My invention relates to a machine for wrapping objects, and one of the objects of the invention is to provide means for wrapping a protective strip of material about pipe of a pipe line already in position in the ground.

Another object of the invention is the provision of a pipe wrapping machine by which protective strips are wrapped about a fixed pipe, and embodying means for applying an adhesive and waterproof fluid to bind the wrapping to the pipe and seal the pipe with an impervious covering which is water and decay proof.

Another object of my invention is the provision of improved means for holding a supply roll of wrapping material during the operation of the machine.

Another object of the invention is the provision of means for preventing loosening of the supply roll of wrapping material during operation of the machine.

A further object of my invention is the provision of improved means for applying adhesive fluid to bind the wrapping to the pipe.

My invention possesses other objects and valuable features, some of which will be set forth in the following description of my invention which is illustrated in the drawings forming part of the specification. It is to be understood that I do not limit myself to the showing made by the said description and drawings, as I may adopt varying forms of my invention within the scope of the claims.

Referring to the drawings:

Figure 1 is a plan view showing the wrapping machine of my invention in position for applying a wrapping strip on a pipe line; and Figure 2 is a side elevation of the same, a portion of the structure being omitted to disclose the construction more clearly.

Figure 3 is an end elevation of the machine, the view being taken in the direction of arrow 3 of Figure 2.

Figure 4 is a sectional view showing the driving gear for the reel and distributor head; the plane of section is indicated by the line 4-4 of Figure 2.

Figure 5 is a transverse sectional view thru the adhesive fluid distributor head, the plane of the section being indicated by the line 5-5 of Figure 2.

Figure 6 is a longitudinal sectional view thru the upper part of the distributor shown in Figure 5. The plane of section is shown by the line 6-6 of Figure 5.

Figure 7 is a perspective view showing a modified type of distributor pipe for the distributor head.

Figure 8 is a perspective view showing the use of two distributor pipes on the distributor head; and Figure 9 is a sectional view taken on a plane indicated by line 9-9 of Figure 6.

Figure 10 is a transverse sectional view thru the wrapping strip reel. The plane of section is indicated by the line 10-10 of Figure 2.

Figure 11 is a sectional view taken in a vertical plane coincident with the axis of the reel shown in Figure 10. The plane of section is indicated by the line 11-11 of Figure 10.

Figure 12 is a sectional view thru a distributor pipe, showing a spring gate to control the flow of fluid.

In terms of broad inclusion, the wrapping machine of my invention comprises a frame, provided with means for supporting it upon a pipe to be wrapped. A reel on which a quantity of the wrapping material is held in a roll encircling the pipe is arranged on the frame. Means are provided for rotating the reel to wind the strip about the pipe and simultaneously to advance the frame along the pipe, so that the wrapping strip is applied to the pipe spirally one over the other; and means are provided to prevent unwinding of the roll while the strip is wound about the pipe. Means are provided for applying a sealing fluid such as hot asphalt, so that the wrapping strip is adhesively retained in place and the laps sealed with an adhesive, waterproof and durable material. To prevent accumulation of the adhesive on the reel, a covering is used to protect the reel.

In greater detail, the wrapping machine of my invention comprises a frame 2, one end of which is pointed. On the frame is journaled a shaft 3 carrying a wheel 4, adapted to support the unpointed end of the frame upon the pipe or pipe line 6. Preferably the wheel is provided with a rubber tire 7 to tractively engage the surface of the pipe. The pointed end of the frame is similarly supported by a wheel 8 carried on the frame and provided with a rubber tire 9. Shoes 11 (Figure 2) supported on the frame on each side of the pipe prevent lateral displacement of the frame, and a vertically adjustable arm 12 extending laterally from the frame carries a wheel 13 adapted to rest on a plank 14 temporarily arranged at the side of the ditch in
which the pipe is laid. The dirt at the side of the ditch may be leveled off so as to provide an approximately true path on which the plane may be conveniently placed. The machine may thus travel along the pipe without danger of tipping over.

Sidably mounted and journalled adjacent one end in the forked bearing 17, fixed to the frame, is a shaft 18, the opposite end of which is journalled in the bearing 19 fixed to the frame. Upon the shaft 18 is keyed a combination friction disk and gear 21 in mesh with the pinion 22 of the electric motor 23 connected by flexible conductors with any suitable source of power to drive the main shaft 18. Splined on the shaft 24, journalled in the terminal bearing 26 integral with the bearing 17 and also journalled in the bearing 27 on the frame, is a friction wheel 28 adapted to engage the face of friction disk 21. The friction disk 21 is pressed against the friction wheel 28, by means of a spring 29 surrounding shaft 18 and interposed between fixed bearing 17 and a collar 31 threaded on the shaft 18. For causing the friction disk 21 to rotate without contact with the friction wheel a set screw 32 abutting against the end of shaft 18 is threaded in bearing 33 on the frame. A wheel 34 is provided for turning the set screw to move the shaft and disk 21 inwardly, and lock wheel 36 is provided for fixing the set screw in position. It is thus seen that the spring 29 normally tends to hold the friction wheel and disk in contact, but by turning the set screw 32 inwardly the mechanism can be clutched.

The wheel 4 is driven to move the frame along the pipe by means of pinion 37 fixed to shaft 24 and in mesh with gear 38 on shaft 39 carrying the pinion 41 in mesh with gear 42 carried by the shaft 3, upon which the wheel 4 is also carried.

For selectively varying the speed of rotation of friction wheel 28 and hence the speed of movement of the frame along the pipe, the friction wheel is provided with a grooved hub 43 in engagement with the spindle 44 in suitable bearings on the frame, and which can be positioned by means of the wheel 46 on the spindle.

Engaged on the main shaft 10 is a pinion 47 in mesh with the annular gear or rotor 48, arranged in a bearing 49 on the frame, and which as shown in Figure 4 extends around the upper two-thirds of the journal 51 of the gear, thus leaving a gap in the lower portion of the bearing. The rotor is provided with a removable segment 50 so that when the segment is taken out of the rotor, the machine may be let down over the pipe. With the securing of the segment once more in place by means of the screws 52, the rotor surrounds or encircles the pipe.

Extending from diametrically opposite points on the rotor are arms 53 on the ends of which is pivotally mounted a reel frame comprising the bottom 54 having a slot 55, with inwardly projecting flanges 56' adjacent the slot to form a spout, and the annular side flanges 56. Journalled in the annular flanges are a series of circumferentially spaced rollers 57 each of which is provided with an annularly grooved hub 58 on each side. These hubs provide a journal for the annular plates 59 which comprise flanges for the rollers. In order to permit assembly of the reel over the pipe line, the annular flanges 56 and 58 are also made in two portions as shown best in Figures 3 and 11, and each is adapted to be secured together by the swing screws 61 locked in lugs 62 by the wing nuts 63.

The reel thus formed is adapted to hold a roll 64 of strip wrapping material, and because of the possession of the rollers 57, this roll may be unwound from the inside as the strip is applied to the pipe. Means are provided for adjusting the angular relation of the reel to the pipe and this is accomplished by providing the end of one of the arms 53 with an upturned end 65 which has pivotally mounted therein a lug 66 thru which is threaded a spindle 67, passing loosely thru a lug 68 fixed to the bottom 54 and prevented from axial movement in the lug 68 by the round faced collars 69. A hand wheel 71 permits rotation of the spindle to fix the angular position of the reel.

In order to wind on the supply of wrapping material, the friction disk 21 is moved out of contact with friction wheel 28 to prevent movement of the machine along the pipe and the reel is adjusted with its axis coincident with that of the pipe. The motor is stopped and the end of the strip 72 of material from a supply roll, positioned either on the machine directly above the reel or off the machine on a truck or carriage, is then applied to the reel which is indicated by the dotted lines in Figure 10. With the starting of the motor 23, the reel is rotated until a sufficient amount of material has been accumulated whereupon the material may be torn to provide a loose end on the reel.

In applying the wrapping material to the pipe, the inner end of the roll on the reel is placed about one of the rollers 57 as best shown in Figure 10, and is then drawn thru the slot 55 in the reel bottom 54. The material is next started about the reel by the action of the strip which, when the strip passes, is located above the slot 55 and is preferably a little larger than the other rollers; the bottom 54 of the reel is indented to accommodate the roller.

The angular relation of the reel to the pipe is determined by the ratio between the rotational speed of the reel and the speed of forward movement of the main frame along the pipe; and this ratio, the angular adjustment of the reel and the width of the strip of wrapping material are so arranged and proportioned that the desired amount of lapping of the spiral strips is obtained. If desired this lap may be so great that with a single strip, the covering will consist of two or even more thicknesses of material. With the motor started and other adjustments properly made, the reel is rotated simultaneously with rotation of drive wheel 4, and with the progression of the entire machine along the pipe, the wrapping strip is drawn off the inside of roll 64, the entire roll rotating upon the rollers of the reel.

In winding the roll of material from the reel onto the pipe, the loose end on top of the roll flaps about and thereby causes a loosening of the roll which is undesirable; therefore, means are provided for tensioning the roll 64 on the reel and to prevent loosening thereof. As best shown in Figures 1 and 2, a rod 73 is fixed to the main frame, and to rest on the roll, is pivotally connected from to a point adjacent the reel. Journalled on the rod 73 is a collar 74 prevented from sideward movement by means of collars 76 fixed to rod 73.

A second rod 77 carrying the pivotally mounted weight 78 adapted to fit between the annular flanges of the reel and to resist on the roll, is pivotally connected to the collar 74. It is thus seen that weight 78 resting on the roll, prevents loosening thereof, and at the same time due to the flexibility of the connections between the 79
weight and main frame, it can be adjustably positioned according to the position of the reel. Means are provided for applying a sealing fluid to the pipe and wrapping strip while the latter is applied, and preferably this fluid is hot asphalt so that the strip is not only cemented into place but all joints sealed with a decay-resisting and water-proof material. Fixed on the arms 53 between the rotor 48 and the reel is an annular trough-like chamber 79, best shown in Figures 5 and 6. The chamber has a U-shaped section and is closed at its outer periphery by a rim 81 suitably mounted on the frame 2. The rim is provided with recesses adapted to hold electric heating elements 82, supplied thru conductors 83 connected to any suitable source of energy, so that the contents of the chamber may be kept hot. The rim is preferably provided with insulation 84 to prevent waste of heat, and this retained in place by the metallic shell 85.

The chamber is fed thru the pipe 87, connecting the rim with the tank 88 in which fluid asphalt is placed from time to time as the wrapping proceeds. Both the chamber and the tank are made in sections as shown in Figure 5 to permit them to be assembled over the pipe. The rim is conveniently made in two halves, joined together by the readily released swing screws 89, and the lower part is supplied with a drain opening normally closed by plug 91, so that the chamber may be drained of fluid when it is necessary to disconnect the parts. The removable portion of annular chamber 79 preferably constitutes about one-third of the circumference of the chamber, and are held together by readily operated swing screws 92.

Extending from the side of the distributor head or chamber 79 thus constituted and positioned just ahead of the wrapping strip, is a pipe or distributor 93 having a slot 94 in the end thereof in such position to permit the wrapping strip to pass therethrough as to discharge fluid between the pipe and wrapping strip and on both sides of the wrapping strip. This insures sufficient coating for the strip and pipe. The distributor rotates with a lunar motion about the pipe.

To facilitate passing the strip thru the slot of the distributor pipe, the pipe may be constructed with a removable mounted portion 96 having the half plug 97 cooperating with the half plug 98 to close the end of the pipe. The removable portion is resiliently held to the pipe by means of a spring 99 fitting in groove 101. It is thus seen that in the construction described, the strip may be easily passed thru slot 102 by separating the parts and then permitting them to snap into position again.

In Figures 8 and 9 is shown another modification for applying the fluid to both sides of the wrapping strip. Extending from the side of the chamber 78, are two distributor pipes 103 spaced from each other and between which the strip is passed. Slots 104 are provided in the ends of the pipes on adjacent sides; so that fluid is discharged on each surface of the strip. The two distributor pipes are also mounted for lunar motion about the pipe to be wrapped.

In the event of fluid flowing out too rapidly from the slot in the distributor pipe through which the material passes, a spring gate 105, shown in Figure 12, may be fixed to one or both sides of the pipe adjacent the slot; so that the ends of the gate resiliently abut against the strip and pipe to control the flow of fluid.

It is to be noted that since the reel is provided with a bottom 54, a covering for the rollers 57 obtains; therefore, fluid does not accumulate on the rollers to cause them to function improperly; nor does it accumulate on the underside of the reel to cause it to stick to the rollers.

I claim:

1. A pipe wrapping machine comprising a frame, a wheel for supporting said frame upon the pipe to be wrapped, a rotor adapted to encircle the pipe and mounted on said frame, means for rotating the rotor to transfer the wrapping material from the holding means to the pipe, means for rotating the wheel to move the frame along the pipe, means for varying the relative speed of rotation between the wheel and rotor, and means for applying a fluid to bind the wrapping material to the pipe.

2. A pipe wrapping machine comprising a frame, a wheel for supporting said frame upon the pipe to be wrapped, a reel for holding the wrapping material in a roll encircling the pipe, means for rotating the reel to apply the wrapping material to the pipe, and means for rotating the wheel to move the frame along the pipe.

3. A pipe wrapping machine comprising a frame, a wheel for supporting said frame upon the pipe to be wrapped, a reel for holding the wrapping material in a roll encircling the pipe, means for rotating the reel to apply the wrapping material to the pipe, and means for varying the relative speed of rotation between the wheel and reel.

4. A pipe wrapping machine comprising a frame, a wheel for supporting said frame upon the pipe to be wrapped, a reel for holding the wrapping material in a roll encircling the pipe, means for rotating the reel to apply the wrapping material to the pipe, means for rotating the wheel to move the frame along the pipe, and means for varying the speed of rotation of the wheel.

5. A pipe wrapping machine comprising a frame, a wheel for supporting said frame upon the pipe to be wrapped, a reel for holding the wrapping material in a roll encircling the pipe, means for rotating the reel to apply the wrapping material to the pipe, means for rotating the wheel to move the frame along the pipe, and means for applying a fluid to bind the wrapping material to the pipe.

6. A pipe wrapping machine comprising a reel for holding the wrapping material in a roll encircling the pipe, means for varying the angular relation between the reel and the pipe, means for rotating the reel to apply the wrapping material to the pipe, tensioning means for the roll on the reel, and means for movably positioning the tension means to accord with the varying positions of the reel.

7. A pipe wrapping machine comprising a reel for holding the wrapping material in a roll encircling the pipe, means for varying the angular relation between the reel and the pipe, means for rotating the reel to apply the wrapping material to the pipe, and a shifting weight adapted to rest upon the roll on the reel.

8. A pipe wrapping machine comprising a frame, a reel for holding the wrapping material in a roll encircling the pipe and arranged on said frame, means for rotating the reel and advancing
the frame axially along the pipe, and tensioning means for the roll on the reel. 9. A pipe wrapping machine comprising a frame, a reel for holding the wrapping material in a roll, means for rotating the reel and advancing the frame axially along the pipe, and a weight mounted on said frame and adapted to rest upon the roll on the reel.

10. A pipe wrapping machine comprising a frame, a reel for holding the wrapping material in a roll encircling the pipe and arranged on said frame, means for rotating the reel and advancing the frame axially along the pipe, and a weight movably mounted on said frame and adapted to rest upon the roll on the reel.

11. A pipe wrapping machine comprising a reel for holding the wrapping material in a roll encircling the pipe, means for rotating the reel to apply the wrapping material to the pipe, means for applying a fluid to bind the wrapping material to the pipe, and means for protecting the roll on the reel from the fluid.

12. A pipe wrapping machine comprising a reel for holding the wrapping material in a roll encircling the pipe, means for rotating the reel to apply the wrapping material to the pipe, means for applying a fluid to bind the wrapping material to the pipe, and a covering interposed between the roll and pipe.

13. A pipe wrapping machine comprising a reel for holding the wrapping material in a roll encircling the pipe, means for rotating the reel to apply the wrapping material to the pipe, a chamber for sealing fluid, means for discharging the fluid from the chamber to bind the wrapping material to the pipe, means for mounting the discharging means for lunar motion about the pipe, and means for protecting the roll on the reel from the fluid.

14. A pipe wrapping machine comprising a reel for holding the wrapping material in a roll encircling the pipe and including friction-reducing means between the material and the body of the reel, said reel having a bottom to provide a covering for the material and friction reducing means, and means for rotating the reel to transfer the wrapping material from the roll to the pipe.

15. A pipe wrapping machine comprising a reel for holding the wrapping material in a roll encircling the pipe and including friction-reducing means between the material and the body of the reel, said reel having a bottom to provide a covering for the material and friction reducing means, and said bottom having a slot thru which the material passes, and means for rotating the reel to transfer the wrapping material from the roll to the pipe.

16. In a pipe wrapping machine, a plurality of rollers circumferentially journaled about the pipe and adapted to hold a roll of wrapping material, means interposed between the pipe and rollers to provide a covering for the rollers, and means for moving the plurality of rollers to transfer the wrapping material from the roll to the pipe.

17. In a pipe wrapping machine, a reel adapted to encircle the pipe, and a plurality of rollers journaled circumferentially in said reel to hold a roll of wrapping material, said reel having a bottom to provide a covering for said rollers, and said bottom having a slot thru which the material passes.

18. In a pipe wrapping machine, a reel adapted to encircle the pipe, and a plurality of rollers journaled circumferentially in said reel to hold a roll of wrapping material, said reel having a bottom to provide a covering for said rollers, and said bottom having a slot thru which the material passes.

19. In a pipe wrapping machine, a reel adapted to encircle the pipe, a plurality of rollers journaled circumferentially in said reel to hold a roll of wrapping material, said reel having a bottom to provide a covering for said rollers, and said bottom having a slot thru which the material passes, and flanges adjacent the edges of said slot.

20. A pipe wrapping machine comprising a rotor adapted to encircle the pipe, means mounted on said rotor for holding the wrapping material, means for rotating the rotor to transfer the wrapping material from the holding means to the pipe, fluid discharge means for applying fluid on both sides of the wrapping material, and means for mounting the fluid discharge means for lunar rotation about the pipe.

21. A pipe wrapping machine comprising a rotor adapted to encircle the pipe, means mounted on said rotor for holding the wrapping material, means for rotating the rotor to transfer the wrapping material from the holding means to the pipe, fluid discharge means including a distributor pipe having a slot thru which the material passes, and means for mounting the distributor for lunar rotation about the pipe.

22. A pipe wrapping machine comprising means for applying wrapping material to the pipe, and fluid discharge means comprising a distributor pipe mounted for lunar motion about the pipe and having a slot thru which the material passes for applying fluid on both sides of the wrapping material.

23. A pipe wrapping machine comprising means for applying wrapping material to the pipe, and fluid discharge means comprising a plurality of distributor pipes between which the material passes, said pipes having discharge openings for applying fluid on both sides of the wrapping material.

24. A pipe wrapping machine comprising a reel for holding the wrapping material in a roll encircling the pipe, a wheel for supporting the reel upon the pipe, means for rotating the reel to apply the wrapping material to the pipe, means for rotating the wheel to move the reel along the pipe, and means for applying a fluid to bind the wrapping material to the pipe.

25. A pipe wrapping machine comprising means for holding the wrapping material in a roll encircling the pipe to be wrapped, a wheel for supporting said holding means on the pipe, means for rotating the wheel, and means for applying a fluid to bind the wrapping material to the pipe.

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