

UNITED STATES PATENT OFFICE

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EARTH MOVING APPARATUS

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1 Claim. (Cl. 214-138)

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This invention relates to earth moving apparatus, or the like, and has particular reference to new and improved features adapted for use with a tractor carried apparatus such as the back hoe set forth in my application filed November 14, 1949, Serial Number 127,170.

It is an object of the present invention to provide mountings and connections for dipper stick operating jacks which provide for alternative connections near the upper or lower end of the stick. Thus, said jacks may be converted from "push" to "pull" jacks by a mere removal of two pins without disconnecting the hydraulic fluid supply lines to the dipper stick jacks.

Other objects and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings. It will be understood that changes may be made in the details of construction and arrangement of parts without departing from the scope of the invention as set forth in the accompanying claim as the preferred forms have been given by way of illustration only.

Referring to the drawings:

Fig. 1 is a side view of a bucket and its operating arrangement constructed according to the invention;

Fig. 1A is a top or plan view of the construction shown in Fig. 1.

Referring more particularly to the drawings wherein similar reference characters designate corresponding parts throughout, there is shown in Figs. 1 and 1A an arrangement wherein 10 is the supporting structure on the tractor to which is pivotally connected the boom 11 at pivot point 12 adjacent the lower end of support 10. On this arrangement a dipper stick 13 is pivotally connected at 14 to the free end of boom 11.

Boom 11 is supported by cylinder 15 and ram 16 which is connected to a double acting piston within cylinder 15. Cylinder 15 is pivotally connected at 17 to support 10 adjacent its upper end and ram 16 is pivotally connected at its free end at 18 to boom 11.

Cylinder 15 has the hydraulic lines 19 and 20 connected thereto adjacent its opposite ends and adapted to supply hydraulic fluid under pressure from a hydraulic system carried by the tractor as set forth in said application Serial Number 127,170.

On the upper end of dipper stick 13 is secured bracket 21 to which is pivotally mounted cylinder 22 at 23. Cylinder 22 has the hydraulic lines 24 and 25 connected thereto adjacent its opposite ends and adapted to actuate a double acting pis-

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ton within said cylinder 22 and ram 26 is connected to said piston.

A pair of twin cylinders 27 are provided, one on each side of boom 11 and said cylinders 27, only one of which can be seen in Fig. 1, and these cylinders are pivotally connected to boom 11 at 30a. Within each of said cylinders 27 is a double acting piston having the rams 28 connected thereto and each of said cylinders 27 have the hydraulic lines 32 and 33 connected thereto adjacent the opposite ends of said cylinders.

The rams 28 each may be pivotally connected at 34a to dipper stick 13 or at points 34 and said pair of twin cylinders 27 and rams 28 are adapted to move dipper stick 13 about its pivotal connection 14 with boom 11, and thereby actuate trencher bucket 38.

In this construction bucket 38 is connected to ram 26 through a linkage arrangement consisting of link 39 which is pivoted adjacent its opposite ends to bucket 38 and link 40 at 41 and 42 respectively and said link 40 is pivotally connected to ram 26 at 43 and at 44 to a pivotal connection on dipper stick 13.

In Figs. 1 and 1A a trencher bucket is shown. A skirt or guard 58 is provided on either side of dipper stick 13 to prevent injury or damage to ram 28.

This construction allows the changing of cylinders 27 and rams 28 from the position shown in Fig. 1 to a position wherein the rams 28 are each connected to one of the supports 34 without the necessity of changing the hoses in the field which for obvious reasons is undesirable.

Due to the fact that cylinders 27 need necessarily be fairly large for reasons of strength and displacement purposes to allow a fairly quick return of the dipper stick into normal digging position, it would, therefore, naturally have a considerable or great amount of power when pushing on the piston connected to ram 28. Therefore when the device is used as a loader it is satisfactory if used in the position shown in dotted lines in Fig. 1, that is, with rams 28 connected at points 34. If, however, it is desired to employ the device as a trencher bucket, it would be necessary to pull in on the piston to derive power for trenching and due to the fact that the displacement is smaller on this side, since the ram takes up considerable space in the cylinder, there would be relatively little power for digging or trenching and the device would have a relatively slow return which would not be satisfactory for rapid operation.

By connecting rams 28 at point 34a, which does

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not require any changing of hoses or other change unless desired, except the changing of ram 28 from points 34 to points 34a which only requires the changing of the two pivot pins, the operator then has the proper amount of power in the right direction for trenching and still has a high speed return of the dipper stick in the opposite direction.

In brief, this construction allows adjustment for best operation for loading or trenching with only the necessity of changing the connections of the rams so as to provide greatest hydraulic force for trenching or loading as well as speeding up the return of the bucket, thus speeding up the operation of the device without the necessity of any changes except the changing of the points of connection of the dipper stick operating rams.

With a single large cylinder 15 for operating boom 11, as shown in Fig. 1, the twin cylinders 27 can straddle boom 11 and thereby provide a neater, more compact and more efficient device.

With the bucket operating linkage described above, the linkage is so arranged as to provide the greatest power when needed, that is when the door and bucket approach, and to get higher speed when the bucket is fully opened, thus both greatest speed and greatest power are obtained when they can be used to best advantage. Also by varying the hitches of the linkage the speed and power obtainable may be varied.

From the foregoing it will be seen that I have provided simple, efficient and economical means for obtaining all of the objects and advantages of the invention.

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Having described my invention, I claim:

In a device of the character described, a support, a boom member pivotally connected to said support, a dipper stick member pivotally connected intermediate its ends to said boom member, a pair of cylinders and rams, said cylinders and rams being disposed on opposite sides of said boom and being connected adjacent one end to said boom and adjacent their opposite ends to said dipper stick member adjacent one end thereof for actuating said dipper stick member, alternate connecting means adjacent the opposite end of said dipper stick for attachment to said cylinders and rams and a single cylinder and ram positioned between said pair of cylinders and rams and having one end connected to said boom member and connected to said support adjacent its opposite end for actuating said boom member.

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