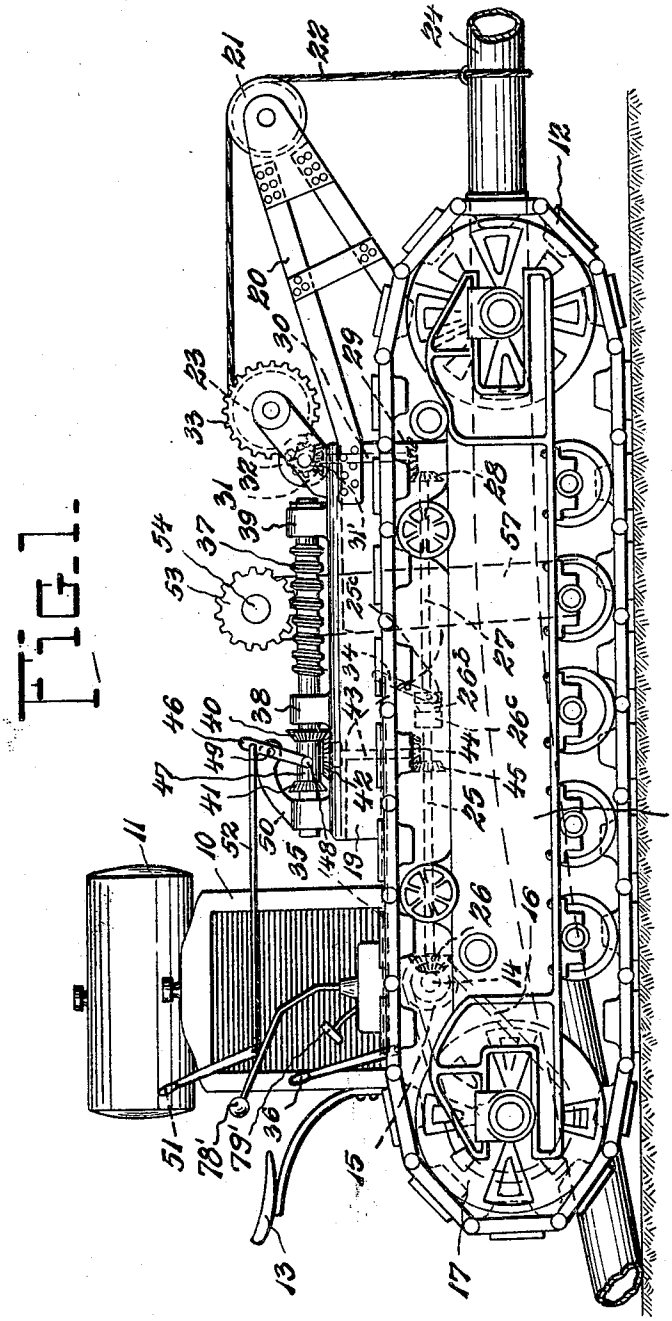
Sept. 20, 1932. J. F. ROBB 1,877,975

MACHINE FOR LAYING PIPES IN TRENCHES

Filed Sept. 8, 1930 5 Sheets-Sheet 1

FIG. 1.



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MACHINE FOR LAYING PIPES IN TRENCHES

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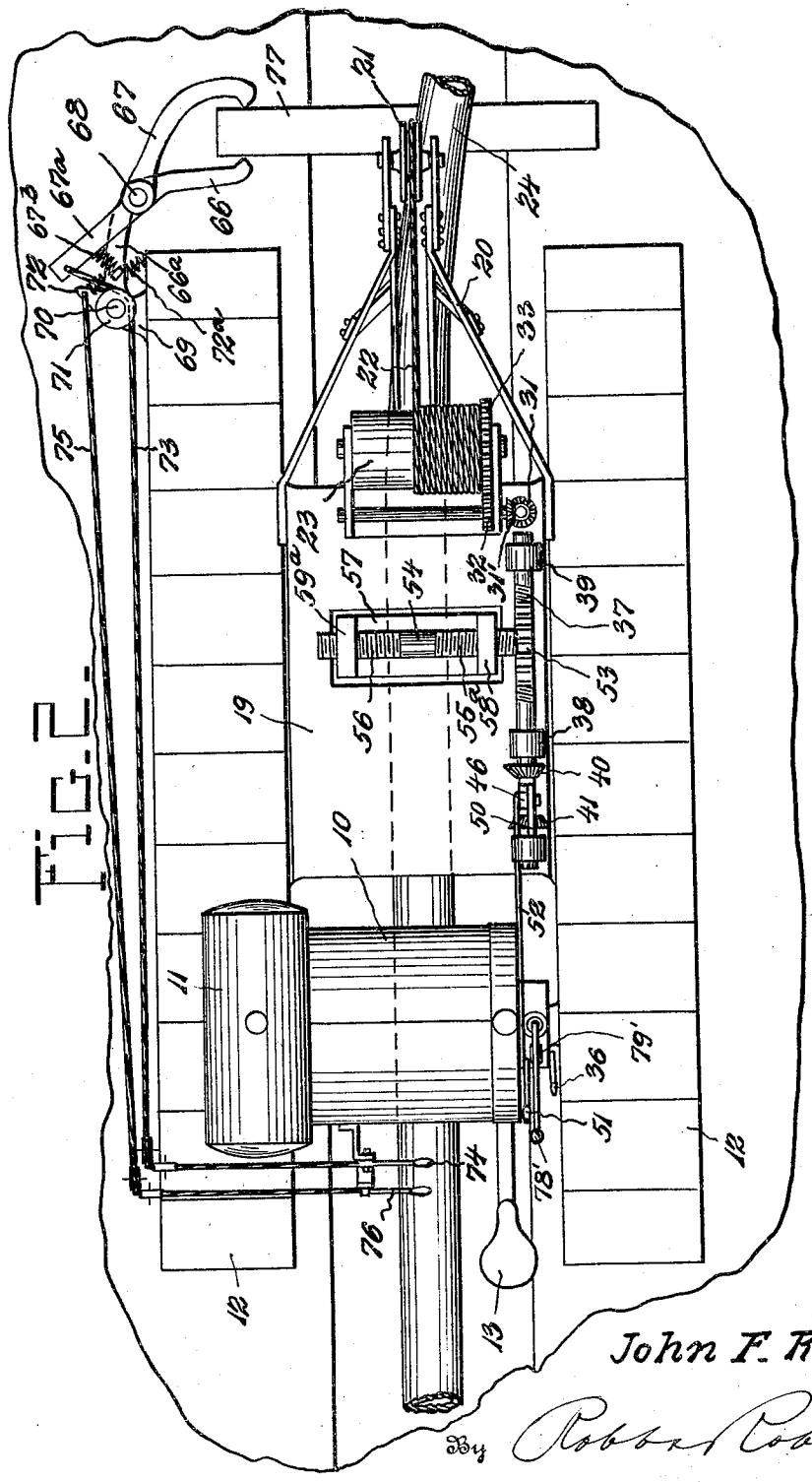


FIG. 2.

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MACHINE FOR LAYING PIPES IN TRENCHES

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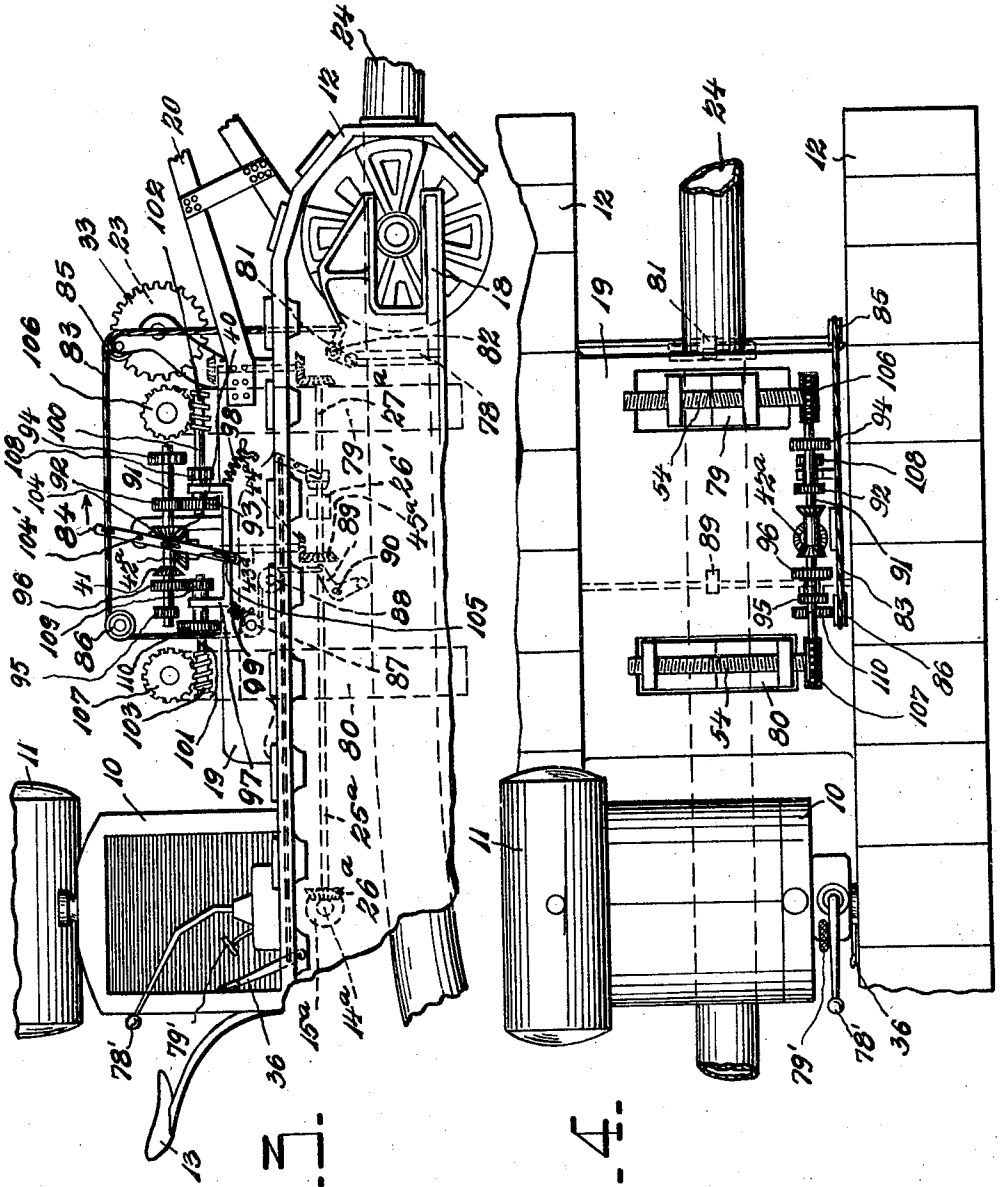


FIG. 1.

FIG. 4.

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MACHINE FOR LAYING PIPES IN TRENCHES

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Fig. 5.

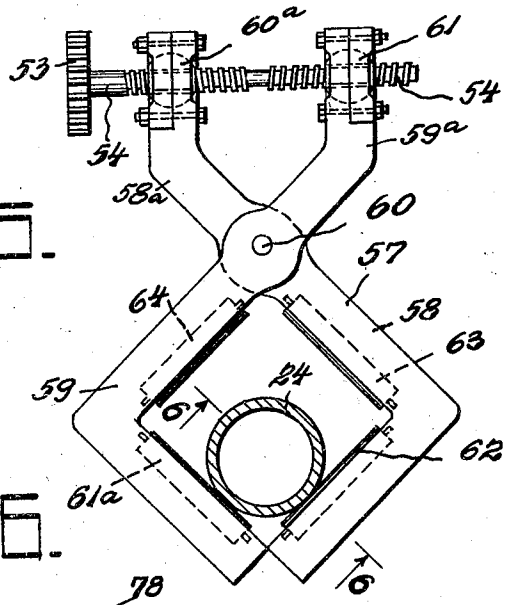


Fig. 6.

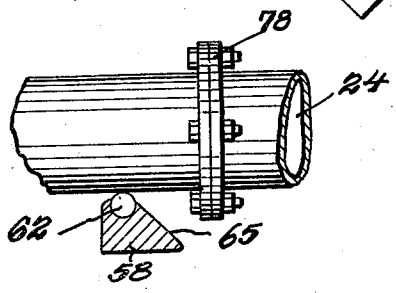
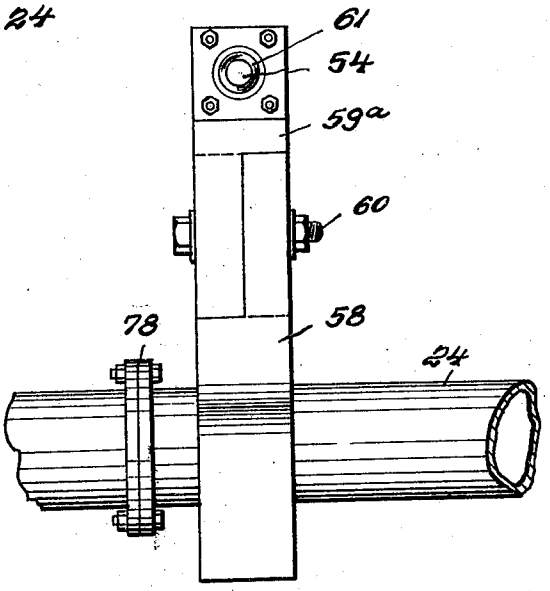


Fig. 7.



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MACHINE FOR LAYING PIPES IN TRENCHES

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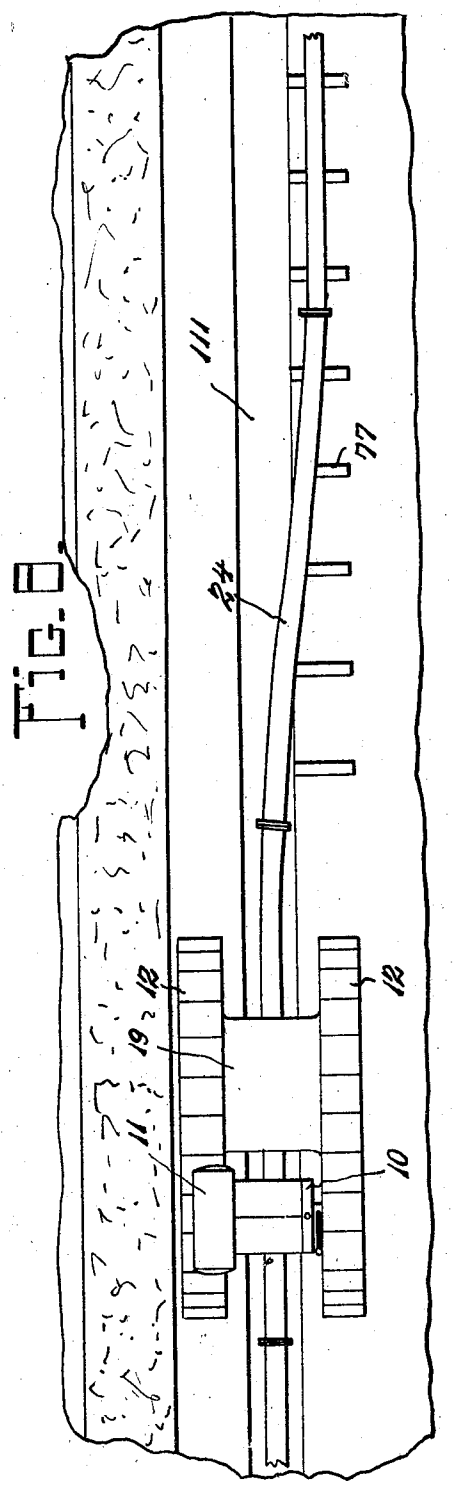


Fig. 8

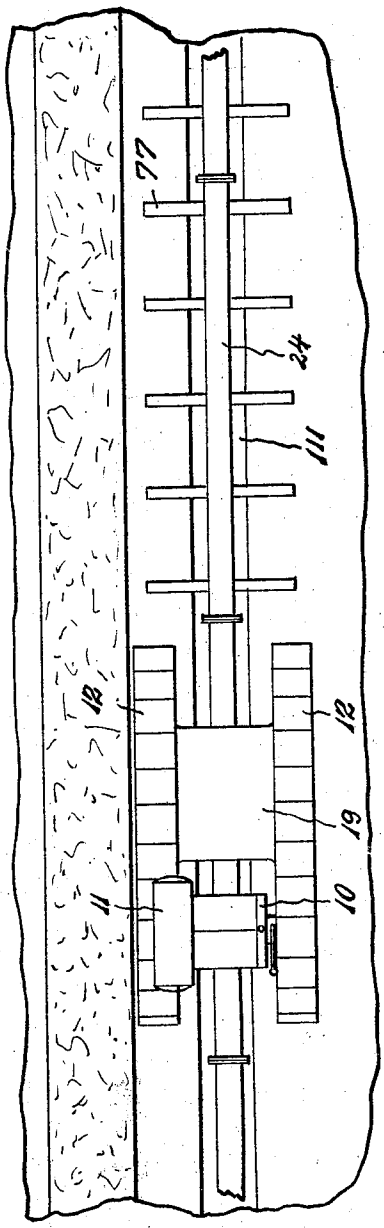


Fig. 9.

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UNITED STATES PATENT OFFICE

JOHN F. ROBB, OF CLEVELAND HEIGHTS, OHIO

MACHINE FOR LAYING PIPES IN TRENCHES

Application filed September 8, 1930. Serial No. 480,544.

In the laying of the pipe lines of considerable lengths, as for instance, in the construction of pipe lines designed to transport natural gas from the fields to dispensing points from which it is dispensed to consumers, or where petroleum products are led from the producer to the refiner, it is customary to lay the sections of pipe end to end alongside of a ditch or trench dug to receive the line, then secure the ends of the respective sections together either by welding or by joining in any other well known manner, and then letting the completed line down into the trench. Usually before introducing the line into its receiving trench, it is customary to lay the sections of pipe, usually before joining, over the trench, the sections being supported on heavy bars across the trench, so that after the ends of the respective sections have been joined, the resulting line can be laid into the trench by the removal of the bars from beneath it; although in some instances the bars are laid alongside the trench and the ends of the pipe sections connected at the side of the trench and then deposited therein.

The present invention relates to a machine which will readily remove the supporting bars from beneath the pipe line, and deposit the pipe line into its prepared trench; and the invention provides a machine which will progressively travel along the trench while straddling the same, and which is provided with appropriate lifting and supporting means adapted to travel along the pipe line, and also means whereby the supporting means or bars may be readily removed from under the pipe and the pipe laid into the trench without danger of breaking the joints in the line.

In addition to the foregoing a special purpose of my invention has been to design my machine to provide rolling engaging means intermediate the pipe, and the supporting means therefor carried by the machine, such means affording the two-fold function of enabling a continuous forward movement of the machine while holding the line of pipe and straddling the trench in which it is to be laid, and also acting as a lateral shoving means for shoving the pipe into a position in line with and above the trench when the operation is one wherein the pipe is preliminarily disposed at one side of the trench preparatory to being deposited therein.

Still another important object of this invention has been to design the pipe supporting means on the machine so that it may travel continuously in engagement with the pipe and readily pass over the pipe joints which in certain types of pipes form protuberant annuli that must be dealt with by a machine such as herein proposed.

The machine of this invention is characterized by its simplicity in construction, its wide applicability for pipe laying operations, and its ease of operation.

The invention will be more readily understood by reference to the accompanying drawings, in which:—

Figure 1 is a side elevation of a machine constructed in accordance with this invention.

Figure 2 is a top plan view of the machine.

Figure 3 is a side elevation of a somewhat modified form of the machine.

Figure 4 is a top plan view of the machine of Figure 3.

Figure 5 is a view of a pipe guide or supporting member which forms an important part of this machine.

Figure 6 shows a detail of construction of the guide or pipe supporting member, taken about on the line 6—6 of Figure 5, but showing in side elevation two pieces of pipe joined together by the usual bolts.

Figure 7 is a side elevation of the member of Figure 5.

Figure 8 is a top plan view showing the machine laying the pipe line into a trench, when the pipe line has been formed, and is supported along the side of the trench; and,

Figure 9 is a similar view showing the machine laying a pipe line into a trench from the more usual position, wherein the pipe line has been formed and is supported directly over the trench.

It will be seen from the drawings that the machine is a motor driven device, the numeral 10 representing the radiator and hood for

the engine, the engine being supplied by fuel from the tank 11, the machine being mounted upon traction devices 12 for propulsion along the trench. The machine is also provided with a seat 13 for the operator. These features are of standard construction and form no part of the invention. Power is transmitted to the traction devices through the crank shaft 14, the gear 15 and through the chain 16 in the usual fashion, the chain 16 engaging driving sprockets on the driving member 17.

It will be understood that the frame of the machine is formed in much the usual fashion, and comprises side members 18, one on each side, which are bridged by the bridge 19, this bridging serving as the carrying member for certain of the driving elements hereinafter to be described. This member 19 is shaped as indicated in Figure 1.

It will be seen that the machine is provided with a hoisting device comprising a boom 20 provided with a pulley 21 over which passes a cable 22, the cable being wound upon the drum 23, and adapted to engage a pipe line 24 to lift the same from its supporting rods, so that an end of the pipe may readily be introduced into the pipe guide and shoving member later to be described.

Power is transmitted to the drum 23 by means of a shaft 25 provided with a gear 26 which meshes with the gear 15, and takes power from the gear 15, the shaft 25 rotating as long as the shaft 14 and gear 15 are being driven by the motor. Taking power from the shaft 25 by virtue of the clutch device 26*b*, is a shaft 27, provided with a gear 28 which meshes with a gear 29 to drive a shaft 30, which is provided with a gear 31 which meshes with a gear 31′. A gear 32 meshes with a gear 33 with which the drum 23 is provided, motion thus being imparted to the drum 23. It will be seen that the gear 33 is considerably larger than the gear 32, so that there is appropriate reduction in speed of rotation of the drum 23. The shaft 27 may be brought into and out of operative engagement with the shaft 25 by means of the clutch 26*b*, a lever 34 connected with a rod 35 to a lever 36 bringing the clutch 26*b* into engagement with the shaft 25 upon operation of the lever 36, operating the lever 36 causing corresponding operation of the lever 34, to make and break the contact between the clutch elements 26*c* and 25*c*.

Also mounted upon the member 19 is a worm 37, which worm is mounted in brackets 38 and 39, and the shaft of which is provided with gears 40 and 41 which are adapted to engage and mesh with a gear 42 on the end of a shaft 43, the other end of the shaft 43 being provided with a gear 44, which is meshed with the gear 45 on the shaft 25.

The worm 37 turns in the brackets 38 and 39, and is operated by the gears 40 and 41, which are carried by a sleeve 47 which is slidably keyed to the shaft of the worm 37. The lever 46 is secured to the sleeve 47, as indicated at 48, and is fulcrumed at 49 to a standard 50, which is also secured on the member 19. The lever 46 is operated by a lever 51 which is connected by a rod 52 to the lever 46, the lever 46 thereby serving as a bell crank to slide the sleeve 47 to engage the gears 40 and 41 selectively, with the gear 42. It will be observed that the gears 40 and 41 are so mounted as to give opposite rotation to the worm 37, the worm 37 engaging a worm gear 53 mounted on a shaft 54. This shaft 54 is threaded, as indicated at 55 and 56, threads 55 and 56 running in opposite directions, there being a guide member, indicated at 57, which will be more specifically described hereinafter.

The guide member 57 is formed with two jaws 58 and 59, the jaws terminating in members 58*a* and 59*a* through which the threaded shaft 54 passes. The jaws are pivoted together at 60.

To prevent breakage of the arms 58*a* and 59*a* during operation of the guide member 57, these arms are provided with bearings, such as ball bearings, indicated at 60*a* and 61, Figure 5, which facilitates opening and closing of the jaws 58 and 59 upon their operation.

It will be seen that the jaws 58 and 59 when closed, define a four sided opening, there being provided in the sides of each opening, a roller indicated at 61*a*, 62, 63 and 64, the face of the side of the clamp adjacent each roller being beveled, as indicated at 65, in Figure 6, to facilitate the passage of pipe 24 through the jaws 58 and 59 of the clamp 57. After the lever 51 is operated to mesh the gear 40 with the gear 42, the worm 37 will actuate the gear 53 to operate the shaft 54 so as to, for instance, open the jaws 58 and 59. Operation of the lever 51 in the opposite direction to mesh the gears 41 and 42 will cause the worm 37 to be rotated in the reverse direction to cause the jaws 58 and 59 to close.

It has been stated that the pipe line is supported over or adjacent its trench on rods supported transversely of the trench through the ends of the rods resting on the ground adjacent the sides of the trench; and it is also stated that it is necessary to remove these rods or bars before the pipe line can be laid in the trench. The machine of the present invention is provided with means for removing these bars so that the pipe line may be laid.

These means are indicated by jaws 66 and 67 terminating in arms 66*a* and 67*a* respectively, fulcrumed together at 68, and supported by bracket 69 secured to the side frame of the machine.

Through the bracket 69 runs a shaft 70, which carries a pulley 71 and a lever 72, the lever 72 being either a part of the arm 66*a*, or in operating engagement therewith. A

cable 73 passes over the pulley 71, and is connected to the arm 67*a* of the jaw 67, its other end being connected with a lever 74. A cable 75 is connected at one end to the lever 72, and at its other end with a lever 76.

It will be seen that the spring 72*a* will hold the jaw member 66*a* and 66 in position, as shown in Figure 2, where it can engage a bar 77 upon which the pipe line 24 has been resting, while the jaw member 67 is swung out of the way by actuation of the lever 74 and cable 73. Operation of the lever 74 in the opposite direction will then cause the jaw member 67, which is forced to closing position by a spring 67*b*, to firmly grip the bar 77 between itself and the jaw 66 so that the bar 77 can be swung out of the way by operation of the lever 76 turning the jaw members 66 and 67 around the shaft 70.

To lay the pipe line with this type of machine, the machine is propelled along the trench until the cable 22 can be looped over the end of the line 24, whereupon the clutch 26*b* is brought into engagement with the driving shaft 25 so as to operate the shaft 27 to transmit power to operate the drum 23 to wind up the cable thereon, to lift the pipe 24 by winding the cable 22 upon the drum 23.

The cable 22 may be unwound by reversing the motion of the motor through operation of the gear shift lever 78′ by the operator preventing motion being transmitted to the propelling device 17 by disengaging the clutch 79′. This construction is a standard construction in motor vehicles.

When the pipe line 24 has been lifted to a point just below the jaws by the cable 22, the guide 57 is opened sufficiently wide to permit the pipe line 24 to pass between the jaws 58 and 59, which are then closed to hold the line 24 in position, the pipe at this point being above the height of the rods 77 whereupon on driving the machine forward upon the traction members 12, the pipe will be lifted and supported by the jaws and laid into the trench. It may be here mentioned that when it is desired not to operate the worm 37, thereby keeping the gear 53, shaft 54 and guide 57 stationary, all it is necessary to do is to operate the handle 51 so as to bring the gears 40 and 41 into neutral position with respect to the gear 42. Then as the machine travels along the ditch, the pipe line 24 readily slides over the rollers with which the jaws 58 and 59 of the guide 57 are provided, the pipe line being deposited in the ditch rearwardly of the machine.

The arrangement above described, serves very satisfactorily for pipe lines wherein the sections are welded together, whereas, in Figures 6 and 7, the ends of the section of the pipe line have been joined together to produce a joint 78.

This joint may be sufficient to abut against the sides of the jaws 58 and 59, and be held there so that free motion of the line through the member 57 may be obstructed. To overcome this difficulty, the modification shown in Figures 3 and 4 is provided, which modification shows a machine similar to that above described, but provided with two guide members 79 and 80. These guide members are constructed similarly to guide member 57, previously described, but their operation is somewhat different.

In this arrangement, in front of the guide member 79, is situated a bell crank 81 fulcrumed at 82, one arm of which is connected to a cable 83 which passes through and is secured to a lever 84, the cable passing over pulleys 85 and 86; thence over pulleys 87 and 88, and is thence connected at its other end with a bell crank 89 fulcrumed at 90, and being similar in every respect to the bell crank 81. The free arm of each of the bell cranks 81 and 89 are placed in such a position that a joint 78 of the pipe line will abut the free ends of the respective cranks, so that the arm of the crank 81 to which the cable 83 is secured, will be depressed; to pull the lever 84 in such a position as to bring the gears on shaft 100 into position such that the gear 92 thereon is meshed with the gear 93 carried by the shaft 100, and slidably keyed thereon.

The arrangement of the gears for operating the guide members 79 and 80 may now be described, and it will be seen that these gears and guide members are operated similarly to the manner described in connection with Figures 1 and 2. In other words, power is taken from the shaft 14*a* and gear 15*a*, the gear 15*a* driving a shaft 25*a* through the agency of the meshed gear 26*a*, the shaft 25*a* operating a clutch 26′, when clutch 26′ is in operative engagement with the shaft 25*a*, a shaft 27*a* corresponding to the formerly described shaft 27 being thereby driven, to operate the hoist mechanism as previously described, which hoist mechanism is partially broken away in Figure 3.

Upon the shaft 25*a* is positioned the gear 45*a*, similarly connected as above described, with the gear 45, gear 45*a* operating a gear 44*a* meshed therewith to drive the shaft 43*a*, which is provided at its upper end with the gear 42*a*. This shaft 43*a* and the gear 42*a* form the driving agencies for the system of gears now about to be described.

The shaft 91 is provided with a series of gears illustrated at 92, 94, 95 and 96. A fork 97, slidably mounted on shafts 100 and 101 carries the gears 109, 110, 93 and 108. These gears are slidably keyed to shafts 100 and 101.

The lever 84 is fulcrumed as at 104′, and engages a sleeve preferably slidably keyed to the shaft 91; at 104, the other end of the lever 84 being secured to the fork 97 as indicated at 105. The worms 102 and 103 mesh

respectively with gears 106 and 107 which operate the clamping members 79 and 80 respectively. The shaft 100 has secured to it a gear 93, which is relatively large, and a second gear 108 which is relatively substantially smaller than the gear 93, and the shaft 91 carries the gears 92 and 94 which are adapted during the operation of the machine to mesh with the gears 93 and 108 respectively, gear 92 being substantially smaller than gear 94. It will be seen that the gear 93 is positioned adjacent the end of the shaft 100, whereas the smaller gear 108 is positioned intermediate the large gear 93 and the warm 102.

For operating the guide member 80, a reverse arrangement of gears is provided. For this guide member 80, there is provided on the shaft 101 a small gear 109 which is adapted to mesh with the large gear 96, and intermediate the small gear 109 and the worm 103 is positioned the large gear 110 which is adapted to engage and mesh with the small gear 95.

As the machine progresses along the trench the joint 78 of the pipe line will abut against the free arm of the crank 81, depressing the arm to which is secured the cable 83. This operation pulls the cable and the end of the lever 84 in the direction shown by the arrow, causing the other end of the lever 84 to pull over the fork 97 against the tension of the spring 99 until the large gear 93 meshes with the small gear 92. This then rotates the worm 102 to operate the gear 106 to open the guide member 79 sufficiently wide to permit the passage therethrough of the joint 78.

Simultaneously with this action, the small gear 109 is brought into engagement with the large gear 96 which because of the relative sizes and dispositions of these gears, imparts a relatively more rapid motion to the gear 109 than is the speed of rotation of the gear 96 so that as the guide member 79 opens, the guide member 80 will be closed so that there is no possibility of the pipe line slipping out between both members.

When the joint 78 of the pipe line has passed through the guide member 79, it engages the bell crank 89, which depresses the cable carrying arm thereof to pull the lever 84 in the opposite direction, to open the guide member 80 while the guide member 79 is being closed. This action automatically takes place with each passage of a joint 78, one of the guide members being always closed as the other opens so that there is continuous support given to the pipe line as it is laid. The closing operation is quicker than the opening operation so as to insure that the pipe is at all times fully supported by one of the guide members.

In Figures 8 and 9 there is shown the machine passing over trenches, in Figure 8 the pipe line 24 being laid adjacent the trench 111, whereas, in Figure 9, the line 24 is laid directly over the trench.

As the machine passes along the trench straddling the same, see Figure 8, the pipe line is shoved or pushed inwardly over the trench as clearly shown, whereas in Figure 9 it is simply laid directly down by the machine as the bars 77 are removed. The weight of the machine is sufficient to give necessary lateral pressure to the pipe guiding and supporting jaws as they perform their functions of pushing the pipe into alinement with the trench according to the operation illustrated in Figure 8. Likewise the regular forward movement of the machine lowers the pipe gradually into place at the bottom of the trench. All required is to keep the machine in forward motion and, if desired, operate the members 66—67 for removing the cross-pieces or bars 77 on which the pipe has been resting. The parts 66—67 may under some conditions be omitted entirely.

It will be understood that the above illustrated forms and description thereof are illustrated only as examples of machines constructed in accordance with this invention, and that many modifications in the details of the construction thereof may be made without departing from the inventive concept. It will be accordingly understood that it is intended and desired to embrace within the scope of this invention such modifications and changes as may be necessary to adapt it to varying conditions and uses.

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

1. A pipe laying machine comprising a traction base for traveling along the trench in which a pipe is to be laid, and guiding means on the said base to continuously travel along and engage the pipe for lowering it into the trench, said guiding means including jaws movable to engage and disengage the pipe, and mechanism to operate the jaws.

2. A pipe laying machine comprising a traction base for traveling along the trench in which a pipe is to be laid, and guiding means on the said base to continuously travel along and engage the pipe for lowering it into the trench, said guiding means including jaws movable to engage and disengage the pipe, mechanism to operate the jaws, and roller means on the jaws to engage and directly contact with the pipe as the machine progressively lowers the same into the trench.

3. A pipe laying machine comprising a traction base for traveling along the trench in which a pipe is to be laid, and guiding means on the said base to continuously travel along and engage the pipe for lowering it into the trench, said guiding means including jaws movable to engage and disengage the pipe, and mechanism to operate the jaws,

comprising devices actuated by the joints between sections of the pipe for actuating the jaws to control their action on the pipe.

4. A pipe laying machine comprising a traction base for traveling along the trench in which a pipe is to be laid, and guiding means on the said base to continuously travel along and engage the pipe for lowering it into the trench, said guiding means including parts to spread and move together to release and embrace the pipe, and instrumentalities to actuate the last named parts for said movements.

5. A pipe laying machine comprising a traction base for traveling along the trench in which a pipe is to be laid, and guiding means on the said base to continuously travel along and engage the pipe for lowering it into the trench, said guiding means including parts to spread and move together to release and embrace the pipe, and instrumentalities to actuate the last named parts for said movements, including control members operable by joints between the pipe sections, the guiding means so operable adapted to move apart to pass a joint, and then together to engage the pipe between joints.

6. A pipe laying machine comprising a traction base for traveling along the trench in which a pipe is to be laid, and guiding means on the said base to continuously travel along and engage the pipe for lowering it into the trench, said guiding means including spaced pairs of jaws to receive and engage the pipe at opposite sides thereof, and means to operate each pair of jaws to open and close as the other pair is closed and opened, for enabling the jaws to readily pass joints in the pipe.

7. A pipe-laying machine, comprising the combination with driving means for the machine, of hoisting means carried by the machine for lifting a pipe line from its supporting beams, and mechanism carried by the machine for removing the beams as the pipe line is lifted.

8. A pipe-laying machine, comprising the combination with driving means for the machine, of hoisting means carried by the machine for lifting a pipe line from its supporting beams, mechanism carried by the machine for gripping and removing the beams as the pipe line is lifted, and means under ready control of an operator for the machine for actuating the beam removing mechanism.

9. A pipe-laying machine, comprising the combination with driving means for the machine, of hoisting instrumentalities carried by the machine for lifting a pipe line from its supporting beams, and mechanism carried by the machine for gripping and removing the beams as the pipe line is lifted, the mechanism comprising a pair of interacting jaw members pivotally mounted upon the machine for gripping and removing the beams, and means under ready control of the operator for actuating the beam removing mechanism.

10. A pipe-laying machine, comprising the combination with driving means for the machine, of hoisting instrumentalities carried by the machine for lifting a pipe line from its supporting beams, and mechanism actuated by the driving means for supporting the lifted line and for laying it in its trench.

11. A pipe-laying machine, comprising the combination with driving mechanism, of a guiding device carried by the machine for guiding a pipe line into its trench, the said guiding means comprising cooperating members, adapted to engage the pipe line, and means operated by the driving mechanism to actuate the members.

12. A pipe-laying machine, comprising the combination with driving mechanism, of a guiding device carried by the machine for guiding a pipe line into its trench, the guiding means comprising cooperating jaw members for engaging and guiding the pipe line rollers carried in each jaw to facilitate passage of the pipe line through the guide as the machine travels along the line, and means operated by the driving mechanism to actuate the jaws to open and close them.

13. A pipe-laying machine, comprising the combination with driving mechanism, of a guiding device carried by the machine for guiding a pipe line into its trench, the guiding means comprising cooperating jaw members adapted to receive between them predetermined sizes of pipe, means in each jaw for engaging the pipe line to facilitate passage thereof through the guide as the machine travels along the line, and instrumentalities operated by the driving mechanism to engage and disengage the jaws from the pipe line.

14. A pipe-laying machine, comprising the combination with driving mechanism, of a pair of guiding devices carried by the machine, each of the devices being actuated by the driving mechanism and being adapted to close around a pipe line to guide it into a trench therefor as the machine travels along the trench, and means for closing one of the devices as the other opens to assure continuous support for the pipe line.

15. A pipe-laying machine, comprising the combination with driving mechanism, of a pair of guiding devices carried by the machine for guiding a jointed pipe line into a trench therefor, each of the devices comprising a pair of jaws adapted to close around the pipe line for guidance thereof, and means for closing one of the devices as the other opens to assure continuous support for the pipe line.

16. A pipe-laying machine, comprising the combination with driving mechanism, of a pair of guilding devices carried by the machine for guiding a jointed pipe line, each

of the devices being adapted to close around the pipe line, means adjacent each device and operated by contact with the pipe line joints to bring the devices selectively into contact with power transmitted from the driving mechanism to open first one and then the other of the devices, and means for closing one of the devices as the other opens to assure continuous support for the pipe line.

17. A pipe-laying machine, comprising the combination with driving mechanism, of a pair of guiding devices carried by the machine for guiding a jointed pipe line into a trench therefor, each of the devices comprising a pair of jaws adapted to close around the pipe line, means adjacent each device and operated by contact with the pipe line joints to bring the devices selectively into contact with power transmitted from the driving mechanism to open first one and then the other of the devices, and a gear system for transmitting power from the driving mechanism to the devices, the gear system also serving to close one of the devices as the other opens to assure continuous support and guides for the pipe line.

18. A pipe-laying machine, comprising the combination with driving mechanism, of lifting and guiding means for laying a pipe line into a trench thereof, and instrumentalities carried by the machine, for progressively removing supporting bars which carry the pipe line.

19. A pipe-laying machine, comprising the combination with driving mechanism, of lifting and guiding means operated by the driving mechanism for laying a pipe line into a trench therefor, and cooperating gripping members pivotally mounted on the machine in advance of the guiding means for progressively gripping and removing supporting bars which carry the pipe line.

20. A pipe-laying machine, comprising the combination with driving mechanism, of lifting and guiding means operated by the driving mechanism for lifting and guiding a pipe line into a trench therefor, and a gripping means for progressively gripping and removing to one side bars carrying the pipe line.

21. A pipe laying machine comprising a traction base for traveling along the trench in which a pipe is to be laid, and guiding means on the said base to continuously travel along and engage the pipe for lowering it into the trench, said guiding means including spaced pairs of jaws to receive and engage the pipe at opposite sides thereof, means to operate each pair of jaws to open and close as the other pair is closed and opened, for enabling the jaws to readily pass joints in the pipe, and instrumentalities to actuate the last means, the operation of which is caused by coaction with joints in the pipe.

22. A pipe laying machine comprising a traction base for traveling along the trench in which a pipe is to be laid, and a pushing device adapted to push a pipe from a lateral and parallel position relatively to the trench into a position above the trench and in longitudinal alignment therewith, the said pushing device being carried by the base and arranged for continuous running engagement with the pipe being laid as the machine progresses along the trench, said pushing device comprising a frame having moving contact parts upon it upon which the pipe is carried and which turn freely by contact against the under side of the pipe as the traveling base moves along the pipe being handled to thus avoid friction between the frame and pipe.

23. A pipe laying machine comprising a traction base for traveling along the trench in which a pipe line is to be laid, and pipe line lifting and supporting means on the said base, including instrumentalities to continuously travel along the pipe line comprising moving parts to directly contact the under side of the pipe and support the same to avoid friction between the supporting means and the pipe as the base travels along the pipe, the said supporting means engaging and lifting the pipe line from the ground for lowering it into the trench.

24. A pipe line handling machine comprising a traction base for traveling longitudinally of a trench along which a preformed pipe line is disposed ready to be laid therein, and pipe lines supporting means on the said base including a frame having moving parts to engage the under side of a pipe line and to continuously travel along the pipe line as the latter is positioned relatively to the trench, the said means engaging the pipe line to move the same relatively to the trench in the pipe line handling operation.

25. In a pipe line laying machine of the class described, a pipe supporting member embracing the pipe line and movable along the pipe, the said member comprising a plurality of rolling surfaces transverse to the line of pipe being handled and disposed in divergent relation to provide a space in which the pipe is received and supported.

26. In a pipe line laying machine of the class described, a pipe supporting member embracing the pipe line, the said member comprising a plurality of jaw members in spaced relation and roller means on the said jaw members for permitting free longitudinal movement thereof along the pipe line.

27. In a pipe line handling apparatus, a pipe supporting element comprising a pair of movable pipe supporting jaws mounted for movement along the pipe, and roller means carried by the jaws and disposed transversely of the pipe to provide free longitudinal movement of the supporting ele-

ment with respect to the pipe to be supported and means for holding said jaws in closed position.

28. In a pipe handling apparatus of the class described, a portable support, means for moving the support, and a pipe supporting member carried by the support including a pair of complemental pivoted jaw members arranged to engage a pipe line to be handled, each of said jaw members being provided at its inner face with pipe supporting rollers arranged to rotate in a direction coinciding with the direction of movement of the support for producing free longitudinal travel of the support along the pipe.

29. In a pipe handling apparatus, a grapple device adapted to engage and support a pipe while moving therealong, the said device being provided with anti-friction means disposed transversely of the direction of movement of the device.

In testimony whereof I affix my signature.

JOHN F. ROBB.