Feb. 2, 1937. A. J. PENOTE 2,069,712

POWER DRIVEN TRENCHER

Filed May 16, 1934 6 Sheets-Sheet 1

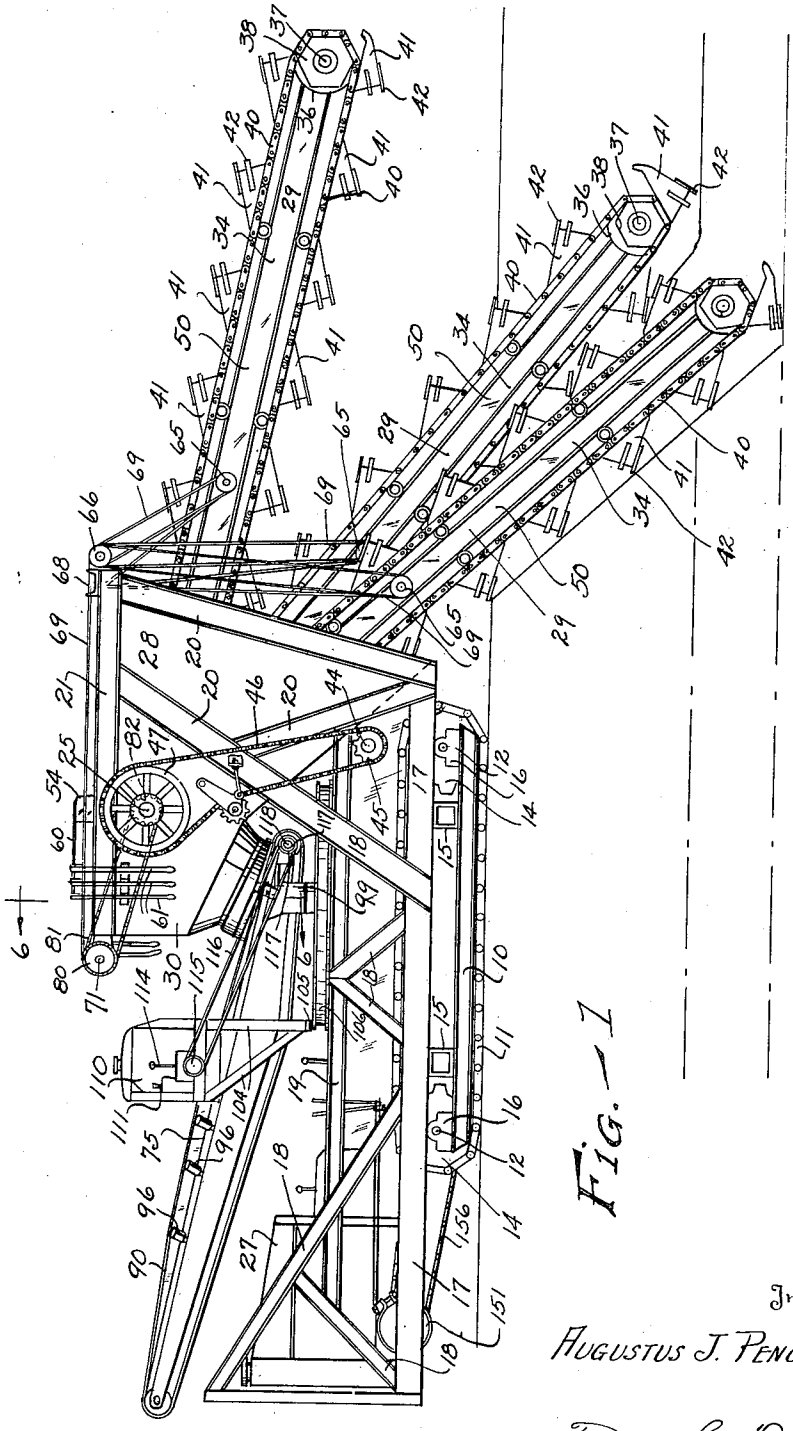


FIG. 1

Inventor
AUGUSTUS J. PENOTE

By Frank D. Gray
Attorney

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POWER DRIVEN TRENCHER

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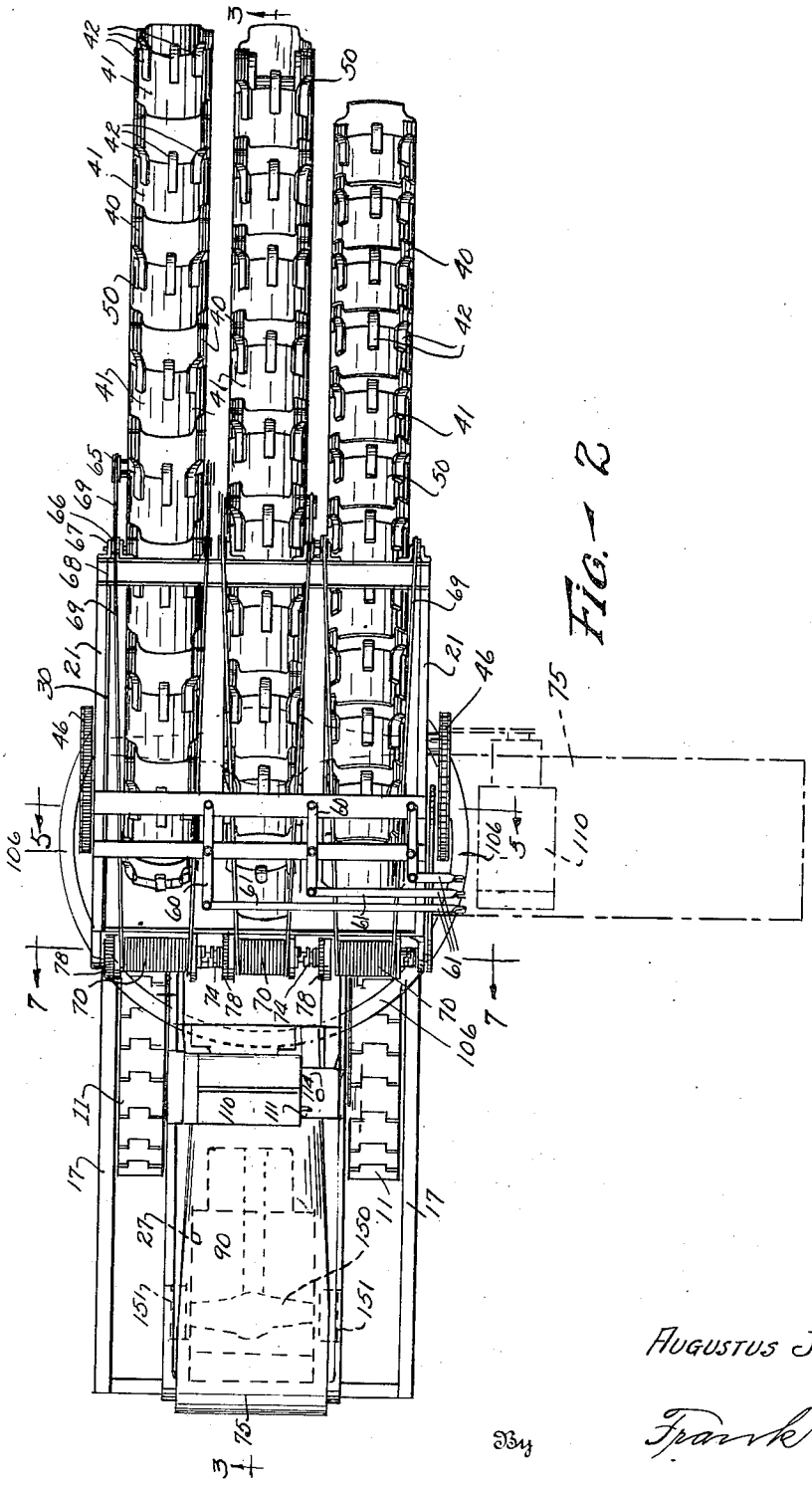


Fig. 2

Inventor
Augustus J. Penote

By Frank D. Gray
Attorney

Feb. 2, 1937. A. J. PENOTE 2,069,712

POWER DRIVEN TRENCHER

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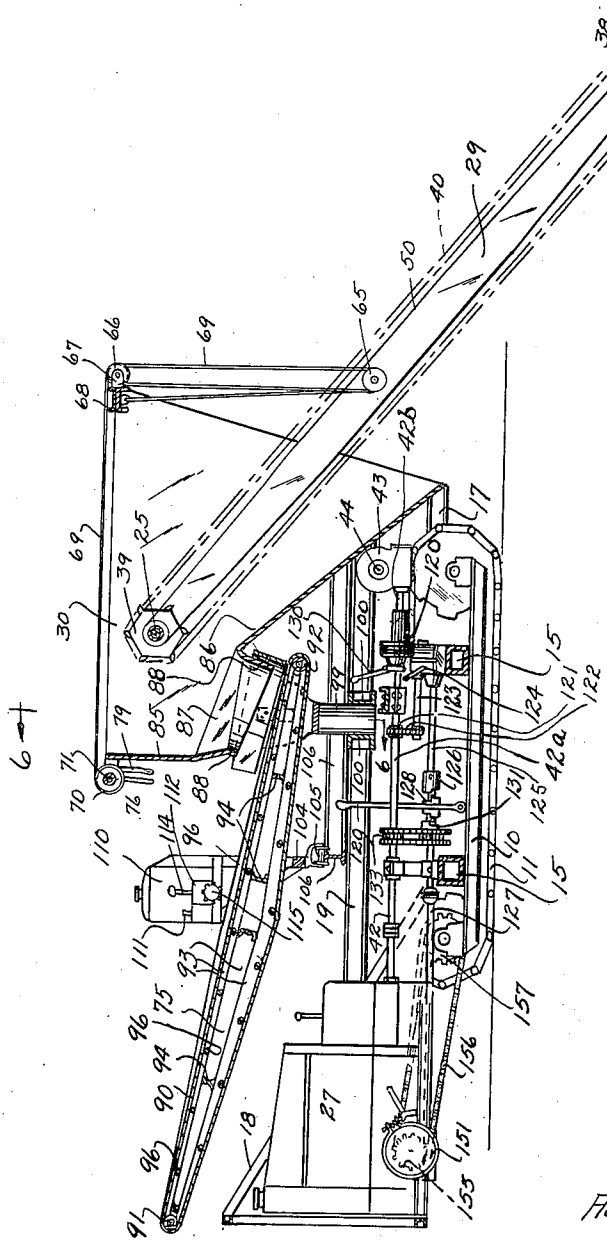


FIG. — 3

Inventor

AUGUSTUS J. PENOTE

By Frank D. Gray

Attorney

Feb. 2, 1937. A. J. PENOTE 2,069,712

POWER DRIVEN TRENCHER

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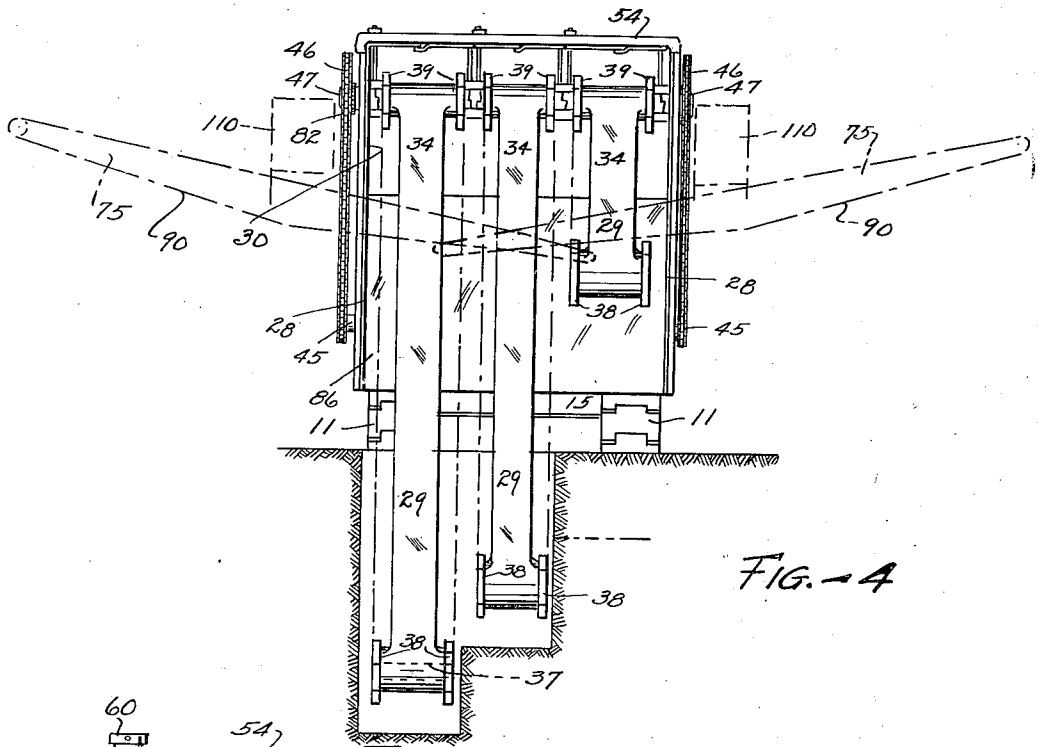


FIG. 4

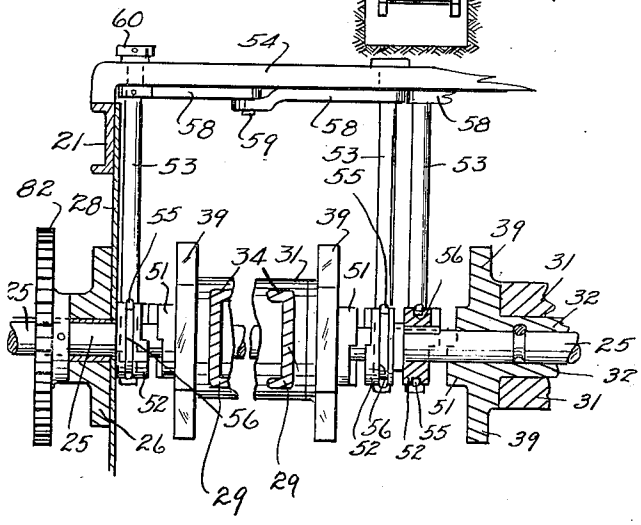


FIG. 5

Inventor

AUGUSTUS J. PENOTE

By Frank D. Gray

Attorney

Feb. 2, 1937. A. J. PENOTE 2,069,712

POWER DRIVEN TRENCHER

Filed May 16, 1934 6 Sheets-Sheet 5

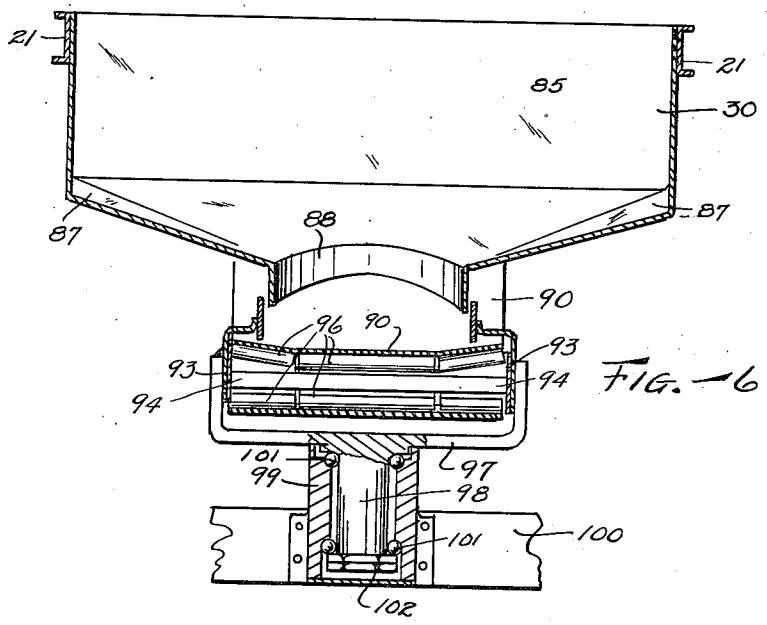


FIG. 6

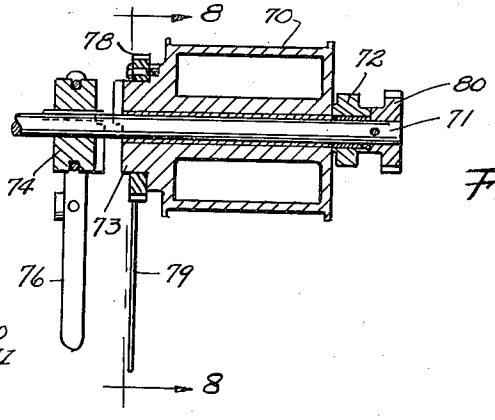


FIG. 7

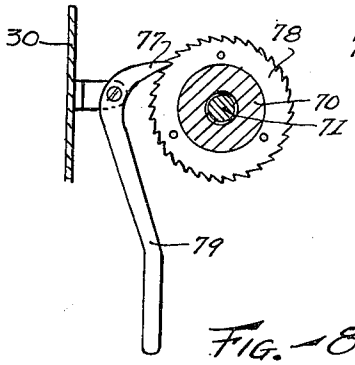


FIG. 8

Inventor

AUGUSTUS J. PENOTE

By Frank D. Gray

Attorney

Feb. 2, 1937. A. J. PENOTE 2,069,712

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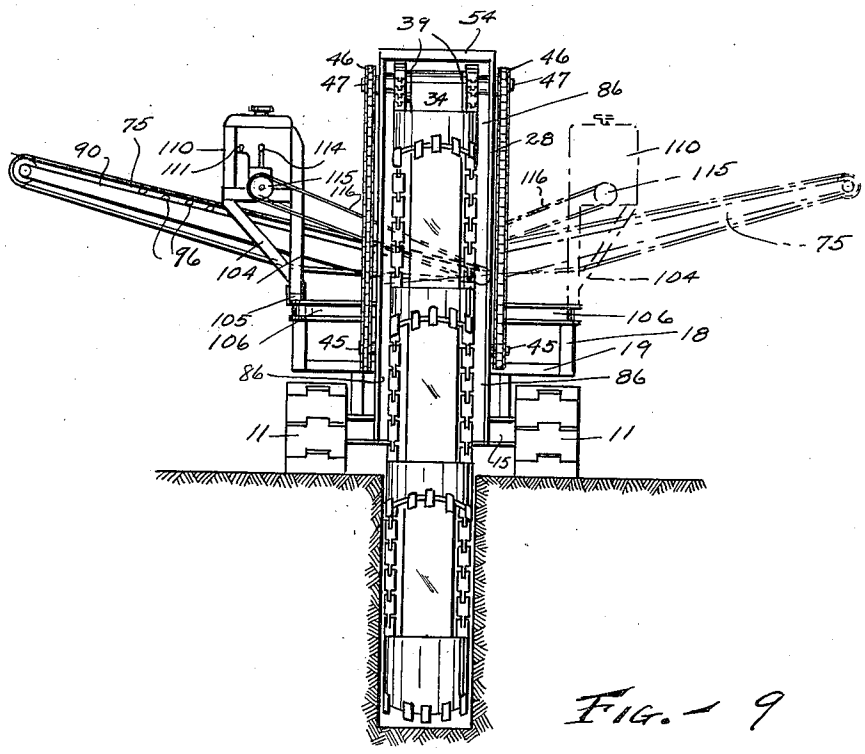


FIG. - 9

Inventor

AUGUSTUS J. PENOTE

By Frank D. Gray

Attorney

Patented Feb. 2, 1937 2,069,712

UNITED STATES PATENT OFFICE

2,069,712

POWER DRIVEN TRENCHER

Augustus J. Penote, Shaker Heights, Ohio; Eleonora C. Penote executrix of said Augustus J. Penote, deceased

Application May 16, 1934, Serial No. 725,929

9 Claims. (Cl. 37—86)

This invention relates to a mechanism for cutting or digging of trenches in soil for the laying of sewers, water and gas lines, power and telephone transmission lines or other conduits which may be used for various purposes, and is especially concerned with a power driven mechanism which will dig a trench and pile the removed material to one side of the trench or into suitable trucks or wagons. This therefore is the general object of the present invention.

A more specific object of the present invention is to provide a trench digging mechanism with a flexible power mechanism, which will be economical to construct, efficient and flexible in operation.

A further object is to provide a trench digging mechanism comprising a digging mechanism and a material diverting mechanism so arranged that the relative positions of the two mechanisms may be varied to divert the material to various positions relative to the machine, and to provide each of the mechanisms with an independent source of power, the power mechanism of the diverter being rigidly supported by the diverter which in turn is movably supported on a main frame carrying the digger and its power unit.

Another object of this invention is to provide a trencher which will either cut a trench having several depths or one depth, as desired.

A further object is to provide a trencher which will dig a trench having a plurality of different depths which depths may be regulated, that is one section of the trench deepened and another section of the same trench raised as the trench is lengthened.

Other objects of my invention will be explained in the following description, reference to the accompanying drawings showing a preferred embodiment thereof and the essential characteristics of the invention will be set forth in the claims.

Referring to the drawings, Fig. 1 is a side elevation of my improved trencher;

Fig. 2 is a plan view of my improved trencher;

Fig. 3 is a central longitudinal section as indicated by the lines 3—3 on Fig. 2;

Fig. 4 is a front elevation of my improved trencher;

Fig. 5 is a fragmentary sectional detail, the plane of the section being indicated by the lines 5—5 on Fig. 2;

Fig. 6 is a transverse vertical section through the loading hopper and the conveyor which carries the soil to one side of the trencher, the plane of the section being indicated by the lines 6—6 on Fig. 1;

Fig. 7 is a sectional detail as indicated by the lines 7—7 on Fig. 2;

Fig. 8 is a sectional detail as indicated by the lines 8—8 on Fig. 7;

Fig. 9 is a front elevation similar to Fig. 4, but illustrating a modified form of my invention.

In the digging of trenches, various soils are encountered for instance in one length of trench a sandy soil may be encountered, shortly after a clay may be encountered, then a conglomerate such as filled in material, and so on. The present day digging mechanisms are rigidly constructed and well powered and capable of travelling at a fairly steady speed through these various soils. However some of these soils must be carried away by the diverter faster than others, sand for instance must be carried away more rapidly than clay as the former has a tendency to flow and cannot be piled on the diverter hence its capacity for sand is less than its capacity for clay. Hence I mount a separate power unit on the diverter whereby it may be readily controlled independently of the digging mechanisms.

In present day trenchers it is essential that the diverter mechanism be arranged to divert the removed material to either side of the trencher as desired, hence many types of driving connections between the movable diverter and the motor on the frame, however such drives have been found to be expensive and a source of trouble. My arrangement of power units overcomes these disadvantages.

At the present time power and telephone transmission lines, gas, water, oil and sewer mains and pipe lines are being placed in conduits below the ground. In many instances it is convenient and desirable to place several different lines in the same trench. It is readily apparent that the desired elevation of these lines vary. For instance, sewers must have sufficient depth to drain basements on adjoining property; water lines need only be of sufficient depth to lie below frost line, power and telephone transmission lines are located only sufficient depth below the surface to protect them from surface impacts. It is also apparent that these elevations vary as the lines progress from point to point. For example, sewer lines must provide sufficient slope to permit gravitational flow, water mains do not require such a slope. Power and telephone lines may follow the surface contour, these lines however must be dropped and lowered to accommodate transverse lines and conduits.

To dig a trench to one depth and to place one line at one elevation and another conduit at another elevation has many disadvantages over initially digging a trench having an elevation for each of the several lines or conduits to be laid. Among these disadvantages are the unnecessary handling of great amounts of dirt, the danger of damage to conduits laid at the upper levels, due to the settling of filled in dirt, the necessity of constructing the various lines and conduits in the order of their depth, permitting sufficient time to intervene between the construction of one conduit and the construction of another conduit to permit the dirt to settle in the partially filled in trench, and the partial filling in of the trench after each conduit is constructed which requires the use of several backfiller and tamping mechanisms, or the making of several trips over each length of trench by one backfiller and tamper mechanism.

My improved trencher is so constructed that it will dig a trench of several different elevations simultaneously, whereby all the disadvantages of a single depth trench will be overcome.

Referring again to the drawings, wherein I illustrate a preferred form of my invention. The body of the machine rests on main longitudinal sill members 10 supported upon tractor belts 11 which constitute preferably their sole support, there being no support for the forward end of the machine as often thought essential in machines of this type. The tractor belts 11 are carried by sprockets 14 mounted on shafts 12 journalled in suitable bearings 16 carried by the sill members 10. The sprockets are mounted in the customary manner for independent rotation on their respective shafts.

The longitudinal sill members comprise part of the framework which supports the various mechanisms of the trencher. The sill members are connected together by suitable transverse frame members, some of which are shown in Figs. 1 and 3 at 15. Certain of these transverse frame members 15 extend outwardly beyond the tractor belts and support at their outermost ends longitudinal frame members 17 which in turn support other longitudinal frame members 19 through the medium of diagonal and other upstanding frame struts 18.

Near the forward ends of the frame, supported by the frame members 17, spaced brace members 20 are erected for supporting and securing in position, spaced parallel upper frame members 21 which serve to support the digging mechanism, the loading hopper, as well as certain control mechanism for the digger.

As in applicant's prior Patent No. 1,553,833 issued September 15, 1925, the main frame of the machine is supported as heretofore described, solely on the belt tractors 11. This makes the machine more easily controlled, both as to the steering and the elimination of unnecessary weight. As shown in Figs. 1 and 3, the frame members 17 extend forwardly beyond the front end of the tractor belts, and a motor or engine 27 is mounted on this overhanging part of the frame so that its weight counterbalances the weight of the digger mechanism at the rear end of the machine. The motor, as will hereinafter be more fully described, serves to drive the digger mechanism, as well as to selectively propel the machine.

The digger mechanisms are pivotally carried on a transverse shaft 25 journalled in suitable bearings 26 which are carried by the side walls 28 of a hopper 30, the hopper being secured to the frame members 20 and 21 heretofore described.

In the drawings I have shown one form of trencher, in Figs. 1 to 8 inclusive, having three independent digger mechanisms 50, each of which is supported for independent pivotal movement about the shaft 25, and which, as shown in Figs. 2 and 4 lie one next to the other. In Fig. 9 I have shown another form of trencher having one digging mechanism. I have shown each of these trenchers as being provided with my improved power drive, that is, in each of these constructions are provided with a diverter movably mounted on the machine frame and provided with a source of power movable as a unit with the diverter mechanism.

The digger mechanisms of each form of my invention comprises a boom 34 which extends substantially the length of the mechanism and includes, as shown in Figs. 1, 2, 3 and 5, a pair of spaced parallel beams 29 which are secured at their upper ends to a bearing member 31 having a longitudinal opening therethrough for the purpose of mounting on a driving sleeve 32 which in turn is rotatably mounted on the shaft 25.

The farther or lower ends of each pair of boom beams are attached to bearing members 36, there being an independent member 36 for each boom. Each member 36 carries a pin or shaft 37 of suitable length and shape. The pins 37 are rotatably mounted in their respective members 36 and are provided on their outermost ends with sprockets 38. Similar sprockets 39 are rigidly mounted on the upper sleeve members 32.

The cutting mechanism of each digger is more or less conventional, each comprising preferably a pair of chains composed of an endless series of links 40 which are mounted on the sprockets 38 and 39 as shown in Figs. 1, 2 and 3. Between each pair of chains and secured thereto are cutting buckets 41. The buckets 41 are provided with cutting teeth 48 which serve to cut the soil away at the bottom and forward end of the trench, and carry the material upwardly on the lower side of their respective booms and empty such material into the hopper 30. The material passes from the hopper 30 onto a cross conveyor 75 which discharges it at either side of the machine desired and beyond the trench being dug as will be hereinafter more fully described.

As heretofore mentioned I drive my digger mechanisms from the motor 27. As shown in Fig. 3 a shaft 42 extends rearwardly from the motor 27 to a gear reduction and differential gear unit housed within the casing 43. Extending laterally to opposite sides of the machine from and driven by the differential are a pair of spindles 44 which are driven from the shaft 42 through the differential. On the outer end of each spindle is a sprocket 45, which, through the medium of driving chains 46, drives respective sprockets 47. The sprockets 47 are secured to respective ends of the shaft 25 which, as heretofore described, is common to each digger mechanism 50.

When more than one digger mechanism is used I prefer to so arrange them, that digger mechanisms may be selectively driven either individually, in pairs, or all of them simultaneously, as desired by the operator. As shown in Figs. 2 and 5 the sprockets 39 are provided with clutch hubs 51 arranged to be selectively engaged by respective clutch members 52 which are splined to the shaft 25. It will be noted that I drive each

sprocket of each conveyor, this construction eliminates excessive strains in the mechanism. The clutches 52, which coact with the clutch hubs 51 of the sprockets 39, are arranged to be engaged in pairs so that both sprockets of each digger 50 will be clutched to the driving mechanism simultaneously. As shown in Figs. 2 and 5, a cross bar 54 is carried by the upper frame members 21 of the hopper. Each clutch 52 is provided with a control member in the nature of a rod 53 carrying, on its lower end, a yoke 55 arranged to engage an annular groove 56 in its respective clutch 52. The rods 53 are journalled in the cross member 54 and are so arranged that their rotation will shift their respective clutches axially on the driving shaft 25.

The control members or rods 53 of each digger 50 are connected by links 58 which are coupled together by a pin and slot connection 59 so that when one clutch 52 of a digger 50 is engaged or disengaged the other will be similarly positioned, one rod 53 or each digger has rigidly secured thereto a lever 60, which in turn is secured to an operating lever 61. Each lever 61 therefore controls the clutches of their respective diggers 50 and they may be manually operated to selectively cause the operation of their respective digger mechanisms.

While my digger mechanisms are spaced a comparatively slight distance apart, to provide for clearance between such mechanisms, I find that the strip of soil therebetween is so narrow that it breaks down and is gathered up from the bottom of the trench by the diggers. The distance between the diggers is greatly exaggerated in the accompanying drawings for the ease of illustration, but actually such distance is materially smaller in proportion to the other parts on the actual or full sized machine.

Each digger 50 is arranged so that it may be individually rocked about the axis of the shaft 25 on its respective sleeve member 32 (Fig. 5). As shown in Figs. 1 and 2 each digger 50 has a pair of double sheave blocks 65 secured to each of the beams 29 thereof and extending beyond the outermost limits of the digger. Corresponding double sheave blocks 66 are carried by brackets 67 which are secured to a transverse frame member 68 on the upper face of the hopper 30. Suitable cables 69 are used in connection with the sheaves 65 and 66 to raise or lower the digger mechanisms. Each cable has one end thereof secured to the frame member 68 and then passes downwardly around one of the sheaves of its respective sheave block 65; thence upwardly around one sheave of its respective sheave block 66; thence downwardly around the other sheave of its respective sheave member 66; and thence rearwardly to suitable winding drums hereinafter to be more fully described.

Each digger is raised and lowered by a pair of cables 69. The cables are secured in pairs to winding drums 70, there being one winding drum for each digger. In the construction illustrated there are three digger mechanisms, hence there are provided three winding drums 70.

Each winding drum is selectively driven to wind its respective cables, as desired by the operator, and thereby individually position their respective conveyors. As shown in Figs. 2, 7 and 8 the winding drums 70 are independently and rotatably mounted on a common shaft 71 which is journalled in suitable bearings 72 carried by the hopper frame members 21. Each drum 70 is provided with a hub 73, the outer face of which forms one member of the jaw clutch. The other clutch member 74 is splined to the shaft 71 which is driven as will be hereinafter more fully described. Suitable levers 76 are provided to enable the operator to selectively operate the drums to wind the cables as desired and thereby raise their respective mechanisms.

The diggers are maintained in their adjusted positions by latches 77 which engage ratchets 78 rigidly secured to their respective drums 70. Each latch 77 is provided with a suitable lever arm 79 by means of which the latch may be disengaged from its respective sprocket to permit the unwinding of its winding drum under the influence of the weight of the digger mechanism and thereby lower such digger mechanisms as desired by the operator.

The drum shaft 71 is driven from the motor 27 heretofore described. On one end of the drum shaft 71 is a sprocket 80. A suitable driving chain 81 drivingly connects the sprocket 80 with a sprocket 82 which is rigidly secured to the shaft 25. The shaft 25 is driven from the power shaft 42 as heretofore described in connection with the driving mechanism for the digger.

As heretofore mentioned, the diggers 50 cut the soil from the trench and carry it into a common hopper 30. As shown, the hopper 30 comprises a forward wall 85, side walls 28, a comparatively low rear wall 86, and a bottom wall 87. The side walls extend rearwardly from the hopper to form, together with the sloping bottom wall, a guide to enable the diggers to carry a maximum amount of material into the hopper. The bottom walls 87 of the hopper slope downwardly from the side walls to a downwardly extending open ended spout 88 which is located substantially midway between the hopper side walls 28. Beneath the spout 88 is one end of the conveyor 75 heretofore mentioned as carrying the material to the side of the machine and depositing it on the surface of the ground adjacent the trench.

The material passes from the lower open end of the hopper spout 88 onto a diverter or conveyor 75. As shown in the drawings the conveyor 75 is of the endless belt type, comprising an endless belt 90 preferably of canvas, rubber composition or other similar flexible material having sufficient width. The belt 90 is looped around a pair of pulleys or rollers 91 and 92, carried at opposite ends of a suitable supporting frame. As shown the conveyor supporting frame or boom comprises a pair of longitudinal beams 93 secured together by transverse frame members 94. The conveyor belt is supported intermediate its ends by a series of idler rollers 96 carried by the frame. The idler rollers 96 prevent excessive sagging of the conveyor belt when loaded with material cut from the trench.

The conveyor 75 is pivotally mounted about an axis which is substantially in alignment with the axis of the discharge spout 88 of the hopper. This enables the discharge of the material, cut from the ditch, toward either side of the machine as desired. As shown the conveyor may be swung from the full line position shown in Fig. 2, 90 degrees to the dotted line position shown in that figure, or it may be swung from the full line position 90 degrees in a clockwise direction to a position diametrically opposite to the dotted line position shown in Fig. 2.

One end of the conveyor frame or boom is rigidly secured to a yoke 97 which extends beneath the conveyor and is provided with a downwardly extending spindle 98 which is supported in a vertically extending bearing member 99, the latter

being rigidly secured to a pair of transverse frame members 100. Suitable bearings 101 are interposed between the spindle and its bearing to reduce the friction therebetween. A pair of locking nuts 102 at the base of the spindle and a shoulder 103 at the top thereof prevent vertical movement of the spindle in its bearing.

The conveyor is supported intermediate its ends to relieve the cantilever strains on the bearing 93. As shown in Fig. 1, downwardly extending struts 104 carry a roller 105 at their lowermost ends, and are secured to the conveyor frame members 93. The roller is preferably flanged as shown in Fig. 3 and engages an arcuate shaped rail 106 which is supported by the main frame members 19 and the transverse frame members 100 heretofore mentioned.

When a plurality of diggers are used the trencher machine is so constructed that any one or all of the diggers may be simultaneously operated and each digger may be raised or lowered to cut its section of the trench at various depths. It follows therefore that the conveyor may be called upon to discharge greatly varying amounts of material, dependent upon the contour of the trench being cut. Likewise as my trencher is apt to encounter many types of soil, some of which must be handled with more rapidity than others, the conveyor speeds must vary over a great range. The latter is equally true in the form of the invention shown in Fig. 9, when only one digger is used. I therefore, in either case, depart from the usual custom and provide a separate motor 110 to drive the conveyor belt 90. Likewise to eliminate expensive transmissions and gearing I mount this motor as an integral part of the conveyor frame so that it is movable with the conveyor as it swings from one side to the other of the trencher.

As shown in Figures 1, 3 and 9 the struts 104, heretofore mentioned, extend upwardly above the conveyor and support on their upper ends the motor 110. The motor is spaced a sufficient distance above the upper stretch of the conveyor belt 90 to permit the passage of material, cut from the trench, without damage to the motor or conveyor.

The motor is preferably of the well known internal combustion or automotive type, fuel oil or gasoline burning motor and is provided with the usual throttle valve 111 and change speed transmission, which, being well known, are not shown in detail here. Suffice it to say that the gearing is enclosed in the usual transmission case 112 and is controlled by shifting the lever 114 in the customary manner. By manipulation of the throttle valve 111 and the gear control lever 114 innumerable variations in speed are provided in the same manner as in the present day automotive vehicle. The driving shaft of the gearing extends outwardly beyond the gear housing 112 and has secured on its outer end a sprocket 115. A driving chain 116 drivingly connects the sprocket 115 with a sprocket 117 carried on an outwardly extending shaft 118 which supports and is integral with the belt pulley or roller 92, heretofore described.

The machine is progressively moved above the trench during the actual digging operation. As shown in Fig. 3 a clutch 120 drivingly connects the power shaft 42 with a sprocket member 121 which, through a driving chain 122, drives a sprocket 123 of a change speed reduction gear unit carried within the housing 124. The driving shaft 125 of the reduction gear unit carries on its outermost end a clutch member 126 by means of which the shaft 125 may be connected to a propeller shaft 127 through the medium of a clutch member 128 which is splined to the shaft 127 and movable into engagement with the clutch member 126 by a manually operable control lever 129. The clutch 120 is likewise operated by the manual control lever 130.

When the machine is being progressed from place to place the driving shaft 42 is directly connected with the propeller shaft 127. The clutch 120 is moved to a disengaged position, and the clutch member 126 is disengaged from the clutch member 128 heretofore described and moved into a coacting position with a clutch member 131 which is driven directly from the shaft 42 through the medium of twin driving chains 132 and a driving sprocket 133 which is rigidly secured to the driving shaft 42.

When the clutch 120 is shifted to sever the driving connection between the drive shaft 42 and the propeller shaft 127 it likewise severs the driving connection between the driving shaft 42 and the digger mechanism. As shown, the driving shaft 42 is in two parts, namely 42*a* and 42*b*. The clutch 120 drivingly connects the part 42*a* with the part 42*b* or disconnects them as desired by the operator of the machine.

The driving mechanism which connects the propeller shaft with the tractor treads is shown more or less diagrammatically in the drawings. Suffice it to say that such driving mechanism includes a differential mechanism generally indicated at 150, as well as suitable clutch and brake devices one of which is indicated at 151, none of which are shown in detail, and being more or less conventional, are not claimed specifically in this application. A suggestive gearing for the purpose is shown in applicant's Patent No. 1,553,833 heretofore referred to. It need only be said that the propeller shaft drives a differential gear mechanism 150 which in turn drives sprockets, one of which is shown at 155. The sprockets 155 in turn are drivingly connected by suitable driving chains, one of which is shown at 156 with sprockets 157 which are drivingly connected with the tractor treads on their respective sides of the machine.

Having now fully described my invention, what I claim and desire to secure by Letters Patent is:

1. A vehicular excavating machine including a main frame, a trench digger mechanism including means to raise material out of the trench, a hopper into which said material is discharged and having an opening in the bottom thereof, a conveyor including a conveyor frame pivotally mounted on a vertical axis beneath said opening, said pivot being in substantial axial alignment with said opening, a motor carried by said main frame, driving connections between said motor and the digger mechanism, a second motor carried by said conveyor frame intermediate its ends, a driving connection between said last named motor and said conveyor, and means extending downwardly from the motor and said conveyor frame to the main frame, and a roller interposed between said last named means and the main frame.

2. A vehicular excavating machine including a main frame, a trench digger mechanism including means to raise material out of the trench, a conveyor including a conveyor frame pivotally mounted on a vertical axis beneath the discharge portion of said digger, a motor carried by said main frame, driving connections between said motor and the digger mechanism, a second motor carried by said conveyor frame intermediate its

ends, a driving connection between said last named motor and said conveyor, a trackway carried by the main frame and laying in an arcuate path in a horizontal plane, the axis of said path being in alignment with the axis of said conveyor and the radius such that the track lies substantially below said last named motor, frame members extending downwardly from said motor and carrying on their lower ends a roller adapted to engage said trackway, whereby the motor is supported independently of the conveyor frame.

3. A vehicular excavating machine including a main frame, a trench digger mechanism including means to raise material out of the trench, a hopper into which said material is discharged and having an opening in the bottom thereof, a conveyor including a conveyor frame pivotally mounted on a vertical axis beneath said opening said pivot being in substantial axial alignment with said opening, a motor carried by said main frame, driving connections between said motor and the digger mechanism, a second motor carried by said conveyor frame intermediate its ends, a controller for said motor, a driving connection betweeen said last named motor and said conveyor, a trackway carried by the main frame and lying in an arcuate path in a horizontal plane, the axis of said path being in alignment with the axis of said conveyor and the radius such that the track lies substantially below said last named motor, frame members extending downwardly from said motor and carrying on their lower ends a flanged roller adapted to engage said trackway, whereby the motor is supported independently of the conveyor frame.

4. A vehicular excavating machine comprising a main frame, a plurality of independently operable digger mechanisms mounted one adjacent the other to operate in a common trench, a common support on which said digger mechanisms are pivoted for independent swinging movement, and means to swing said diggers about their pivots whereby they may be raised or lowered to independent levels to thereby cut a trench having a plurality of elevations.

5. A vehicular excavating machine comprising a main frame, a plurality of independently operable digger mechanisms mounted one adjacent the other to operate in a common trench and a common support on which said digger mechanisms are pivoted for independent swinging movement, means to swing said diggers about their pivots whereby they may be raised or lowered to independent levels to thereby cut a trench having a plurality of elevations, and a common hopper into which said digger mechanisms discharge.

6. A vehicular excavating machine comprising a main frame, a plurality of independently operable digger mechanisms mounted one adjacent the other to operate in a common trench, a common support on which said digger mechanisms are pivoted for independent swinging movement, and a common source of power for said mechanisms and wherein each of said diggers comprises an endless belt and has a series of excavating buckets attached thereto, each of said belts being supported by a pair of sprockets spaced apart by a boom, the axis of one of said sprockets being coincident with the pivot of said digger, a common hopper into which said digger mechanisms discharge and having an opening in the bottom thereof, and means mounted beneath said opening to carry material from said hopper to either side of the machine, as desired.

7. A vehicular excavating machine comprising a main frame, a plurality of independently operable digger mechanisms mounted one adjacent the other to operate in a common trench, each of said digger mechanisms comprising a pair of endless chains spaced apart, a series of excavator buckets spaced apart one from the other and secured to said chains, each of said chains being supported at its upper end by a sprocket, and at its lower end by a second sprocket, the sprockets at the upper end of each digger being drivingly connected together, each of said sprockets being provided with a clutch member, a motor, means to simultaneously connect both clutch members of any digger with said motor.

8. A vehicular excavating machine comprising a main frame, a plurality of independently operable digger mechanisms mounted one adjacent the other to operate in a common trench each of said digger mechanisms comprising a pair of endless chains spaced apart, a series of excavator buckets spaced apart one from the other and secured to said chains, each of said chains being supported at its upper end by a sprocket, and at its lower end by a second sprocket, the sprockets at the upper end of each digger being drivingly connected together, each of said sprockets being provided with a clutch member, a motor, means to simultaneously connect both clutch members of any digger with said motor, a common hopper carried by said frame and into which said digger mechanisms discharge, and an independently operated means to discharge material from said hopper toward either side of the machine as desired.

9. A vehicular excavating machine including a main frame, a plurality of trench digger mechanisms carried by said frame, each digger including means to raise material out of the trench, a common hopper into which said material is discharged and having an opening in the bottom thereof, a conveyor including a conveyor frame pivotally mounted on a vertical axis beneath said opening said pivot being in substantial axial alignment with said opening, a motor carried by said main frame, driving connections between said motor and the digger mechanisms said connections including a series of clutches whereby the diggers may be selectively operated, a second motor carried by said conveyor frame intermediate its ends, a driving connection between said last named motor and said conveyor, a trackway carried by the main frame and lying in an arcuate path in a horizontal plane the axis of said path being in alignment with the axis of said conveyor and the radius such that the track lies substantially below said last named motor and frame members extending downwardly from said motor and carrying on their lower ends a flanged roller adapted to engage said trackway, whereby the motor is supported independent of the conveyor frame.

AUGUSTUS J. PENOTE.