This invention relates to new and useful improvements in attachments for tractors.

An object of this invention is to support a tool such as a plow, shovel or others on a tractor by means of an improved structure which includes a pair of spaced sides having means thereof for attachment to a tractor component and guides carried by said sides, arms pivoted at one pair of ends to said sides and passed through said guides whereby upon movement of the arms preferably through the medium of hydraulic cylinders and pistons, the arms are raised and lowered in a guided travel, and including an improved means of actually mounting and supporting the particular tool being used.

Another object of this invention is to rotatively mount the tool by attachment to brackets which are fixed to a rotatable element, the said element being rotatable in a horizontal plane and the said brackets being secured to the arms by means of links having swivel connections at each end so that the entire tool support may be raised and lowered with the arms and so that the tool on the support may be adjusted in a horizontal plane by mere rotation.

A still further object of this invention is to shift the tool support by means of a rod which is rotatively mounted in a beam carried by the said brackets, the rod being attached to the above named brackets by means of a pin which whereby upon rotation of the shaft the entire tool support is shifted laterally.

Another object of this invention is to mount a scraper or other type of tool on the brackets by an adjusting mechanism, said adjusting mechanism also supporting depth gauges whereby the pivotal travel of the said arms is limited in accordance with the adjustment of the depth gauges.

An important feature of the present invention is the use of plates which are disposed on the arms for sliding contact with the confining walls of the guides.

Another object of this invention is to supply a device of the general class to be described which may be readily attached and detached from a tractor either of the wheel driven or the endless track type, which attachment may be used for supporting many types of implements or tools, such as the mold board, plow, bucket, hoist and many others.

Ancillary objects and features of novelty will become apparent to those skilled in the art in following the description of a preferred form of the invention, illustrated in the accompanying drawings.

Figure 1 is a plan view of the preferred form of the invention;

Figure 2 is an elevational side of the device shown in Figure 1;

Figure 3 is a front view of the device shown in Figure 1;

Figure 4 is a perspective view of a form of the frame forming the attachment for a tractor;

Figure 5 is a sectional detail of construction showing particularly the guides and arrangement of structural elements connected thereto;

Figure 6 is a perspective view of one of the arms attached to the frame sides and passed through the guides;

Figure 7 is a longitudinal sectional view of a depth gauge used in conjunction with and forming a part of the invention, and;

Figure 8 is a schematic view showing one possible fluid flow system for use in operation of the device.

The present invention deals with improvements in attachments for use in conjunction with tractors. The embodiment of the invention is a device which may be readily attached and removed from the tractor at will and with a minimum of time and effort. The attachment is used with best results on one end of the tractor leaving the other end untouched in order that it may support another type of implement to serve an entirely different purpose.

The device is to be composed of rather heavy structural elements for large scale use but may be made relatively light in weight and small in size when it is adapted for use in connection with light equipment.

Generally, one who has use for a tractor has use for certain types of implements. Otherwise spoken, the mere purchase of a tractor is usually insignificant unless attachments peculiar to various types of operations are purchased. For farming purposes plows, harrows, etc. are generally required. In grading streets, terraces, etc. other types of implements are used. But, all of these implements must be attached by one means or another to the tractor. The present invention provides a device for the purpose of facilitating the attachment and removal of the above named implements as well as many others including hoists, drag line buckets, shovels and the like. Once the attachment is placed on a tractor it need be removed seldom if ever. Simply the removal of certain of the operative elements of the attachment need be effected in order to convert from one type of tool holder to a device capable of supporting another type of tool.

A tractor generally indicated at 18 is illustrated and is of the endless tread type. The tractor includes all of the necessary elements for rendering the operation thereof possible such as an engine, body and chassis, wheels and the other necessary elements which are unshown. Mounted at one end of this tractor is the attachment. The said attachment includes a pair of sides 12 and 14 respectively which for the purposes of illustra-
tion have been indicated in plate form. These sides have angle brackets 16 and 18 respectively welded or otherwise secured to the lower back corner thereof. A number of apertures 20 are provided therein in order to receive bolts or the like for attachment to the structure of the tractor. A number of bars 22 and 24 extend across the two plates 12 and 14 and also through strengthening members 26 and 28 to serve the purpose of attaching to fasteners which are carried by the tractor. They also serve the secondary purpose of maintaining the side plates 12 and 14 in spaced, substantially parallel relationship.

A pair of guides 30 and 32 respectively are fixed to the sides 12 and 14 by any suitable means such as welding, brazing or the like. These guides are composed of a pair of spaced plates 34 and 36 fixed to a tube 38 and a structural member 40 respectively. A cross member 42 is attached to the top of each guide 30 and 32 for maintaining them in substantially vertical fixed position. A bottom cross member 44 extends across the lower ends of the framing structural members 40 and 46 respectively.

A substantially horizontal beam 50 is attached to the framing members 40 and 46. This beam is composed of a pair of divergent structural members and has braces 52 and 54 respectively attached at the point of convergence to the said framing structural members 40 and 46 spaced from the junction of the divergent members and the said framing structural members 40 and 46. A fish plate 68 is disposed in the apex of the divergent members and has a shaft 60 mounted for rotation therein. This shaft has a wheel 62 at one end for a purpose of rotating the shaft 60 thereby rotating the rod 64 which is attached at the other end of the shaft. Means is provided for maintaining the shaft in selected positions of rotation such as the aperture and pin mechanism 63 thereby maintaining the rod in selected positions.

A cross member 66 is carried by the sides 12 and 14 and has its ends extending through bearings 68 on the sides 12 and 14. The ends thereof are used for the purpose of pivotally mounting a pair of cylinders to be described subsequently. Hinge members 76 are also disposed on the outer surfaces of the sides 12 and 14 respectively for the purpose of pivoting the ends of arms (Figure 6) which are used in supporting and operating the tool support.

A pair of cylinders 72 and 74 respectively are mounted for pivotal movement on the ends of the member 66 (Figure 2) and have pistons with piston rods 76 and 78 respectively extending therefrom. Combination inlet and outlet tubes 60 and 82 respectively terminate in a suitable valve 84 which is mounted in any convenient location on the attachment or on the tractor. One type of valve is illustrated in Figure 8 however, by the expedient choice of different types of valves various operations will be attributed to the arms. A four-way valve 84 is illustrated whereby the arms may be pivotally raised, lowered, fixed in a selected position or any other types of valves other operations, such as a floating position of the arms, may be obtained.

Noting Figure 6, a specific type of arm is used in conjunction with the attachment. This arm includes a bar 86 which has a hinge member 88 at one end thereof adapted to be used in conjunction with the hinge member 70. A hinge pin simply passes through the appropriate places in both of these elements thereby mounting the arm shown in Figure 6 for pivotal movement. A substantially U-shaped member 90 is disposed intermediate the ends of the arm and is fixed thereto by any suitable manner such as welding, brazing or the like. An inverted U-shaped member 92 is disposed within the sides of the U-shaped member 90 and has a cut-out 94 therein. By the utility of the cut-out a recess is provided which accommodates the end of the piston rod. A hinge pin passes through the apertures 96 provided in the U-shaped members 88 and 90 and 92 in order to pivotally mount the piston rod.

A tool support is provided for the purpose of holding one of the previously mentioned tools such as the mold board 98 which may be supplied with scraper disks 108 at one or both ends thereof, this being optional equipment. The tool support consists of a pair of brackets 102 and 104 respectively which have diverging end portions with a cross member 106 extending thereacross. The opposite ends of brackets 102 and 106 are bent downwardly (Figure 2) and terminate in a ball attached to a shank 108. This ball is received in a socket, which socket has a forked member 110 associated therewith, forming a part of a universal joint 112 which in turn attaches to the drawbar 114 of a conventional tractor.

Plates 116 and 118 respectively have an inner ring 120 fixed thereto and an outer ring 122 is rotatable thereon. These rings may be held in selected positions of rotation with respect to each other by any suitable conventional means. Curved brackets 124 and 126 extend from the outer ring and have parallel bars 128 and 130 respectively fixed to the ends thereof. The said parallel bars 128 and 130 have means carried thereby for the purpose of releasably maintaining a tool such as the mold board 98 suspended. This last named means consists of a pair of curved brackets 132 and 134 respectively having slots therein. Bolts pass through the slots fastening the curved brackets 132 and 134 thereto in selected adjusted positions. The ends of the curved members 132 and 134 are secured to the mold board 98 for movement therewith about the bar 128 as an axis. Accordingly, selected adjusted positions of angularity of the mold board 98 may be obtained.

Depth gauges are carried by brackets 140 and 142 respectively which are in turn supported ultimately by the curved brackets 124 and 126 respectively. The brackets 140 and 142 have a lower pair of ears 148 extending therefrom and an upper pair of slotted curved members 148 extending therefrom.

Depth gauges are supported in each bracket 140 and 142 respectively. The structure of the depth gauges is shown best in Figure 7 and includes an outer housing 150 having a lower pair of trunnions 152 extending therefrom and an upper pair of trunnions 154 extending therefrom. The upper trunnions are disposed in the curved slotted members 148, while the lower trunnions are mounted for pivotal movement in the ears 146.

Mounted for sliding and rotative movement therethrough. With other special rod 156 which has a dish-like foot 158 at the lower end thereof adapted to engage the ground.

A collar 160 is threaded disposed in the lower end of the housing 150 and has the rod passed therethrough. A stop 162 is fixed adjustably on the rod 156 by means of a set screw 164.

A spring 166 is provided for constantly urging the stop 162 against the collar 160 through the medium of a wear plate 167. This spring reacts
on the top of the housing and the wear plate 167 which is disposed on the stop 162.

In view of the foregoing it is seen that the mold board 98 may be adjusted in the tool support and the depth gauge has two adjustments pertinent thereto. The first is adjustment as to actual depth of the second is the pivotal movement obtained in its mounting. In order that access may be had to the set screw 164, an opening 165 is provided in one of the walls of the housing as disclosed in Figure 7.

The flexible hitch shown best at 110, 112 and 114 as well as 109 in Figure 1 assists in stabilizing and controlling the depth of cut taken by the mold board 98, in conjunction with the spring loaded shoes or feet 158. The rear end of the tractor raises after the balance point of the tractor passes over a mound of dirt or other obstacle. This is particularly true in the crawler-type tractor as disclosed.

As the rear end of the tractor 10 raises there is a tendency for the grader to be raised. Hence, the depth of cut taken would ordinarily be lessened, causing a variation in grade. The flexible hitch including universal joint 113 allows this difficulty to be partially corrected by flexing upward as the rear of the tractor is moved up, as when the tractor has gone over a mound far enough so that the tractor balance point is in front of the mound. This upward movement of the hitch causes the drawbar of the grader to be raised which in turn permits gravity lowering of the mold board due to the rolling action of the ball and socket joint incorporated in the hitch.

If the rear end of the tractor is lowered as when the tractor initially climbs on a mound, the operation is simply reversed that is, the hitch is flexed downward allowing a corrective upward movement of the mold board. The spring loaded shoes or feet assist in controlling the action of the flexible hitch.

Each of the arms has a ball 170 fixed to the end thereof opposite the hinge member 88. This ball is disposed in a socket 172 (Figure 2) at the end of a link 174. An identical structure is provided for the other arm as disclosed in Figure 1. At the lower end of the link 174 there is another socket 176 having another ball (unnamed) disposed therein which is carried by one of the diverging brackets 103. Accordingly, when each arm is raised or lowered the diverging brackets 102 and 104 are also raised and lowered. This movement is in turn reflected in raising and lowering movement of the mold board 96.

Means for shifting the entire tool support in a lateral horizontal direction is provided. A portion of this means has already been described. The remainder consists of a pitman 178 (Figures 2 and 3) which is connected to the cross member 105 at one end and to the ball 180 at the end of the rod 54. Hence the arms are attached to the divergent brackets by swivel connections and the beam 50 supports the means for laterally shifting the tool support also by means of swivel connections.

When the arms are operated by the pistons it is apparent that the arms would ordinarily scrape against the confining walls of the guides 30 and 32. However, in order that a smooth even operation is obtained, wear plates 190 are attached to the outside surfaces of the substantially U-shaped members 90 on each arm.

It is apparent that variations may be made and additions may be made such as the use of a number of strengthening braces as at 198 may be resorted to without departing from the spirit of the invention.

Having described the invention, what is claimed is:

1. In a tractor including a body and chassis structure, and a drawbar, an attachment for carrying tools comprising a frame which includes a pair of spaced sides having means for attachment to said structure, vertical guides secured to said sides, arms pivoted at one pair of ends to said sides and passed through said guides, means pivoted to said arms intermediate their ends and to said sides for pivotally actuating said arms, tool support, links attached to the opposite pair of ends of said arms and to said tool support by swivel connections, and means secured to said tool support for attaching said tool support to the drawbar, a beam carried by said frame, a rod mounted for rotation on said beam, and a pitman connecting said rod and said tool support.

2. The combination of claim 1 and a scraper, means carried by said tool support adjustable attaching said scraper to said tool support, and a depth gauge carried by said last mentioned means.

3. An attachment for a tractor comprising a frame having a pair of sides, vertical guides carried by said sides, and a cross member secured to said guides, arms pivoted to said sides and passed through said guides, wear plates secured to said arms contacting said guides, a beam extending from said cross member and having a rod rotatively carried thereby, a tool support including a rotatable member with brackets attached thereto, links attached to said brackets and said arms and a pitman connecting said beam and one of said brackets whereby upon rotation of said rod said tool support is shifted, and means carried by said sides and said arms for raising and lowering said arms thereby operating said tool support.

4. An attachment for a tractor comprising a frame having a pair of sides, vertical guides carried by said sides, and a cross member secured to said guides, arms pivoted to said sides and passed through said guides, wear plates secured to said arms contacting said guides, a beam extending from said cross member and having a rod rotatively carried thereby, a tool support including a rotatable member with brackets attached thereto, links attached to said brackets and said arms and a pitman connecting said beam and one of said brackets whereby upon rotation of said rod said tool support is shifted, and means carried by said sides and said arms for raising and lowering said arms thereby operating said tool support, is shifted, and means carried by said sides and said arms for raising and lowering said arms thereby operating said tool support.

5. A number of strengthening braces as at 198 may be resorted to without departing from the spirit of the invention.

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