June 5, 1928. 1,672,557

R. C. CHATTIN

DITCHING MACHINE

Filed March 13, 1925 3 Sheets-Sheet 1

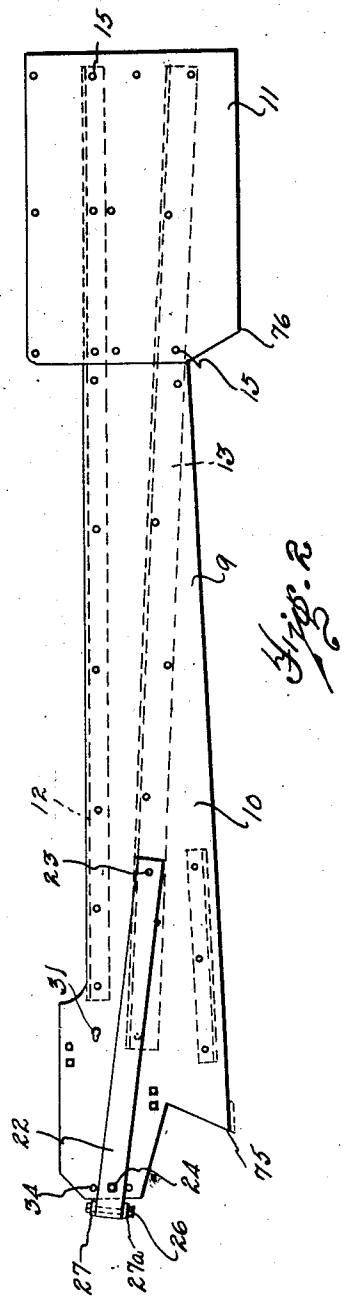



Fig. 2

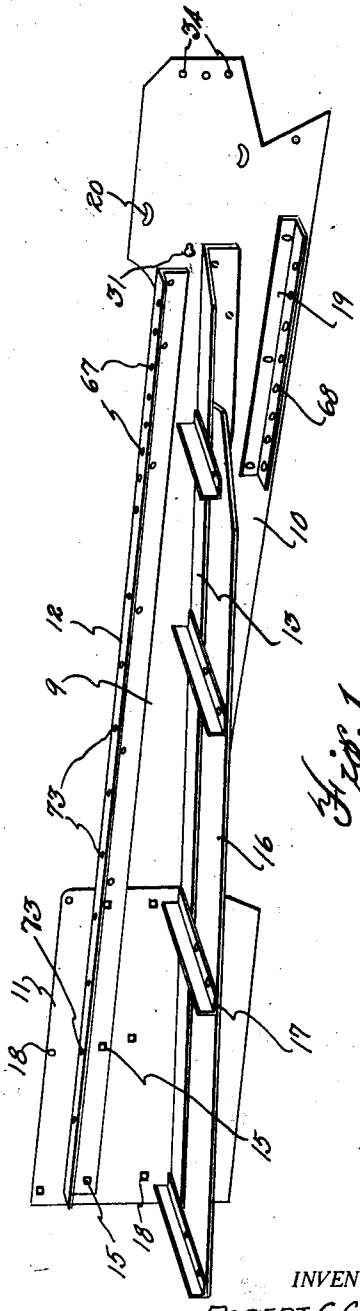



Fig. 1

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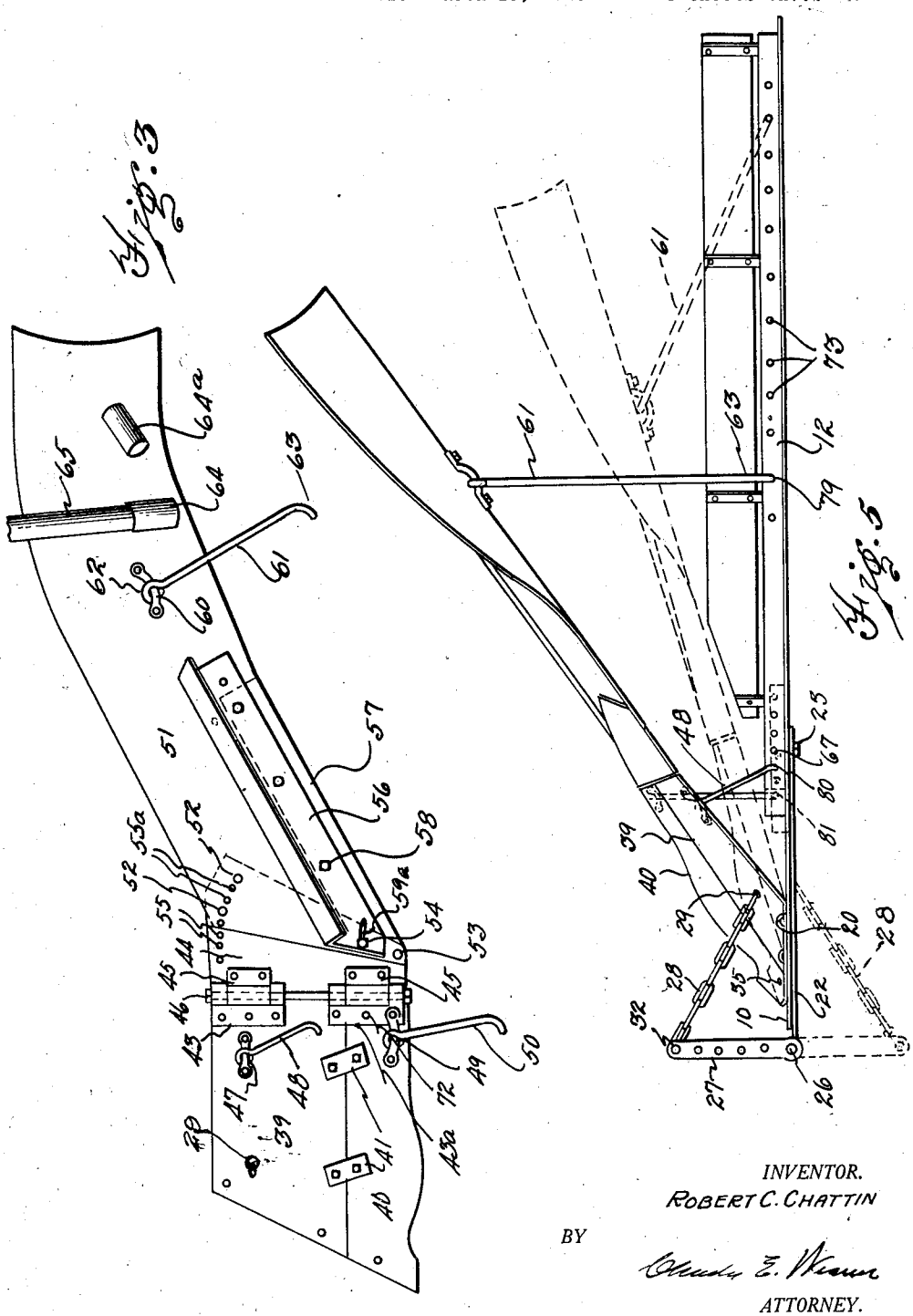


Fig. 3

Fig. 5

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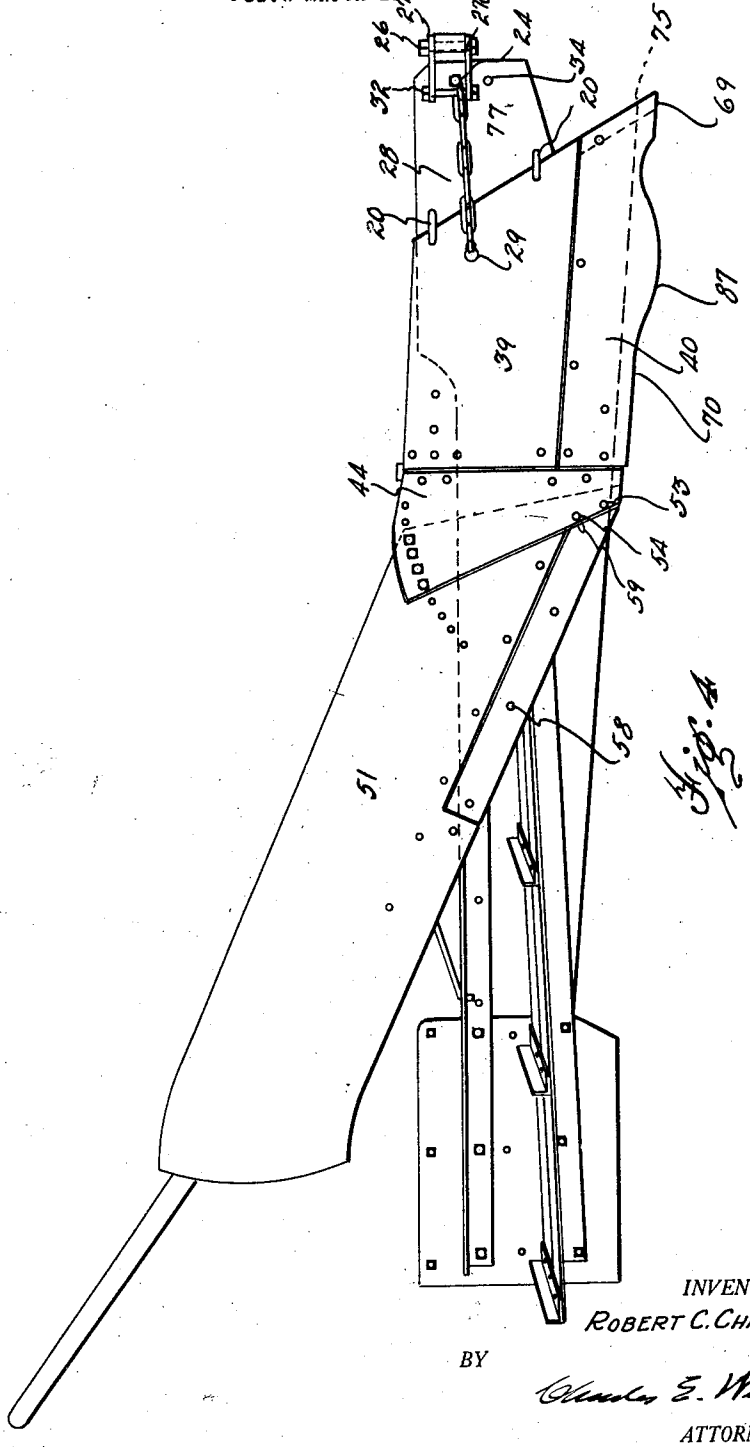



Fig. 4

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# UNITED STATES PATENT OFFICE.

ROBERT C. CHATTIN, OF MOUNTAIN HOME, IDAHO.

## DITCHING MACHINE.

Application filed March 13, 1925. Serial No. 15,272.

This invention relates to ditching machines, more particularly to a device adapted for use in the making of irrigation ditches.

The object of the invention is to provide a comparatively inexpensive apparatus that may be either drawn by use of horses or by the use of mechanical power apparatus and so constructed and arranged as to produce a flat bottomed ditch which allows a large volume of water to flow without necessity of making the top of so great a width as the usual V type of ditch and thus saves a great amount of labor in the fact that a minimum amount of dirt need be removed. This object is secured principally through the arrangement permitting an adjustent of the angle of the share and mold board relative to the land side and maintaining the cutting edge of the share at about a level with the bottom of the land side thereby securing the flat bottomed ditch and utilizing in conjunction therewith a wing member adjustable in both a horizontal and a vertical plane to form the bank of the ditch and dispose of the removed earth.

A further feature is involved in the construction of the wind member which is transversely curved at the rear enabling it to carry the dirt received up and out of the ditch and at the same time turning it over, the purpose being to place the dirt higher on the bank and at a further distance from the bottom of the ditch than has heretofore been the practice or is possible with the usual straight wing heretofore used in many cases. In my improved construction the wing has the earth engaging edge curved toward the rear end in a vertical plane.

A further object of the invention is involved in the means providing for adjustment of the wing member relative to the share permitting the rear portion of the wing to be swung in a horizontal plane relative to the share portion and to also be varied in angle relative to the horizontal to an angle of about forty to forty-five degrees with respect to the shore, the arrangement also providing that the whole wing member may be varied in angle to the land side in a horizontal plane, and also provides that the rear portion of the wing member may also be moved to a greater or less degree relative to the forward portion in a horizontal plane and varied in vertical position to enable the material to be thrown outwardly and upwardly to a greater or less extent depending upon the depth of the ditch and under all of the various adjustments producing a ditch having a flat bottom.

A further feature of the invention is involved in the means provided for adjusting the various parts for the construction of ditchers of various widths, depths and cross section.

Another feature of the invention is involved in the provision of a movable wing, the lateral angle of adjustment of which may be changed without altering the adjustment of the cutting share and the mold board. These and other objects of the invention are hereinafter more fully described and claimed, and the preferred form of construction of a ditching machine involving my invention is shown in the drawings in which—

Fig. 1 is an elevation of the inner face of the land side of the machine.

Fig. 2 is an elevation of the outer face thereof.

Fig. 3 is an inside elevation of the wing.

Fig. 4 is a side elevation of the complete machine taken from the wing side.

Fig. 5 is a plan view of the machine.

The land side of my improved ditching machine as shown in Figs. 1 and 2 is designated by the numeral 9 and consists of the forward steel plate 10 and the rear plate 11 which are arranged in the same vertical plane and secured to the angle irons 12 and 13 on the inside face thereof as shown in Fig. 1. The plate 10 being preferably riveted to the angle bars and the rear plate 11 preferably bolted thereto as indicated by the bolts 15 and both the bolts and rivets are preferably countersunk to come flush with the outer face of the land side of the machine. The angle iron 13 has a three-fold purpose—namely, to take the bending stresses of the plates 10 and 11 and secondly to support a platform 16 which is secured to the angle iron 13 by the transverse bars or angle irons 17 riveted or otherwise secured to the angle iron 13. Thirdly—these angle irons 12 and 13 provide a common means of connecting and maintaining the two plates 10 and 11 in vertical position. To the forward end of the land side plate 10 is secured an additional angle iron 19 preferably riveted to the inside face of the said plate. This angle iron 19 is provided with a series of apertures 68 in the horizontal flange and

these are utilized as a means of adjustment between the share and the land side 9 as hereinafter described. The plate 11 is adjustably connected to the angle irons 12 and 13 by means of the bolts 15 heretofore mentioned, there being a series of apertures 18 provided for this purpose. The bolts 15 may be readily removed and the rear land side plate 11 raised or lowered relative thereto as will be readily understood. This enables compensation to be made for wear and also is serviceable where it is difficult to hold the ditcher in a straight line as it allows the bottom cutting edge to enter the earth to a greater extent than the adjacent edge of the plate 10. It is to be noted in Fig. 2 that the plate 10 is wider at the forward end than at the point of junction with the plate 11, the forward point 75 being substantially in the same horizontal line as the point 76 of the plate 11.

A draw bar 22 is also provided on this forward end of the plate 10 being connected therewith by the bolt 23 which extends through the plate 10 as shown in Fig. 2. The forward end of the bar 22 is secured to the plate 10 by the bolt 24 which extends through the holes 34 in the forward edge of the plate 10. This bar is a heavy piece of iron and serves a two-fold purpose, first that of providing an adjustable draft bar, second, to take the bending stresses of plate 10 ahead of the angle iron 13. There is a series of holes 34 which allows a vertical movement of the bar which is provided in the forward extreme end with a hole through which passes the bolt 26. As will be seen in Fig. 5 this bolt 26 secures the hitching bars 27 and 27ª at one end of each to the bar 22 and the other end of each is fastened to the chain 28 by the bolt 32. The other end of the chain 28 has an eye bolt on which a head is formed which head is passed through the pear shaped hole 29 in the moldboard thereby making a rigid fastening for the hitch on the wing side. By removing the eye bolt from the hole 29 and turning the adjustable bars 27 and 27ª to the opposite side of the land side, as indicated in dotted lines in Fig. 5, and again inserting the head of the eye bolt in the pear shaped aperture 31 on the land side, the hitching device is thus secured in its new position. This construction allows the lateral adjustments of the hitch to be made easily and quickly. With the hitching device secured in this last named position (shown by dotted lines in Fig. 5) the draft power is applied in a line parallel with the land side at a point to the left thereof considering the direction of movement of the device. This makes it possible for a team of horses or other power means to maintain a greater distance from a fence, wall or other device adjacent which the ditcher is to be operated and toward which the earth to be removed from the ditch is to be turned by the wing shown in Fig. 5 extending at an angle to this land side.

The wing is composed of the wing plate 51, mold board 39 and share 40. The steel share 40 is positioned below the mold board 39 and is detachably secured at the forward end to the plate 10 by the bolt 35. The mold board is secured at its forward edge to this plate 10 by U bolts 20 as shown in Fig. 5 as well as in Fig. 1. This steel share 40 and the mold board 39, as will be observed more particularly in Fig. 4 have their forward edges lying in the same straight line and the holes for the U bolts 20 and bolt 35 are sufficiently large to allow some freedom of movement of the mold board and share thereon. The front end of the steel share 40 and of that portion of the mold board 39 which lies below the forward extension 77 of the plate 10 and the portion of the plate 10 which is contiguous to these parts of the mold board and steel share, are sharpened or beveled to present a sharp cutting edge. It will be noted in Fig. 3 that the mold board 39 and the share 40 are connected by means of strips 41 bolted thereto on the inner side of the said members. These strips tend to hold the mold board and share in a fixed relative position.

I also have provided a triangular shaped swinging wing adjustment plate 44. This plate is hingedly attached to the rear ends of both the mold board 39 and share 40, there being hinge plates 43 and 43ª secured to the mold board and share and companion plates 45 secured to the swinging wing plate. The two parts 43 and 43ª and companion plates 45 receive the bolt 46 which secures the parts in the hinged relation. Preferably the lower hinge plate 43ª is secured to the share 40 by bolts 72 allowing the share to be detached by simple removal of the bolts. To the swinging adjusting plate 44 is secured the main wing 51 which is hereinafter more fully described.

As will be seen more clearly from Figs. 3 and 5, there is provided an adjusting rod 48, secured at one end to the inside of the mold board 39 by a yoke 47, the bar 48 being provided with an eye for the yoke at that end whose axis is in a horizontal plane and with a hook at the opposite end formed at a right angle to the axis of the eye which may engage in any hole 67 provided in the forward end of the horizontal flange of the angle iron 12. There are several holes 67 provided for this purpose which permits adjustment of the angle of the entire wing member consisting of the parts 39, 40, 44 and 51 relative to the land side. There is also provided a link 50 of the same general character as the bar or link 48 which is secured at one end to the rear end of the share

40 by means of the yoke 49. At the opposite end the bar 50 is connected by means of a yoke end with the holes 68 in the bar 19 at the forward end of the land side. These two bars 48 and 50 are thus utilized in the adjustment of the angularity of the wing member with the land side. It is to be noted that, by use of the eye of the bars 48 and 50 to connect with the yoke members 47 and 49, the wing may be adjusted at various angles relative to the land side without binding the eye portions in the yokes and by these adjusting members ditches of various widths of the bottom may be formed. The wing 51 is curved in form after the general form of a mold board of a plow but of considerably greater length as will be seen from the drawings. The wing at its forward lower point is pivotally connected to the wing adjusting plate 44 by the pivot bolt 53. This curvature of the wing enables it to carry the earth or other material removed by the share up and out of the ditch and turning the same over and covering all vegetable matter that is on the surface of the displaced earth. There is also provided a bolt 54 in the plate 44 which extends through an arcuate slot 59 in the wing share and similar slot 59[a] in the angle iron supporting plate 56 secured to the wing member. This slot and bolt permit pivotal adjustment of the wing member 51. There is a series of bolts 58 passing through the angle iron 56 supporting the wing share 57. This enables the wing share to be removed for sharpening and part of the function of this wing share is to cut into the bank of the ditch above the flat bottom thereof. This wing share 56 therefore cuts into the bank of the ditch being formed and the wing and share together take the dirt displaced by the share 40 in the bottom of the ditch and also that removed from the side bank of the ditch and discharges it up and out of the ditch. Inasmuch as there are various heights of banks, particularly where an old ditch is being cleared, the wing is made adjustable about the pivot point or bolt 53. This adjustment is secured by forming a series of apertures 55 in the upper end of the plate 44 which may be aligned respectively with a similar series of bolt apertures 55[a] in the upper forward edge of the wing plate 51. These series of apertures are formed on a radius from the pivot bolt 53. There is a number of bolts 52 provided to engage in these apertures to maintain the wing plate at the desired angle. It will be noted that, by removing the bolts 52 and loosening the bolt 54, a vertical adjustment of the wing 51 may be secured and preferably the adjustment has such a range that the lower edge of the wing may occupy various positions from below a horizontal line with the share 40 to an angle of approximately forty or forty-five degrees above the horizontal. This angle of adjustment of the wing 51 as the lateral adjustment thereof previously described, in combination with the various adjustments of the mold board 39 and share 40 through the adjustment of the links 48 and 50, provides a means by which ditches of various widths and of varying heights of bank or distances to the side of the ditch to which the earth is deposited can be secured. By this arrangement of parts, ditches either wide or narrow and deep or shallow are readily formed. This is an important feature of my improved ditching machine inasmuch as any possible combination of adjustments can be secured in the device of widths and depths of the ditch and the wing adjusted to elevate the removed earth to the sides of the ditch depositing it on the top or over the bank of the ditch.

The angle iron 56 provides a strengthening member for the wing plate 51 and a means for detachably securing the wing share 57 within the recessed portion provided therefor in the wing member 51 as will be understood from the drawing.

There is also provided a wing adjusting rod 61. This is secured to the wing 51 by a yoke 60 which passes through the eye 62 in the end of the rod. The bent end 63 of the rod 61 engages the horizontal flange of the angle iron 12 which is provided with a series of apertures 73 to receive said bent end. As there is a series of apertures extending longitudinally of the angle iron 12, various adjustments may be made of the wing member 51 as is indicated in dotted lines in Fig. 5. The eye 62 of the rod 61 provides a pivotal connection between the rod and wing 51 permitting both horizontal and vertical adjustments in any direction. The rear end of the wing 51 is provided with two socket members 64 and 64[a] which are of hollow cylindrical form to receive the end of a handle 65. This handle is to be used by the operator in the adjustment of the wing member and to hold it at any desired point.

It is also to be noted that the bottom edge of the wing is not formed on a single straight line but that the share 57 is at a certain angle to the horizontal, and that the lower edge of the wing from the end of the wing share 57 to the rear of the wing member 51 the angle to the horizontal is less. This drop in the angle of the lower edge of the wing member produces the rounding shape which it is desired to give the ditch bank, the lower wing edge not being in exactly a straight line but increasing in degree of curvature toward the end as shown in Figs. 3 and 4. It will also be noted from Fig. 5 that the mold board 39 and share 40 are adjustable in angularity relative to the land side by the adjusting rod 50 which is secured

to the angle iron 19 by the bent end 81 and also by the curved rod 48 as heretofore described which is secured to the angle iron 12 by the bent end 80. These bars hold the share and mold board in the adjusted relation with the land side 10. The wing 51 is not adjustable with the mold board 39 and share 40 but is independently adjustable laterally by the rod 61, the wing 51 and plate 44 being pivoted to swing on a vertical axis relative to the mold board 39 and share 40.

The variation of the angle of the wing 51 relative to the horizontal may be made irrespective of the angle assumed by the mold board and share. Thus these adjustments may be made independently one of the other.

Preferably, the share 40 is made from a high carbon steel. The point 69 is drawn to a sharp bevel edge and turned slightly outward to present a plow like point to better engage the ground. This turned edge is indicated by shade lines in the drawing. The edge 87 to about the point 70 is sharpened and is also curved slightly outwardly as indicated by shade lines. This gives a good cutting edge for the share and removes all growing vegetable matter in the bottom of the ditch. It is further to be noted that this edge of the plow share extends below the lower edge of the land side 10 as is indicated by dotted lines in Fig. 4 starting from the point 75. The wing share 57 is also preferably made of a high carbon steel sharpened at the lower edge and turned slightly forward to present a sharp cutting edge as is indicated by shade lines in Fig. 4. It is also to be noted that the forward entering edge of plow share and mold board extend practically at the same angle to the vertical. This angle is of considerable importance in that at all times in the various adjustments of the parts this edge is in cutting position with regard to the ground or bottom of the ditch being formed.

From the above description it will be readily understood that the device is designed to secure a flat bottomed ditch rather than the V type which many previous ditching devices have been designed to make, and that I am able to secure this flat bottom of the ditch and still readily remove the earth displaced by the share 40 by means of the pivoted wing adjustable both laterally and vertically producing a curved bank free from vegetation due to the sharp edge of the wing share 57 and further that the device is of comparatively simple and inexpensive form and readily adjustable to provide ditches of various widths, depths and height of bank.

Having thus fully described my invention, what I claim and desire to secure by Letters Patent of the United States is—

1. In a ditching machine, a land side having a rearwardly sloping forward edge, a wing member having a forward and a rear part, means for adjusting the rear part relative to the forward part on a vertical axis and means for adjusting the said rear part relative to the forward part on a horizontal axis, the said forward part having a rearwardly sloping edge pivotally connected with the forward edge of the land side and adjustable in a horizontal plane only relative to the land side, the said pivotal connection of the forward part of the wing member to the land side restricting the adjustment of the parts to variation in angle in a horizontal plane to vary the width of the ditch and preserve a flat bottom.

2. In a ditching machine, a land side, a wing member of two parts, the forward part being pivotally connected with the forward edge of the land side and relatively adjustable in a horizontal plane only, the said rear wing part being curved transversely, and a hinge member connecting the rear part with the said forward part, said hinge member being connected with the forward part to swing on a vertical axis only and the connection with the rear part therewith permitting an adjustment of said rear part on a horizontal axis only, the forward edge of the wing member and land side together providing an earth entering edge and the forward portion of the wing member consisting of a rigidly connected share and mold board.

3. In a ditching machine, a land side consisting of a metal plate positioned in a vertical plane and having at the lower side of its forward end a rearwardly sloping edge, a wing member having a forward part provided with a similarly sloping edge pivotally secured to the land side to turn in a horizontal plane only, means for adjusting the angular position of the wing member in said horizontal plane, the said wing member comprising the said forward part, a rear part and a plate interposed between the said parts, said plate being pivoted to the rear edge of the forward part to swing on a vertical axis and the said rear part being pivotally connected to the said plate adjacent its bottom end to swing on a horizontal axis, and means for adjusting the said rear part on the vertical axis relative to the forward part.

In testimony I sign this specification.

ROBERT C. CHATTIN.