted on said lower lifting beam, means, operative only when said upper and lower lifting beams are parallel to each other, for raising and lowering said lifting beams, automatically operating means for locking said lower lifting beam against rotation when in parallel relation to said upper lifting beam and means carried by said lifting hooks and operable by said transport for permitting the raising and lowering of said lifting beams only when said lifting hooks are in predetermined engagement with said transport.

4. A transport lift comprising an upper lifting beam, a lower lifting beam rotatably suspended from said upper lifting beam, a plurality of lifting hooks mounted on said lower lifting beam, means, operative only when said upper and lower lifting beams are parallel to each other, for raising and lowering said lifting beams, means carried by said lifting hooks and operable by said transport for permitting the raising and lowering of said lifting beams only when said lifting hooks are in predetermined engagement with said transport, spring means for urging said lifting hooks into operative position and manually operable means for holding said lifting hooks in inoperative position.

5. A transport lift comprising an upper lifting beam, a lower lifting beam rotatably suspended from said upper lifting beam, a plurality of lifting hooks mounted on said lower lifting beam, means, operative only when said upper and lower lifting beams are parallel to each other, for raising and lowering said lifting beams, automatically operating means for locking said lower lifting beam against rotation when in parallel relation to said upper lifting beam, means carried by said lifting hooks and operable by said transport for permitting the raising and lowering of said lifting beams only when said lifting hooks are in predetermined engagement with said transport, spring means for urging said lifting hooks into operative position and manually operable means for holding said lifting hooks in inoperative position.

6. A transport lift comprising an upper lifting beam, a lower lifting beam rotatably suspended from said upper lifting beam, a plurality of lifting hooks mounted on said lower lifting beam, means, operative only when said upper and lower lifting beams are parallel to each other, for raising and lowering said lifting beams, automatically operating means for locking said lower lifting beam against rotation when in parallel relation to said upper lifting beam, means carried by said lifting hooks and operable by said transport for permitting the raising and lowering of said lifting beams only when said lifting hooks are in predetermined engagement with said transport, spring means for urging said lifting hooks into operative position, manually operable means for holding said lifting hooks in inoperative position and guide means for positioning said transport with respect to said lifting hooks.

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