April 17, 1956 R. A. BRUDI 2,742,167

PUSHER ATTACHMENT FOR LIFT TRUCKS

Filed Dec. 23, 1953 3 Sheets-Sheet 1

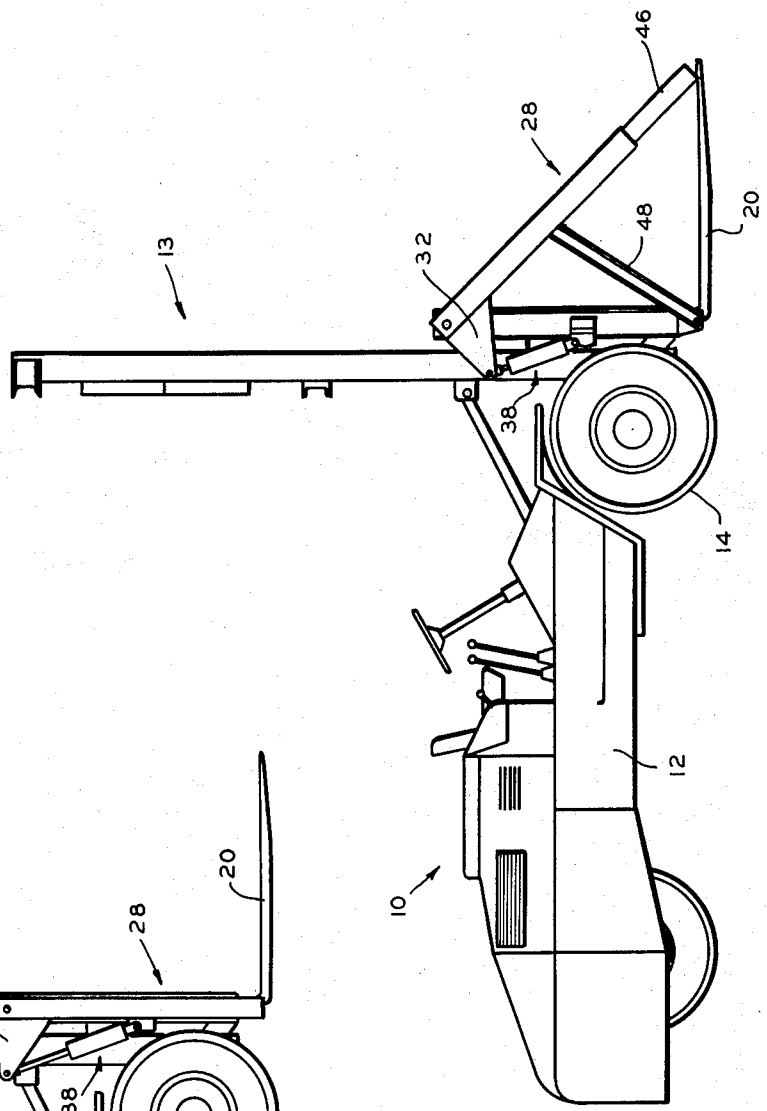


FIG. 1

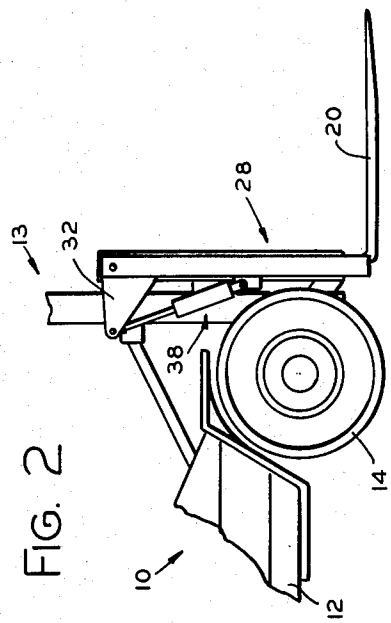


FIG. 2

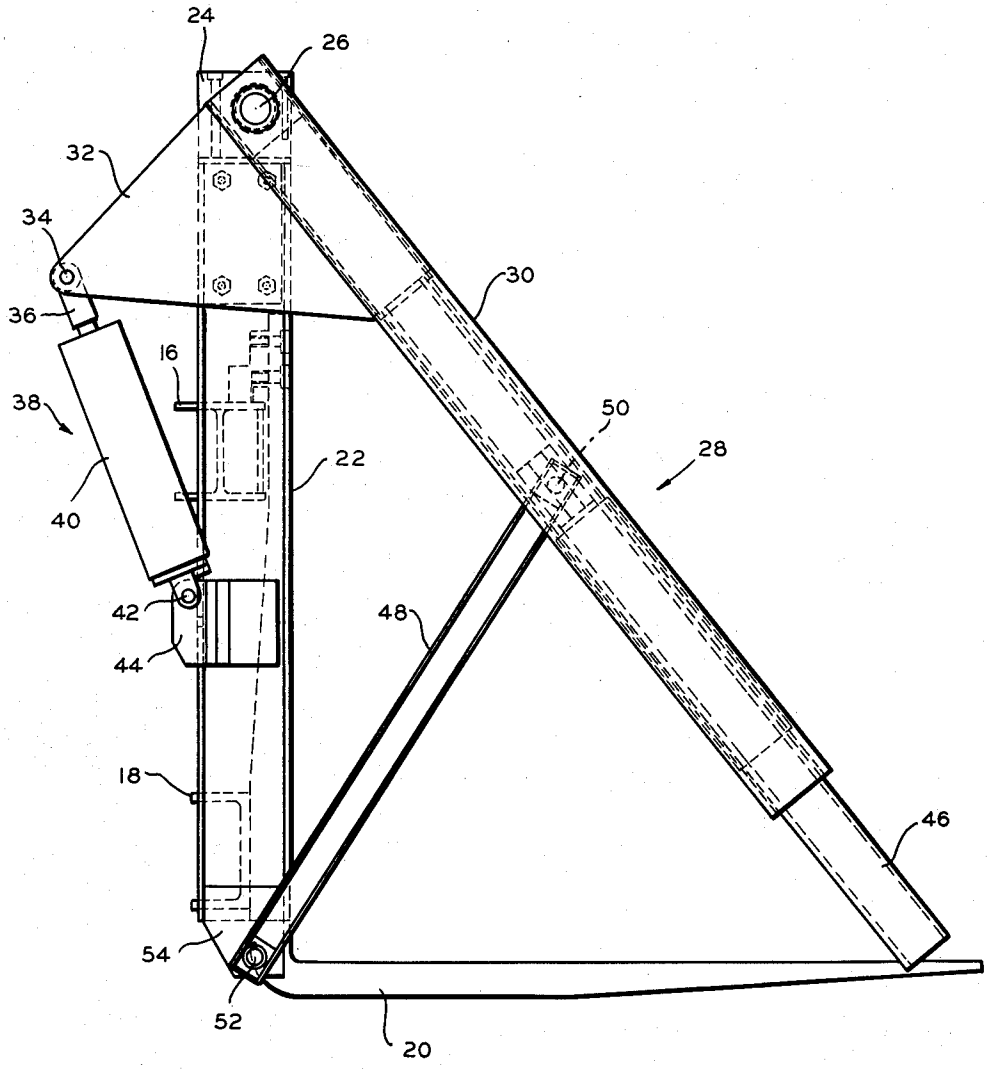
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FIG. 3



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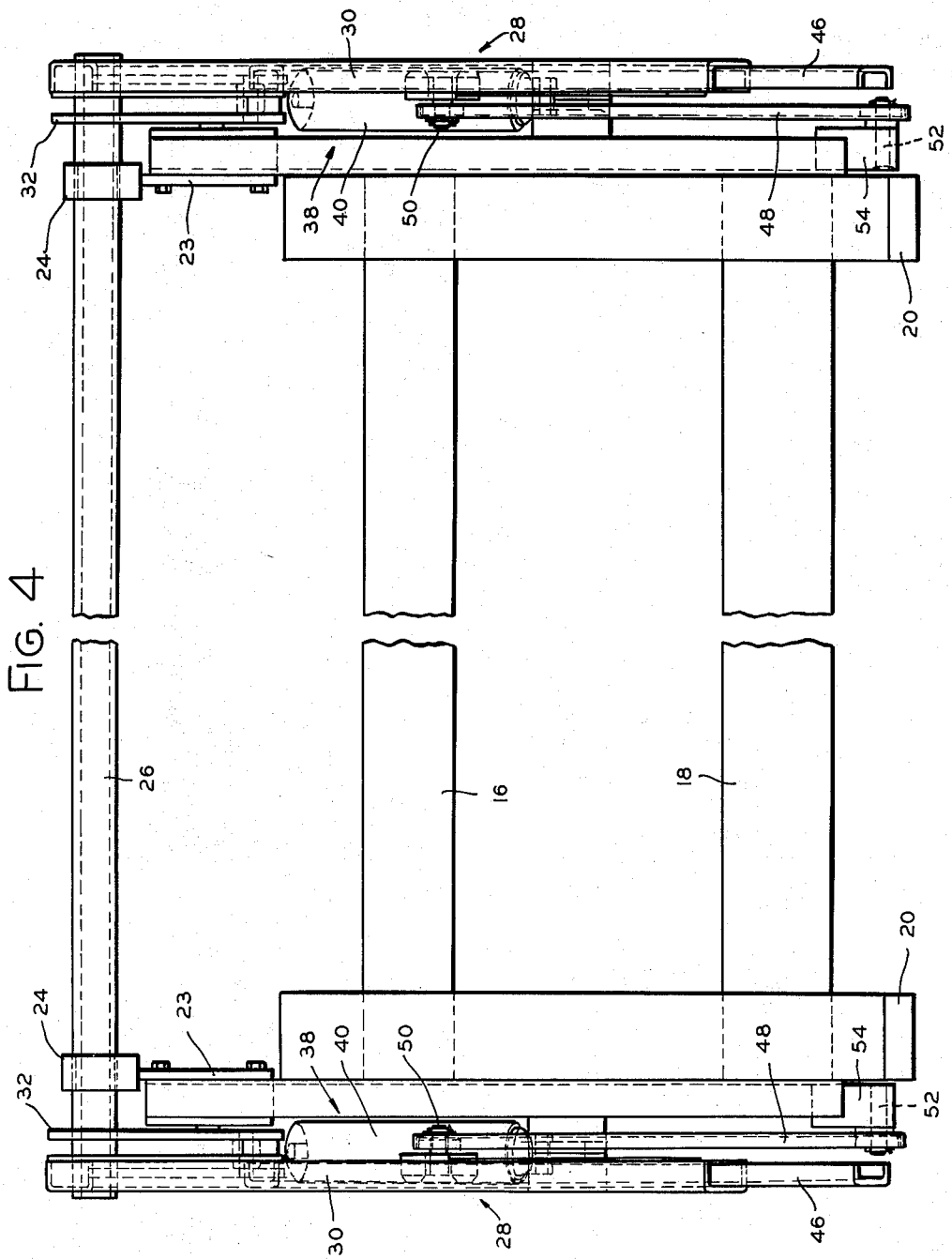


FIG. 4

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PUSHER ATTACHMENT FOR LIFT TRUCKS

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6 Claims. (Cl. 214—514)

My present invention relates generally to attachments for industrial lift trucks, and, more specifically, to pusher means which may be employed for selectively discharging a load from such a truck.

Industrial lift trucks are extensively used in the handling of goods such as logs. The load supporting carriage of the conventional truck is provided with forks having horizontal forwardly extending load supporting portions upon which the logs are stacked for transportation; the load supporting carriage ordinarily is arranged for vertical movement on a mast structure which is tiltable forwardly through a small angle. After the logs have been transported to the place of deposit, the logs heretofore have been rolled off the forks by tilting the mast forwardly, or by placing the logs on dunnage and withdrawing the forks. In the case of logs having a flat side, or in unloading logs where dunnage is not available, or in placing logs on top of other logs, the forward tilt available may not be adequate to insure discharge of the logs and attempts to withdraw the forks from under a log may pull over the whole pile or otherwise be dangerous to workmen engaged in unloading and piling the logs.

It is an object of my present invention to provide remotely operable pusher means which may be employed for discharging a load such as logs from the forks or other load supporting means of an industrial truck.

It is another object of my present invention to provide pusher means which may be retracted, when not in use, to a non-interfering position relative to the carriage and supporting means so that the latter may be used for handling loads other than logs, without any loss in load-carrying capacity.

The structure, which enables the foregoing objects to be attained, comprises pusher means which includes arms pivotally mounted at their one ends to the load supporting carriage in the plane of the latter at the upper end of each side thereof. Crank arms are secured to the pusher arms and project rearwardly therefrom, and hydraulic piston and cylinder assembly means, carried by the load supporting carriage, has connection with the crank arms for effecting pivotal movement of the latter and swinging movement of the pusher arms. The pusher arms may be swung outwardly at their lower ends for pushing a load from the load supporting means.

It is a further object of my present invention to provide pusher means wherein the lower end thereof is confined to a path of travel which is approximately parallel to the load supporting means during outward swinging movement thereof so that logs of relatively small diameters may be discharged from the load supporting means.

The pusher arms are of a telescopic construction and include extensible lower sections. Actuating links are pivotally mounted at their one ends to the lower sections of the pusher arms and at their other ends to the load supporting carriage in the plane of the latter at the lower end of each side thereof. The actuating links serve to urge the lower sections of the pusher arms downwardly relative to the upper sections as the pusher arms are swung

away from the load supporting carriage so that the lower ends of the lower sections follow a path which is approximately parallel to the load supporting means during outward swinging movement thereof.

It is a still further object of my present invention to provide a pusher attachment, as described, which is simple in construction, efficient, and economical.

Now, in order to acquaint those skilled in the art with the manner of constructing and using pusher means in accordance with the principles of my present invention, I shall describe in connection with the accompanying drawings a preferred embodiment of my present invention.

In the drawings:

Figure 1 is a side elevational view of an industrial truck with the pusher means of my present invention arranged at the forward end thereof in extended position;

Figure 2 is a partial view of the machine of Fig. 1 with the pusher attachment in retracted position;

Figure 3 is a detailed side elevational view of the pusher attachment in extended position; and

Figure 4 is a partial front elevational view of the attachment in the same position as in Fig. 3.

Referring now to the drawings, there is indicated generally by the reference numeral **10** an industrial truck which has a main frame (enclosed within the body portion **12**) supported on forward wheels **14**. The main frame, at its forward end, supports a vertically disposed mast structure **13**. The mast in turn carries a load supporting carriage defined by a pair of vertically spaced transversely extending beam members **16** and **18** (see Figs. 3 and 4) which carry load supporting means comprising a pair of L-shaped fork frames **20**. The horizontal portion of the load supporting means **20** projects forwardly and away from the beam members **16** and **18** of the load supporting carriage. It will be understood that the carriage and forks thereon are movable vertically up and down mast **13** in a conventional manner by hydraulic or other suitable means to raise and lower a load on forks **20**.

Vertically extending channel members **22** of U-shaped cross section are secured to the ends of the beam members **16** and **18** and may be considered part of the load supporting carriage. The channel members **22** have bolted to their upper ends plates **23** which support blocks **24** having journaled therein a transversely extending tubular cross bar **26**. Suspended from the transverse tubular member **26** is pusher means which comprises telescoping arm members indicated generally at **28**. The arm members **28** include upper tubular members **30** of rectangular cross section which, at their one ends, are suitably secured, as by welding, to the ends of the tube **26**. Secured to the tube **26**, immediately inwardly of the arm sections **30**, are rearwardly extending crank arms **32**; the arm sections **30** and the crank arms **32** may also be connected directly by welding a suitable attaching block between them, if desired, to provide increased strength. The rear ends of the crank arms **32** are pivotally mounted at **34** to the outer ends of piston rods **36** of hydraulic piston and cylinder assemblies indicated generally at **38**. The actuating assemblies **38** further comprise cylinders **40** pivotally mounted at **42** to bracket members **44** which are secured to the vertical channel members **22** of the load supporting carriage of the truck **10**.

The hydraulic piston and cylinder assemblies **38** are adapted to be suitably actuated remotely by an operator seated on the truck **10**. By admitting fluid under pressure to the lower ends of the cylinders **40**, the piston rods **36** are adapted to be distended thereby causing clockwise rotation of the crank arms **32** and pusher arms **28**. Likewise, when fluid under pressure is admitted to the upper ends of the cylinders **40**, the piston rods **36** are withdrawn within the cylinders **40** and the crank arms **32** and pusher

arms 28 are pivoted in a counter-clockwise direction for moving a load off of the load supporting fork frames 20.

In order to facilitate the handling of goods such as logs which are of relatively small diameters, I provide the pushing attachment with extensible members which are moved downwardly from the lower ends of the pusher arms as the latter are swung away from the load supporting carriage, so that movement of the lower end of the pusher means follows a path which is approximately parallel to the load supporting forks 20 and closely adjacent thereto. The extensible members of the pusher means comprise lower channel members 46 which are mounted for sliding movement within the upper tubular sections 30 of the pusher arms 28. In order to effect movement of the extensions 46 within the sections 30, actuating links 48, at their one ends, are pivotally mounted at 50 to the extensions 46 and at their other ends are pivotally mounted at 52 to block members 54 which are suitably secured in the lower ends of the vertical channel members 22. It will be understood that the rectangular tubular sections 30 have one side cut out for a sufficient distance to allow the pivot connections 50 to move up and down with respect to sections 30 as described.

Now since the lower ends of the actuating links 48 are relatively fixed to the load supporting carriage, as the pushers arms 28 are rotated counter-clockwise, for discharging a load, the upper ends of the actuating links 48 tend to pivot outwardly and downwardly thereby moving the extension members 46 downwardly for maintaining the lower ends thereof closely adjacent to the load supporting forks 20 irrespective of the pivotal position of the pusher arms 28. Likewise, when the pusher arms 28 are rotated clockwise, the upper ends of the actuating links 48 tend to pivot inwardly and upwardly for moving the extension members 46 upwardly so as to maintain the lower ends of the latter close to the load supporting forks 20. The paths followed by the lower ends of the members 46 actually are slightly serpentine; however, for all practical purposes these paths are approximately parallel to the horizontal portions of the forks.

It is to be further observed that the pivotal mountings of the pusher arms 28 and actuating links 48 to the vertical channel members 22 of the load supporting carriage lie rearwardly of the plane of the forward face of the load supporting carriage thereby permitting the pusher arms 28 to be retracted to a position alongside of the members 22 where they will not interfere with the engagement of loads other than logs. Those skilled in the art will recognize that by arranging the pusher arms in the manner shown and described, rather than forwardly of the load supporting carriage, loads other than logs, such as rectangular loads, may be stacked in abutment with the load supporting carriage rather than in a less stable position forwardly thereof. Thus, although the attachment of my present invention is particularly adapted for handling logs, the attachment neither limits the truck solely to such use nor decreases its capacity for handling other types of loads.

Now, while I have shown and described what I believe to be a preferred embodiment of my present invention, it will be understood that various rearrangements and modifications may be made therein without departing from the spirit and scope of my invention.

I claim:

1. For use with an industrial truck having a load supporting carriage, pusher means pivotally mounted at one end to the load supporting carriage and outwardly swingable at its other end for pushing a load away from the load supporting carriage, means for effecting swinging movement of said pusher means about its pivotal mounting, and the said other end of said pusher means being extensible as it is swung away from the load supporting carriage so that the said other end of said pusher means moves in a path which is approximately parallel to the ground during outward swinging movement thereof.

2. For use with an industrial truck having a load supporting carriage and horizontal load supporting means extending forwardly therefrom, pusher means pivotally mounted at its upper end to the load supporting carriage and outwardly swingable at its lower end for pushing a load from the load supporting means, means for effecting swinging movement of said pusher means about its pivotal mounting, and said pusher means being extensible downwardly in the plane of said pusher means as the latter is swung away from the load supporting carriage so that the lower end of said pusher means moves in a path which is approximately parallel to the load supporting means during outward swinging movement thereof.

3. For use with an industrial truck having a load supporting carriage, pusher means pivotally mounted at its upper end to the load supporting carriage and outwardly swingable at its lower end for pushing a load away from the load supporting carriage, means for effecting swinging movement of said pusher means about its pivotal mounting, extension means mounted in said pusher means for sliding movement in the plane of the latter, and means for urging said extension means downwardly relative to said pusher means as the latter are swung away from the load supporting carriage so that the lower end of said extension means moves in a path which is approximately parallel to the ground during outward swinging movement thereof.

4. For use with an industrial truck having a load supporting carriage, pusher means pivotally mounted at its upper end to the upper end of the load supporting carriage, said pusher means being outwardly swingable at its lower end for pushing a load away from the load supporting carriage, means for effecting swinging movement of said pusher means about its pivotal mounting, extension means mounted in said pusher means for sliding movement in the plane of the latter, actuating link means pivotally mounted at one end to said extension means and at the other end to the lower end of the load supporting carriage, and said actuating link means serving to urge said extension means downwardly relative to said pusher means as the latter are swung away from the load supporting carriage so that the lower end of said extension means moves in a path which is approximately parallel to the ground during outward swinging movement thereof.

5. For use with an industrial truck having a load supporting carriage, telescoping pusher arms having upper sections pivotally mounted to the load supporting carriage at the upper end of each side thereof, means for effecting swinging movement of said pusher arms about their pivotal mountings, said pusher arms having extensible lower sections, and means for urging said lower sections of said pusher arms downwardly relative to said upper sections as the pusher arms are swung away from the load supporting carriage so that the lower ends of said lower sections move in paths which are approximately parallel to the ground during outward swinging movement thereof.

6. For use with an industrial truck having a load supporting carriage and horizontal load supporting means extending forwardly therefrom, telescoping pusher arms having upper sections pivotally mounted to the load supporting carriage in the plane of the latter at the upper end of each side thereof, crank arms secured to said upper sections of said pusher arms and projecting rearwardly therefrom, hydraulic piston and cylinder assembly means carried by the load supporting carriage and having connection with said crank arms for effecting pivotal movement of the latter and swinging movement of said pusher arms, said pusher arms having extensible lower sections, actuating links pivotally mounted at their one ends to said lower sections of said pusher arms and at their other ends to the load supporting carriage in the plane of the latter at the lower end of each side thereof, and said actuating links serving to urge said lower sections of said pusher arms downwardly relative to said upper sections as the pusher arms are swung away from

the load supporting carriage so that the lower ends of said lower sections move in paths which are approximately parallel to the load supporting means during outward swinging movement thereof.

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