July 17, 1951 S. G. STOKES 2,561,242

PORTABLE FREIGHT ELEVATOR

Filed July 26, 1946 3 Sheets-Sheet 1

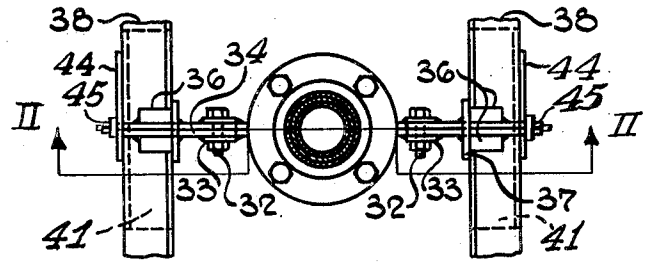


FIG.-1

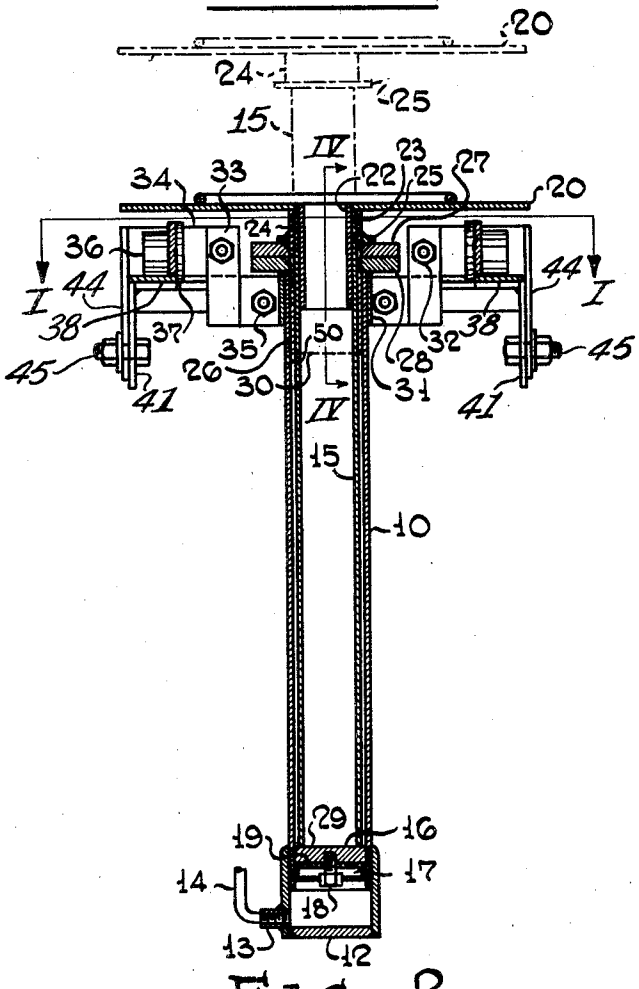


FIG.-2

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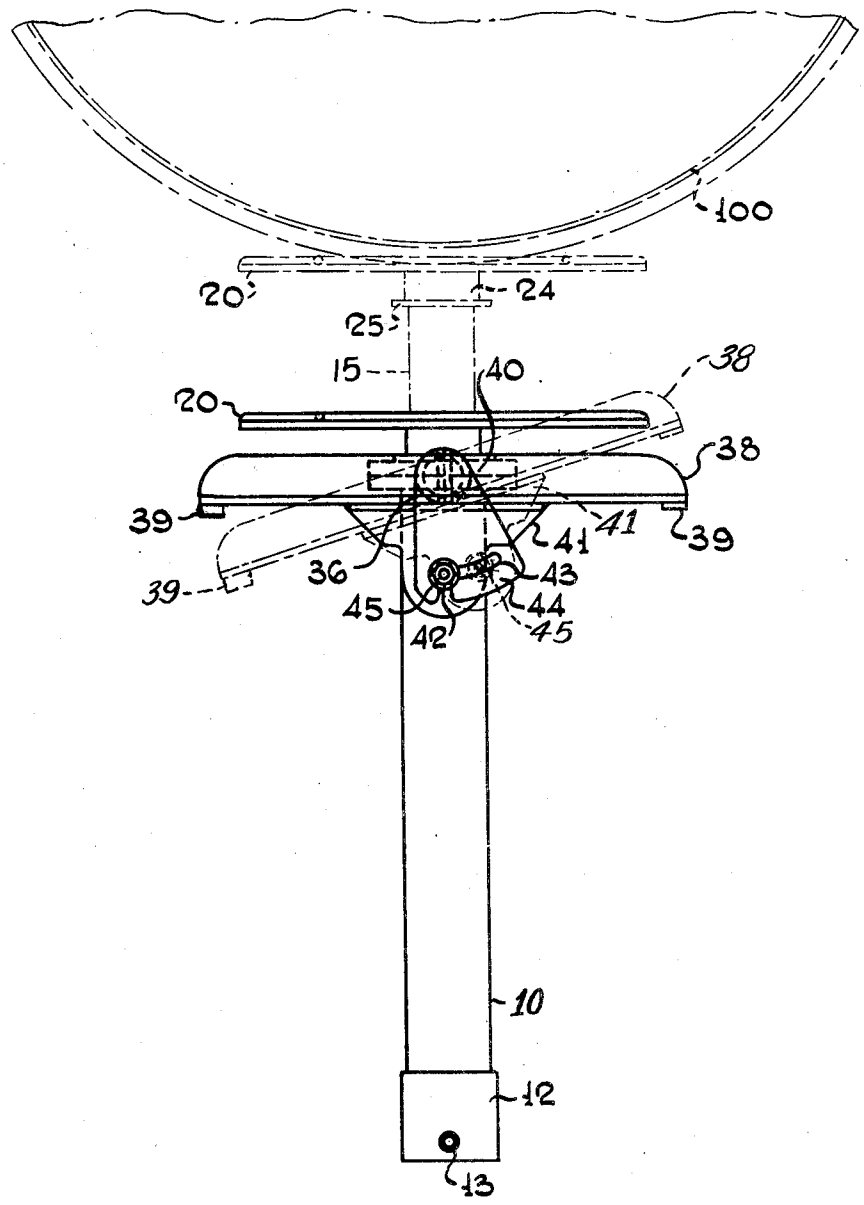


FIG - 3

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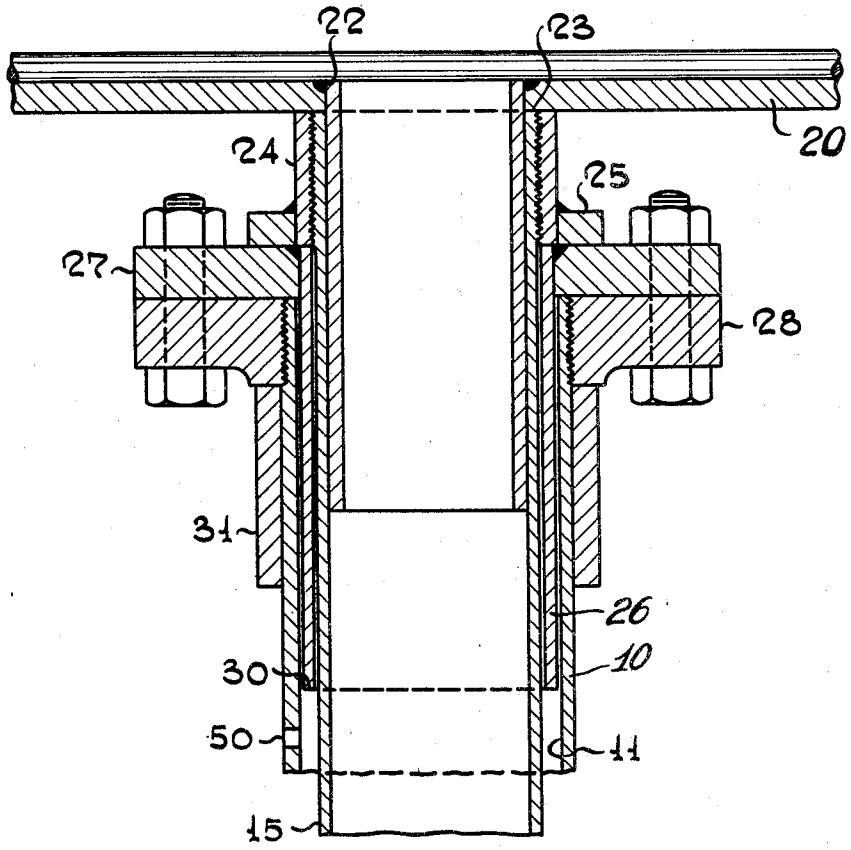


FIG.-4

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PORTABLE FREIGHT ELEVATOR

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5 Claims. (Cl. 254—93)

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This invention relates to freight elevators, and more particularly to portable freight elevators.

It is a particular object of this invention to combine in a freight elevator effective and efficient operation with simplicity and economy of construction.

It is another particular object of the invention to furnish a device by the use of which, for the handling and stacking of heavy freight such as barrels and packages containing petroleum products, steel sheets, billets and ingots, savings in time and manpower, coupled with added safety, accrue over the use of prior art freight handling equipment.

It is another particular object of the invention to furnish a device through the use of which the damaging of freight can be almost eliminated and, as a result, essentially simple handling of hazardous type freight such as petroleum products and chemicals can be effected.

In order that the invention may be understood, the accompanying drawings of a particular embodiment are presented. In these drawings, similar numerals refer to similar parts. Figure 1 is a transverse section along the line I—I of Figure 2. Figure 2 presents a vertical cross-section taken along the line II—II of Figure 1. Figure 3 is an elevation of the structure showing the general arrangement of the device with the platform in lowered and raised positions, respectively and indication of a barrel on the platform in the raised position. Figure 3 also shows the device adapted to facilitate loading of freight from one loading surface to another of unequal height. Figure 4 presents an enlarged sectional elevation on the line IV—IV of Figure 2.

The device is shown in Figure 2 as consisting of a cylinder 10 sealed at its lower end by means of a head 12 in threaded engagement with the cylinder. Securely attached to the head and adjacent to the lower end is a pressure inlet 13 with an inlet pipe 14. A piston 15 which reciprocates in the cylinder is shown as being constructed of a tubular member closed at its lower end by means of piston head 16 adapted to have a close fit with the bore of the cylinder 10. On the lower surface of the piston head, a packing cup 17 is provided. This packing cup 17 may be made of rubber, leather or similar material, and is attached to the piston head 16 by means of the screw 18 with washer 19. The platform 20 is rotatably mounted so as to permit free movement in any direction at right angles to the cylinder.

In Figures 2 and 4 particularly, a tubular member 22 is shown as being rotatably mounted in the cylinder, thus permitting free movement in any direction at right angles to the cylinder of the platform to which it is attached. The platform 20 is attached to the tubular member 22 by welding or other such means, and with the underside of the platform abutting against the top end 23 of the plunger 15. Added bearing surface at this point is obtained by means of the spacer 24 in threaded engagement with plunger 15. The spacer is provided with an annular flange 25 at its lower end forming a stop member to absorb the impact of the plunger at the end of the return stroke.

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The plunger 15 is shown particularly in Figure 4 as being fitted with an annular sleeve 26 in sliding relation with the bore 11 and the outside cylinder wall of the plunger 15. Securely attached to the top end of the sleeve 26 is the flange 27. The flange 27 is also bolted to a flange 28 of corresponding dimensions. Thus, when operating when the plunger is at the end of its upward stroke, the upper portion 29 (Figure 2) of the piston head 16 is abutting against the lower portion 30 of the sleeve 26, just above the vent hole 50 for allowing air to be drawn in on the downward movement of the piston and discharge of air on the upward stroke. The structure thus set forth constitutes a lift assembly, forming one unit of the device.

As shown in detail by Figs. 1 and 2, the lift assembly, including the cylinder 10, platform 20 and their respective related parts, is mounted in a support structure consisting of a two-section collar 31 encircling and rigidly clamping the cylinder 11 by means of the bolts 32. Extending vertically and securely attached to each half of the collar 31 are connecting links 33 with bearing members 34 extending outwardly from the upper portion of the connecting links and attached thereto by means of welding or other such means. The two portions of the structure consisting of the collar 31, connecting links 33 and bearing members 34 are joined by means of bolts 32 and 35. Clearly, this structure may be fabricated from a plate in two single units. The outer ends of the members 34 are provided with trunnion type bearings 36, each formed of two substantially semi-circular portions welded, or otherwise joined, to the outer surfaces of the members 34 adjacent their ends. Each semi-circular portion is provided with a flange part at its inner end which, in the assembled unit, forms a collar portion 37. When thus assembled as a unit, engaging the lift assembly in the man-

ner described, the support structure provides a lift assembly support.

A rectangular-shaped bridge frame member for bridging the gap which may exist between two loading surfaces, as between a warehouse platform and the floor of a freight car or truck bed, is provided to receive the lift assembly support structure. The bridge frame, as shown in Figs. 1, 2 and 3, is formed of a pair of spaced, angle-iron, side rail members 38 disposed with their vertical legs inwardly and in substantially parallel relation, the ends of the members 38 being connected by transverse, side rail end connecting elements 39, formed of strap iron, and attached to the lower surface of the horizontal leg portions, adjacent each end thereof. The members 38 are spaced one from another at substantially the distance between the exterior face of the collars 37. Midway of the length of the members 38, semi-circular recesses 40 are formed in the vertical legs of the members 38, intermediate the end connecting elements 39 to receive the trunnion ends of the lift assembly support, with the collars 37 disposed inwardly of the vertical leg portions of members 38.

In order to maintain the lift assembly, its support, and bearing member in fixed relation to the rectangular bridge frame member during operation of the device, a locking plate 41 depends from and is flush with the outer edge of each angle iron 38. The plates 41 are centered with the recesses 40 and trunnions 36, and are provided with centered bolt holes 42 in their lower portions.

Cooperating with the locking plates 41 to provide for a fixed, but adjustable angular relationship between the lift assembly and its support, and the bridge frame member, quadrant plate members 44 are secured to the outer ends of one-half portion of the trunnions 36, depending therefrom into parallel, closely spaced, surface relationship to the locking plates 41. Arcuate slotted portions 43 are provided to receive locking bolts 45 passed through the locking plate bolt holes 42. The cooperating plates may thus be held in fixed surface engagement by nuts on the bolts 45. If desired, the locking bolts 45 may be replaced by equivalent stud bolts affixed to the plates 41.

As shown by dotted lines in Fig. 3, where the loading floor surfaces are at different levels, the bridge frame member may be tilted to rest upon the edge portions of both floor surfaces while, by adjustment of the locking bolts 45, the lift assembly may be rotated with its support on trunnions 36 to maintain the platform 20 in a horizontal position. Rotation of the parts with relation to the vertical and horizontal planes is normally limited to about 30°, but only by the dimensions of the quadrant plates 44, and the length of slotted portions 43.

The inlet pipe 14 is connected in a pressure-tight relationship to the inlet fitting 13 and may be provided with an easily detachable coupling for connection to valved air, steam or hydraulic hose or pipe lines.

In operation, one end of the bridge frame member is rested on a supporting surface, such as a loading platform, while the other end of the member is rested upon the surface of an adjacent vehicle, such as the floor of a freight car or the bed of a motor truck, with the side rail elements of the frame extending between two surfaces and with the lift assembly depending from the frame and lift support in a space between the vehicle and the platform. Where required, the relationship of the locking plates 41 and quadrant plate member 44 may be adjusted through the bolts 45 so that regardless of any normal variation in height relationship between the platform and the adjacent vehicle surface, the lift assembly is supported vertically between them, the platform 20 being retained in a substantially horizontal position.

When, as intended, a package such as a barrel, bale or other load is to be transferred from the loading platform to the vehicle or vice versa, and particularly where the transfer is to be made from one level on one surface, to another level on the other surface, the load is moved onto the platform 20 from its initial location, and the lift's assembly operated either to raise or lower the platform 20 to the desired unloading level of the other surface, and the package then transferred from the platform 20 at that level.

The device of this invention, as indicated by the specific embodiment described above, is an effective and efficient portable freight elevator for the handling and stacking of such heavy freight materials as barrels and packages containing petroleum products, heavy rolls of newsprint and bales of wood pulp. The device of the invention with modifications over the design of the specific embodiment has a wide field of application and is particularly suited for the elevation of freight in transit from loading platforms in warehouses, steamship piers and terminals to railroad freight cars, road transport vehicles and the like.

Having described the general design of a device according to the invention with specific illustrations to a particular embodiment, what is claimed is:

1. A portable lift comprising a bridge frame member including side rail and side rail end connecting elements in said member, a lift support mounted transversely of said member engaging said side rail elements intermediate said side rail end connecting elements for limited rotation on its axis of support, a lift assembly rigidly secured in said support, a major portion dependent therefrom below said bridge frame member, and limit means carried by each of said support and the frame member side rail elements, said limit means cooperatively related to limit rotation of the support and lift assembly with respect to the frame member, and rigidly to fix their relative angular relationship as required.

2. Apparatus according to claim 1, in which the limit means are slotted quadrant plates secured to the outer end portions of said lift support and dependent therefrom, locking plate elements dependent from said bridge frame members into parallel surface relation to said quadrant plates, and a locking bolt carried by each locking plate engaging each quadrant plate through its slotted portion to limit and fix the angular relationship of said plates as required.

3. In a portable lift including a bridge frame member having paired side rail and side rail end connecting elements in said member and a lift assembly supported for limited rotation with reference to said bridge frame member on its axis of support, a lift support comprising a collar rigidly engaging the upper end of said lift assembly, opposed support arms extending radially from said collar, a trunnion bearing member at the outer end of each arm adapted for journaled bearing of said collar and arms transversely of

said frame members, and limit means carried by said lift support to limit rotation of its trunnion members with respect to said bridge frame member and rigidly to fix said support in relation to said frame member as required.

4. Apparatus according to claim 3 in which the collar, support arms and trunnion members are joined sectional members, clamping the upper end of the lift assembly by means of said collar.

5. In a portable lift, including a bridge frame member, and a lift assembly support mounted for limited rotation thereon, a lift assembly comprising a casing, in fixed relation to said support and dependent therefrom, closed at its lower end and open at its upper end through an annular flange secured thereto, a hollow piston concentrically disposed in radially spaced relation within said casing, a sleeve member in the radial space between the piston, and casing at the upper end thereof, secured to and dependent from a flange exteriorly engaging said casing flange and secured thereto, an annular piston stop member secured to the piston at its upper

end engageable with the upper surface of the sleeve flange a head portion of greater diameter at the lower inner end of said piston extending radially into fluid tight relation to the inner casing wall and engageable with the inner end of said sleeve member at the upper end of the piston stroke, a load bearing platform rotatably mounted on the upper end of said piston, and fluid conduit means opening into said casing below the piston and piston head therein.

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