May 12, 1964 H. BARRAS 3,132,430

QUARTER DRAIN DITCHERS

Filed April 11, 1963 5 Sheets-Sheet 1

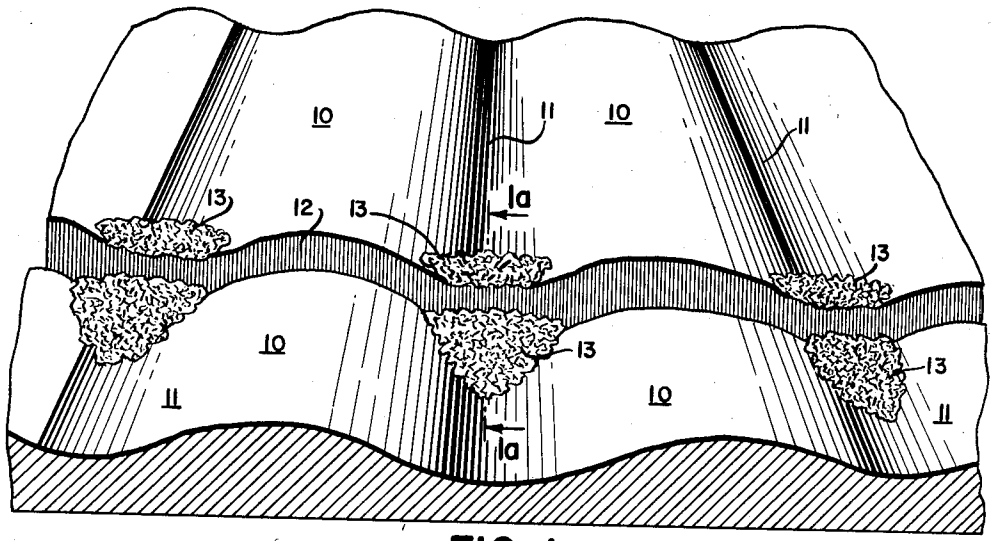


FIG. 1.

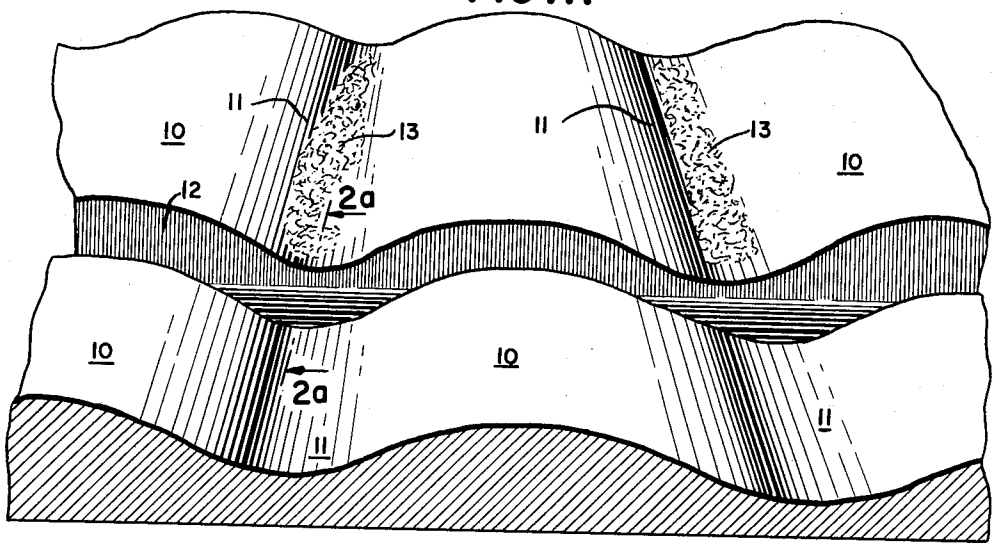


FIG 2.

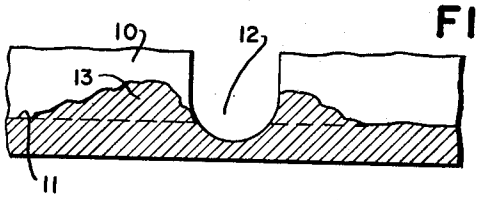


FIG. 1a.

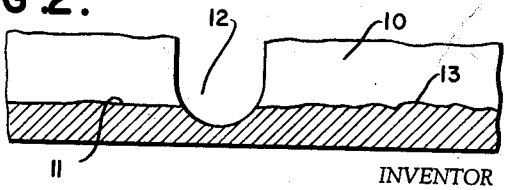


FIG. 2a.

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QUARTER DRAIN DITCHERS

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5 Sheets-Sheet 2

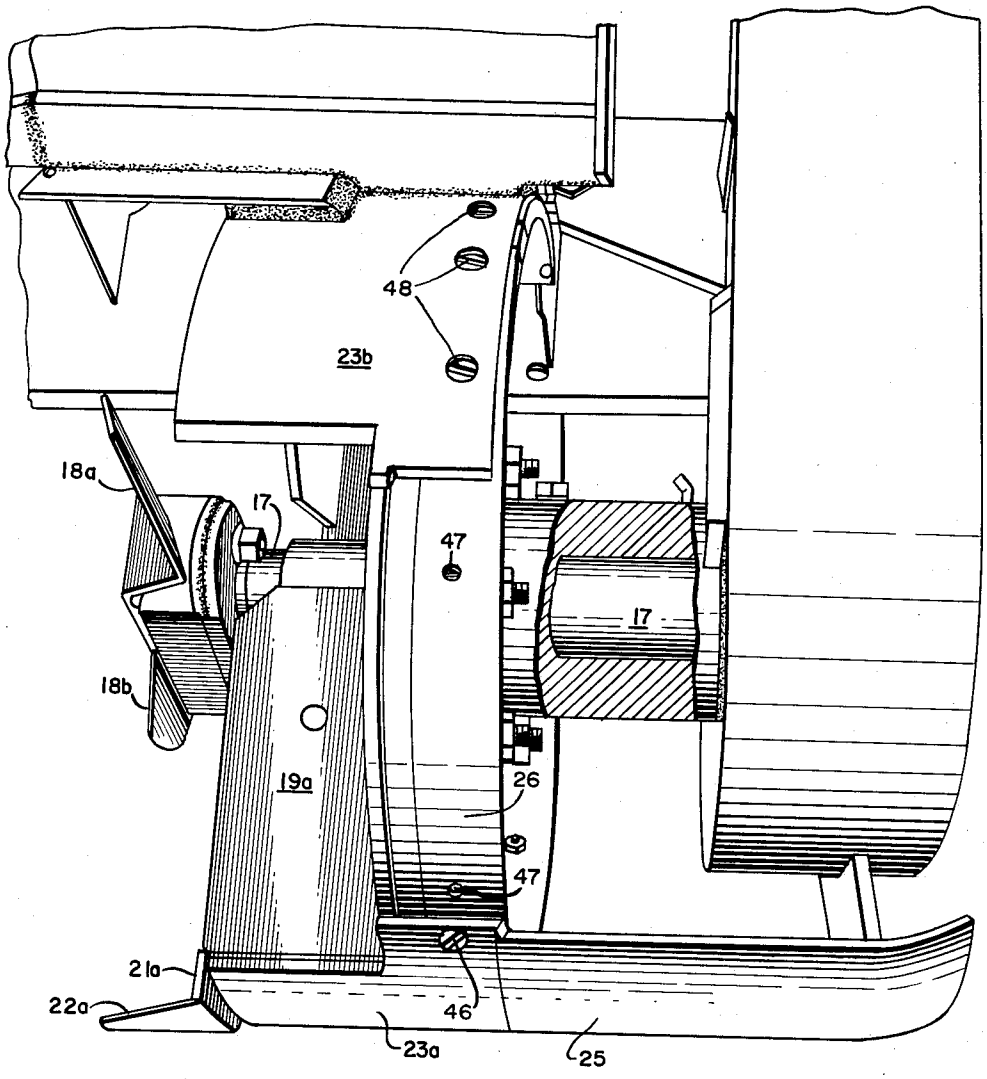


FIG. 3.

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QUARTER DRAIN DITCHERS

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5 Sheets-Sheet 3

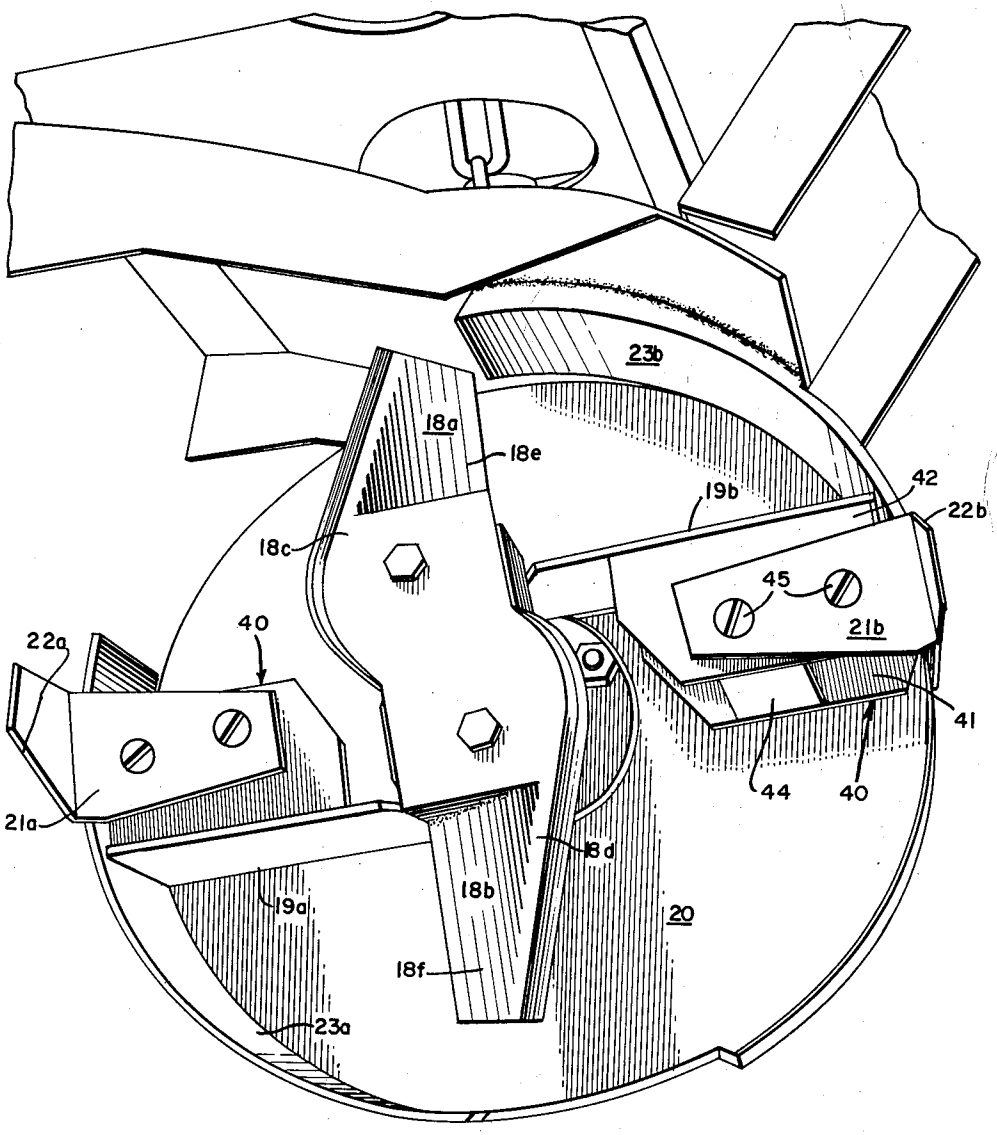


FIG. 4.

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May 12, 1964 H. BARRAS 3,132,430

QUARTER DRAIN DITCHERS

Filed April 11, 1963 5 Sheets-Sheet 4

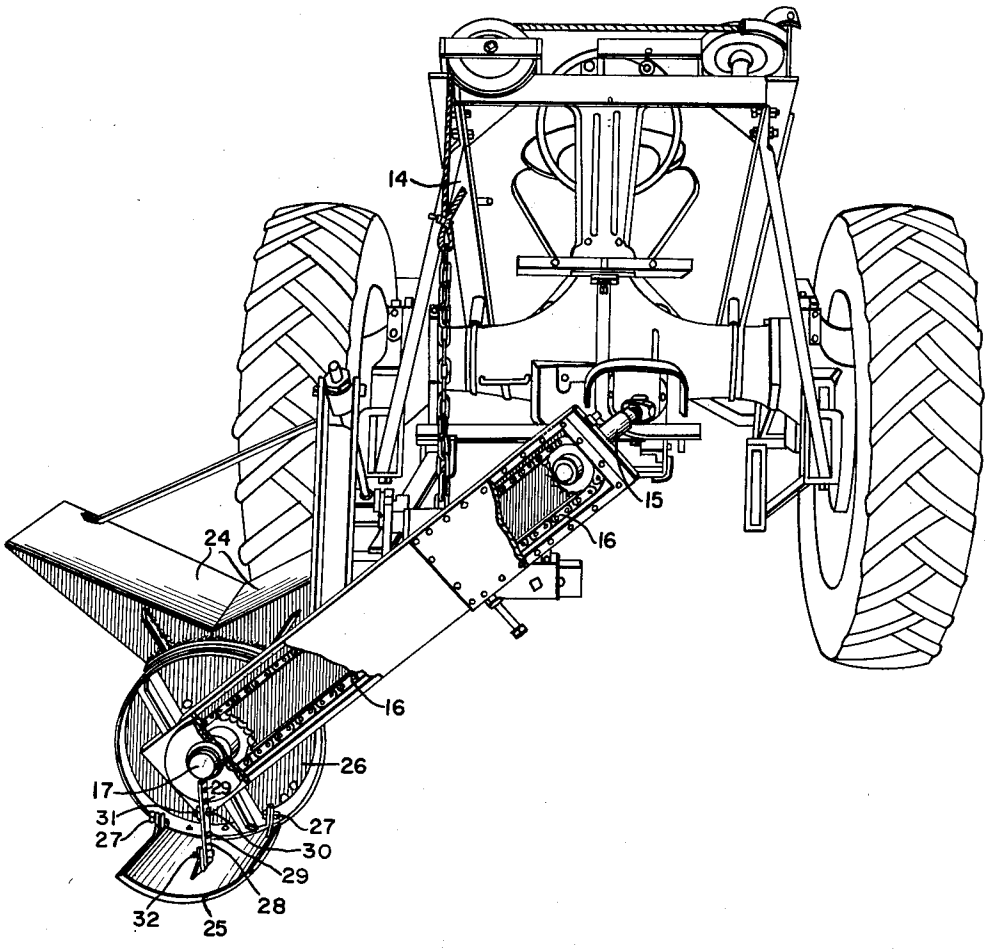


FIG. 5

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QUARTER DRAIN DITCHERS

Filed April 11, 1963 5 Sheets-Sheet 5

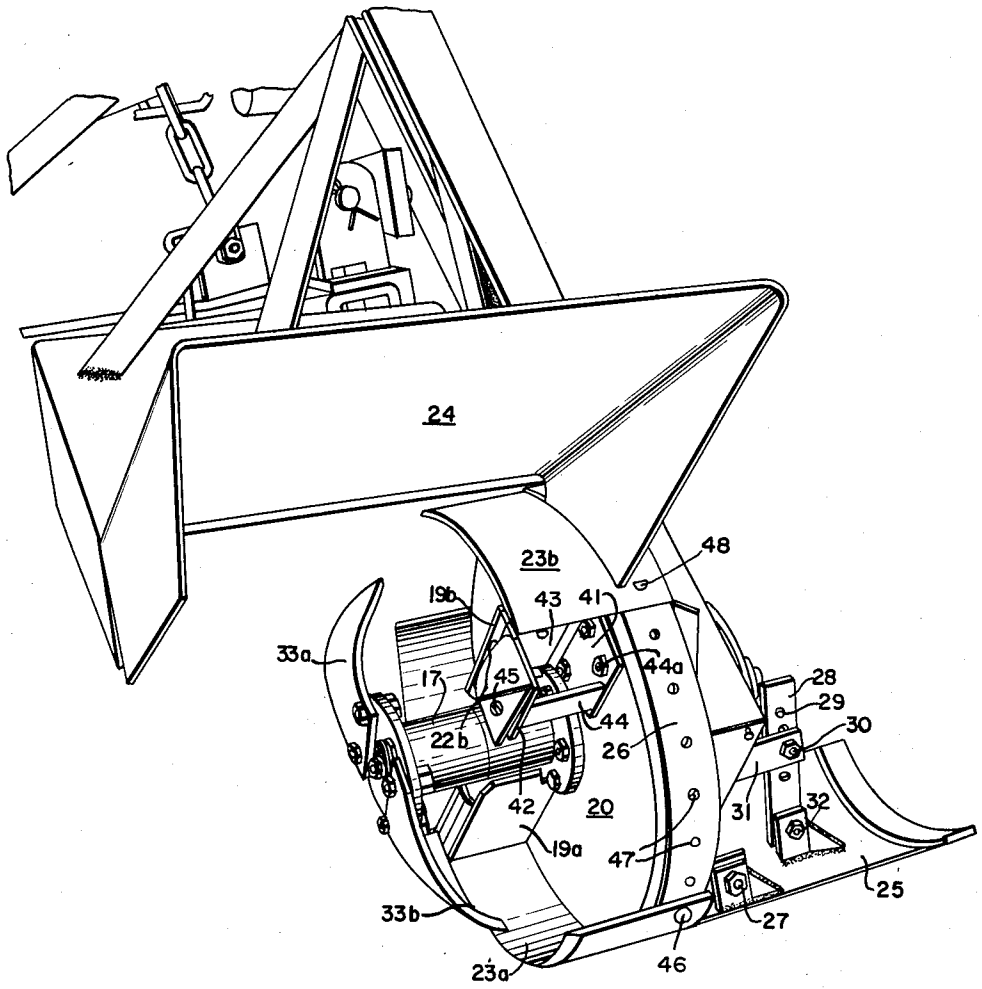


FIG. 6.

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United States Patent Office 3,132,430 Patented May 12, 1964

3,132,430

QUARTER DRAIN DITCHERS

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Filed Apr. 11, 1963, Ser. No. 272,284
4 Claims. (Cl. 37—92)

The present invention relates to quarter drain ditchers, and has for an object to provide an improved construction over my prior Patents No. 2,615,263, granted October 28, 1952, and No. 2,737,734, granted March 13, 1956.

Another object of the present invention is to provide a quarter drain cutter which will initially loosen the earth along the line of the ditch and permit the earth thus loosened to be dropped into a throwing pocket where a flat throwing blade will distribute the earth in a path normal to the ditch line and in a manner as to not clog or plug the eye of the troughs between adjacent sugar cane growing rows.

A further object of my present invention is to provide novel forms of cutting blades and to primarily provide two sets of blades in cooperative relationship with one another whereby the primary blades perform the function of loosening the earth and the secondary blades perform the scattering function and both are mounted on a common rotating member requiring a single power source.

A still further object of the present invention is to provide earth deflecting shields circumferentially about the path of rotation of the earth throwing blades in such a manner as to regulate the angle of loft and throwing of the dirt deposited from the primary blades into the path of the earth throwing secondary blades.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views:

FIGURE 1 shows a sugar cane field across which has been cut a drainage ditch in accordance with prior art apparatus.

FIGURE 1^a is a vertical section taken on the line 1^a—1^a in FIGURE 1.

FIGURE 2 is a view similar to FIGURE 1 of a drainage ditch cut across a sugar cane field with the apparatus and method of the present invention.

FIGURE 2^a is a view taken on the line 2^a—2^a in FIGURE 2.

FIGURE 3 is a side elevational view of the ditching mechanism of the present invention.

FIGURE 4 is a perspective view of the ditching mechanism of FIGURE 3.

FIGURE 5 is a rear elevational view of the ditch cutting device of the present invention shown applied to a tractor.

FIGURE 6 is a perspective view of a modified form of the present invention.

Referring for the moment to FIGURE 1, a sugar cane field is shown having hills **10** in which the cane is grown and lying therebetween are troughs **11**. In order to drain the troughs **11** a quarter drain ditch **12** is cut transversely across the sugar cane field between main drainage ditches or canals (not shown) and as has been customary with prior art apparatus, as best seen in FIGURE 1, when the drainage ditch is cut the eyes of the troughs **11** which connect with the drainage ditch **12** are plugged by deposits of earth **13** which have been thrown by the ditching machine and which deposits of earth **13** block the normal drainage of the troughs **11** to the drainage ditch **12**. This necessitates going out and manually opening these eyes with a shovel which of course increases the cost of the ditching operation since this hand labor must be paid and must be available.

Referring now to FIGURE 2, which is a view similar to FIGURE 1 in which the cane field is shown to comprise hills **10**, troughs **11** and a drainage ditch **12**. It will be noted that the eye area where the trough **11** meets the drainage ditch **12** is not plugged or clogged and will readily permit the water to leave the trough **11** and enter the drainage ditch **12**. The deposit of earth **13** rather than be built across the eye of the ditch and trough in a dam-like manner is distributed up the trough so as to afford minimum resistance to the drainage of water.

The ditch **12** shown in FIGURE 2 has been cut by first engaging the earth with earth loosening blades to reduce the compaction of the earth and to stir it up into a more granular-like mass and to drop it back to scattering blades which scattering blades hurl the dirt at right angles to the axis of the drainage ditch and which blades cooperate wtih earth deflecting shields about the blades which cause the earth to be lofted and thrown an appreciable distance up the trough so that the earth will not form a dam at the eye of the drainage ditch and trough.

Referring now to FIGURE 5, **14** denotes a tractor having a power take-off shaft **15** at the rear thereof, which power take-off shaft drives a sprocket and chain drive **16** for rotating a rotary driven power shaft **17**; and as best seen in FIGURE 3 the power shaft **17** has secured at the front thereof for rotation therewith a pair of primary earth engaging blades 18^a and 18^b. Positioned rearwardly of the primary earth engaging blades 18^a and 18^b are two secondary earth distributing blades 19^a and 19^b. These secondary earth distributing blades 19^a and 19^b have flat faces and are mounted on and upstand from a rotary disc **20**, which disc is secured to and rotates with the rotary shaft **17**. As best seen in FIGURES 3, 4 and 6 the primary earth engaging blades 18^a, 18^b and 33^a and 33^b are pitched to not only engage the earth to dislodge the dirt but to impart a positive high velocity of travel to the dirt rearwardly in an axial direction relative to the axis of rotation of the blades so that the earth strikes the disc **20** and is immediately scattered at right angle to the axis of rotation of the disc and primary blades by the secondary blades 19^a and 19^b to avoid the earth falling by gravity and slipping off the secondary blades to plug the eyes of the troughs in communication with the quarter drain being dug.

The primary blades 18^a, 18^b, 33^a and 33^b are angularly offset relative to the distributing blades 19^a, 19^b at substantially a right angle and the transverse width of the primary blades is substantially less than the arc between adjacent earth distributing blades carried by the disc whereby the primary blades engage the earth in advance of the secondary distributing blades.

The secondary earth throwing blades 19^a and 19^b carry their own tip blades 21^a, 21^b, which tip blades have leading edges 22^a and 22^b which are bent at right angles to the blade portion 21^a and are also at right angles to the rotary disc **20**.

Each of the tip blades 21^a and 21^b is secured to the disc **20** by means of a bracket generally indicated at **40** which comprises two substantially parallel side plates **41** and **42** secured at their inner ends to the trailing face **43** of each of the blades 19^a and 19^b as by welding or the like. A cross brace **44** is secured to the inner faces of the plates **41** and **42** adjacent the outer ends thereof as by welding or the like. The plate **41** is attached to the disc **20** by fastening elements 44^a which may be bolts passing through suitable openings in the plate **41** and the disc **20**. Each tip blade is secured to the plate **42** of its bracket **40** by screws **45** or the like which extend through appropriate aligned holes in the plate **42** and the tip blade.

The leading edges 22^a and 22^b of the tip blades 21^a and 21^b extend radially beyond the length of the earth

throwing blades 19a and 19b; and as best seen in FIGURE 3, extend beyond earth deflecting shields 23a and 23b, there being defined between 23a and 23b an opening through which earth being centrifugally hurled by blades 19a and 19b will exit. The regulation of this opening will determine the loft of the earth hurled by the blades 19a and 19b and the shields 24 will protect the tractor operator and tractor from any fortuitous flying of earth being hurled by the secondary earth throwing blades 19a and 19b.

The shield 23a is adjustably mounted on the disc housing 26 by fastening elements 46 which extend through suitable openings in the shield 23a and are selectively received by openings 47 formed in the housing 26.

The deflecting shield 23b is adjustably mounted on the housing 26 by fastening elements 48 which extend through openings in the shield 23b and are selectively received by the openings 47 in the housing 26. The shields 23a and 23b can therefore be circumferentially adjusted around the disc housing 26 so that the loft of the earth hurled by the blades 19a and 19b can be controlled and the location and size of the opening between the shields 23a and 23b can be varied.

The angle of attack of the primary and secondary blades may be regulated by a sled member 25 which is pivoted to the rotary disc housing 26 as by pivots 27 and the angle of which may be regulated by a lever 28 having varying openings 29 therethrough through which passes a bolt 30 secured to a fixed part of the ditching cutter power transmission housing 31. A similar pivotal bolt 32 joins the lever 28 to the sled member 25.

Referring now to FIGURE 4 the primary earth engaging blade 18a and 18b have two substantially flat portions 18e and 18f, the cutting beveled edges of which are upturned at 18c and 18d. The cutting beveled edges of the primary blades are also tapered toward their truncated ends to provide a slip off of any sugar cane or rooty matter which would tend to wrap itself about the blades.

The units shown in FIGURES 4 and 6 rotate counterclockwise so that the taper angle of the primary blades will tend to throw off material which would normally tend to wrap itself about the blades.

As shown in FIGURE 6 the primary earth engaging blades are modified from those shown in FIGURE 5 and are designated as 33a and 33b which are bent rearwardly toward the earth throwing blades. While the primary blades 33a and 33b of FIGURE 6 are operative, I have found that I get increased wear and longer life and a better loosening action from the form of blade 18a and 18b shown in FIGURE 4.

Although I have disclosed herein the best forms of the invention known to me at this time, I reserve the right to all such modifications and changes as may come within the scope of the following claims.

What is claimed is:

1. In combination, a tractor having at least one rear driving wheel, a quarter drain ditcher cooperating with such tractor for use in digging quarter drains in sugar cane fields having hills and troughs, the troughs of which define substantially parallel drainage ditches, the path of the quarter drain is at an angle to the paths of the drainage ditches with the eye openings of the drainage ditches at their juncture with the quarter drain ditch; means attaching said ditcher on said tractor at the rear of the tractor and rearwardly of and in substantially longitudinal alignment with said rear driving wheel of the tractor and including means for operating the ditcher from the power source of the tractor, said ditcher comprising a disc rotatable on an axis disposed longitudinally of the tractor and rotated by said operating means for the ditcher, said ditcher having an earth engaging position, earth distributing blades outstanding from said disc for distributing earth at right angles to the axis of rotation of said disc, said distributing blades having a major dimension which extends radially from about the center

of said disc and are spaced angularly apart on the disc, primary earth engaging blades mounted to rotate with said disc and positioned to engage the earth in advance of said distributing blades to loosen the earth and being pitched to induce high velocity flow of the loosened earth to travel into the earth distributing blades, said primary earth engaging blades being at substantially a right angle to said earth distributing blades and being of a transverse width substantially less than the arc between adjacent earth distributing blades carried by said disc, the diameter of the primary earth engaging blades being less than the diameter of said disc and the major dimension of the distributing blades being substantially equal to the radius of said disc so that the radially outer edges of the distributing blades extend approximately to the periphery of said disc so that the primary blades direct the loosened earth rearwardly into the path of rotation of the leading radial faces of the distributing blades, earth deflecting means comprising shield means positioned at least partially about the axis of rotation of said blades at the lower peripheral portion of said disc and cooperating with said distributing blades to project the loosened earth along the drainage ditch between adjacent cane rows in a thin scattered pattern beyond the eyes of the drainage ditch.

2. A quarter drain ditcher as claimed in claim 1 further comprising tip blades carried by each earth distributing blade and extending forwardly beyond said distributing blades.

3. In combination, a tractor having at least one rear driving wheel, a quarter drain ditcher cooperating with such tractor for use in digging quarter drains in sugar cane fields having hills and troughs, the troughs of which define substantially parallel drainage ditches, the path of the quarter drain is at an angle to the paths of the drainage ditches with the eye openings of the drainage ditches at their juncture with the quarter drain ditch; means attaching said ditcher on said tractor at the rear of the tractor and rearwardly of and in substantially longitudinal alignment with said rear driving wheel of the tractor and including means for operating the ditcher from the power source of the tractor, said ditcher comprising a disc rotatable on an axis disposed longitudinally of the tractor and rotated by said operating means for the ditcher, said ditcher having an earth engaging position, earth distributing blades outstanding from said disc for distributing earth at right angles to the axis of rotation of said disc, said distributing blades having a major dimension which extends radially from about the center of said disc and are spaced angularly apart on the disc, primary earth engaging blades mounted to rotate with said disc and positioned to engage the earth in advance of said distributing blades to loosen the earth and being pitched so that the loosened earth is induced to travel at a high velocity into the path of the earth distributing blades, said primary earth engaging blades being at substantially a right angle to said earth distributing blades and being of a transverse width substantially less than the arc between adjacent earth distributing blades carried by said disc, the diameter of the primary earth engaging blades being less than the diameter of said disc and the major dimension of the distributing blades being substantially equal to the radius of said disc so that the radially outer edges of the distributing blades extend approximately to the periphery of said disc so that the primary blades direct the loosened earth rearwardly into the path of rotation of the leading radial faces of the distributing blades, earth deflecting means comprising a shield positioned at least partially about the axis of rotation of said blades at the lower peripheral portion of said disc and shield means including a second shield positioned partially about the axis of rotation of the blades adjacent the upper peripheral portion of the disc, said shields cooperating with said distributing blades to project the loosened earth along the drainage ditch between adjacent cane rows in a thin scattered pattern beyond the eyes of the drainage ditch,

and a tip blade carried by each distributing blade and extending beyond the distributing blade.

4. In combination, a tractor having at least one rear driving wheel, a quarter drain ditcher cooperating with such tractor for use in digging quarter drains in sugar cane fields having hills and troughs, the troughs of which define substantially parallel drainage ditches, the path of the quarter drain is at an angle to the paths of the drainage ditches with the eye openings of the drainage ditches at their juncture with the quarter drain ditch; means attaching said ditcher on said tractor at the rear of the tractor and rearwardly of and in substantially longitudinal alignment with said rear driving wheel of the tractor and including means for operating the ditcher from the power source of the tractor, said ditcher comprising a disc rotatable on an axis disposed longitudinally of the tractor and rotated by said operating means for the ditcher, said ditcher having an earth engaging position, earth distributing blades outstanding from said disc for distributing earth at right angles to the axis of rotation of said disc, primary earth engaging blades secured to rotate with said disc and positioned to engage the earth in advance of said distributing blades to loosen the earth and being pitched so that the loosened earth is induced to travel at a high velocity into the path of the earth distributing blades, said primary earth engaging blades being at substantially a right angle to said earth distributing blades and being of a transverse width substantially less than the arc between adjacent earth distributing blades carried by said disc, the diameter of the primary earth engaging blades being less than the diameter of said disc and the major dimension of the distributing blades being substantially equal to the radius of said disc so that the radially outer edges of the distributing blades extend approximately to the periphery of said disc so that the primary blades direct the loosened earth rearwardly into the path of rotation of the leading radial faces of the distributing blades, earth deflecting means comprising a first shield positioned at least partially about the axis of rotation of said blades at the lower peripheral portion of said disc and shield means including a second shield positioned partially about the axis of rotation of the blades adjacent the upper peripheral portion of the disc, said shields cooperating with said distributing blades to project the loosened earth along the drainage ditch between adjacent cane rows in a thin scattered pattern beyond the eyes of the drainage ditch, means for adjusting said shields towards and away from one another around the periphery of said disc to regulate the location and the size of the spacing between the shields to control the loft of the loosened earth which is distributed by the earth distributing blades comprising a fixed housing about the disc provided with a series of spaced-apart openings and fastening elements carried by said shields for selective reception by the openings on said housing.

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