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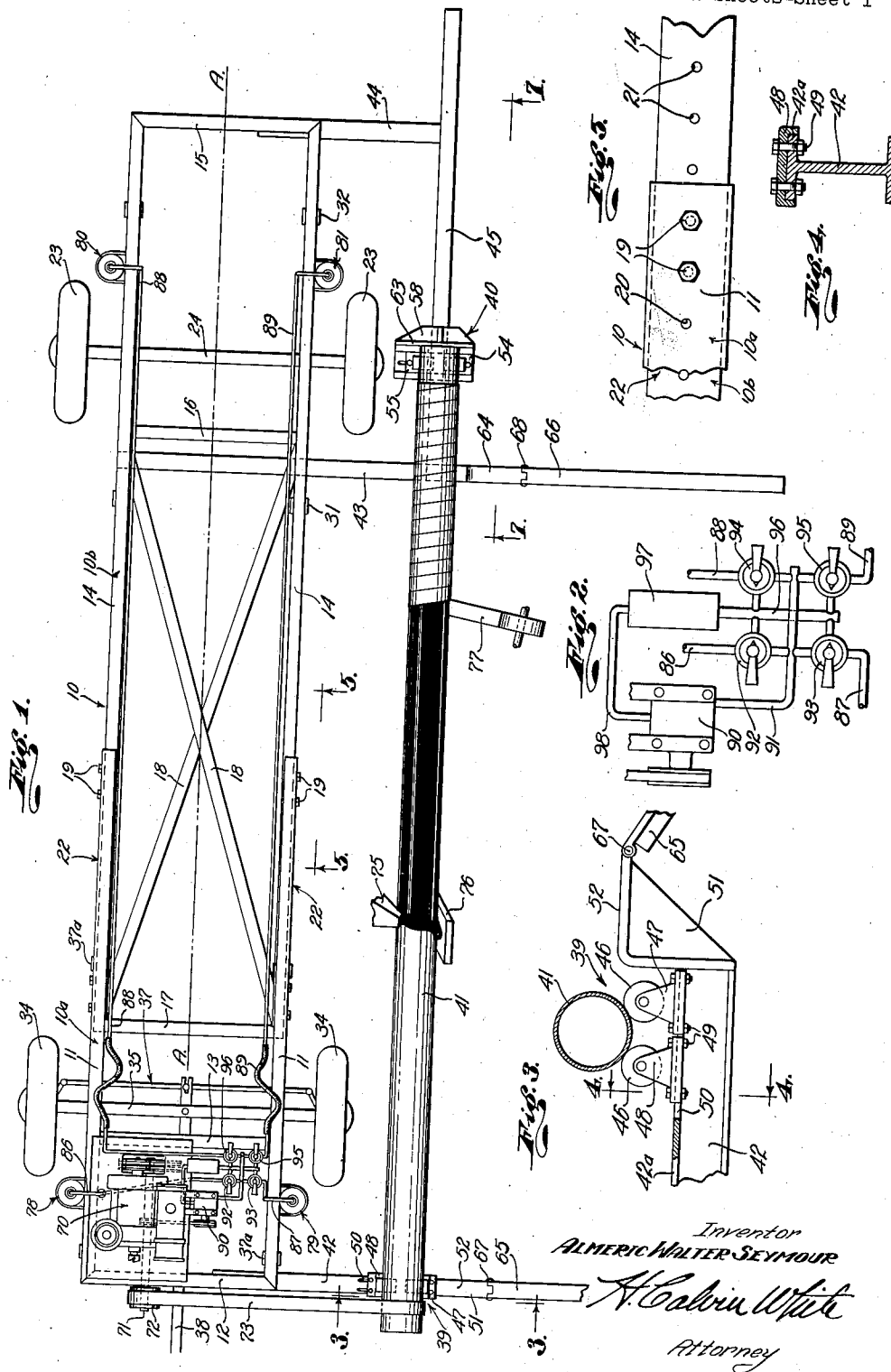
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2,258,104

APPARATUS FOR WRAPPING PIPE

Filed Oct. 23, 1939

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Fig. 6.

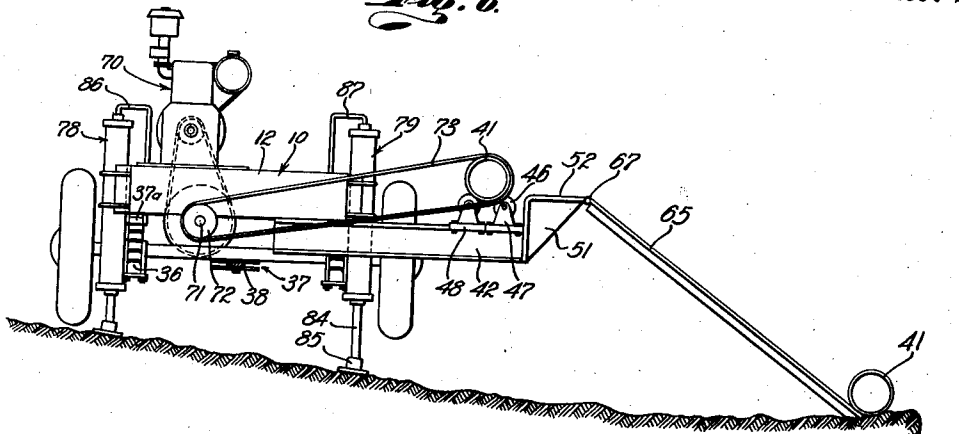


Fig. 7.

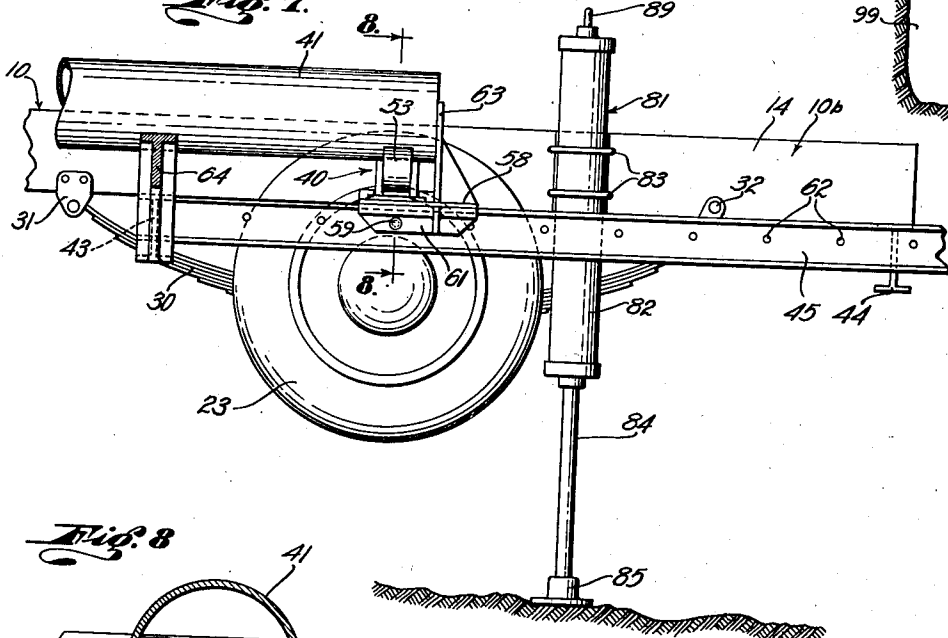
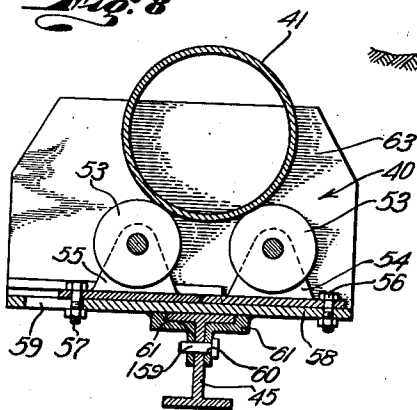


Fig. 8.



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APPARATUS FOR WRAPPING PIPE

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7 Claims. (Cl. 214—1)

This invention has to do generally with apparatus for spirally wrapping pipe, and is particularly concerned with improved wrapping equipment adapted to travel along the course of successive lengths of pipe arranged endwise in a more or less continuous series, and to be used in wrapping the pipe lengths individually. As an example, the apparatus may be used at great savings of time and labor for spirally wrapping the individual sections of a gas pipe main that initially are laid in end to end series on the bank of an open trench, to be first cleaned and wrapped, and later welded together in the trench.

In the past, the more general practice in spirally wrapping pipe has been to employ comparatively massive and mechanically complicated machines located at a central wrapping plant, and to transport the wrapped pipe from this plant for use on the job. A recently issued patent, No. 2,148,780, granted February 28, 1939, to Edward W. Seymour on Apparatus for wrapping pipe, describes a form of pipe wrapping machine having the advantage of portability that enables it to be set up in the field to wrap pipe at the location of the job, thus obviating the necessity for having to transport the pipe to and from a central or remote wrapping plant. The present invention represents a further advance in portable pipe wrapping equipment, in that it provides greater facility and speed in wrapping pipe laid out along the course of a distribution line, than any apparatus heretofore available.

In laying a pipe line, the individual pipes are placed on the bank of the trench and strung out along its course. My principal object is to avoid having to first wrap the pipe at some remote location, with possible damage to the wrapping in transit to the job, by providing a traveling apparatus that may be advanced along the pipe course to wrap successive pipe lengths without having to transport the pipe other than to move it onto and off the apparatus. The invention permits a new and expeditious method of laying the pipe line in that all operations can be carried forward at the same time and with a consolidated crew of workmen. Thus while certain workmen are engaged in cleaning, coating and wrapping each length of pipe, others may be engaged in placing in the trench and welding together the ends of the immediately preceding lengths. And of course these operations may go forward with advance trench digging and follow-up filling machines, so that the entire work involved in laying the line goes along progressively and without interruption.

Referring more specifically to the particular features of the invention, the present apparatus may be described generally as comprising a wheeled vehicle adapted to advance along the pipe course, and carrying suitable means for rotatably supporting the pipe while the coating and wrapping are applied. In the broad aspects of the invention, the pipe supporting and rotating means may be of any suitable form and design. Typically and preferably, the pipe may be supported for rotation at longitudinally spaced points on the vehicle frame, and rotated by a suitable drive powered by a motor carried by the vehicle. Ordinarily, though not always necessarily, the pipe may be supported at a position offset from the longitudinal axis of the vehicle frame, thus rendering it more convenient to load and unload the pipe from the side of the vehicle, all as will later appear more fully.

Due to the frequent irregularity and changing slope of the ground on which the equipment is moved in successive operations, it may be desirable to provide for maintaining the apparatus in level position, either or both laterally and longitudinally of the vehicle. While the invention broadly contemplates any suitable device for so leveling the apparatus, I show and later describe an illustrative means in the form of selectively operable jacks which may be used to level the frame in any direction and for all conditions of ground slope.

Various additional features and aspects come within the purview of the invention, but these as well as the objects referred to above, will be understood from the following description of the invention as embodied in a typical form. Reference is had throughout the description to the accompanying drawings in which:

Fig. 1 is a plan view of the apparatus;

Fig. 2 is a fragmentary enlargement of the jack operating pump, accumulator and control valve assembly;

Fig. 3 is a fragmentary elevation as viewed from line 3—3 of Fig. 1, showing one pair of the pipe supporting rollers;

Fig. 4 is a section on line 4—4 of Fig. 3;

Fig. 5 is a fragmentary enlargement of one of the frame section joints as viewed from line 5—5 of Fig. 1;

Fig. 6 is a left end elevation of Fig. 1, showing the vehicle in a leveled position on sloping ground;

Fig. 7 is an enlarged side elevation toward the rear of the apparatus as viewed from line 7—7 of Fig. 1; and

Fig. 8 is a section on line 8—8 of Fig. 7.

For purposes of illustration, I have shown the pipe wrapping apparatus to be carried on a vehicle in the form of an elongated trailer adapted to be pulled by a suitable traction vehicle such as a truck or tractor. While preferred and particularly advantageous from many standpoints, the particular form of vehicle shown is to be regarded merely as typical, since the invention broadly contemplates mounting the pipe wrapping apparatus on any suitable wheeled vehicle, and which may or may not be self-driven.

Referring first to Fig. 1, the vehicle comprises an elongated frame, generally indicated at 10, of suitable construction and made preferably in forward and rear sections 10a and 10b which are relatively longitudinally adjustable so that the frame as a whole is capable of being distended or contracted to accommodate pipes of varying lengths. The forward frame section 10a comprises side rails 11 and a suitable arrangement of cross members as at 12 and 13. The rear frame section 10b includes side rails 14 interconnected by cross members 15, 16 and 17, the section being suitably reinforced as by the diagonal braces 18. The forward ends of side rails 14 are received within the channel-shaped side rails 11 of the forward frame section 10a, and are adjustably retained therein by inserting bolts 19 through registering pairs of longitudinally spaced holes 20 and 21 in the rails. As will be apparent, adjustability of the bolts 19 permits variation of the frame length within the limits of telescopic adjustment of the joints 22. Rear wheels 23 and the conventionally illustrated axle 24, are attached to the frame by the usual spring 30 and shackle connections 31 and 32, see Fig. 7. The front wheels 34 and axle 35 similarly are connected to the forward frame section by springs 36 and shackles 37a, see Fig. 6. The forward wheels, or wheel and axle assembly, may have any suitable steering mechanism, conventionally indicated at 37, controlled by lateral movements of the draw bar 38 which connects the trailer to the traction vehicle.

The pipe wrapping apparatus comprises means, generally indicated at 39 and 40, adapted to rotatably support the pipe 41 to be wrapped at longitudinally spaced points on the frame 10. While the supporting means 39 and 40 may be located at any suitable positions transversely of the frame, they preferably are offset to one side of the central frame axis A—A, and advantageously beyond the wheels 23 and 34 to avoid interference in placing the pipe upon and removing it from the supports. This arrangement also permits the pipe 41 to be supported at a level below the tops of the wheels 23 and 34, without having to lift the pipe over the wheels as it is placed in and removed from wrapping position.

The offset pipe supporting structure comprises a forward, laterally projecting frame member 42, and a pair of members 43 and 44 interconnected by a longitudinally extending rail 45. The forward pipe support 39, see Fig. 3, comprises a pair of rollers 46 pivotally mounted on carriers 47 and 48 secured to the flanges 42a of the I-beam frame member 42 by bolts 49. Carrier 48 is adjustable to vary the spacing of the rollers 46 by loosening the bolts and sliding the carriage along member 42, the latter being slotted at 50 to permit shifting the bolts. The outer end of member 42 is welded to bracket 51, the top surface 52 of which is positioned at or slightly above the level of the tops of rollers 46, in order to

avoid the necessity for bodily lifting of the pipe as it is rolled onto and off the rollers.

The support 40 similarly comprises a pair of rollers 53 on carriers 54 and 55, the bases of which are secured by bolts 56 and 57 to a carriage 58. Bolt 57 extends through a slot 59 in the carriage to permit lateral adjustment of carrier 55 and spacing of the rollers 53. The carriage 58 is slidable longitudinally on beam 45 between positions of adjustment at which the carriage is held by a pin 159 inserted through openings 60, see Fig. 7, in angular guide members 61 welded to the underside of the carriage, and spaced holes 62 in the center web of the beam 45. Formed integrally with the carriage is an upstanding abutment plate 63 positioned beyond the rollers 53 and adapted to be engaged by the end of the pipe 41 to properly position and stabilize the latter against endwise motion during the wrapping operation. The adjustability of the carriage 58 longitudinally of beam 45 provides a means, in addition to the distensibility of the vehicle frame 10, for varying the distance between the pipe supports 39 and 40. Together, these features of adjustment may permit variation of the support spacing within ranges of 10 feet or more to accommodate corresponding variations that may occur in the lengths of pipe to be wrapped.

Referring to Fig. 1, the outer end of frame member 43 carries an upset portion or bracket 64 similar to bracket 51 on member 42, to maintain the pipe being rolled onto and off the rollers, at proper elevation relative thereto. The individual pipe lengths are rolled on and off the machines on a pair of inclined rails 65 and 66 hinged at 67 and 68, respectively, to brackets 51 and 64 so that when the vehicle is being advanced from one location to the next, rails 65 and 66 may be swung back about their pivotal connection to out of the way positions on the frame 10.

It is to be understood that while being wrapped, the pipe 41 may be rotated by any suitable means, and that the illustrated drive therefore is to be regarded as typical only. The pipe drive is shown to comprise a motor, generally indicated at 70, mounted on the frame 10 and driving a forwardly extending shaft 71 carrying a belt pulley 72. The latter drives the pipe 41 by way of a belt 73 carried by pulley 72 and placed about the end portion of the pipe projecting beyond its support 39. The belt 73 is of course applied to and removed from the individual pipe lengths before and after they are wrapped.

In the wrapping operation, the pipe 41 is placed on the roller supports 39 and 40, with the carrier 58 adjusted so that the abutment 63 will position the pipe to leave sufficient length projecting beyond the forward support 39 for application of the driving belt 73. The pipe is wrapped throughout its length except for exposed portions at the ends, which rest on the rollers 46 and 53, these exposed ends of successive pipes being welded together after the pipes are laid in the trench. While the pipe may be wrapped by any suitable method, ordinarily and in most instances it will be preferable to apply the wrapping manually. To illustrate, while the pipe is being rotated, one workman may advance along the pipe a receptacle, indicated by the spout 75, containing hot asphalt that is poured above the wiper 76. A second workman follows immediately with the wrapping tape 77 which is spirally wound about the pipe on the hot asphalt coating. As previously mentioned, one of the principal

uses for the apparatus is in wrapping lengths of pipe strung along the bank of a trench in laying gas, oil or water lines. Frequently the vehicle is required to move along uneven ground, for example, a sloping trench bank surface or ground sloping longitudinally of the trench. In order to maintain the pipe 41 properly positioned on the supports 39 and 40, it is desirable that the individual pairs of rollers 46 and 53 be maintained at the same level, and also that both pairs be at about the same level, although the rear support 40 may be slightly lower to maintain the pipe against the abutment plate 63. The invention contemplates broadly the use of any suitable means for maintaining the rollers level at times when the vehicle may be on sloping ground. As typical leveling means, I show the frame 10 to carry forward and rear pairs of hydraulically operated jacks 78, 79 and 80, 81, which may be operated individually or in any pair combination in conformity with the ground slope, to maintain the frame and pipe wrapping apparatus at level position.

Referring to Fig. 7, each of the jacks comprises a cylinder 82 suitably secured to the frame side rail as at 83, and containing a piston having a rod 84 which carries a normally elevated swivel shoe 85 adapted to bear on the ground when the jack is operated. High pressure fluid may be supplied to the jack cylinders through lines 86, 87, 88 and 89 by a pump 90 driven from the engine 70 and discharging through a manifold line 91 from which the fluid pressure may be selectively communicated to the jack cylinders under control of four way valves 92, 93, 94 and 95. These valves also control return flow of fluid from the jack cylinders to a manifold line 96 discharging into a reservoir 97 from which the pump takes suction through line 98.

Assuming the vehicle to be standing on laterally sloping ground as illustrated in Fig. 6, all the jacks, or at least 79 and 81 at the low side, may be operated to bodily lift the vehicle, including the wheels, to a level position. Valves 92 to 95 are then closed to lock the jacks in proper raised positions. Preferably, though perhaps not necessarily in all instances, the jacks are caused to raise all wheels of the vehicle from the ground, so as to give firm and substantially rigid support on the jack shoes 85. As will be apparent, in section where the ground slopes longitudinally of the trench 99, the forward and rear pairs of jacks 78, 79 and 80, 81 may be selectively operated to level the apparatus longitudinally.

It is to be understood that the drawings are to be regarded merely as typical and illustrative, and that various changes and modifications may be made without departure from the invention in its intended spirit and scope.

I claim:

1. Traveling pipe wrapping apparatus comprising a vehicle having an elongated frame and forward and rear pairs of wheels, said frame including an elongated side rail extending longitudinally of the vehicle beyond the wheels, laterally extending members supporting said rail, rollers spaced longitudinally of the frame on said rail for rotatably supporting the outer surfaces of an elongated pipe in spaced relation to the vehicle permitting free access to the pipe for application of the wrapping, and a power source for rotating the pipe.

2. Traveling pipe wrapping apparatus comprising a vehicle having an elongated frame and forward and rear pairs of wheels, said frame including an elongated side rail extending longitudinally of the vehicle beyond the wheels, laterally extending members supporting said rail, rollers spaced longitudinally of the frame on said rail for rotatably supporting the outer surface of an elongated pipe in spaced relation to the vehicle permitting free access to the pipe for application of the wrapping, means for mounting a pair of said rollers for bodily adjustment longitudinally on said rail, and a power source for rotating the pipe.

3. Traveling pipe wrapping apparatus comprising a vehicle having a motor, an elongated frame and forward and rear pairs of wheels, said frame including an elongated side rail extending longitudinally of the vehicle beyond the wheels, laterally extending members supporting said rail, rollers spaced longitudinally of the frame on said rail for rotatably supporting the outer surfaces of an elongated pipe in spaced relation to the vehicle permitting free access to the pipe for application of the wrapping, and means driven by said motor and applied to an end portion of the pipe to rotate the pipe independently of said rollers.

4. Traveling pipe wrapping apparatus comprising a vehicle having an elongated frame and forward and rear pairs of wheels, said frame including a plurality of spaced laterally projecting members, a rail supported by said members and extending longitudinally of the side of the vehicle beyond and below the tops of the wheels, and rollers mounted on said rail to rotatably support an elongated pipe.

5. Traveling pipe wrapping apparatus comprising a vehicle having an elongated frame and forward and rear pairs of wheels, said frame including a plurality of laterally projecting members, a rail supported by said members and extending longitudinally of the side of the vehicle beyond the wheels, pipe supporting rollers mounted on and adjustable longitudinally of said rail, a stop movable in accordance with the position of said rollers and adapted to engage the pipe to limit its endwise movement in one direction, and means included in the frame structure for supporting the pipe at the outside of the rollers and at substantially the elevation thereof.

6. Traveling pipe wrapping apparatus comprising a vehicle having an elongated frame and forward and rear pairs of wheels, rollers spaced longitudinally on said frame for rotatably supporting an elongated pipe, means supporting said rollers at one side of the frame beyond the wheels, means for longitudinally distending said frame to vary the spacing of said rollers, and a power source for rotating the pipe.

7. Traveling pipe wrapping apparatus comprising a vehicle having an elongated frame and forward and rear pairs of wheels, pairs of rollers spaced longitudinally on said frame for rotatably supporting an elongated pipe, means supporting said rollers at one side of the frame beyond the wheels, means for longitudinally distending said frame to vary the spacing of said rollers, means for independently adjusting one of said pairs of rollers longitudinally of the frame, and a power source for rotating the pipe.

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