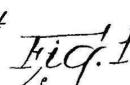


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SCISSORS OPERATING LINKAGE

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This invention relates to the operation of a scissors lift in changing it from a down or closed position to up or open position. It is particularly employed in connection with lift tables and the like.

As previously used, a completely closed scissors linkage on lift equipment is ordinarily pried open and is extended through the use of cams or rollers. In the present invention, by mounting a hydraulic cylinder so that the mounting points are substantially offset from the axis of the cylinder, a component of force is obtained on the mounting points with the component being normal to the axis of the cylinder. This component is employed to open the closed scissors linkage.

A principal object of the invention is therefore to eliminate the extra cams, or rollers, etc., normally employed to start the movement of a scissors lift from the closed position. A simple hydraulic cylinder is employed for all phases of the lifting or operation of the scissors linkage.

Other objects of the invention are: to provide a sleeve type operating cylinder having a direct thrust with eccentric bearings; to provide for a significant thrust component offset from the cylinder axis for breaking the scissors linkage open; and in general, to provide a more simple and efficient direct thrust lifting mechanism for this linkage.

Other objects of the invention will appear in the specification and will be apparent from the accompanying drawings, in which:

FIG. 1 is an elevation, partly in section as taken on the line 1-1 of FIG. 2 of a scissors lift and eccentrically loaded power cylinders in accordance with this invention, as applied to a raisable lift table in its up position;

FIG. 2 is a sectional view of FIG. 1 as taken on a line 2-2 of FIG. 1;

FIG. 3 is a sectional view, showing the parts of FIG. 2 in partially lowered position; and

FIG. 4 is a sectional view of the table and its parts in the closed or down position.

Although the following disclosure offered for public dissemination is detailed to ensure adequacy and aid understanding, this is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how others may later improve it by variations in form or additions or further improvements. The claims at the end hereof are intended as the chief aid toward this purpose; as it is these that meet the requirement of pointing out the parts, improvements, or combinations in which the inventive concepts are found.

In this invention, a lift table with a completely closed scissors linkage is raised by one or more hydraulic cylinders, depending upon the lifting force necessary, without the use of pryers, cams, or power rollers. The cylinders are mounted eccentrically to the crossed legs and a sufficient force is generated to open or raise the closed linkage by a direct thrust made possible by the offset position of the cylinder mountings with respect to the cylinder axis. To achieve the required operation the cylinder mountings should be offset by a distance greater than the internal diameter of the hydraulic cylinder.

Referring now more particularly to the drawings, the invention comprises a lift table having a top 10 and a base 12 connected by crossed scissors legs 14 and 16 at each side. Legs 14 and 16 are pivotally connected at 18. As shown, the base 12 is in the form of an open shallow box or receptacle having upright sides 20, and the top 10 fits

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down closely upon the sides enclosing all the operating parts, as shown in FIG. 4.

Depending from the top, at each side, is a plate 21. A pivot 22 near one end of the plate 21 connects the upper end of the leg 14 to the plate. Leg 14 has a roller 24 rotatably mounted at the other end on shaft 25. Roller 24 rides on the upper surface of a strip 26 in the bottom of one side of the base 12. One end of the other leg 16 has a pivot 28 connecting it to a support block 29 directly below the pivot 22 for the leg 14. A roller 30 mounted on shaft 31 at the other end of leg 16 rides on the under side of the table top 10. The legs are closely folded together by the pivot 18 intermediate their ends, for parallel scissor action between the base and the top.

Attached to the roller ends of the outer legs 14 is a cross piece 34 which may be in the form of an angle bar having one web 36 extending across the bottom ends of legs 14 with a shorter web 37 normal thereto. A second and shorter angle bar 38 has two webs 40 and 44. Web 40 is pivotally connected to web 36 by studs 42 projecting from web 40 and extending through openings in web 36. Additional pistons and cylinders may be employed as suggested by the dot-dash lines. A reinforcing plate 46 is employed in angle 38 at the point where a piston is secured. The outer end of piston 48 of hydraulic cylinder 50 is secured to web 44. The mounting of angle 38 to angle 36 provides for a somewhat flexible movement of the outer ends of the pistons 48, with an effective mounting point (e.g. 42) for the application of pressure. This mounting point is offset at one side of the piston axis and is below the center line of the legs 12.

Cylinder 50 has a side mounting plate 52 pivotally mounted on a rod 54. Rod 54 extends between the two opposite legs 16 to which it is connected. It is located at the side of the cylinder 50 opposite the pivotal mountings formed by studs 42. This rod 54 is at the upper side of the legs 16 above the common pivot 18 for the legs (FIGURE 4), and the mountings 52 extend downwardly. In the down position the cylinders will be entirely below the upper edges of the legs 16 to which they are connected.

In FIGURE 4, it will be seen that the line 62 which connects the rod 54 and the studs 42 for the hydraulic cylinder is angularly disposed with respect to the axis 63 of the cylinder. Line 62 also is at an angle to the longitudinal axes of legs 14 and 16 when the scissors linkage is closed. The pivotal mountings formed by studs 42 and rod 54 for the hydraulic cylinder should be offset from the axis 63 of the cylinder an amount that is greater than the internal diameter of the cylinder 50 (or the external diameter of the piston).

With reference to FIGURE 4 it will be seen that as piston 48 is forced out of cylinder 50 a vertical component of this force is developed upwardly at the pivotal mounting of the cylinder on rod 54. This vertical component will break the scissors linkage open from the FIGURE 4 position and start the table moving upwardly.

It is necessary to have the best possible running fit between piston 48 and cylinder 50. A bearing surface of Teflon (polymerized tetrafluoro ethylene) plastic has been found to be most suitable. An ideal method for forming a bearing that is suitable is disclosed in Patent 3,061,887. The eccentric mounting of the cylinders results in twisting and side loads on the piston which would damage the inner cylinder walls if not properly protected.

To supply air or fluid pressure, each cylinder 50 is provided with an inlet 60 near its outer end to which some suitable connection (not shown) is made. Adjacent the other end is a pipe 61 which may be used as an exhaust, or connected to the pressure source through a suitable valving arrangement if the cylinder is to be double acting.

I claim:

1. In a lift table having a base and a top connected by a scissor linkage comprising at least two legs pivotally connected intermediate their ends and with one end of one leg pivotally connected to the top and one end of the other end pivotally connected to the base and hydraulic means including a cylinder and piston connected for controlling the angular position of the legs with respect to each other, which linkage is of the type that may be collapsed to the extent that the two legs are substantially parallel, the improvement comprising, a first pivotal mounting connection on the cylinder and a second pivotal mounting connection on the piston, said connections being spaced apart in a direction at right angles to the axis of the cylinder a distance greater than the internal diameter of the cylinder, whereby extension of the piston from the cylinder will create a force component at the connections in a direction normal to the axis of the cylinder.

2. In a lift table as set forth in claim 1 wherein each

said mounting is offset to one side of a line extending between said two pivotal connections on the leg associated with said mounting.

References Cited by the Examiner

UNITED STATES PATENTS

2,501,001	3/1950	Neely	254—122
2,704,221	3/1955	Gwinn.	
3,032,319	5/1962	Dale	254—122

FOREIGN PATENTS

1,306,404	9/1962	France.
1,348,093	2/1963	France.
204,328	10/1939	Switzerland.

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