Aug. 17, 1965 J. W. MARRON 3,200,891

BULLDOZER ATTACHMENT

Filed April 16, 1963

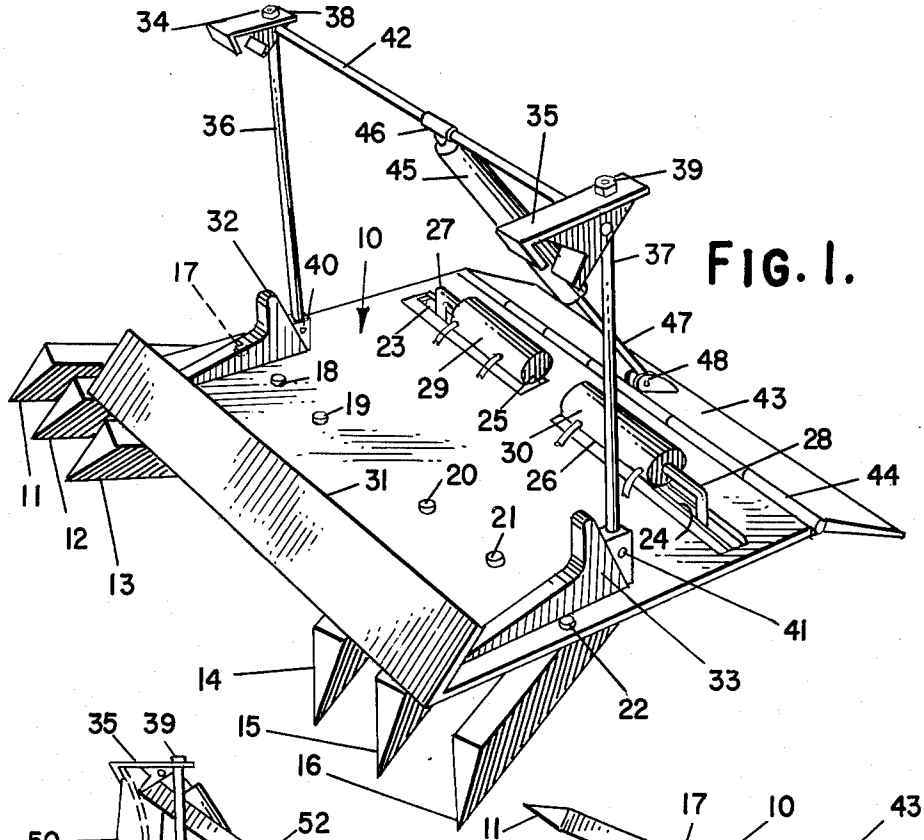


FIG. 1.

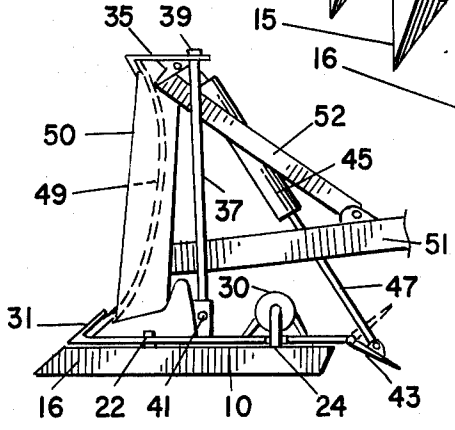


FIG. 2.

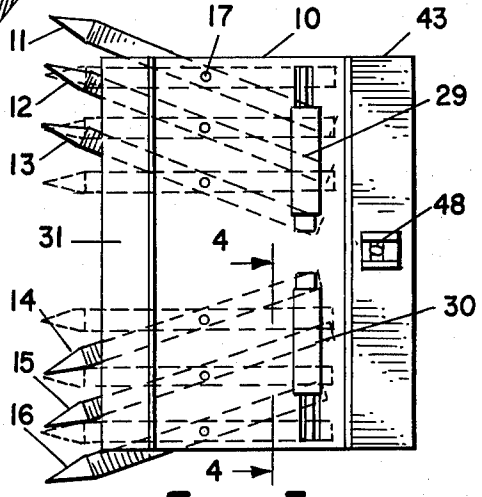


FIG. 3.

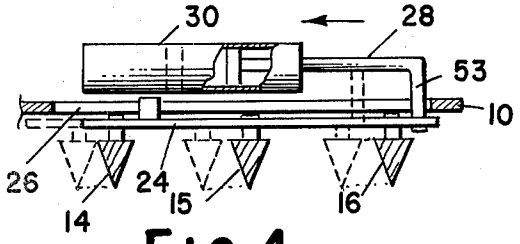


FIG. 4.

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BULLDOZER ATTACHMENT

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This invention relates generally to earth-moving equipment and, more particularly, to an improved attachment for the blade of a bulldozer to facilitate conditioning of soil for compaction at construction sites.

In leveling operations preparatory to construction, it is common practice to mix water and dirt or soil to facilitate grading of the earth. Normally, this operation requires at least two machines. First, a bulldozer is used to effect a general leveling. Thereafter, the soil is suitably wetted and mixed by means of a second piece of earth-moving equipment. The bulldozer may then subsequently be used to effect further leveling operations.

With the foregoing in mind, it is a primary object of this invention to provide a novel attachment for a bulldozer so that the bulldozer itself may be employed for the mixing of the soil and water to the end that an extra machine is not required.

More particularly, it is an object to provide an attachment for a bulldozer which may very easily be secured to a bulldozer blade or removed therefrom with a minimum of labor and effort so that multiple earth-moving operations may be carried out by the single bulldozer machine and attachment.

A particular object of this invention is to provide an improved attachment for a bulldozer to effect mixing of water and soil to the end that preparation of the earth for ultimate compacting is greatly facilitated and may be carried out in considerably less time than heretofore required.

Another particular object of this invention is to provide an attachment for a bulldozer blade for effectively mixing soil and water which is operable when the bulldozer is moved in both forward and rearward directions so that no waste motion is lost in conditioning a given area of earth.

Briefly, these and many other objects and advantages of this invention are attained by providing a plate including an upwardly and rearwardly extending front flange adapted to hook over the lower edge of a bulldozer blade. Intermediate the front and rear edges of the plate, there are provided suitable rod supports terminating in their upper ends in hooks arranged to hook over the upper edge of the bulldozer blade. By this arrangement, the plate may be secured to the underside of the bulldozer blade in a position generally parallel to the ground.

Beneath the plate there are provided a plurality of teeth running generally in a fore and aft direction and pivoted intermediate their ends to the plate structure. These teeth will provide furrows in the earth when the bulldozer is operated with the blade itself suitably adjusted in height so that the teeth will engage the earth. The plate carries suitable means for laterally swinging the teeth about the pivot points so that certain ones of the teeth may be held in positions in which their forward ends diverge from each other thereby providing a "plow" effect. Moreover, the arrangement is such that the teeth may actually be swung laterally while the bulldozer is in motion to effect the desired mixing of soil and water.

A feature of the structure comprises a lip member hinged to the rear edge of the plate itself adjacent to the rear ends of the teeth. Suitable means such as a hydraulic cylinder and piston arrangement carried by the plate are connected to the lip so that the rear edge of the lip may be raised or lowered to assume positions above and below the plane of the plate. This lip serves to

smooth soil agitated by the teeth when the bulldozer is traveling in a forward direction. However, the bulldozer may be operated in a reverse direction by simply raising this lip above the plane of the plate so that the teeth themselves function in a reverse manner.

A better understanding of the invention will be had by now referring to a preferred embodiment thereof as illustrated in the accompanying drawings, in which:

FIGURE 1 is a perspective view of the bulldozer attachment of this invention shown separated from the bulldozer blade;

FIGURE 2 is a reduced side elevational view illustrating the manner in which the attachment of FIGURE 1 is secured to the blade portion of the bulldozer;

FIGURE 3 is a plan view partially schematic of the attachment shown in FIGURE 1, useful in explaining certain features of the invention; and

FIGURE 4 is a fragmentary cross-section of the attachment taken in the direction of the arrows 4—4 of FIGURE 3.

Referring first to FIGURE 1, the attachment comprises a plate 10 arranged to support a plurality of teeth preferably provided in first and second sets of three as indicated at 11, 12, 13, and 14, 15, 16. As shown, these teeth are pivoted intermediate their ends to the plate as at pivot points 17, 18, 19, and 20, 21 and 22, respectively. The rear end portions of the teeth are also coupled to the plate through a suitable means to effect lateral swinging movement of the teeth. Towards this end, there are provided first and second cross-bars 23 and 24 pivoted to the first and second sets of teeth and arranged to be moved in laterally opposite directions through suitable connecting means passing through slots 25 and 26 formed in the plate 10. These connecting means are, in turn, connected to piston rods 27 and 28 operable in hydraulic cylinders 29 and 30 carried on the plate 10. The exact manner of this coupling will become clearer as the description proceeds.

As shown in FIGURE 1, the front edge of the plate 10 includes an upwardly and rearwardly directed flange 31. As will also become clearer as the description proceeds, the flange 31 is arranged to hook over the lower portion of the bulldozer blade and cooperates with cradle members 32 and 33 for securing the plate 10 to the underside of the bulldozer blade. The securement is completed by means of upper hook structures 34 and 35 coupled to the upper ends of rods 36 and 37 as by suitable nuts 38 and 39. The lower ends of the rods 36 and 37 are pivotally connected at 40 and 41 to the plate 10. A cross-rod 42 extends between the upper hook structures 34 and 35.

The rear edge of the plate 10 includes a lip 43 hinged to the plate as at 44 and arranged to be raised and lowered as by a hydraulic cylinder 45 swingably mounted at 46 to the referred to cross-rod 42. A piston rod 47 extending from the cylinder 45 is pivoted at 48 to the lip 43 to effect the desired up and down motion. By pivoting the cylinder 45 to the cross-rod 42, swinging movement of this cylinder may take place to accommodate the arcuate movement of the lip 43.

Referring now to FIGURE 2, there is shown a bulldozer blade indicated in dotted lines at 49 including side flanges such as shown at 50. This blade 49 and side flange 50 is secured to the bulldozer as by structural members 51 and 52. The bulldozer itself is not shown, but the structural member 51 is connected thereto in a conventional manner.

As shown in FIGURE 2, the front flange 31 of the plate 10 hooks over the lower edge of the bulldozer blade 49 and the upper hook structures such as 35 hook over the upper edge of the bulldozer blade. If the nut 39 for the

rod 37 is tightened, an upward force will be exerted on the rod 37 to fully lock the plate 10 to the underside of the bulldozer blade. The plate 10 is held in a position substantially parallel to the ground and because of the conventional mechanism for raising and lowering the bulldozer blade 49, the height of the teeth, such as the tooth 16, above the earth may be suitably adjusted.

Referring now to FIGURE 3, the resulting positioning of the first and second sets of teeth 11 through 16 when the cylinders 29 and 30 are operated is indicated in dotted lines. As shown, actuation of the piston rods from the cylinders 29 and 30 will serve to swing the rear portions of the teeth laterally so that the first and second sets will diverge from each other in a forward direction as indicated. Reverse movement of the teeth by the cylinders 29 and 30 will cause them to extend substantially in a fore and aft direction in parallel relationship.

FIGURE 4 illustrates, in detail, one means for simultaneously effecting the swinging movement of the teeth in any one set. As shown, the end of the piston 28 for the cylinder 30 connects to the structural member 53 which passes through the slot 26 formed in the plate 10. The cross-bar 24 in turn is coupled to this member 53 and the rear portions of the teeth 14, 15 and 16, in turn, are pivoted to the cross-bar 24. With this arrangement, it will be evident that inward movement of the piston rod 28 such as indicated by the arrow will result in the cross-bar 24 moving to the left as viewed in FIGURE 4 to swing the teeth 14, 15 and 16 simultaneously about the front pivot points. Movement of the piston rod 28 in a reverse direction will again line the teeth in a fore and aft direction.

In the operation of the bulldozer attachment, the plate 10 is first secured to the bulldozer blade as described in conjunction with FIGURES 1 and 2. The nuts 38 and 39 on top of the hook structures 34 and 35 are then tightened to thoroughly clamp the plate 10 and cradle portions 32 and 33 to the lower underside portion of the blade. The operator of the bulldozer may then adjust the height of the teeth above the ground by raising or lowering the entire blade structure, so that suitable agitation or mixing of the soil may be effected. Thus, during forward movement of the bulldozer, the soil, after being wetted, will be thoroughly mixed by the action of the teeth traveling therethrough. This mixing is augmented by simultaneously laterally swinging the teeth as described in conjunction with FIGURE 3 by providing hydraulic fluid to the cylinders 29 and 30.

During forward movement of the bulldozer attachment, the lip 43 is ordinarily in its lower or solid line position as depicted in FIGURE 2, so that it serves as a scraper to level the furrows formed in the soil by the teeth. When the bulldozer is reversed or backed up, the lip 43 may be raised by action of the hydraulic cylinder 45 to the dotted line position illustrated in FIGURE 2, so that it will permit rearward movement of the attachment and further mixing action can take place.

Preferably, the respective teeth are triangular in cross-section as clearly illustrated in FIGURE 4. This triangular shape provides converging sides to the teeth so that the soil when worked upwardly is compressed as it becomes more distant from the earth surface. This action helps in effecting a full mixing of the soil and water.

When it is desired to use the bulldozer in a conventional manner, it is a simple matter to loosen the nuts 38 and 39 and remove the upper hook structures 34 and 35. The entire plate 10 may then be rocked downwardly and then slipped forwardly to unhook the front flange 31 from the lower edge of the bulldozer blade. The hose couplings to the various cylinders (not shown) may then be disconnected and the entire attachment separated from the bulldozer blade.

From the foregoing description, it will thus be evident that the present invention has provided a greatly improved attachment for a bulldozer. By means of the present attachment, the necessity of requiring a separate piece of earth-moving equipment designed to mix soil and water is wholly avoided with consequent savings in labor, cost and time.

While only one preferred embodiment of the invention has been disclosed and described, it should be understood by those skilled in the art that various changes and modifications may be effected without departing from the scope and spirit of the invention. The bulldozer attachment is therefore not to be thought of as limited to the exact embodiment set forth merely for illustrative purposes.

What is claimed is:

1. An attachment for a bulldozer blade comprising, in combination: a flat plate having a top surface and an upwardly and rearwardly directed front flange defining a hook structure for attaching the front portion of said plate; rod means extending upwardly from said top surface intermediate the front and rear edges of said plate and terminating in hook structures for securing the rear portion of said plate so that said plate is adapted to be held in a position substantially parallel to the ground; first and second sets of teeth individually pivoted to the underside of said plate, each set including three teeth running generally parallel to each other in a fore and aft direction; first and second cross-bars respectively pivoted to the rear portions of the teeth in each set; and means carried by said plate and coupled to said cross-bars to move said bars in opposite lateral directions whereby said first and second sets of teeth are swung about their pivot points so that the first set of teeth diverges with respect to the second set of teeth.

2. An attachment according to claim 1, in which said plate includes a lip member hinged to its rear edge; and means carried by said plate and coupled to said lip member to raise and lower the rear edge of said lip member above and below the plane of said plate.

3. An attachment according to claim 2, in which each of said teeth is triangular in cross-section.

References Cited by the Examiner

UNITED STATES PATENTS

556,313	3/96	Heuermann	37—143
620,655	3/99	Hutchinson	172—197
886,802	5/08	Haynes	37—145 X
989,365	4/11	Kellogg	172—647
1,945,517	2/34	Carlson	37—143
1,986,327	1/35	De Wind	94—44
2,769,625	11/56	Wooldridge	172—657
2,840,936	7/58	Rand	37—145
2,885,802	5/59	Eskridge	37—145
2,992,499	7/61	McSpadden	37—145
3,034,238	5/62	McGee	37—145

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