

Jan. 27, 1959

M. C. WILLS

2,870,924

BUCKET AND BUCKET ARM CONTROL FOR BOOMS

Filed Jan. 16, 1956

2 Sheets-Sheet 1

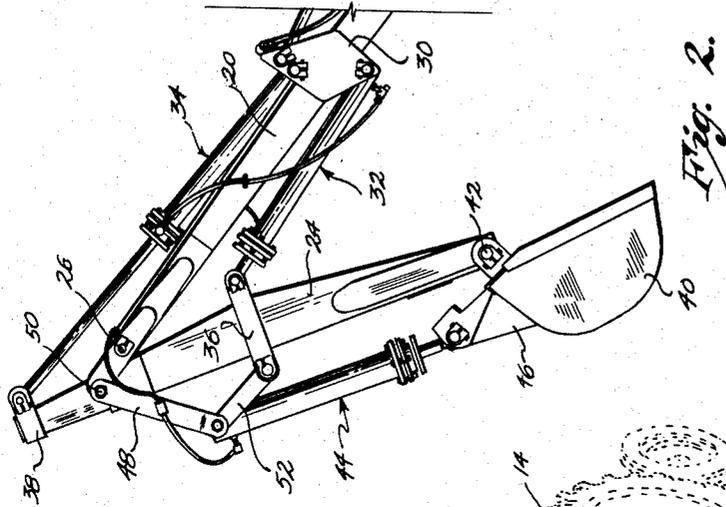


Fig. 2.

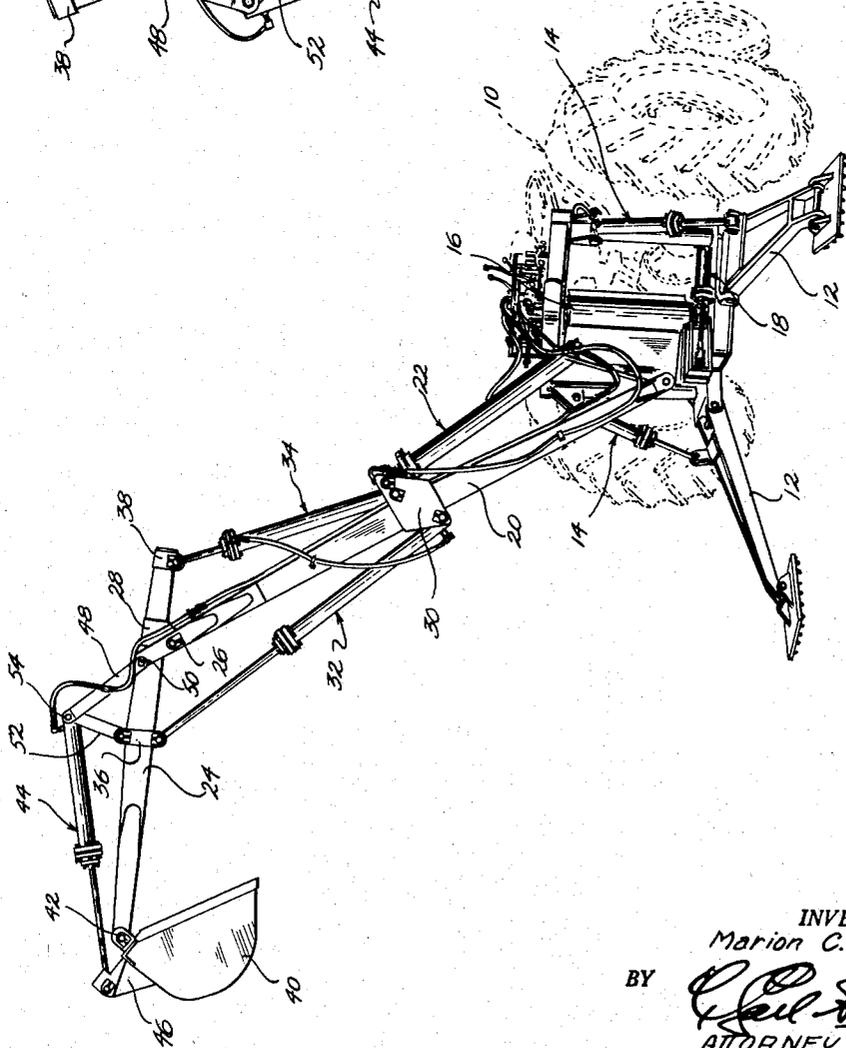


Fig. 1.

INVENTOR.
Marion C. Wills
BY *Carl H. [Signature]*
ATTORNEY

Jan. 27, 1959

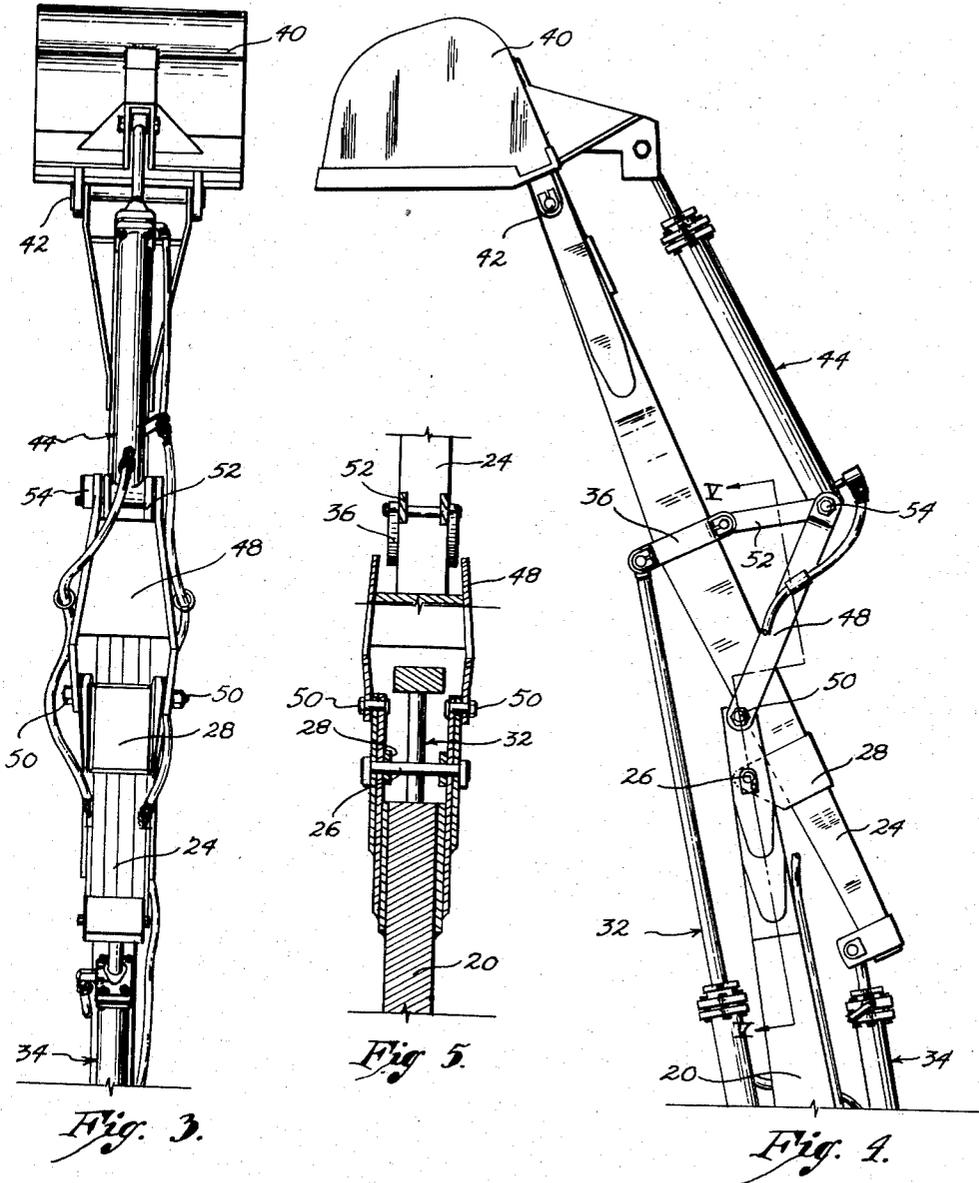
M. C. WILLS

2,870,924

BUCKET AND BUCKET ARM CONTROL FOR BOOMS

Filed Jan. 16, 1956

2 Sheets-Sheet 2



INVENTOR.
Marion C. Wills
BY *Carl Young*
ATTORNEY

1

2,870,924

BUCKET AND BUCKET ARM CONTROL FOR BOOMS

Marion C. Wills, Topeka, Kans., assignor to Shawnee Manufacturing Company, Inc., Topeka, Kans., a corporation of Kansas

Application January 16, 1956, Serial No. 559,483

2 Claims. (Cl. 214-138)

This invention relates to material handling equipment embodying a movable boom upon which is operably mounted a swingable bucket or other material-handling device, the primary object being to provide novel structure for actuating the said bucket not only with respect to a bucket arm upon which it is mounted, but with respect to the aforementioned boom.

It is the most important object of the present invention to provide increased leverage and highly maneuverable control for earth handling buckets and the like not only through use of a pair of push-pull devices, but through employment of novel linkage which functions automatically to control the bucket as the result of swinging of the arm with respect to the boom.

A further object of this invention is to provide means associated with the said linkage for swinging the bucket relative to its arm and independently of the movement of the arm with respect to the boom.

In the drawings:

Figure 1 is a perspective view of earth handling equipment embodying bucket and bucket arm control means for booms made pursuant to the present invention.

Fig. 2 is a fragmentary, side elevational view illustrating the uppermost end of the boom shown in Fig. 1 and associated parts.

Fig. 3 is an enlarged, fragmentary, top plan view showing the bucket and bucket arm.

Fig. 4 is an enlarged view similar to Fig. 2 showing the assembly in an elevated position; and

Fig. 5 is a fragmentary, cross-sectional view taken on line V-V of Fig. 4.

The equipment illustrated in its entirety by Fig. 1 of the drawings, is adapted for mounting on a tractor or the like 10, and when placed in use, the weight thereof is normally supported in part by ground-engaging legs 12 controlled by double-acting, hydraulic-piston and cylinder assemblies 14.

A head, broadly designated by the numeral 16, is mounted for swinging movement on its vertical axis and such swinging movement is effected through employment of a pair of opposed double-acting, hydraulic cylinder and piston assemblies, one of which is seen in Fig. 1 and designated broadly by the numeral 18. The head 16 pivotally mounts and supports a vertically swingable boom 20 controlled by hydraulic-cylinder assembly 22. The aforementioned components of the machine form no part of the instant invention and, therefore, have not been detailed.

The boom 20 mounts an elongated arm 24 for swinging movement relative to the boom 20 through the medium of a pivot pin 26 spaced from the outermost or uppermost end of the boom 20 as best illustrated in Figs. 4 and 5, the pivot pin 26 in turn receiving a bracket 28 rigid to the arm 24 intermediate the ends of the latter. It is noted in Fig. 5 that the uppermost end of the boom 20 is bifurcated for clearing the arm 24 in its swinging movement about the axis of pivot means 26.

Swinging of the arm 24 is effected by a pair of push-

2

pull devices pivotally connected to the boom 20 between head 16 and pivot 26, through the medium of a bracket 30 rigidly attached to the boom 20. Such devices include a pair of double-action, hydraulic piston and cylinder units 32 and 34 respectively, which are in turn connected with the arm 24 on opposite sides of the bracket 28 by brackets 36 and 38 respectively, rigid to the arm 24.

A material handling device such as a bucket 40, is swingably secured to the arm 24 at that end thereof opposite to bracket 38 through the medium of a pivot 42. Bucket 40 is controlled or swung with respect to the arm 24 primarily by actuation of a double-acting, hydraulic piston-cylinder assembly 44 pivotally connected to a rearwardly-extending bracket 46 on the bucket 40.

The bucket 40 is caused to swing with respect to the arm 24 independently of the action of assembly 44 by virtue of a linkage arrangement which, by virtue of the inclusion of the assembly 44, pivotally interconnects bucket 40, arm 24 and boom 20. Such linkage includes a pair of links 48 swingably secured to the outermost free end of the boom 20 by opposed pivot pins 50, together with a pair of links 52 pivotally connected to bracket 36. The links 48 are not joined to the arm 24 as is clear in Fig. 5, but pivotally connect with the assembly 44 and with the links 52 through a common pivot pin 54.

From the foregoing, it is apparent that when the arm 24 is to be swung downwardly with respect to the boom 20, a pulling action is imparted to the arm 24 by operation of the unit 32 while the unit 34 simultaneously imparts a pushing action to the arm 24. Conversely, when the arm 24 is swung upwardly relative to the boom 20, the unit 32 pushes on the arm 24 while the unit 34 imparts a pulling action thereto.

Such swinging movement of the arm 24 affects the position of bucket 40 relative to the arm 24 whether or not the operator causes actuation of assembly 44. By virtue of the linkage 48 and 52 and the way in which it operably couples with the bucket 40 through assembly 44, downward swinging movement of the arm 24 relative to the boom 20 causes the bucket 40 to move from the position illustrated in Fig. 2. In other words, in absence of actuation of assembly 44, such swinging movement of the arm 24 causes the bucket 40 to swing upwardly and, conversely, the bucket 40 is pulled downwardly and inwardly relative to the arm 24 when the latter is rotated clockwise relative to the boom 20.

Notwithstanding such automatic operation of the bucket 40, the user of the machine may independently control the bucket 40 by actuation of the assembly 44. All of these independent controls render the entire machine highly maneuverable when considered with the action of the boom 20 itself through control 22 therefor, and the way in which the entire unit is adapted to swing horizontally through use of control means 18.

It is possible for example, to dig relatively deep excavations and at the same time raise the excavated material contained in the bucket 40 to relatively flat heights for dumping as may be desired. Operators becoming skilled in the use of the machine can expertly form walls of ditches and the like and handle dirt and other materials in a manner to move the same to desired positions, all without necessitating periodic changing of the position of tractor 10.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In a machine of the kind described, the combination of a boom; an arm; means spaced from one end of the boom swingably mounting the arm on the boom; a material handling device swingably mounted on the arm; a first link pivotally connected to the boom at said one end thereof; a second link pivotally connected to the arm intermediate the ends of the latter; a double-action, hy-

3

4

draulic piston and cylinder assembly pivotally connected to the material handling device; and pivot means interconnecting the links and the assembly for swinging the material handling device relative to the arm in response to swinging of the arm relative to the boom, said links and said assembly progressively and continually increasing the angle between the device and the arm when the latter is swung in one direction and progressively and continuously decreasing said angle when the arm is swung in the opposite direction.

2. In a machine of the kind described, the combination of a boom; an arm; means spaced from one end of the boom swingably mounting the arm on the boom intermediate the ends of the arm; a pair of double-action, hydraulic piston and cylinder units, each pivotally connected to the boom and each pivotally attached to the arm, one on each side respectively of said means for swinging the arm relative to the boom; a material handling device swingably mounted on the arm; a first link pivotally connected to the boom at said one end thereof; a second link pivotally connected to the arm intermediate

the ends of the latter; a double-action, hydraulic piston and cylinder assembly pivotally connected to the material handling device; and pivot means interconnecting the links and the assembly for swinging the material handling device relative to the arm in response to swinging of the arm relative to the boom, said links and said assembly progressively and continually increasing the angle between the material handling device and the arm when the latter is swung in one direction and progressively and continuously decreasing said angle when the arm is swung in the opposite direction.

References Cited in the file of this patent

UNITED STATES PATENTS

15	842,904	Nelson	Feb. 5, 1907
	2,678,741	Pilch	May 18, 1954
	2,682,346	Wills et al.	June 29, 1954

FOREIGN PATENTS

20	662,807	Great Britain	Dec. 12, 1951
	1,051,801	France	Sept. 23, 1953