

PATENT SPECIFICATION

(11)

1 559 500

1 559 500

(21) Application No. 28124/76 (22) Filed 6 July 1976

(23) Complete Specification filed 26 Oct. 1976

(44) Complete Specification published 23 Jan. 1980

(51) INT. CL.³ B60P 1/52

(52) Index at acceptance
B8E 18X

(72) Inventor JOHN EDMUND RICHARD WEBB



(54) MECHANICAL HANDLING APPARATUS

(71) We, HYDRAROLL LIMITED, a British Company, of Nettleton House, Calthorpe Road, Birmingham B15 1RD, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

The invention relates to a device for use as or as part of material handling apparatus and to such apparatus and particularly concerns such device and apparatus for facilitating moving and securing loads which may be carried for example on pallets for example in a load carrying vehicle.

According to one aspect of the invention there is provided a device for use as or as part of mechanical handling apparatus which can support a load both during movement of the load into position and when the load is static, the device comprising an elongate body member a support (as herein defined) for loads an inflatable device connected to the support for raising and lowering it and stop means independent of the inflatable device which is movable between one position in which passage along the device is unimpeded and another position in which passage along the device is prevented or hindered.

The support for loads may comprise it will be understood, and is defined herein to mean, either (a) a support surface for carrying loads which is movable by the inflatable device up and down in relation to the upper boundary surface of rotatable members such as rollers which are mounted in a static mounting of the device, or (b) rotatable members such as rollers which themselves are held in a mounting which is reciprocable by the inflatable device so that the rollers or part thereof move transversely of the plane of a static support surface on which loads are seated when the inflatable device is deflated.

The stop means may be positioned intermediate the length of the body member so that the device is, in the another position of the stop means, formed into sections for supporting a load.

There may be stop means at one or both ends of the device.

The stop means may comprise a plate which rests on the body member in the one position and which in said another position rests in a slot or slots in the body member so that the plate presents an obstruction above the level of the body member and the rollers.

The support may comprise a load bearing plate which has a plurality of discrete openings, there being as many openings as there are rollers and the arrangement of the rollers and the openings being such that each roller is associated with a respective one of the openings.

The clearance of the roller and the boundary of the associated opening is preferably such that the load bearing plate prevents ingress of dirt into the body member.

The body member may include a guide plate which is secured to one of its sides and which extends in the longitudinal direction of the device at a position above the load bearing surface of the load bearing plate.

According to a second aspect, the invention provides a pair of devices as hereinbefore defined comprising mechanical handling apparatus for pallets, the devices being of such a distance apart that each one supports the legs or other supports such as skids along one side of a pallet.

According to a third aspect, there is provided mechanical handling apparatus comprising a device or devices as hereinbefore defined mounted in a vehicle.

One construction embodying the invention is diagrammatically illustrated, by way of

10

2

1 559 500

2

of example, in the drawings filed with the Provisional Specification.

Figure 1 shows a vertical sectional view of a device for use in mechanical handling apparatus;

Figure 2 shows a plan view of the device;

Figure 3 shows a longitudinal sectional view of the device; and

Figure 4 shows a side elevational view of the device.

Referring to the drawings, the device 1 shown has a hollow elongate body member 2 in the form of a channel member 3 which houses an inflatable device in the form of an air bag assembly 4 which has connectors (not shown) for connecting it to an existing air supply of a vehicle for example.

The open top of the channel member 3 is closed by a static support surface in the form of a top plate 5 (as viewed in Figure 1) which has a number of discrete openings 6. A roller 7 is aligned, in the vertical sense, with each opening 6. The rollers 7 are freely rotatable and are mounted by means 8 such as a shaft and retainer nuts in a mounting in the form of a channel shaped support 9 which is situated internally of the device and the underside of which is connected to the air bag assembly 4.

The clearance of the rollers 7 and their associated openings 6 is such that substantially no foreign bodies can enter the channel member. Under the support 9 and above the air bag 4 there is a flat plate (not shown) covering the width of the inside of the track to protect the air bag from foreign bodies which might possibly enter into the inside section.

The device 1 has stop means in the form of a plate 10 intermediate its length and independent of the air bag assembly 4. The stop plate 10 comprises a flat plate which can be moved manually from one position to another position in which it is supported in a slot 11 in the body member 2. There is a slot 11 at either side of the device, see Figure 2.

There is a stop plate 12 at each end of the device.

The stop plate 10 is between two rollers 7 so that in the inoperative position shown in Figure 2, one edge lies close to one of the rollers.

There is a longitudinally extending guide plate 13 (Figures 2 to 4) secured to one side of the device 1 (though this guide plate can, it will be understood, be dispensed with).

In operation, for handling loads or pallets in for example a 40' vehicle, one or more pairs of devices 1 are laid along the length of the vehicle at lateral spacings adequate to support the feet of pallets.

The devices 1 form tracks. The air bag assemblies 4 are connected up to the air supply of the vehicle, which is operated by a simple two way position valve for "on/off" operation.

There may be several devices 1 laid end to end in each track of a pair, depending on the length of the vehicle.

In order to handle and secure pallets, the or each air bag assembly 4 is inflated (from the chain dotted to full line position in Figure 1) so that the support 9 and thus the rollers 7 are raised so that part of the boundary surface of the rollers protrudes above the plane of the top plate 5. The rounded heads of the nuts of the means 8 prevent canting of the support 9 during raising and lowering, and guiding is effected by a guide 14 which runs in a slot 15 of the support 9. Then, with the stop plates 10, 12 horizontal as shown, the pallets are pushed over the tracks. When a pallet is in position, the stop plates 10 are moved manually to the upright position so that they are supported in the slots 11 to prevent or hinder movement of the pallet along the track. This is particularly important where handling is taking place on uneven ground, which could otherwise cause movement of a pallet if the stop plates were not used. The operator, or other personnel, can then position other pallets in the vehicle until all are in position. In this way, the apparatus forming the track stays "live" during the whole loading operation. When all the pallets are loaded, the or each air bag assembly 4 can be deflated so that the rollers 7 retract below the plane of the top plate 5 and the track becomes "dead" with the legs of the pallets supported by the top plates 5.

The apparatus can be built into a floor of a vehicle, or can be laid on an existing floor.

The apparatus can take loads of up to 2 tons per pallet at a P.S.I. of 40lbs. The equipment is normally operated at 20 P.S.I.

When in use, the guide plate 13 helps guidance of the pallets during movement to and from the stowed position.

It will be appreciated that the invention may take other forms than that shown in the drawings and above described. Thus it is possible to omit a top plate 5 providing that a support for loads is maintained, the guide 14, and the flat plate between the support 9 and the air bag 4. The rollers 7 may also be of any suitable configuration and indeed could be replaced by spherical bearings or conveyors in certain circumstances. Also, each length of track-line device could have more than the single stop means intermediate its length for example there could be two or three between the ends, though this number is not to be taken

as limiting. When two tracks are laid end-to-end, the adjacent ends may be made complementary to give a smooth run along the track.

- 5 The inflatable device may also be inflatable by ingress of liquid.

Also, the guide 14 may comprise a pin carrying a sleeve, which pin is spring mounted in aligned holes in the body member 2.

10 WHAT WE CLAIM IS:—

1. A device for use as or as part of mechanical handling apparatus which can support a load both during movement of the load into position and when the load is static, the device comprising an elongate body member a support (as herein defined) for loads an inflatable device connected to the support for raising and lowering it and stop means independent of the inflatable device which is movable between one position in which passage along the device is unimpeded and another position in which passage along the device is prevented or hindered.

- 25 2. A device according to Claim 1, in which the stop means is positioned intermediate the length of the body member so that the device is, in the another position of the stop means, formed into sections for supporting a load.

- 30 3. A device according to Claim 1 or Claim 2, in which there is stop means at one end of the device.

- 35 4. A device according to Claim 1 or Claim 2, in which there is stop means at both ends of the device.

- 40 5. A device according to any one of the preceding Claims, in which the stop means comprises a plate which rests on the body member in said one position and which in said another position rests in a slot or slots in the body member so that the plate presents an obstruction above the level of the body member and the rotatable means.

- 45 6. A device according to any one of the accompanying Claims, in which the support

for loads comprises a load bearing plate which has a plurality of discrete openings there being as many openings as there are rotatable means and the arrangement of the rotatable means and the openings being such that each rotatable means is aligned with a respective one of the openings.

7. A device according to Claim 6, in which the clearance of the rotatable means and the boundary of its associated opening is such that the load bearing plate prevents ingress of foreign bodies into the body member.

8. A device according to any one of the preceding Claims, in which the rotatable means are rollers mounted for rotation in a mounting which can be raised and lowered by the inflatable device and in which there is a guide means comprising a pin and slot for guiding the mounting during raising and lowering.

9. A device according to any one of the preceding Claims, in which there is an upstanding guiding along the length of the device at one side thereof for guiding a load during movement along the device.

10. A pair of devices each according to any one of the preceding Claims and spaced apart such a distance that each one can support the legs or other supports such as skids along one side of a pallet.

11. Mechanical handling apparatus comprising one or more devices as hereinbefore defined mounted in the floor of a vehicle.

12. A device for use as or as part of a mechanical handling apparatus which can support a load both during movement of the load into position and when the load is static, substantially as hereinbefore described with reference to and as shown in the drawings filed with the Provisional Specification.

EDWARD EVANS & CO.

Chancery House,
53-64 Chancery Lane,
London, WC2A 1SD.
Agents for the Applicants.



11

as limiting. When two tracks are laid end-to-end, the adjacent ends may be made complementary to give a smooth run along the track.

- 5 The inflatable device may also be inflatable by ingress of liquid.

Also, the guide 14 may comprise a pin carrying a sleeve, which pin is spring mounted in aligned holes in the body member 2.

10 WHAT WE CLAIM IS:—

1. A device for use as or as part of mechanical handling apparatus which can support a load both during movement of the load into position and when the load is static, the device comprising an elongate body member a support (as herein defined) for loads an inflatable device connected to the support for raising and lowering it and stop means independent of the inflatable device which is movable between one position in which passage along the device is unimpeded and another position in which passage along the device is prevented or hindered.

- 25 2. A device according to Claim 1, in which the stop means is positioned intermediate the length of the body member so that the device is, in the another position of the stop means, formed into sections for supporting a load.

- 30 3. A device according to Claim 1 or Claim 2, in which there is stop means at one end of the device.

- 35 4. A device according to Claim 1 or Claim 2, in which there is stop means at both ends of the device.

- 40 5. A device according to any one of the preceding Claims, in which the stop means comprises a plate which rests on the body member in said one position and which in said another position rests in a slot or slots in the body member so that the plate presents an obstruction above the level of the body member and the rotatable means.

- 45 6. A device according to any one of the accompanying Claims, in which the support

for loads comprises a load bearing plate which has a plurality of discrete openings there being as many openings as there are rotatable means and the arrangement of the rotatable means and the openings being such that each rotatable means is aligned with a respective one of the openings.

7. A device according to Claim 6, in which the clearance of the rotatable means and the boundary of its associated opening is such that the load bearing plate prevents ingress of foreign bodies into the body member.

8. A device according to any one of the preceding Claims, in which the rotatable means are rollers mounted for rotation in a mounting which can be raised and lowered by the inflatable device and in which there is a guide means comprising a pin and slot for guiding the mounting during raising and lowering.

9. A device according to any one of the preceding Claims, in which there is an up-standing guiding along the length of the device at one side thereof for guiding a load during movement along the device.

10. A pair of devices each according to any one of the preceding Claims and spaced apart such a distance that each one can support the legs or other supports such as skids along one side of a pallet.

11. Mechanical handling apparatus comprising one or more devices as hereinbefore defined mounted in the floor of a vehicle.

12. A device for use as or as part of a mechanical handling apparatus which can support a load both during movement of the load into position and when the load is static, substantially as hereinbefore described with reference to and as shown in the drawings filed with the Provisional Specification.

EDWARD EVANS & CO.
Chancery House,
53-64 Chancery Lane,
London, WC2A 1SD.
Agents for the Applicants.