F. B. WINKELMAN.

DITCHING MACHINE.

APPLICATION FILED APR. 5, 1910.

975,593.

Patented Nov. 15, 1910.

2 SHEETS—SHEET 1.

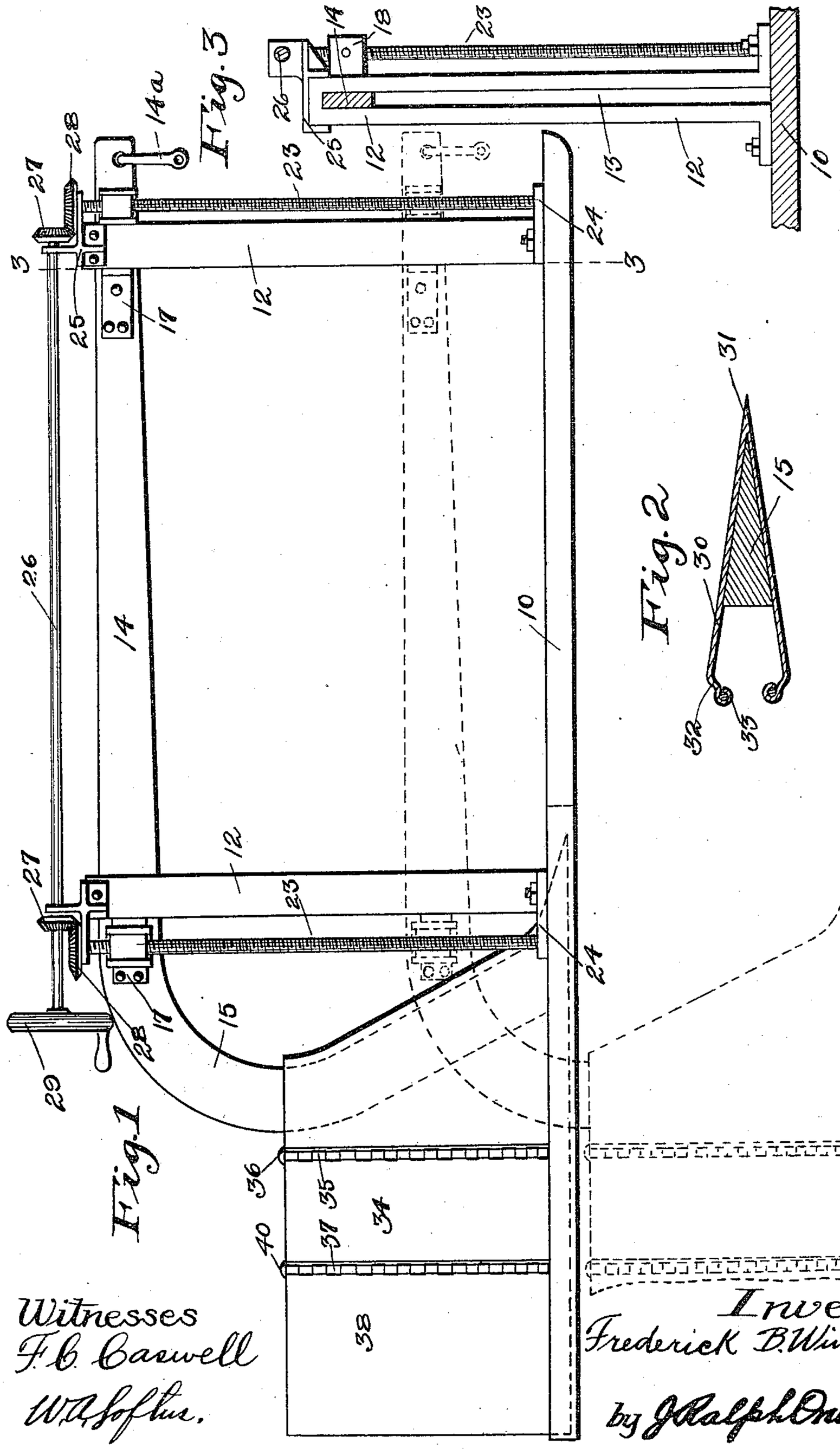

Fig. 1.

Fig. 2.

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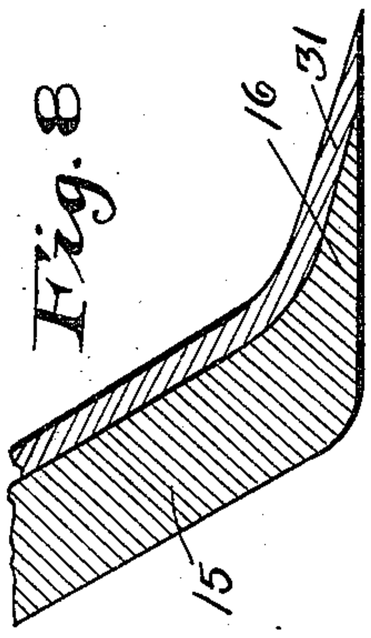

Fig. 8

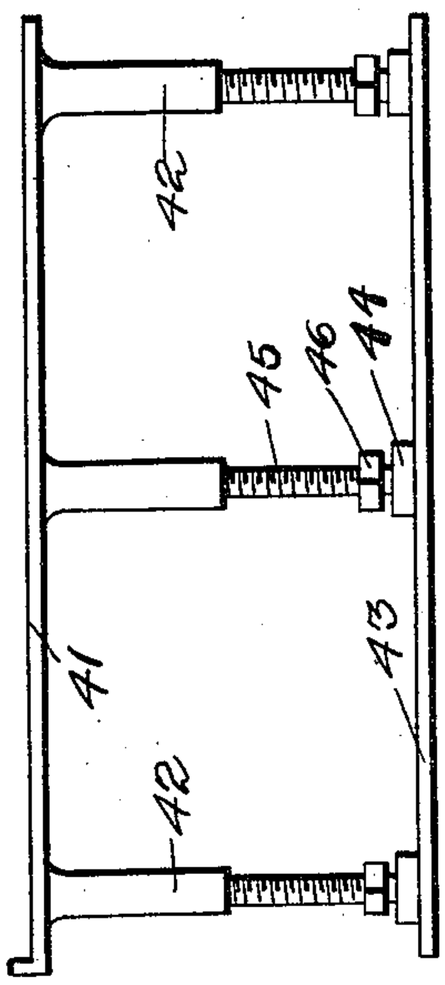

Fig. 5

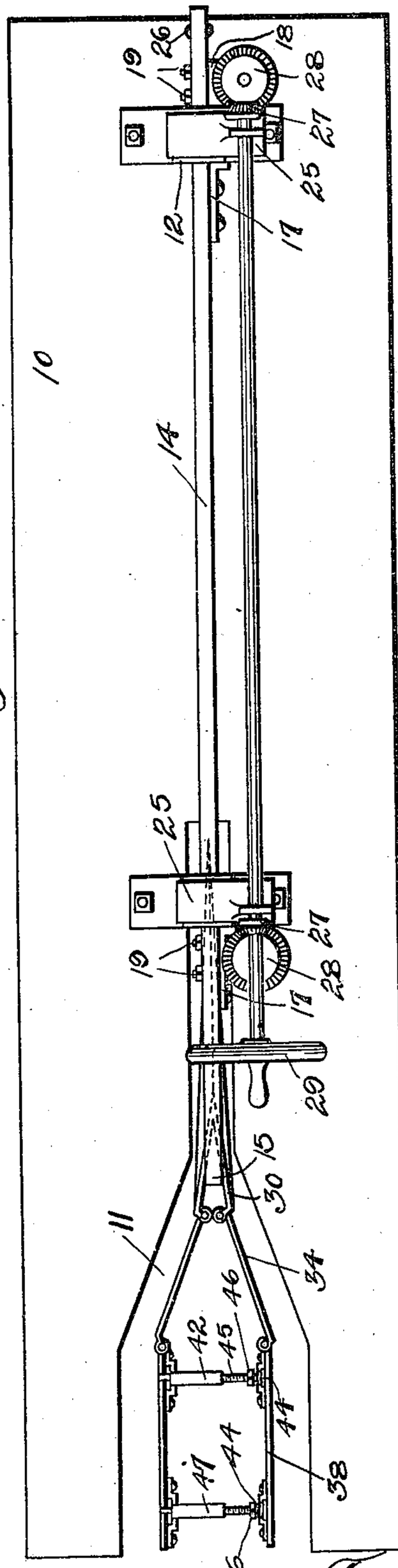

Fig. 4

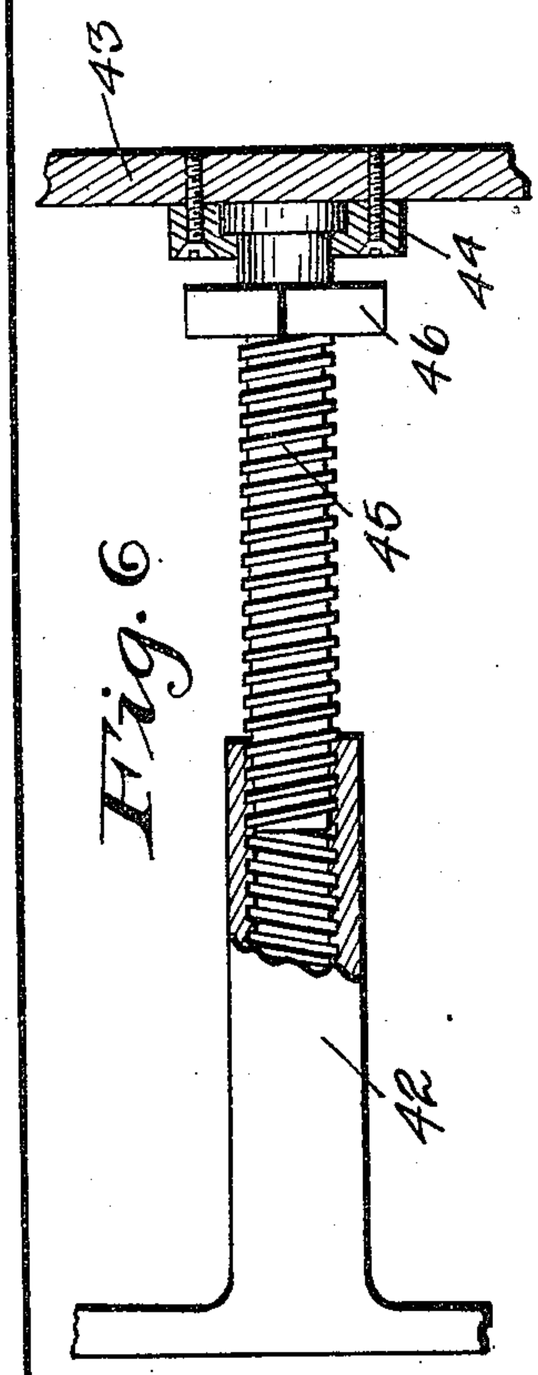

Fig. 6

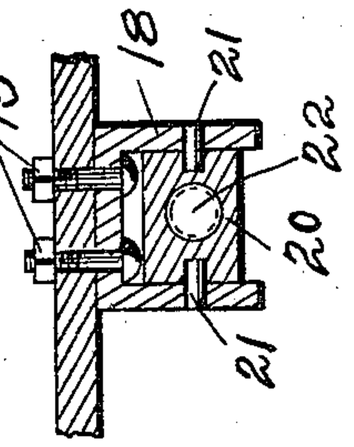

Fig. 7

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UNITED STATES PATENT OFFICE.

FREDERICK B. WINKELMAN, OF CHURDAN, IOWA.

DITCHING-MACHINE.

975,593. Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed April 5, 1910. Serial No. 553,666.

To all whom it may concern:

Be it known that I, FREDERICK B. WINKELMAN, a citizen of the United States, residing at Churdan, in the county of Greene and State of Iowa, have invented a certain new and useful Ditching-Machine, of which the following is a specification.

The object of my invention is to provide a tile ditching machine of simple, durable and inexpensive construction especially designed for use in wet or swampy land where it is impracticable to run an ordinary tile ditching machine provided with means for removing earth from the ditch.

More specifically it is my object to provide a device of this kind in which the earth may be cut to the full depth of the ditch at one operation and the sides of the ditch thus made may be gradually spread apart so as to offer a minimum of resistance to the cutting plates and also to provide means whereby the pressure of the earth upon the plates may be reduced to a minimum whereby the rear ends of the plates may be supported in positions closer to each other than the front ends to thereby hold the sides of the ditch open until drain tiles can be placed therein and to permit the earth to close again over the tile.

A further object is to provide improved and simplified means for vertically adjusting the beam that supports the cutter plates to thereby maintain a uniform grade at the bottom of the ditch even if the surface of the ground is uneven.

My invention consists, in certain details, in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, in which:

Figure 1 shows a side elevation of a ditching machine embodying my invention. The dotted lines show the supporting beam and cutter plates in their lowered positions. Fig. 2 shows a detail, sectional view through the beam and the forward portions of the cutting plates. Fig. 3 shows a sectional view on the line 3—3 of Fig. 1. Fig. 4 shows a top or plan view of a machine embodying my invention. Fig. 5 shows an enlarged, detail view illustrating one of the devices for adjustably holding the rear members of the cutting plates away from each other. Fig. 6 shows an enlarged, detail, sectional view of one of the adjusting screws of said device. Fig. 7 shows an enlarged, detail, sectional view illustrating the screw threaded bearing for the screw threaded rods that serve to vertically adjust the beam, and Fig. 8 shows a detail, side view of the lower end of the main beam.

Referring to the accompanying drawings, I have used the reference numeral 10 to indicate the base or platform of the machine. This is preferably made of wood and is designed to rest on top of the ground surface and to be moved over it as the ditch is being dug. At its rear is an opening 11 through which the ditch cutting device is projected. Mounted upon the base 10 are two uprights 12, one at the front and one near the rear end thereof and both in its longitudinal center. Each of these uprights is formed with a vertical slot 13 and said slots are designed to receive and slidingly support the main beam 14 that supports the cutter plates. This beam has its forward end provided at its front end with a clevis 14^a to which a rod or chain may be attached for advancing the machine. The said beam also extends in the rear of the rear upright 12 and it then is curved downwardly at 15 and its lower end has a forwardly extended pointed projection at 16. Fixed to the said beam 14 are brackets 17 designed to engage the rear face of the uprights 12 to prevent forward movements of the beam relative to the frame, and fixed to said beam are two brackets 18, each firmly connected with the beam by means of bolts 19 and each of said brackets is provided with a bearing block 20 pivoted therein by the pivot pins 21 as shown in Fig. 7. Each bearing block is provided with a screw threaded opening 22. Extended through each of said screw threaded openings is an upright screw threaded shaft 23, the lower end of which is rotatably mounted in a base plate 24 on the base 10. It is obvious that when said screw threaded shafts are turning the beam will be moved either up or down relative to the base 10. I have provided for jointly rotating said shafts as follows: On the upper end of each of the uprights 12 is a bracket 25 in which a rotatable shaft 26 is mounted and which extends longitudinally of the machine in a horizontal plane. The upper ends of the shafts 23 are also rotatably mounted in said brackets. The said shaft 26 is provided with two beveled pinions 27 in mesh with the beveled pinions 28 on the

shafts 23 and a handwheel 29 is mounted on the rear end of the shaft 26 so that it may be manually rotated and so that in turning will jointly rotate the shafts 23 and by having the bearing blocks 20 pivotally supported in their brackets I prevent binding movements of the bearing blocks relative to the shafts 23. It is obvious by this arrangement of parts than an operator standing upon the base 10 may readily, quickly and easily raise or lower the beam 14 and that said beam will be maintained in this same horizontal position throughout its entire movement.

The means for spreading the earth apart to form a ditch and for holding it until an operator can place a tile in the ditch thus formed, comprises a number of plate members. The first plate member is indicated by the numeral 30 and is shaped to fit the front and sides of the downwardly extended portion of the beam 15. Its forward edge is preferably pointed at 31 and its sides extend outwardly and rearwardly away from each other and at their rear ends they are extended inwardly toward each other at 32 and are provided with hinge members 33. By having the lower portion of the plate 30 extended forwardly over the beam point 16, I have provided means for holding the plate to the beam and for preventing downward movement of the plate relative to the beam. At the rear of the plate 30 are two side plate members 34. These are each straight flat plates having at their forward ends hinge members 35 on their inner faces to coact with the hinge members 33 and the hinge members 35 are connected with the hinge members 33 by means of the pintles 36. The maximum width of the plate 30 is much less than the maximum width of the ordinary tile ditch and the plates 34 are therefore usually extended outwardly and rearwardly and are for the purpose of pressing the earth at the sides of the ditch outwardly. At the rear of each of the plates 34, I have formed hinge members 37 on the inner face of the plate. At the rear of the plate members 34 are two additional plate members 38. Each of these consists of a straight flat piece of metal having at its forward edge the hinge members 39 connected by a pintle 40 with the hinge members 37.

In order to hold the plate members 38 accurately spaced apart from each other, I have provided the following devices: Referring to Fig. 5 of the drawings, I have used the reference numeral 41 to indicate a metal bar fixed in an upright position to one of the plates 34 near its forward edge. On this metal bar is a series of screw threaded tubular extensions 42. On the opposite plate 34 is a second bar 43 arranged in an upright position and having a series of bearings 44 thereon. Mounted in the bearings 44 and extended into the parts 42 is a series of screw threaded rods 45, each having an integral nut 46 thereon. By this arrangement it is obvious that by turning the nuts 46 in one direction the forward edges of the plates 38 may be moved away from each other and by turning said nuts in the opposite direction said plates may be moved toward each other. Near the rear ends of the plates 38 is another adjusting device, indicated generally in Fig. 4, by the numeral 47.

By means of this arrangement of the plates 30, 34 and 38 it is obvious that a ditch may be made of any desired width within the scope of adjustment of the screws 45 and it is also obvious that an operator standing on the platform may readily and quickly adjust all of said screws. By having an independent set of screws at the rear of the plates 38 from the set of screws at the front, I provide means whereby the rear ends of said plates may be adjusted to position nearer each other than the forward ends. The advantage of this is that the plates 34 will be set to position to cut a ditch slightly wider than the rear ends of the plates 38 to thereby avoid a material amount of the friction that would otherwise occur in drawing the plates 38 through a ditch and at the same time the plates 38 will prevent the earth from falling into the ditch. Hence, an operator on the platform may readily and easily place in the ditch in the rear of the plates 38, drain tiles and form a complete drain as the machine is advanced. If, during the progress of the machine across a field, it is found desirable to have the ditch wider at some places than at others on account of the nature of the earth being cut, the operator can readily and quickly adjust the machine to suit the requirements. In comparatively hard ground, it is only necessary to dig a ditch slightly wider than the drains being used but in comparatively soft and wet ground it is desirable, in some instances, to make a ditch materially wider than the tile being used.

In practical use, the operator first makes an opening in the ground to the desired depth large enough to admit the lower end of the beam 14 and the plates connected with it. Before placing the beam in position in the ditch the plates 38 are adjusted to the proper positions relative to each other. Then the operator manipulates the handwheel 29 and lowers the beam and plates into the ditch. Then power is applied to the clevis 14ª to advance the machine and as the machine is advanced the cutting plate 30 will first cut a narrow slot through the earth and the sides of the cut thus made will be forced apart a short distance by the side of the plate 30, and then will be forced apart farther by the plates 34 and the earth will be held separated by means of the

plates 38 until the operator has an opportunity to place a drain tile in the ditch in proper position. The operator may keep the bottom of the ditch comparatively level or at the desired angle by a manipulation of the handwheel 29 from time to time to suit the requirements.

I claim as my invention:

1. In a tile ditcher of the class described, the combination of a supporting frame to be advanced over a field, a beam carried by said frame and vertically adjustable relative to it, a cutting plate connected with the beam and having its sides diverge outwardly and rearwardly relative to each other, two plates hinged to the rear edges of said cutting plate, and two spacing plates hinged to the rear ends of said latter plates, and means between the said spacing plates to hold them separated from each other.

2. In a tile ditcher of the class described, the combination of a supporting frame to be advanced over a field, a beam carried by said frame and vertically adjustable relative to it, a cutting plate connected with the beam and having its sides diverge outwardly and rearwardly relative to each other, two plates hinged to the rear edges of said cutting plate, and two spacing plates hinged to the rear ends of said latter plates, and adjustable means between the said spacing plates to hold them separated from each other.

3. In a tile ditcher of the class described, the combination of a supporting frame to be advanced over a field, a beam carried by said frame and vertically adjustable relative to it, a cutting plate connected with the beam and having its sides diverge outwardly and rearwardly relative to each other, two plates hinged to the rear edges of said cutting plate, two spacing plates hinged to the rear ends of said latter plates, means between the said spacing plates to hold them separated from each other, said means comprising two bars secured to each plate in upright positions near the forward and rear ends thereof, each bar being provided with screw threaded tubular extensions, two bars fixed to the opposite plate and provided with sockets, screw threaded rods in said sockets and inserted in said tubular extensions and provided with integral nuts for adjusting them in the sockets whereby the forward and rear ends of said plates may be adjusted independently relative to each other, for the purposes stated.

4. In a ditching machine of the class described, the combination of a platform having an opening at its rear, two uprights mounted upon said platform and each having a vertical slot, a beam slidingly mounted in the said slotted uprights, two brackets fixed to the beam, a screw threaded bearing block pivoted in each bracket, screw threaded shafts in vertical positions rotatably supported on the frame and extended through said screw threaded blocks, a beveled pinion at the top of each of said shafts, a horizontally arranged shaft supported on said uprights and having beveled pinions thereon to mesh with the beveled pinions on the upright shaft, a handwheel on said horizontally arranged shaft for turning it, a clevis applied to the forward end of the beam, and a ditch digging plate fixed to said beam and designed to be extended through an opening at the rear of the frame, for the purposes stated.

Des Moines, Iowa, March 18, 1910.

FREDERICK B. WINKELMAN.

Witnesses:
MARY WALLACE,
MILDRED B. GOLDIZEN.