

No. 871,839.

PATENTED NOV. 26, 1907.

W. WATSON.
EXCAVATOR.

APPLICATION FILED OCT. 27, 1906.

2 SHEETS—SHEET 1.

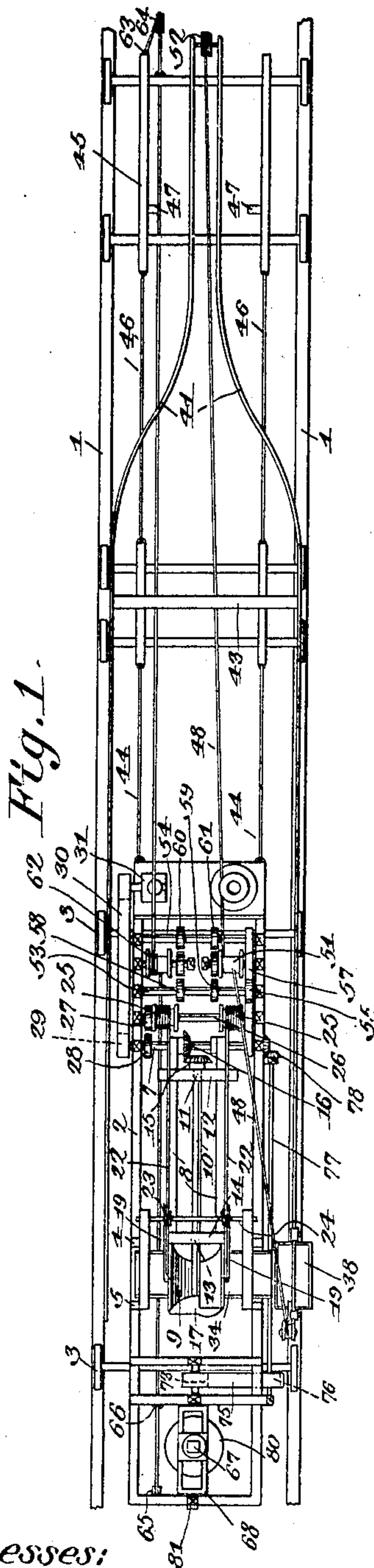


Fig. 1.

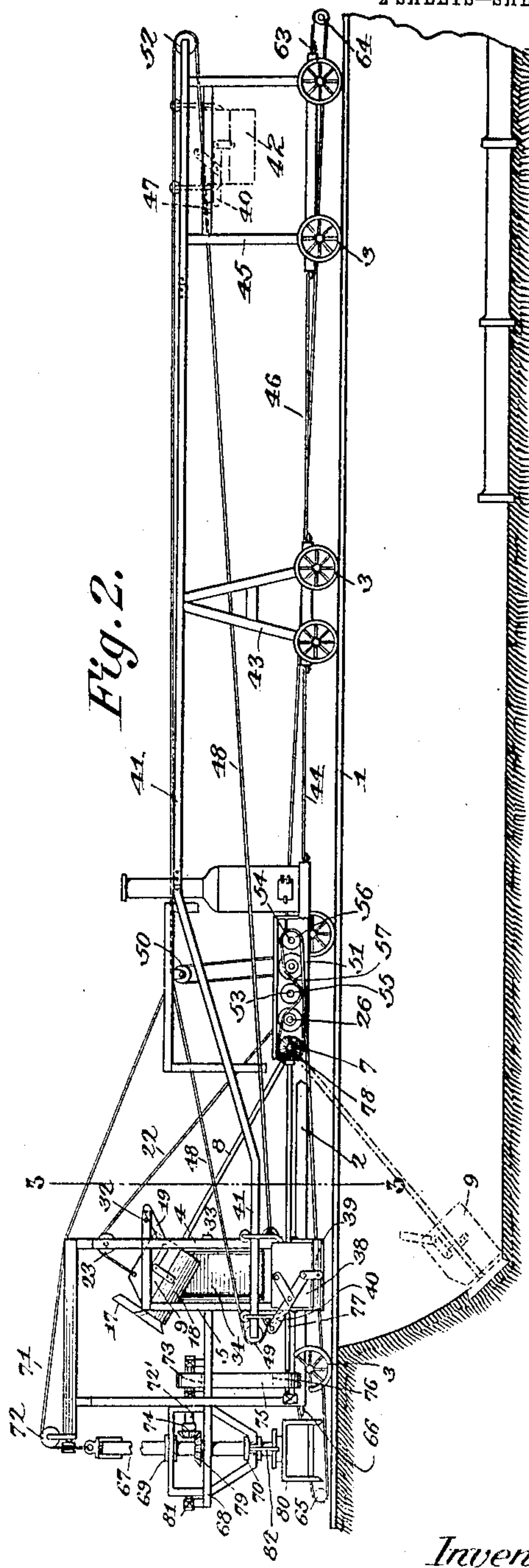


Fig. 2.

Witnesses:
W. A. Robbins
L. J. Steel

Inventor:
William Watson
By D. Ritzberger
Attorney

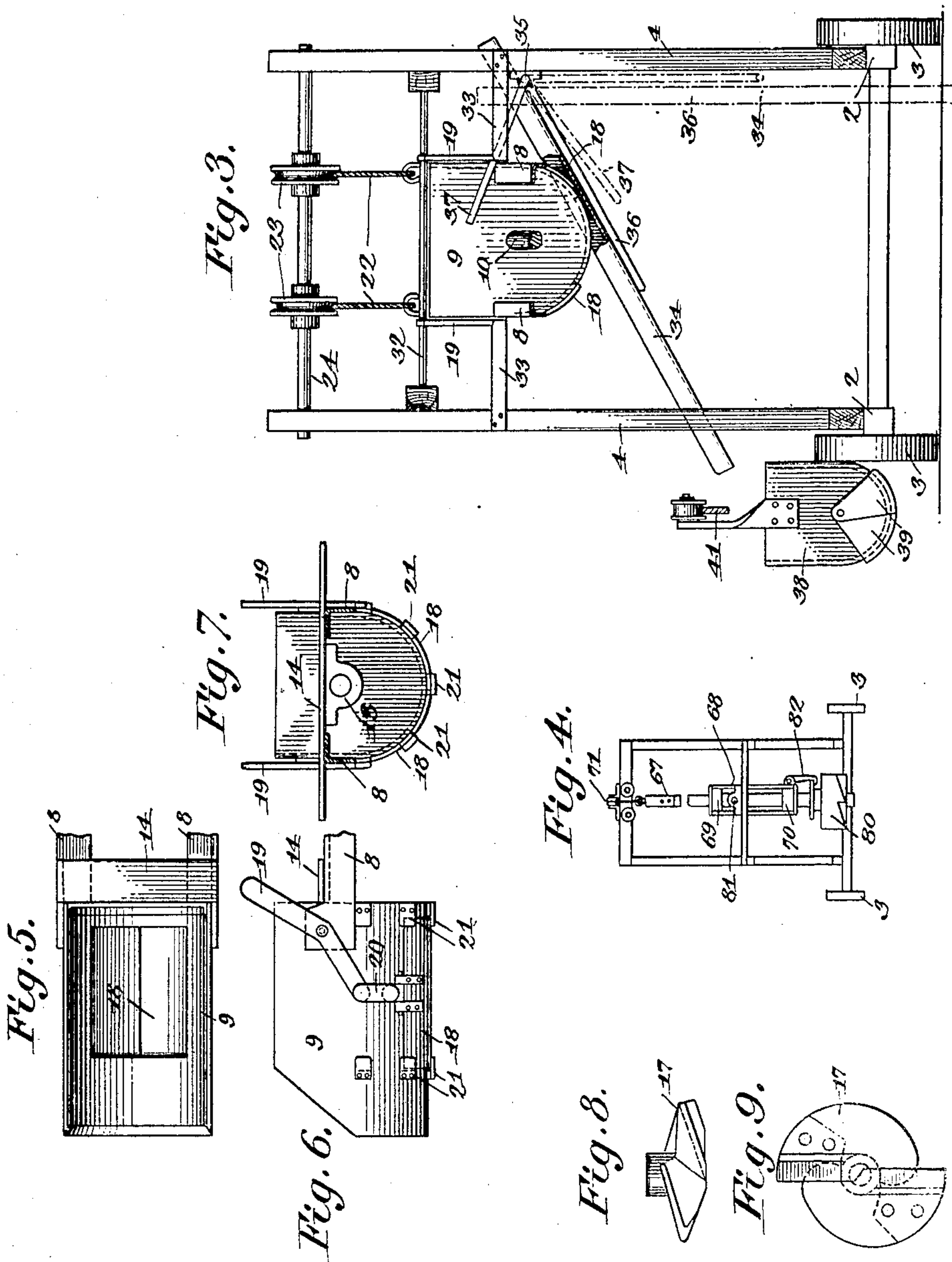
No. 871,839.

PATENTED NOV. 26, 1907.

W. WATSON.
EXCAVATOR.

APPLICATION FILED OCT. 27, 1906.

2 SHEETS—SHEET 2.



Witnesses:
W. A. Robbins
L. F. Steel

Inventor:
William Watson
By *[Signature]*
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM WATSON, OF PORTLAND, OREGON.

EXCAVATOR.

No. 871,839.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed October 27, 1906, Serial No. 340,882.

To all whom it may concern:

Be it known that I, WILLIAM WATSON, a citizen of the United States, residing in the city of Portland, county of Multnomah, and State of Oregon, have invented certain new and useful Improvements in Excavators, of which the following is a specification.

My invention relates to excavators, and particularly to that class of excavators adapted for use in digging ditches or trenches in which to lay pipe, tile, or the like for any use whatsoever.

Among the salient objects of my invention are to provide in an excavator of the character referred to a combination digger or excavating tool and scoop or shovel constructed and arranged to cooperate simultaneously; to provide in an excavator of the character referred to an engine or driving mechanism for driving the digger or excavating tool, for raising and lowering said combination digger and shovel from the operating or loading position to the raised or dumping position, and for bodily moving the excavator forwardly and backwardly; at the will of the operator; to provide such an excavator with a shovel or scoop having an automatic dumping or discharging mechanism; to provide a trough or slideway adapted to be automatically moved into position to receive and convey the damped load to any desired location or receptacle, and at either side of the machine as may be desired; to provide a carrier and trackage therefor with suitable connections with the driving mechanism for moving the carrier from its receiving to its discharging positions; to provide in an excavator of the character referred to an auger-like device adapted to be raised and lowered vertically by the driving mechanism and also adapted to be moved bodily upon a pivotal bearing into angular positions for under-cutting purposes, hereinafter described; and in general, to provide an excavator which is practicable, simple in operation and economical, and which can be largely manipulated and controlled from a central position.

My invention will be readily understood from the following description, reference being had to the accompanying drawings forming a part of this specification, and in which—

Figure 1 is a top plan view of one embodiment of the invention; Fig. 2 is a side view of the same; Fig. 3 is a sectional view taken

on line 3—3 of Fig. 2, with portions omitted; Fig. 4 is a front view of the front portion of the excavator; Figs. 5, 6 and 7 are top, side and rear views, respectively, of a scoop or shovel; Figs. 8 and 9 are edge and bottom views, respectively, of one form of digger or excavating tool.

Referring to the drawings, 1 designates a track which may be of any desired and suitable construction, preferably made in sections and adapted to be joined together end to end and to be moved forward section by section as the machine advances.

2 designates a frame or base of rectangular form and mounted upon and carried by the wheels 3—3. Upon the forward end of said frame is a second or vertical frame composed of the upright pieces 4—4 and 5—5. Upon the rear of the base frame is mounted an engine or motor mechanism which may be of any desired type suitable for the functions of the machine and need not, therefore, be particularly described, as it forms no part of the present invention. Across the base frame is rotatably mounted a shaft 7 (Fig. 1) carrying two forwardly extending arms 8—8, between the forward ends of which is carried the scoop or shovel 9. The rear ends of said arms are rotatably connected to the shaft 7 so as to permit the latter to revolve.

10 designates a driving shaft extending longitudinally between the arms 8—8 and having bearings at 11 in the cross piece 12, and at 13 in a second cross piece 14, extending across the arms 8—8 immediately at the rear of the shovel 9 and constituting a brace therefor. Upon the rear end of the shaft 10 is mounted a beveled pinion 15 operatively connected with a similar pinion 16 mounted upon and driven by the shaft 7. Upon the forward end of the driving shaft 10 and within or at the mouth of the scoop or shovel 9 is mounted a digging or excavating tool or auger 17. This excavating tool or auger may be of any desired and suitable type and construction, depending upon the kind of soil in which it is to be used, and may be made interchangeable for that purpose.

The scoop or shovel 9 is provided with a couple of doors 18, each adapted to be operated by corresponding levers 19—19 pivotally mounted, one upon each side of said scoop, and connected with said doors by means of links 20—20, said doors being

adapted in the present instance to slide through grooves or guide clips 21—21. The scoop or shovel is adapted to be raised and lowered through the frame and between the tracks upon which the machine stands in the manner indicated by the raised and lowered positions shown, respectively, in the full and dotted line positions, in Fig. 2. This raising and lowering movement of the shovel in the present embodiment of the invention is done by means of cables 22—22 attached to the sides of said shovel and working over pulleys 23—23, mounted upon a shaft 24 in the upright pieces 4—4, said cables extending thence backwardly and having operative connection with two drums 25—25, on shaft 26, which shaft also carries a friction wheel 27, adapted to be moved into and out of driving contact with a similar friction wheel 28 on the shaft 7 by means of a lever mechanism common in such machines. The shaft 7 also carries a pulley 29 over which runs a driving belt 30 from an engine or driving mechanism 31. Through this belt the shaft 7 and the shaft 10 carrying the excavating tool 17, are driven. The shaft 26, carrying the drums 25—25 for raising and lowering the shovel, is driven by means of friction wheels 27—28 above mentioned.

Across the upright pieces 4—4 is a shaft 32 which acts as a trip to engage the levers 19—19 upon the shovel and to automatically open the doors 18 thereof in order to dump the load.

33—33 designate a pair of projecting arms upon the upright pieces 4—4 which engage the levers 19—19 as the shovel descends and operates to close the doors of the shovel, it being understood that when the doors of the shovel are closed the levers 19—19 are raised in the position seen in Fig. 6, and do not engage the arms 33—33 during the upward movement, but after they have been tripped by the shaft 32, the levers 19—19 extend backward far enough to be engaged by the arms 33—33 during the downward movement of the shovel and to be positively moved to the closed position.

34 designates a trough or slide-way, (Fig. 3) hinged in the present embodiment of the invention, at its upper end at 35, although this might be constructed to slide into and out of position upon a suitably constructed frame. Underneath said trough or slide-way is a swinging supporting bar or bail 36 having a raising arm 37 shown in the down position in dotted lines, Fig. 3, adapted to be engaged by one of the arms 8—8 of the shovel as the latter is being raised to the up position, which movement, through said bail 36 and raising arm 37, operates to, raise the trough or slide-way 34 into position to receive the load from the shovel when dumped, as shown in full lines Figs. 2 and 3. The load being dumped upon the slide-way 34

slides into the carrier or bucket 38, also provided with doors 39—39, adapted to be automatically opened by means of levers 40, Fig. 2, after the same has been carried over the track 41 upon which it is constructed to move, to the rear of the machine, as shown by the dotted position at 42, Fig. 2. The slideway, carrier bucket and track for said carrier bucket together constitute the means for disposing of the discharged load of dirt from the shovel and for returning the dirt to the ditch from which it was taken after the pipe or tile has been laid therein.

43 designates an intermediate track-supporting frame upon wheels connected with the main machine by means of a link 44 and the track 41.

45 designates a rear supporting and dumping frame or trailer connected with the intermediate track supporting frame by means of a link 46 and the track 41. As the carrier bucket 38 is moved along the track 41 into the supporting and dumping frame 45, the tripping levers 40 thereof engage short trip arms or studs 47 and the doors of the bucket are opened and the load dumped, as shown in Fig. 2, dotted position, back into the trench or ditch after the pipe or tile has been placed.

It will be understood, of course, that the load can be dumped into a wagon or car instead of the carrier bucket, if desired, and also that the guide or slide-way 34 is interchangeable and may be transferred to the opposite side of the frame in order that the load might be discharged at the opposite side of the machine, as the conditions may call for. The carrier bucket can also be transferred from one side of the machine to the other, as a track therefor is preferably provided at both sides of the machine and extends back to the supporting or dumping frame 45, as seen in Fig. 1.

The carrier bucket 38 is moved over the track 41 by a cable 48 passing from the front of the bucket over the pulleys 49 and 50, around a drum 51 connected with the driving mechanism, up over a second pulley at 50 (not shown), back over pulley 52 upon the supporting frame 45, and thence forwardly again to the rear of the carrier bucket 38. Therefore, when the drum 51 is driven the bucket is carried over the track from the position shown in Fig. 2, the loading position, to the rear or dumping frame 45, as shown in dotted lines in Fig. 2, where the load is automatically discharged into the ditch. When the drum is driven in the opposite direction, the bucket is returned to the loading position.

53 and 54 designate a pair of driving shafts rotatably mounted in the frame and constituting a part of the driving mechanism, said shafts being provided, respectively, with pulleys 55 and 56, by means of which they are driven in opposite directions by a belt 57.

Upon each of said shafts 53—54 is also mounted a pair of friction wheels 58—59 and 60—61, respectively.

Mounted between the driving shafts 53 and 54 are two drums 51, hereinbefore referred to, and 62, each drum being movably mounted so as to be moved either forwardly or backwardly against either the friction wheels of shaft 53, or those of shaft 54, according to the direction in which it is desired to drive the drums. The driving of each drum and the direction in which it is to be driven is controlled by means of levers in a well known manner, the details of which need not be gone into here for the reason that the driving mechanism constitutes no part of the present invention, any suitable and desirable driving mechanism being easily adapted to the invention.

The drum 62 is utilized for moving the whole excavator upon the track 1. This is accomplished by means of a cable attached to the rear end of the machine, as at 63, passing around a pulley 64 anchored to the end of the track at the rear of the machine, passing thence to and around the drum 62, thence forwardly to a pulley 65 anchored to the track at the front of the machine, and thence back to the front of the machine, where it is attached, as at 66. Thus, when it is desired to move the machine bodily, the lever mechanism controlling drum 62 is manipulated by the operator and the drum moved into driving contact with the friction wheels 58 or 60, depending upon the direction in which it is desired to move the machine, whether forwardly or backwardly.

I have also provided in my excavator and as a part thereof a second excavating tool of auger-like construction, mounted, in the shown embodiment of the invention, upon the front of the machine, and being adapted to be operated from the same driving mechanism. The function of this portion of the invention is to dig out or undercut and take out the dirt at each side of the ditch or trench at such places as joints in the pipes may come, in order to furnish a larger space in the ditch around the joint in which to work. This portion of the invention is shown in front view in Fig. 4, and in top and side views in Figs. 1 and 2, respectively.

67 designates a vertical shaft, preferably of square construction and may be of wood of suitable size and strength. It is slidably mounted in a supporting frame 68 by means of collars 69 and 70, and is adapted to be raised and lowered by means of a cable 71 connected thereto by a swivel connection and working over a pulley 72. This cable extends rearwardly to the driving mechanism where it is connected so as to be taken up and paid out in raising and lowering the shaft 67.

72' designates a driving shaft suitably

mounted in the frame and provided at one end with a pulley 73 and at its other end with a beveled gear or pinion 74. A belt 75 drives the pulley 73 from a pulley 76 upon a shaft 77 connected by means of pinions at 78 with driving shaft 7.

79 designates a sleeve and pinion upon the vertical shaft 67 and supported in the frame 68 and through this sleeve said shaft is adapted to move vertically. By means of this sleeve and pinion said shaft is driven from the pinion 74.

Upon the lower end of the shaft 67 is mounted an auger-like device 80. This may be of any suitable construction adapted to bore into the ground or cut out the sides of a ditch in order to enlarge said ditch at any particular point.

The supporting frame 68 is pivotally mounted at 81 and by means of the shaft 72 at the opposite side, thus being adapted to be moved into angular positions so as to cut under or enlarge the ditch for the purpose of furnishing greater space in which to work, as at points where pipe joints may come.

The shaft 67 and the auger thereupon, may be held in the raised position by any suitable means, but is here shown so held by means of a hook 82 attached to the supporting frame and adapted to engage and hold the auger in the raised position, as indicated in Fig. 4.

While I have shown but one embodiment of the invention, it will be evident that alterations and modifications in the construction and arrangement thereof can be made without departing from the spirit of the invention, and I do not, therefore, limit the invention to the particular embodiment shown and described, except in so far as the same may be limited by the claims.

I claim:

1. In an excavator, the combination of a digger or excavating tool and a shovel co-operatively connected and having a common bodily movement, driving mechanism for driving the digger or excavating tool independently of the bodily movement of both and for moving both bodily from the operating or loading to the unloading position.

2. In an excavator, the combination of a digger or excavating tool and a shovel co-operatively connected and having a common bodily movement, said shovel being provided with a dumping mechanism, a driving mechanism for driving said excavating tool and for moving both bodily from the operating or loading to the dumping position.

3. An excavator comprising in combination a shovel, a dumping mechanism therefor, an auger-like excavating tool rotatably mounted in said shovel and adapted to be moved bodily therewith, and driving mechanism for driving the excavating tool independently of the bodily movement of both

and for moving both tool and shovel bodily from the loading to the discharging positions.

4. An excavator comprising in combination a shovel, a dumping mechanism therefor, an auger-like excavating tool rotatably mounted in said shovel and adapted to be moved bodily therewith, driving mechanism for driving the excavating tool independently of the bodily movement of both and for moving both tool and shovel bodily from the loading to the discharging positions, and a slideway adapted to be moved into and out of position for receiving the discharged load from said shovel.

5. An excavator comprising in combination a shovel provided with an automatic dumping mechanism, an auger-like excavating tool rotatably mounted therein, a driving mechanism for driving said excavating tool and for moving both shovel and tool bodily from the loading to the unloading position, and mechanism for moving said excavator forwardly and backwardly as the work progresses, substantially as described.

6. In an excavator, the combination of a shovel, a dumping mechanism therefor, an auger-like excavating tool operatively mounted within said shovel, driving mechanism for operating said excavating tool and for moving both shovel and tool bodily from the loading to the unloading positions, a slideway, mechanism for automatically moving said slideway beneath said shovel when the latter is raised to receive the discharged load, and for automatically removing it as the shovel descends for another load, substantially as described.

7. An excavator comprising in combination a shovel, an excavating tool coöperatively mounted therein, driving mechanism for operating said tool and for bodily moving both shovel and tool from the loading to the unloading position, and means for disposing of the load comprising a slideway, a carrier, and trackage therefor, and operative connections with the driving mechanism for conveying said carrier to and from the rear of the machine, substantially as described.

8. In an excavator, the combination with a suitable frame of a shovel carried at the forward ends of a pair of supporting arms hinged at their rearward ends, an excavating tool rotatably mounted in said shovel upon the end of a driving shaft extending longitudinally between said supporting arms and adapted to be moved bodily with said shovel, a power mechanism, driving connections between said power mechanism and said excavating tool and said shovel for operating the tool and for raising and lowering the shovel from its loading or operating to its raised or discharging positions, a dumping mechanism for said shovel, and a slideway for receiving and conveying the dis-

charged load to one side of the machine, substantially as described.

9. In an excavator, the combination with a suitable frame of a shovel carried at the forward ends of a pair of supporting arms hinged at their rearward ends, an excavating tool rotatably mounted in said shovel upon the end of a driving shaft extending longitudinally between said supporting arms and adapted to be moved bodily with said shovel, a power mechanism, driving connections between said power mechanism and said shovel for operating said excavating tool and for raising and lowering both shovel and tool from the loading to the discharging positions, an automatic dumping mechanism for said shovel, and means for disposing of the dumped load comprising a guide or slideway adapted to be automatically moved into position to receive the discharged load from said shovel, a carrier bucket to receive said load from said slideway, a track for said carrier bucket leading to the rear of the machine, and cable connections between said bucket and said power mechanism for moving said carrier bucket to and from its discharging position at the rear of the machine, substantially as described.

10. An excavator comprising in combination a main frame, a shovel with supporting arms hinged in said main frame, an excavating tool rotatably mounted in said shovel, driving mechanism carried upon said main frame for driving said excavating tool and for raising and lowering said shovel, and means for conveying the load from the shovel to the rear of the machine comprising a slideway, a carrier bucket, a supporting or dumping frame at the rear of said main frame, trackage from the main frame to the supporting or dumping frame, a cable connected with said driving mechanism and with said carrier bucket for moving the latter from its loading to its discharging position and return, and a dumping mechanism for said carrier bucket, substantially as described.

11. In an excavator, the combination of an excavating tool, a driving mechanism for operating said tool and for moving it bodily from the loading to the discharging position, and a second excavating tool mounted in said frame in advance of said first excavating tool and operatively connected with the driving mechanism.

12. In an excavator, a suitable supporting frame, an excavating tool and driving mechanism for operating said excavating tool and for moving said tool to and from the discharging position, a second excavating tool mounted in said frame in advance of said first excavating tool, and driving mechanism for actuating said second tool independently of the operation of the first mentioned tool.

13. In an excavator, the combination with

a main frame, of a supporting frame pivotally mounted thereon, a vertical shaft rotatably and slidably mounted in said pivoted supporting frame, an auger-like excavating tool mounted upon the lower end of said shaft, power mechanism for operating said shaft and excavating tool, substantially as described.

14. In an excavator, a supporting frame, a vertical shaft rotatably and slidably mounted thereon, an auger-like excavating tool mounted upon the lower end of said shaft, driving mechanism for driving said shaft and excavating tool, operative connections between said driving mechanism and said shaft for raising and lowering said shaft and excavating tool, substantially as described.

15. An excavator comprising in combination, a main frame, an engine mechanism mounted thereon, a shovel provided with a dumping mechanism carried between two arms hinged in said main frame at their rearward ends, an excavating tool of auger-like construction rotatably mounted in said shovel and moving bodily therewith, driving connections between said engine and said excavating tool, cable connections between said engine mechanism and said shovel for raising and lowering the latter, and means for disposing of the load from the shovel comprising a slideway movably mounted in said frame and adapted to be moved into and out of position to receive the discharged load from said shovel, a carrier bucket and trackage therefor, cable connections between said

engine mechanism and said carrier bucket for moving said bucket from the loading to the discharging position and return, cable connections from said engine mechanism for moving the whole machine forwardly and backwardly at will, a supporting frame upon the forward end of said main frame, a vertical shaft carrying an auger-like excavating tool rotatably and slidably mounted in said supporting frame, driving connections from said engine mechanism for driving said vertical shaft and excavating tool, and mechanism for raising and lowering said shaft and excavating tool from its operating position, substantially as described.

16. The combination with an excavator of a supporting frame or trailer, a conveyer leading from the main machine to the trailer and operative connections with the driving mechanism of the excavator for operating said conveyer to and from the trailer.

17. In combination with an excavator, an independent trailer frame straddling the ditch, a conveyer leading from the main machine to and supported by the trailer frame, a conveyer bucket adapted to travel from the main machine to the trailer frame and discharge its load in the ditch, and operative connections with the power mechanism of the excavator for operating said conveyer bucket.

WILLIAM WATSON.

Witnesses:

JAMES G. WILSON,
W. R. LITZENBERG.