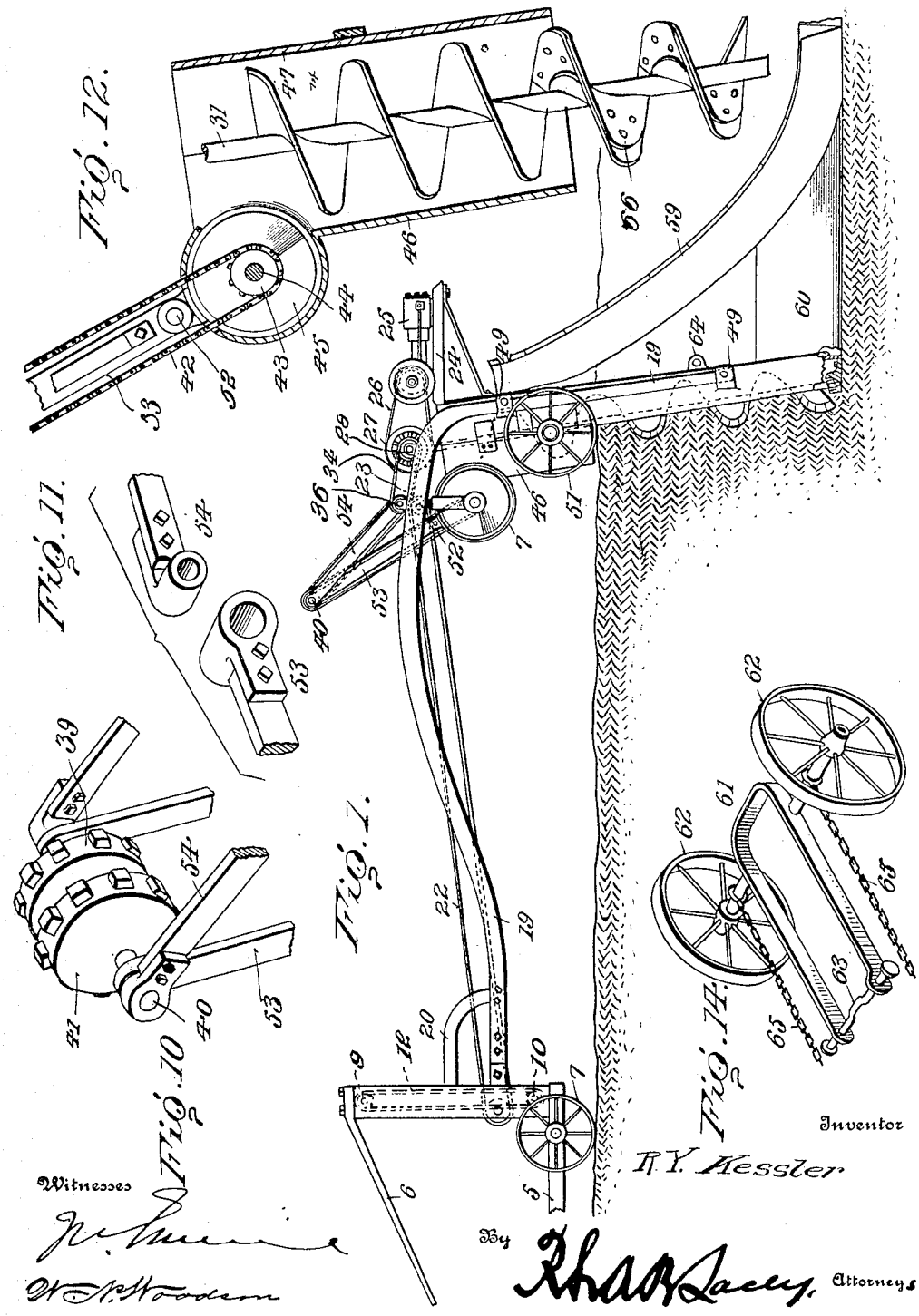
R. Y. KESSLER.

TILE DITCHING MACHINE.

APPLICATION FILED APR. 11, 1908.

919,595. Patented Apr. 27, 1909.

4 SHEETS—SHEET 1.



Witnesses

Inventor

R. Y. Kessler

By Chas. W. Lacey. Attorneys

THE NORRIS PETERS CO., WASHINGTON, D. C.

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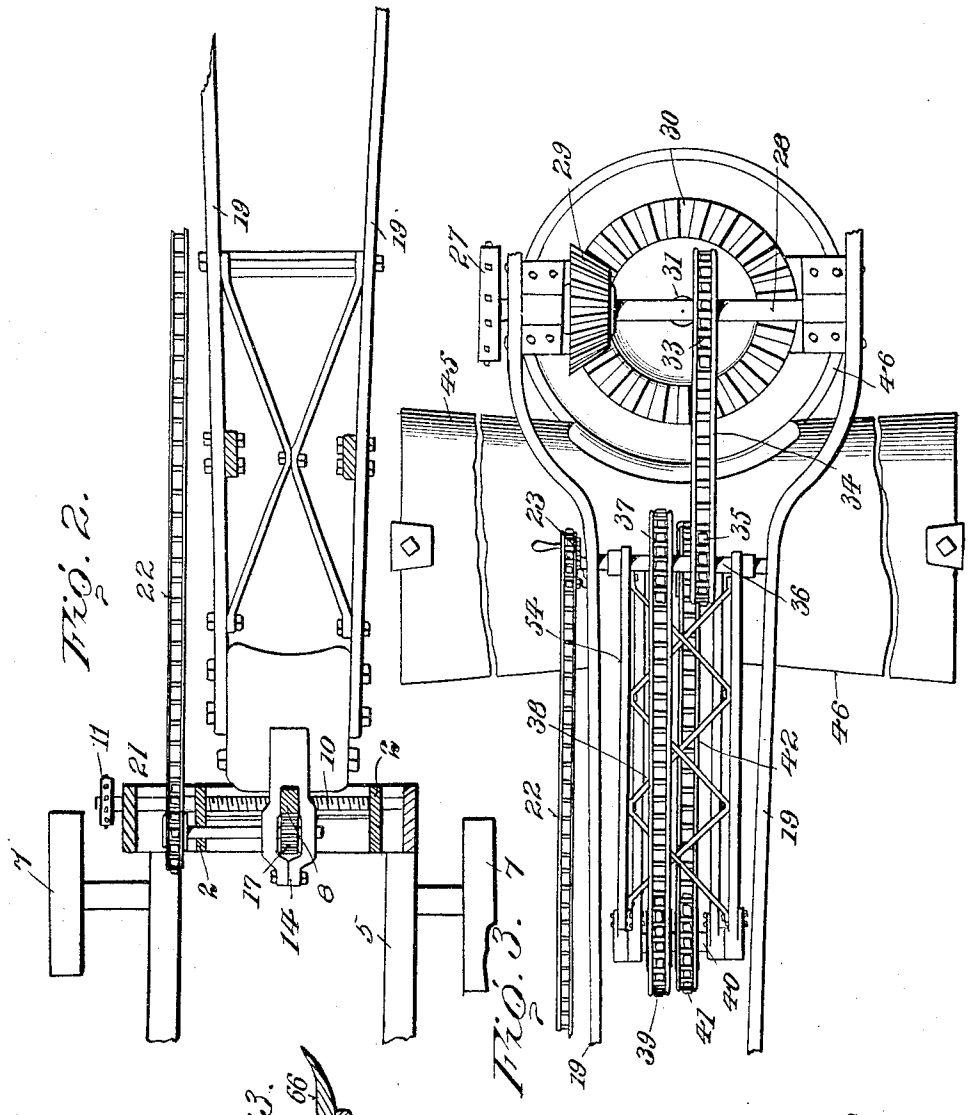
4 SHEETS—SHEET 2.



Witnesses

W. A. Woodson

Inventor

R. Y. Kessler.

By R. A. R. Lacey, Attorneys

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4 SHEETS—SHEET 3.

Fig. 4.

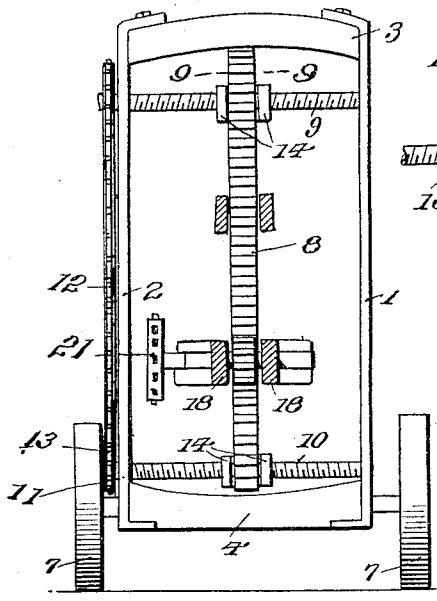


Fig. 9.

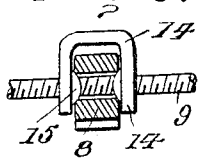
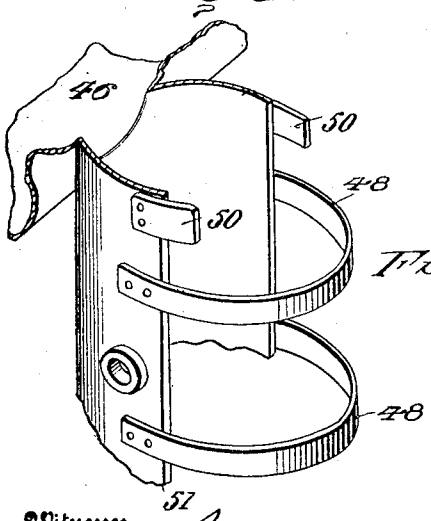


Fig. 5.

Fig. 6.



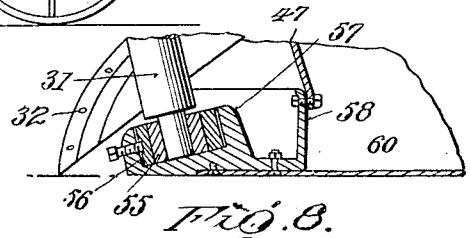
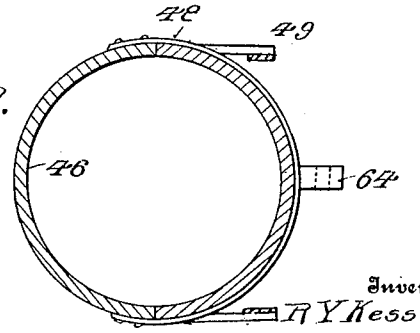


Fig. 8.

Fig. 7.



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W. F. Woodson

Inventor

R. Y. Kessler.

By R. A. B. Lacy, Attorney

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4 SHEETS—SHEET 4.

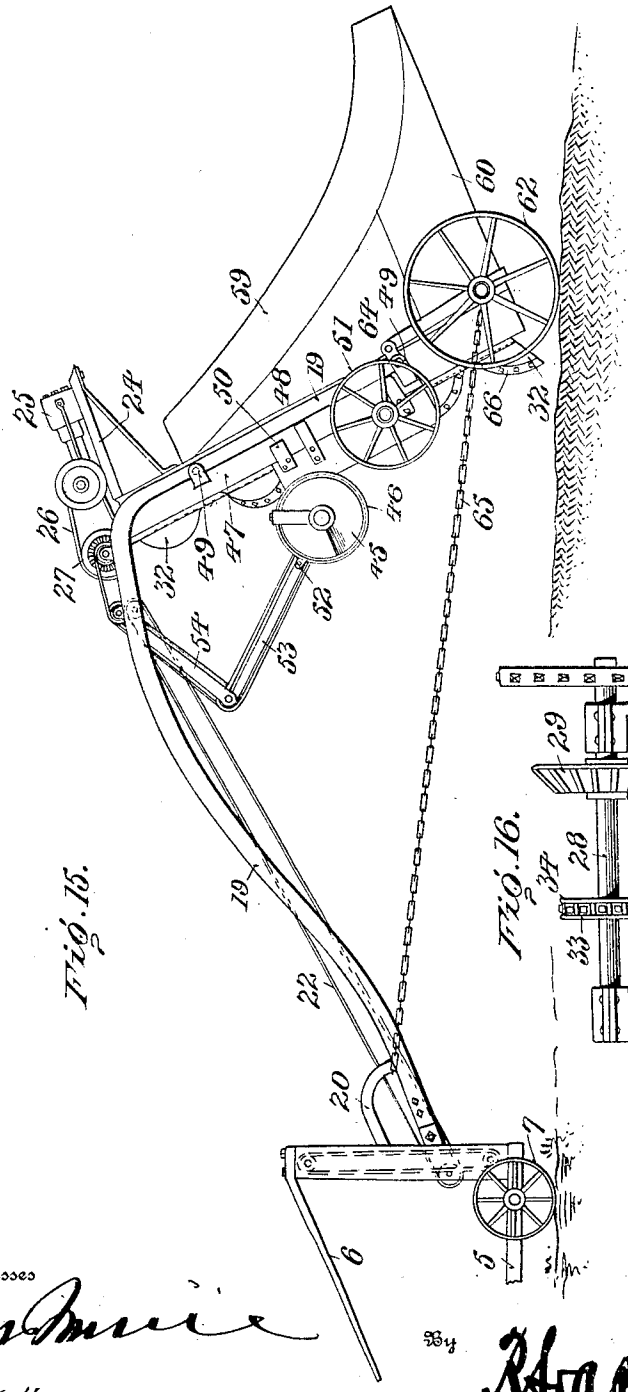

FIG. 15.

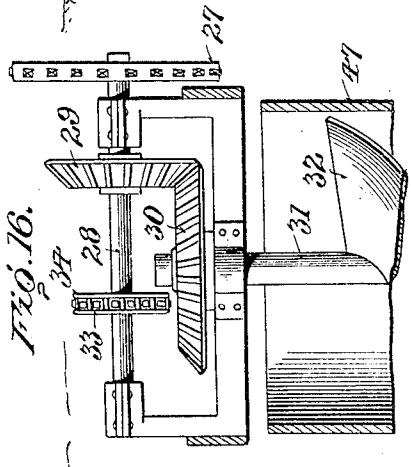

FIG. 16.

Witnesses

H. N. Hoadley

Inventor

R. Y. Kessler

By R. A. P. Macey, Attorneys

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

RICHARD Y. KESSLER, OF MORRISONVILLE, ILLINOIS.

TILE-DITCHING MACHINE.

No. 919,595. Specification of Letters Patent. Patented April 27, 1909.

Application filed April 11, 1908. Serial No. 426,526.

To all whom it may concern:

Be it known that I, RICHARD Y. KESSLER, citizen of the United States, residing at Morrisonville, in the county of Christian and State of Illinois, have invented certain new and useful Improvements in Tile-Ditching Machines, of which the following is a specification.

This invention comprehends certain new and useful improvements in ditching machines and relates particularly to that class of machines which are employed in digging ditches and at the same time laying tiles or culvert sections therein.

The invention has for its primary object a simple, durable and efficient construction of machine of this character, which will work effectively to dig ditches by means of an auger, the soil being elevated by the auger after being dug and being conveyed automatically to one side or the other, or to both sides of the machine as the same is advanced. And a further object of the invention is an improved construction of machine of this character in which the casing for the upper part of the auger and the laterally discharging conveyers is mounted upon traveling wheels so arranged as to have a relative raising or lowering movement with respect to the auger and the main beams of the machine, a peculiar arrangement of gearing being provided, whereby the conveyers will be effectively operated at all times without being interfered with by the up and down movement of the casing.

With these and other objects in view as will more fully appear as the description proceeds, the invention consists in certain constructions, arrangements and combinations of the parts that I shall hereinafter fully describe and then point out the novel features in the appended claims.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a side elevation of my improved ditching machine, showing the same in operation. Figs. 2 and 3 are top plan views of front and rear portions of the machine, respectively. Fig. 4 is a front elevation of the front portion of the machine. Fig. 5 is a longitudinal sectional view of the front end of the machine. Fig. 6 is a detail perspective view, partly broken away, of the casing for the front side of the upper end of the auger and the two laterally discharging conveyers. Fig. 7 is a horizontal sectional view through said casing and through a coacting casing, hereinafter specifically described. Fig. 8 is a detail sectional view of the lower end of the auger shaft and its bearing. Fig. 9 is a detail view on the line 9—9 of Fig. 4. Fig 10 is a detail perspective view of a portion of the actuating mechanism. Fig. 11 is a detail view illustrating two parts of the framework for supporting portions of the actuating mechanism. Fig. 12 is a detail sectional view of a portion of the auger, the housing for the upper end thereof, and the driving mechanism directly connected to the laterally discharging conveyers. Fig. 13 is a detail view of a modified form of auger. Fig. 14 is a perspective view of a device employed to raise the machine out of the ditch so that it may travel along the road. Fig. 15 is a side elevation of my improved ditching machine illustrating it positioned to travel along a road, and Fig. 16 is a detail sectional view of a portion of a drive mechanism for the auger and discharging conveyers.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The head of my improved ditching machine comprises a framework embodying uprights or standards 1 and 2 and upper and lower cross beams 3 and 4 to which the ends of the standards 1 and 2 are connected, as best seen in Fig. 4. A draft tongue 5 or the like projects forwardly from the framework and is preferably braced, as indicated at 6 in Fig. 1, the said head of the machine being supported upon traveling wheels 7, as clearly illustrated in the drawings, and being arranged to be pulled forwardly by means of a capstan, traction engine, or other suitable means, (not shown).

A vertical standard 8 is mounted within the framework just described and is adapted to move laterally therein by having its upper and lower ends fitted to work in slots on the upper and lower cross beams 3 and 4. Upper and lower laterally disposed screws 9 and 10 work through the standard 8 and both of said screws have bearing in the upright 1 of the framework, projecting outwardly from said upright and each screw being provided with a sprocket wheel 11. A chain 12 connects said sprocket and wheels together and one of said sprocket

wheels is preferably provided with a crank 13 by which the wheels may be turned. Clevises or yokes 14 embrace the standard 8 and fit upon the screws 9 and 10, as shown, said clevises being formed with rounded inner walls 15 fitting in corresponding sockets formed in the sides of the standard 8 contiguous to the slots 8^a thereof through which the screws pass. By this means the proper accommodation is made for the sidewise tilting of the standard 8 relative to the uprights 1 and 2 when the screws 9 and 10 are turned in one direction or the reverse, so that the standard may be maintained in a vertical position, irrespective of the exact position of the framework itself, as it travels over the ground.

The front face of the standard 8 is provided with teeth forming a rack 16, and a spur pinion 17 meshes with said rack. The pinion 17 is journaled between the plates 18 that embrace the standard 8 and that are pivotally mounted to swing about a horizontal axis on the front end of the arch beams 19 of the machine.

20 designates braces which are secured to the beams 19 and which extend upwardly and forwardly therefrom and straddle the standard.

On the same shaft with the pinion 17 is a sprocket wheel 21 and a chain 22 extends around said sprocket wheel 21 and also around a similar sprocket wheel 23 on one of the beams 19 near the rear end of the latter. A crank handle is arranged to turn the sprocket wheel 23 and a ratchet pawl device serves to hold the sprocket wheel so as to properly maintain the front end of the beams 19 at the desired elevation according as it is desired to vary the depth of the digging of the auger and consequently the depth of the ditch.

Upon a platform 24, suitably braced and secured to the rear end of the arched beams 19 of the machine, a gasolene engine 25 or other motor is mounted, and a driving belt or chain 26 leading from said motor passes over a sprocket wheel 27 on the transverse shaft 28 mounted in suitable bearings secured to the beams 19 near the rear ends thereof. A shaft 28 also carries a bevel pinion 29 meshing with a horizontally disposed similar pinion 30 on the upper end of the auger shaft 31. 32 designates the auger which is secured on said shaft, as shown, and which extends downwardly into engagement with the ground so as to dig the ditch as the machine is drawn forwardly. The shaft 28 also carries a sprocket wheel 33 connected by a chain 34 to a similar sprocket wheel 35 on the shaft 36 extending transversely and journaled in suitable brackets secured to the beams 19 in front of the shaft 28. This shaft 36 also carries a sprocket wheel 37 which is connected by a chain 38 to a sprocket wheel 39 on a transverse shaft 40. This last named shaft carries a sprocket wheel 41 which is connected by a chain 42 to a sprocket wheel 43 secured to the middle of the transversely extending and horizontally disposed conveyer shaft 44. The shaft 44 is provided in opposite sides of the sprocket wheel 43 with laterally discharged conveyers 45 that extend in opposite directions as shown and that are designed to discharge on both sides of the machine the soil dug by the auger and carried upwardly thereby. The upper end of the auger and the two discharge conveyers 45 are mounted in a T-shaped casing 46, the depending portion of which is best seen in detail in Fig. 6. This portion of the casing 46 is slidingly connected to a co-acting casing 47, by means of straps or the like 48, which encircle the casing 47. The casing 47 is provided with rearwardly projecting ears 49 by which it is secured rigidly to the beams 19 at the rear ends thereof, as best seen in Figs. 8 and 1. To assist in guiding the casing 46 on the casing 47 the former is preferably provided at its upper end with ears 50, as illustrated in Fig. 6, said ears abutting against the outer surface of the casing 47. The casing 47 extends downwardly the full length of the auger. Said casing is semi-cylindrical and incloses the rear side of the auger, leaving the front portion of the auger exposed below the depending portion of the casing 46. The casing 46 is supported on traveling wheels 51 journaled therein at both sides of the same.

The casing 46 is formed with apertured ears 52 to which arms 53 are pivotally connected, said arms being mounted to swing in a vertical plane. The outer ends of the arms 53 are pivotally connected to the ends of corresponding arms 54, the pivotal connection being arranged to receive the shaft 40 before mentioned. The arms 54 are in turn supported upon the shaft 36. It will thus be seen that as the auger is adjusted to dig shallow or deep, the actuating parts carried by the shafts 36, 40, and 44 may freely rise and lower without in any wise interfering with their proper actuation by means of the pivotally connected arms 53 and 54 above described.

The lower end of the shaft 31 of the auger is preferably mounted within a bearing collar 55 and said collar is seated in a bushing 56 held by a set screw, as best seen in Fig. 8, in an upwardly facing socket formed in a cup-like casting 57. The casting 57, or rather the upwardly extending flange 58 thereof, is attached by rivets, bolts or the like to the lower end of the casing 47.

In order to lay the tiles as the ditch is being dug, I provide a chute 59 which is secured at its upper end to the beams 19 and which extends downwardly and rearwardly therefrom as best seen in Fig. 1, the lower end terminating in rear of and in the same hori-

zontal plane as the lower end of the auger 32 and the housing thereof which is constituted by the co-acting casing 46 and 47. The tiles are laid in this chute by the attendant and are pushed downwardly or slide by their own weight downwardly, into the ditch as the same is being dug.

60 designates a skid or sled member which is preferably made of sheet metal of substantially pear shape in cross section and which is secured to the lower ends of the casing 47, the chute 59 and the cup-like casing 57.

From the foregoing description in connection with the accompanying drawings, it will be seen that as the machine is advanced over the ground, being drawn along by a capstan or engine of any kind, the motor 25 being started, it will turn the shaft 31 and the auger 32 to dislodge the soil and carry the same upwardly to the discharging conveyers 45, these latter being simultaneously turned by the sprocket and chain connection above described. The depth of the ditch being dug may be varied by elevating or lowering the forward ends of the beams 19 in the head of the machine by the means hereinbefore set forth, and as the auger is raised or lowered it is pivoted with the hinged arms that carry the driving connection from the countershaft 28 to the conveyers 45, which swing freely upwardly or downwardly to compensate for the raising or lowering movement of the auger.

In order that the machine may travel along the road in an inoperative position of the parts, I provide a wheeled clevis 61 mounted upon the wheels 62. This clevis may be operatively connected to the machine in any desired way. For instance, the machine may be backed off to permit the clevis 61 to pass through to the front of the auger and its housing, the wheels 62 resting in holes dug on each side of the ditch with spades or the like, so that the wheels will be held from turning forwardly at this time and insuring that they will rock about as upon a fulcrum so as to raise the beams 19 upwardly and carry the auger out of the ditch. The clevis may be secured to the housing by means of a crank pin 63 secured to an ear 64 projecting from the rear of the housing, whereupon an advance movement of the machine will cause the wheels 62 to act as a fulcrum to raise the entire machine out of the ditch so that it may travel along the road supported at its rear end by the wheels 62.

65 designates a chain by which the clevis may be secured to the housing, either in addition to or in substitution for the ear 64.

Preferably the auger 32 is provided at suitable intervals with shovels 66 to assist in dislodging soil so that it may be quickly carried upwardly by the main or body portion of the auger. These shovels are preferably bolted to the auger so that they may be removed when dulled or broken and be replaced by new or resharpened ones.

It is to be particularly noted that in my machine the auger is run in an inclined position. I incline the auger for the purpose of giving room at the lower end of the auger for its bearing supports, as illustrated in Fig. 8, this construction being a very important feature as it stiffens the auger and keeps it in proper alinement or prevents it from drawing up against the rear casing 47, the entire machine being thereby strengthened so that the auger may be pulled forwardly against the front end of the ditch with great power and thereby enabling the auger to cut faster and thus handle more dirt.

When the machine is traveling along the road, the truck shown in detail in Fig. 14 is preferably fastened in front of the braces 20 to support the machine. If the machine is drawn forwardly in operation by means of a capstan, the frame illustrated in Figs. 4 and 5 can be fastened to the rear axle of a wagon or any four wheel vehicle and be braced to the front bolster thereof from the top of the frame. If the machine is drawn by a traction engine, the said frame may be fastened to the rear end of the engine and the top be braced to some suitable place at the front of the engine.

Having thus described the invention, what is claimed as new is:

1. In a machine of the character described, the combination of supporting beams, digging mechanism carried by said beams, a vertical standard, a traveling support therefor, and a vertically adjustable connection between the front ends of said beams and said standard.

2. In a machine of the character described, comprising beams, digging mechanism carried by said beams, means for actuating said digging mechanism, a vertical standard, a traveling support therefor, said standard being provided with a rack, a pinion meshing with said rack and carried by the forward ends of said beams, and means for rotating said pinion to effect raising or lowering of said beams.

3. In a machine of the character described, comprising supporting beams, digging mechanism supported by said beams and projecting below the same, means for actuating said digging mechanism, a vertical standard provided with a rack, a traveling support for said standard, a pinion meshing with said rack, plates embracing said standard and carrying said pinion, and a pivotal connection between said plates and the forward ends of said beams, and means for rotating said pinion.

4. A machine of the character described, comprising supporting beams, a vertical standard provided with a rack, a traveling

support for said standard, a pinion meshing with said rack, plates carrying said pinion and embracing the standard and having a pivotal connection with the beams, a sprocket wheel movable with said pinion, a sprocket chain extending around said wheel, and another sprocket wheel journaled near the rear end of one of said beams and over which the said sprocket chain advances, as and for the purpose set forth.

5. In a machine of the character described, the combination of beams, digging mechanism supported by said beams, means for actuating said digging mechanism, a vertical standard to which the forward ends of said beams are connected, a traveling frame in which said standard is mounted for lateral movement, and means for tilting said standard laterally in and relative to said frame.

6. In a machine of the character described, the combination of supporting beams, front traveling wheels therefor, an auger carried by said beams, means for actuating said auger, and a tile chute carried by said beams and extending downwardly and rearwardly behind the auger.

7. In a machine of the character described, the combination of supporting beams, front traveling wheels therefor, a substantially vertical auger mounted between said beams, means for actuating said auger, and laterally disposed discharging conveyers adapted to receive the soil from the auger and discharge it laterally from the machine.

8. In a machine of the character described, the combination of supporting beams, front traveling wheels therefor, a substantially vertical auger mounted between said beams, means for actuating said auger, laterally disposed discharge conveyers adapted to receive the soil from the auger and discharge it laterally from the machine, a casing for the front part of the auger, traveling wheels on which said casing is mounted and conveyers mounted in said casing, said casing and beams being connected together for a relative raising and lowering movement.

9. In a machine of the character described, the combination of supporting beams, an auger mounted between said beams and projecting downwardly below the same, a casing for the rear side of said auger secured to said beams, means for actuating the auger, laterally discharging soil conveyers coacting with the auger, a casing for said conveyers, said casing adapted to close the front side of the auger at the upper end thereof, and a vertically slidable connection between said casings.

10. In a machine of the character described, the combination of supporting beams, an auger mounted between said beams and projecting downwardly below the same, a casing for the rear side of said auger secured to said beams, means for actuating the auger, laterally discharging soil conveyers coacting with the auger, a casing for said conveyers, said casing adapted to close the front side of the auger at the upper end thereof, a vertically slidable connection between said casings, and a driving connection between said conveyers and the auger actuating mechanism.

11. In a machine of the character described, the combination of supporting beams, an auger mounted between said beams and projecting downwardly below the same, a casing for the rear side of said auger secured to said beams, means for actuating the auger, laterally discharging soil conveyers coacting with the auger, a casing for said conveyers, said casing adapted to close the front side of the auger at the upper end thereof, a vertically slidable connection between said casings, a driving connection between the conveyers and the auger driving means, and pivotally connected arms supporting said driving connection

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD Y. KESSLER. [L. S.]

Witnesses:
ALOYSIUS MCLEAN,
J. D. WILSON.