March 29, 1966 R. D. MOORE 3,243,065

BACKHOE

Filed March 26, 1964

FIG. 1

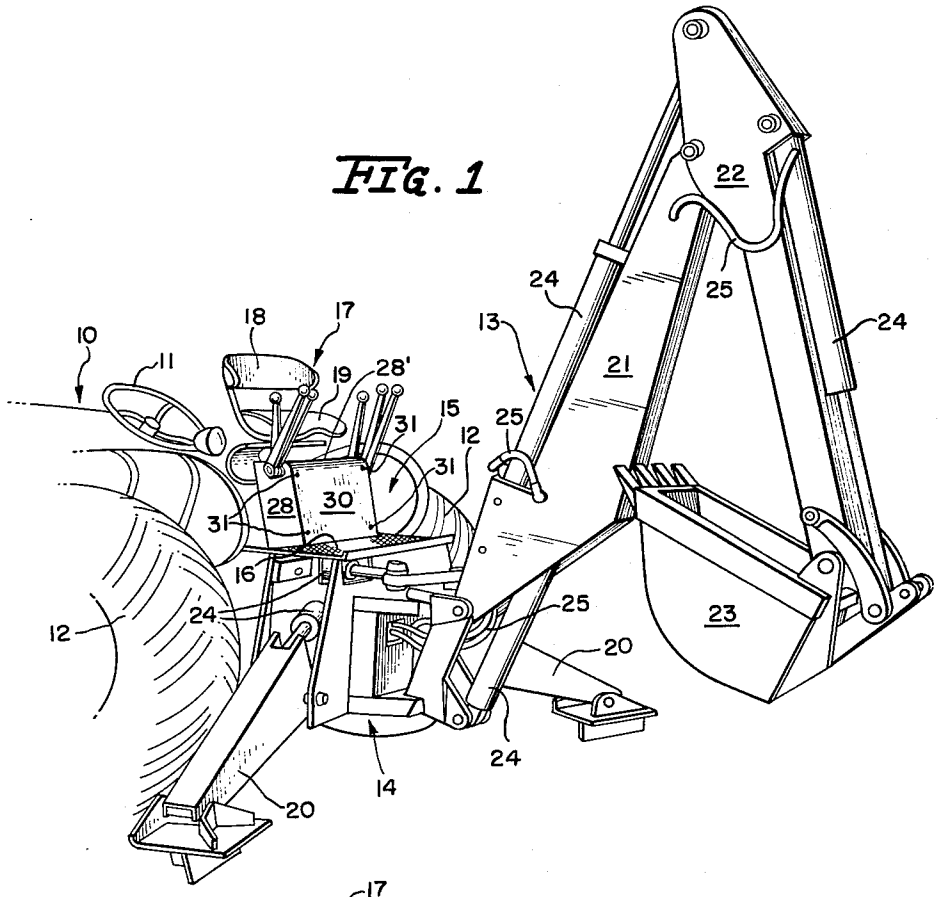
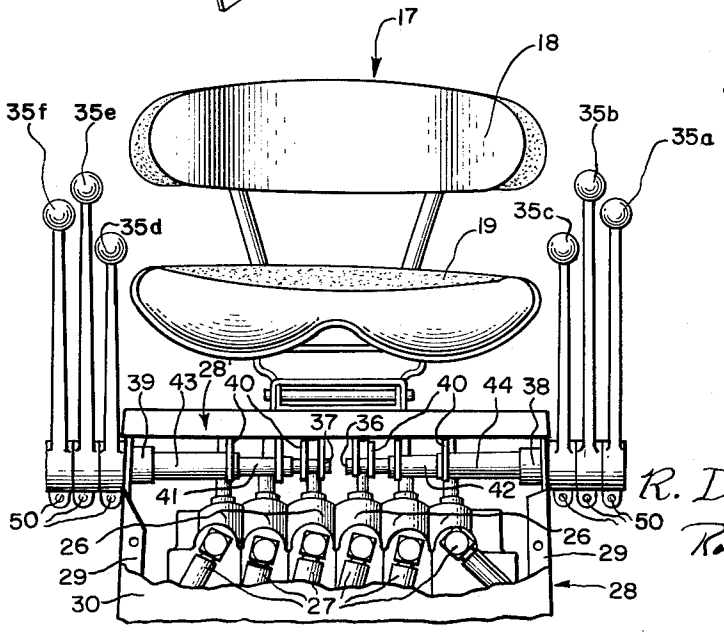


FIG. 2



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BACKHOE

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1 Claim. (Cl. 214—138)

This invention relates to backhoes, and more particularly to the control levers for directing movement of the backhoe.

Presently, it is the habit of operators of earth moving equipment to remain seated for long periods of time while handling levers which control the various movements of the equipment. It is therefore desirable that the control levers be positioned as conveniently as possible to eliminate any bending or reaching which unduly tires the operator and further to remove the levers from interfering with the operator's lower extremities. Also by a symmetrical arrangement of the levers, it is easier for operators to pay less attention to the physical actions of moving the levers thereby permitting them to direct most of their attention to the equipment and its relative position to the actual work being done. Further, by a convenient arrangement of the control levers, it is easier for operators to learn to handle the equipment, thereby making skilled help available in a shorter period of time.

It is therefore an object of the present invention to provide new and improved control levers in earth moving equipment arranged in a more accessible manner thereby providing more comfort and safety to the operator.

Another object of the present invention is to provide new and improved control levers which permit the operating linkage and valves to be positioned in a covered and protected location thereby shielding the equipment from dust and dirt common to this type of work and guarding the operator and the equipment from damage.

Still another object of the present invention is to provide a new and improved arrangement of the control levers in symmetrical groupings thereby making the sequence of operation and control easier to remember and perform.

Other objects and advantages will become readily apparent from the following detailed description taken in connection with the accompanying drawing, in which:

FIGURE 1 is a perspective showing the operator's seat and the control levers relative to the equipment; and

FIGURE 2 is a front elevational view showing the location of the control levers and valves relative to the operator's seat.

While an illustrative embodiment of the invention is shown in the drawing and will be described in detail herein, the invention is susceptible of embodiment in many different forms and it should be understood that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

Referring now to the drawing, the invention is best shown in FIGURE 1 in its enviroment relative to a prime mover **10** having a steering wheel **11** and moving wheels **12**. A backhoe **13** is connected to the prime mover **10** and is of the usual construction including a frame **14** and an operator's platform **15**. The operator's platform includes a floor **16** and an operator's seat **17** having a back rest **18** and a seat portion **19**. Attached to the frame **14** and operated by a hydraulic circuit to be hereinafter discussed are supports **20**, a boom **21**, a dipper stick **22**, and a bucket **23**. In this embodiment of a backhoe it is necessary that the moving elements of the machine be powered and this is accomplished with a number of hydraulic rams **24** and fluid lines **25**. In order to activate a particular ram **24** at the proper time a number of valves **26** (six in this embodiment) are incorporated in the hydraulic circuit and each valve **26** will control a single ram **24**.

The arrangement of valves **26** is best shown in FIGURE 2 where the valves are in line and each has a hydraulic input **27**. The valves are mounted in a housing **28** which is located on floor **16**. The housing **28** includes a top **28'** and inwardly turned flanges **29**. A cover **30** is removably attached to flanges **29** as by fasteners **31**. The valves **26** are therefore enclosed in a protective housing to prevent entry of foreign material to the hydraulic circuit and also to protect the valves from damage.

It is necessary to operate the valves **26** in a convenient and simple manner and this is accomplished by levers **35*a–f*** in the following manner. A pair of shafts **36** and **37** are located under the operator's seat **17** and supported in the housing **28** as by bearings **38** and **39**, and braces **40**. The shafts are in an end-to-end relation and are on a common axis. Shaft **36** is pivotally attached to a valve **26** at one end and to an outer lever **35*a*** at the other end. Shaft **37** is pivotally attached to another of valves **26** at one end and to an outer lever **35*f*** at the other end.

Each of shafts **36** and **37** are inside a pair of bushings having an axis common to the axis of the shafts. Bushings **41** and **43** are on shaft **37**. Bushing **41** is pivotally attached to one of valves **26** at one end and to an intermediate lever arm **35*e*** at the other; bushing **42** is pivotally attached to one of valves **26** at one end and to an intermediate lever arm **35*b*** at the other; bushing **43** is pivotally attached to one of valves **26** at one end and to an inner lever **35*d*** at the other; and bushing **44** is pivotally attached to one of valves **26** at one end and to an inner lever **35*c*** at the other. Each of the various lever arms **35*a–f*** are firmly affixed to its respective shaft or bushing as by fasteners **50**.

As best seen in FIGURE 2 inner levers **35*c*** and **35*d*** are shorter than the intermediate levers **35*b***, **35*e***, and outer levers **35*a*** and **35*f*** are longer than **35*d*** and **35*c*** but shorter than **35*e***, **35*b***.

Thus when any specific lever arm is actuated, it moves only its specific shaft or bushing and thereby operates only a single valve **26** to operate a specific hydraulic ram. This then provides the individual control to position bucket **23** in any desired working position.

By arranging the lever arms **35*a–f*** in the symmetrical arrangement as disclosed herein and by locating them as shown relative to the operator's seat, a control system is provided which is easily and comfortably operated, yet prevents the possibility of damage to the hydraulic valves and injury to the operator.

What is claimed is:

The combination of a prime mover having an operator's seat, a backhoe comprising a boom, a dipper stick and a bucket, means for moving the boom, dipper stick and bucket comprising:

a pair of elongated shafts beneath the operator's seat having a common horizontal axis extending transversely of the seat;

a plurality of bushings on each of said shafts;

a plurality of lever arms arranged in sets at opposite sides of the seat and all of the lever arms of each set extending above the level of the seat and connected one to each of said shafts and one to each of said bushings, said lever arms being located immediately adjacent said seat and arranged symmetrically along both sides thereof;

a hydraulic circuit for operating the backhoe;

a plurality of valves in said hydraulic circuit located beneath the operator's seat;

means connecting one of each of said shafts and bushings to one of each of said valves;

cover means for enclosing said valves and said connecting means, each set of lever arms comprising an inner lever positioned closest to the seat, an intermediate lever disposed outwardly of the respective inner lever and an outer lever disposed outwardly of the intermediate lever, corresponding levers of each set being of corresponding height and the inner lever being shorter than the intermediate lever and the outer lever being longer than the inner lever but shorter than the intermediate lever, and the intermediate lever because of its greater height than the inner and outer levers of the respective set and because of its position in the set providing a reference position for an operator by feel alone to the respective inner and outer levers.

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