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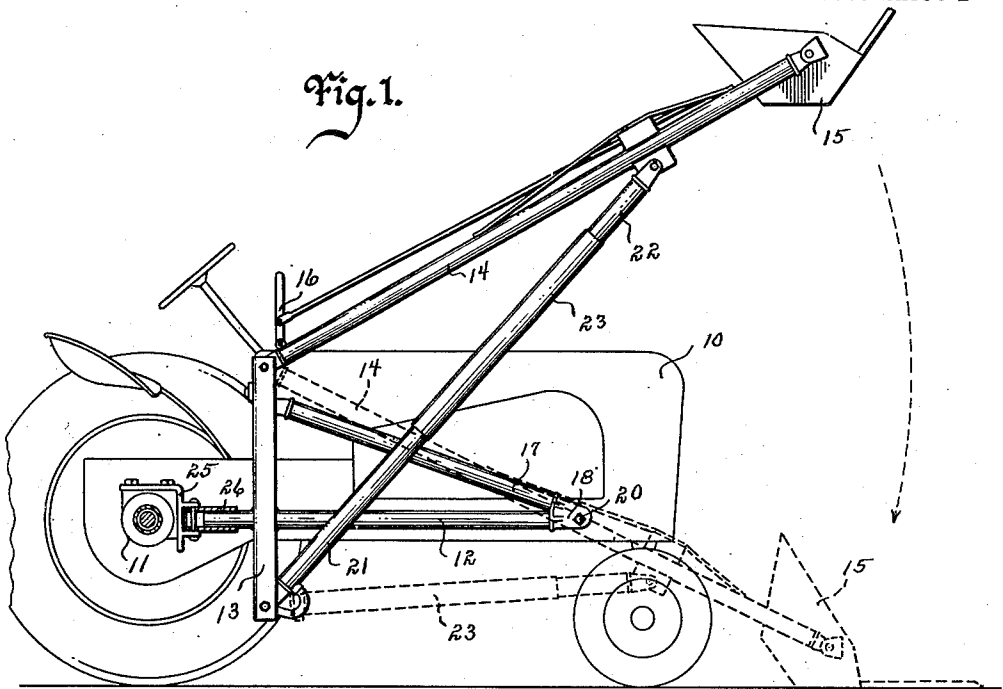
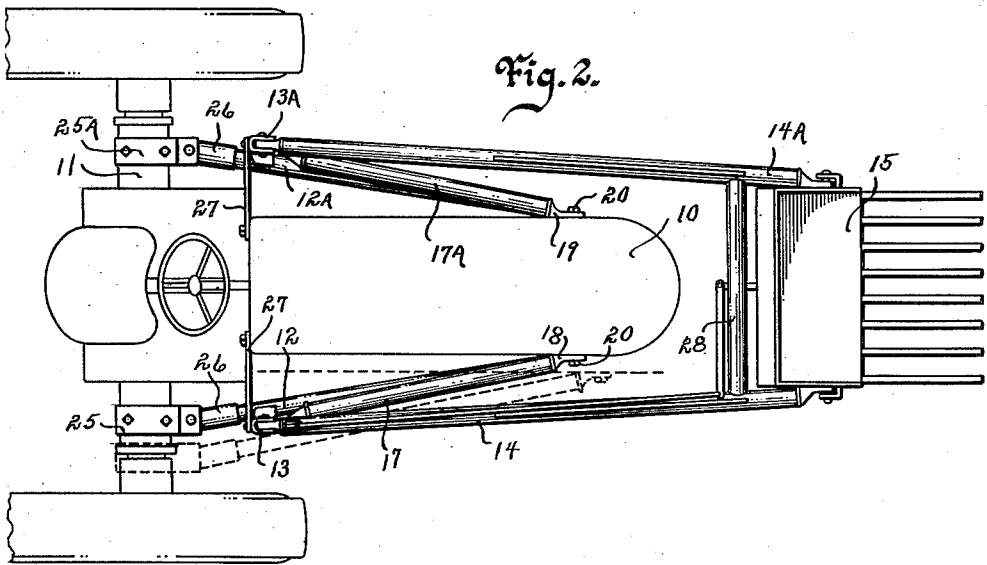
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COMBINATION TRACTOR AND LOADER

Filed July 6, 1953

2 Sheets-Sheet 1



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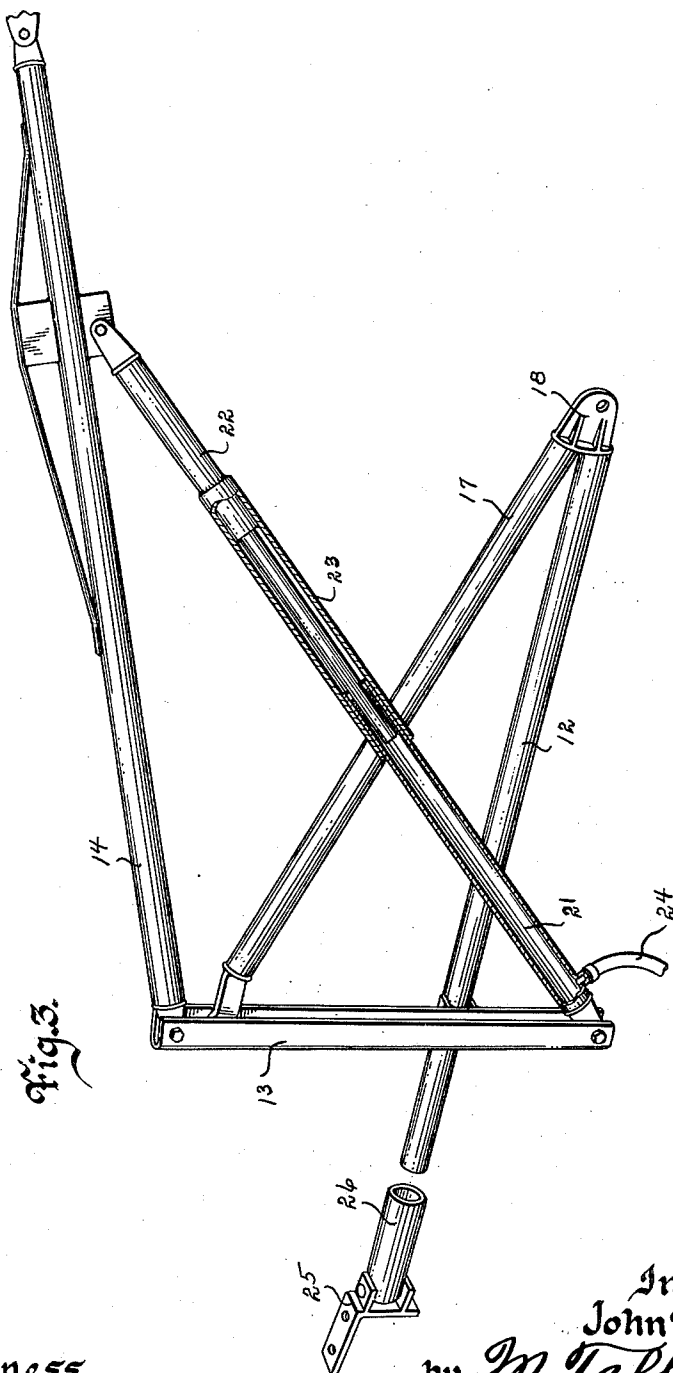
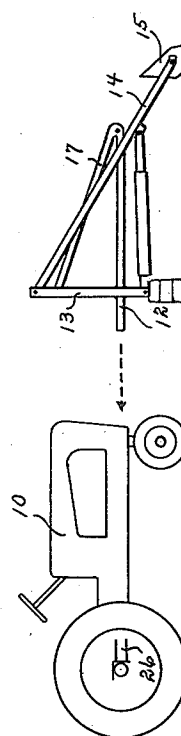
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COMBINATION TRACTOR AND LOADER

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5 Claims. (Cl. 214—131)

This invention relates to tractor powered and supported loaders and more particularly to loaders that are detachable from and attachable to the tractor.

For a great number of years manufacturers have been producing shovel loaders adapted for installation on tractors. The procedure has been complicated for the manufacturer by the various sizes and styles of tractors found even in a single brand of tractor. The result has been that the loader manufacturer has been forced to manufacture an unreasonable number of different loaders to meet the public requirement. If the loader manufacturer has experienced serious problems, the user has even more problems, many of which heretofore have been un-surmountable.

Perhaps the agriculturist is the greatest user of loaders. Regardless, however, of the type of loader used, the tractor must often be used for other purposes than that of supporting and powering the loader. At least in the case of the farmer, it is necessary for him to be constantly removing the loader from the farm tractor and replacing it. However, under the present construction of loaders the removal and replacement of loaders is a difficult task requiring much time and labor and usually the services of more than one man.

Therefore, one of the objects of this invention is to provide a loader that may be easily and quickly attached on or detached from a tractor.

A further object of my invention is to provide a loader that is self-adjusting to fit a great variety of tractors.

A still further object of this invention is to provide a loader for tractors that is so constructed that heavy and rough use will not damage the rear axle and differential housing of the tractor.

A still further object of my invention is to provide a hydraulic lift loader for tractors that is constructed as to reduce wear of the hydraulic mechanism from dust, dirt, sand, and the like.

Still further objects of my invention are to provide a tractor loader that is economical in manufacture, refined in appearance, and durable in use.

These and other objects will be apparent to those skilled in the art.

My invention consists in the construction, arrangement, and combination of the various parts of the device, whereby the objects contemplated are attained as hereinafter more fully set forth, and specifically pointed out in my claims, and illustrated in the accompanying drawings, in which:

Fig. 1 is a side view of my lever installed on a tractor and with sections cut away to more fully illustrate its structure,

Fig. 2 is a top view of my lever installed on a tractor with broken lines showing width adjustment,

Fig. 3 is an enlarged perspective view of one side of my loader frame construction, and

Fig. 4 is a diagrammatic view illustrating the ease of removing or replacing my loader on a tractor.

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Referring to the drawings in detail I have used the numeral 10 to designate an ordinary farm tractor having the usual rear axle housing 11. It is to such a tractor that I install my loader and which I will now describe.

As is well known, substantially all loaders are made up of substantially duplicate side frame portions. I have used the numeral 12 and 12a to designate the two elongated cylindrical horizontal loader frame braces as shown in Fig. 2. Secured to each of the braces 12 and 12a near their rear ends is the vertical frame brace 13 and 13a respectively. These vertical braces may be secured in any suitable manner such as by spot welding, bolting, clamping, or like and they extend both below and above the plane of the horizontal brace to which they are attached. While these vertical braces may be of any suitable structure, I have shown them in Fig. 3 as being formed from a sheet of elongated metal; said metal being bent back upon itself to form in cross section a U-shape structure. By so bending the metal longitudinally of its length and having its open side extending forwardly, an ideal bearing is provided for other braces, beams and like, as well as strengthening these vertical frame posts for hard usage. The numeral 14 and 14a designate the two usual boom arms respectively and hingedly secured at their rear ends to the top ends of the two vertical frame brace members 13 and 13a respectively. These members 14 and 14a extend forwardly of the tractor 10 and support the usual hopper or bucket 15. Such buckets are hingedly secured and are controlled by any suitable means such as the lever arm 16 located near the operator of the vehicle. However, the bucket and its control mechanism has no significance in this particular application except that all loaders have dredging shovels or bucket means. The numerals 17 and 17a designate the two side frame braces respectively that extend forwardly and downwardly with their rear ends secured to the upper portion of the two vertical frame posts 13 and 13a respectively. The forward ends of the member 12 and the member 17 are rigidly secured together by a common fitting 18. Likewise on the other side of the tractor the member 12a has its forward end rigidly connected to the forward end of the member 17a by the common fitting 19 as shown in Fig. 2.

When the loader is secured to a tractor, these fittings 18 and 19 are secured to the forward side frames of the tractor by bolts 20 as illustrated in the drawings. The numeral 21 designates a hydraulic cylinder having its lower rear end hingedly secured to the bottom portion of the vertical frame portion 12. The numeral 22 designates the piston rod portion of the hydraulic lift having its piston portion slidably extending into the outer end of the cylinder as shown in Fig. 3. The forward end of this piston rod portion is pivotally secured to the forward end portion of the boom arm 14.

The novel feature of this hydraulic lifting means, however, is the employment of the sleeve 23 which is secured to and around the member 22 and extends rearwardly to slidably embrace the member 21. By the use of this sleeve 23, that portion of the piston rod that slidably extends into the cylinder will be shielded and protected from dirt, sand and other objectionable abrasive material that might otherwise contact and cling to the piston to cause great wear on both the piston rod and the bearing seal of the cylinder. This structure, therefore, makes for an efficient and long-lasting hydraulic lifting means.

The numeral 24 designates the usual conduit having one end communicating with the inside rear end of the cylinder 21 and its other end designed to communicate with the source of hydraulic pressure of the tractor. The other side of the loader is constructed in the same manner, i. e., a hydraulic cylinder and piston means is con-

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nected between the lower end of the vertical frame posts 13a and the forward end portion of the bucket arm 14a.

The numerals 25 and 25a designate two bracket bearing members respectively, and which are secured by any suitable means such as bolts, spot welding, clamps or like, to the rear axle housing of the tractor 10. These two members 25 and 25a are located at each side of the differential portion of the tractor as shown in Fig. 2. The numeral 26 designates a stub cylinder horizontally and pivotally secured to each of the members 25 and 25a. The inside diameter of each of these stub cylinders is slightly greater than the outside diameter of the horizontal members 12 and 12a. Normally the members 25, 25a, and their stub cylinders 26 remain affixed to the tractor even when my loader is removed from the tractor.

To place my loader on a tractor having previously secured the members 25 and 25a to the rear axle housing, it is merely necessary to block up the rear end portion of the loader with any suitable blocks or like, as shown in Fig. 4 and with the shovel resting on the surface to hold the front end of the loader in elevated position, the tractor is guided and moved into the loader with the free rear end portions of the frames 12 and 12a telescoping into the stub cylinders. After the tractor is so positioned, the fittings 19 and 18 are secured to the front portion of the tractor by the screws, bolts or like 20. With the conduits 24 connected to the hydraulic pressure source of the tractor, the loader is ready for use in the usual manner and for the purposes it is intended.

While my loader is easily and quickly attached to a tractor as above explained, its structure provides unexpected results in use. Loaders heretofore have been rigidly secured to the tractor axle housing and when the tractor is moved forwardly to force the shovel into the material to be processed, substantially all of this thrust is borne by the rear axle housing. Obviously, with such stresses and strains placed on the rear axle housing of the tractor, the housings are often broken and this applies to the tractor differential and differential housing as well as the axles of the tractor. However, with my construction the rear end of the frame bars 12 and 12a do not extend to their maximum penetration within the stub cylinder 26 as shown in Fig. 1. The result is that any such reactionary thrust will be borne by the frame of the tractor at locations where the fittings 18 and 19 are secured to the tractor frame. The most that could happen with my structure would be the shearing of the bolts 20 which would be of minor repair.

I find that with my loader the rear end portion of the tractor is never damaged by hard usage of the tractor and loader.

Still another advantage of the members 12 and 12a slidably extending into the stub cylinders 26 is that the distance between the rear axle and the front frame of the tractor is not critical. Any variations in this distance found in tractors or tractors of different type, is compensated automatically by the members 12 and 12a extending further or less into the stub cylinders 26. My loader is therefore universally attachable on most tractors without any change. This facilitates manufacture assembly and makes for easy installation. By the stub cylinders 26 being capable of horizontal swinging movement, they automatically adjust to the angular direction of the braces 12 and 12a. This is necessary inasmuch as these members 12 and 12a may be required to spread or contract at their forward ends to fit different widths of tractor frames.

While not a part of this invention, cross bracing may be used to secure the two sides of my loader together to promote strength and eliminate other desirable torque movements when the loader is under load media. Such bracing 27 may extend between the uprights 13 and 13a or may extend from these two members at the rear of the tractor motor portion or they may be secured by

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bolts or like to the tractor motor. The numeral 28 designates the usual cross beam between the front end portions of the members 14 and 14a for rigidly connecting these two members together directly rearwardly of the shovel 15.

To remove my shovel from the tractor, it is merely necessary to place supporting blocks or like under the rear end portion of the loader as illustrated in Fig. 4. The bolts 20 are removed and the conduits 24 disconnected. If a cross brace 27 is secured to the tractor, this should be removed from the tractor. At this stage, the tractor is merely backed out of and from the loader at which time it is capable of being used as a tractor for any other purpose inasmuch as it is completely free and detached from my loader. When it is again desired to use my loader on the tractor, the procedure is merely reversed. Obviously, one man can easily and quickly attach my loader to a motorized vehicle or detach it from such a vehicle.

Some changes may be made in the construction and arrangement of my combination tractor and loader without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim:

1. In a loader to be mounted on a tractor having forward side portions and a rear axle housing, said loader comprising a pair of vertical frames, a pair of boom arms secured to the upper portions of said vertical frames at one end and hingedly secured to a bucket at its other end, at least one hydraulic lift arm secured to one of said vertical frames and one of said boom arms, a pair of elongated braces having free ends, said braces secured to and supporting said vertical frames and extending a substantial distance on both sides of said vertical frames, a pair of brackets mounted on said rear axle housing, a pair of stub hollow members having an end wall secured to said brackets and adapted to receive a free end of each of said frame braces part way therein whereby an air space is provided between the end of said frame brace and the inner surface of said end wall of said stub member, said stub members thereby supporting said loader in an operative position, and means securing the other free ends of said frame braces to said forward side portions of said tractor.

2. In a loader to be mounted on a tractor having forward side portions and a rear axle housing, said loader comprising a pair of vertical frames, a pair of boom arms secured to the upper portions of said vertical frames at one end and hingedly secured to a bucket at its other end, at least one hydraulic lift arm secured to one of said vertical frames and one of said boom arms, a pair of elongated cylindrical braces having free ends, said braces secured to and supporting said vertical frames and extending a substantial distance on both sides of said vertical frames, a pair of brackets mounted on said rear axle housing, a pair of stub cylinders having an end wall secured to said brackets and adapted to receive a free end of each of said frame braces part way therein whereby an air space is provided between the end of said frame brace and the inner surface of said end wall of said stub cylinder, said stub cylinder thereby supporting said loader in an operative position, and means securing the other free ends of said frame braces to said forward side portions of said tractor.

3. In a loader to be mounted on a tractor having forward side portions and a rear axle housing, said loader comprising a pair of vertical frames, a pair of boom arms secured to the upper portions of said vertical frames at one end and hingedly secured to a bucket at its other end, at least one hydraulic lift arm secured to one of said vertical frames and one of said boom arms, a pair of substantially horizontal elongated cylindrical braces

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having free ends, said braces secured to and supporting said vertical frames and extending a substantial distance on both sides of said vertical frames, a pair of brackets mounted on said rear axle housing, a pair of stub cylinders having an end wall pivotally secured to said brackets to permit horizontal swinging movement, said stub cylinders adapted to receive a free end of each of said frame braces part way therein whereby an air space is provided between the end of said frame brace and the inner surface of said end wall, said stub cylinders thereby supporting said loader in an operative position, and means securing the other free ends of said frame braces to said forward side portions of said tractor.

4. The structure of claim 3 wherein bolts secure said frame braces to said forward side portions of said tractor.

5. In a loader to be mounted on a tractor having forward side portions and a rear axle housing, said loader comprising a pair of vertical frames, a pair of boom arms secured to the upper portions of said vertical frames at one end and hingedly secured to a bucket at its other end, at least one hydraulic lift arm secured to one of said vertical frames and to one of said boom arms, a U-shaped bracket secured to each of said vertical frames, an elongated cylindrical brace rigidly secured to each

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bracket and supporting said vertical frames and extending a substantial distance on both sides of said vertical frames, a pair of brackets mounted on said rear axle housing, a pair of stub cylinders having an end wall secured to said bracket and adapted to receive a free end of each of said frame braces part way therein whereby an air space is provided between the end of said frame brace and the inner surface of said end wall of said stub cylinder, said stub cylinders thereby supporting said loader in an operative position, and means securing the other free ends of said frame braces to said forward side portions of said tractor.

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