Sept. 11, 1934. E. L. ROLFS ET AL 1,973,505

POWER DRIVEN PIPE WRAPPING AND COATING MACHINE

Filed Jan. 13, 1930 3 Sheets-Sheet 1

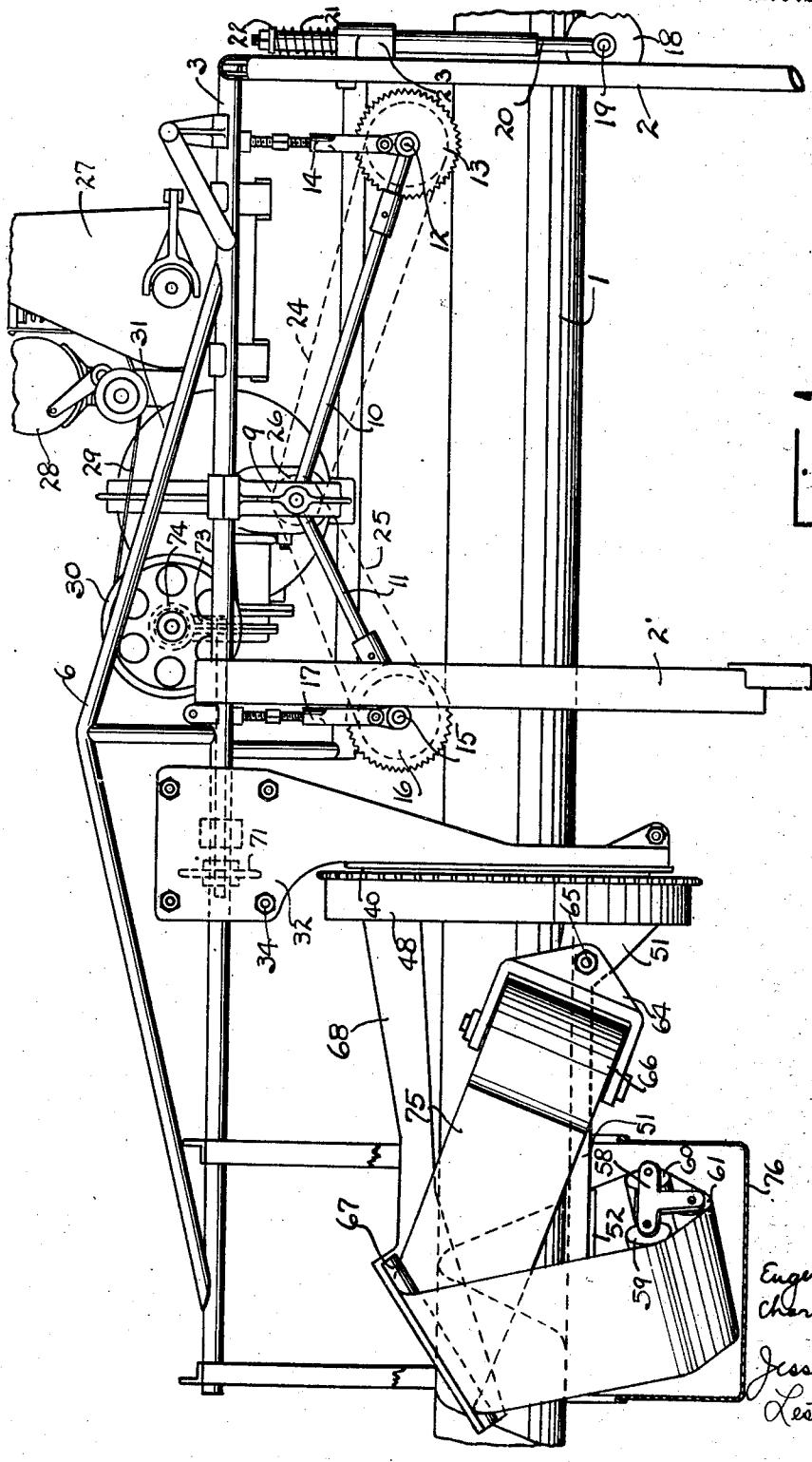


Fig. 1.

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POWER DRIVEN PIPE WRAPPING AND COATING MACHINE

Filed Jan. 13, 1930 3 Sheets-Sheet 2

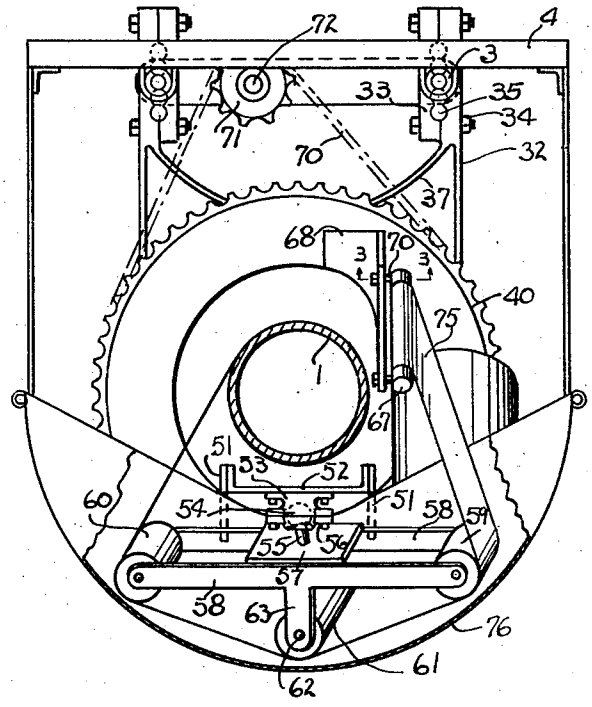


Fig. 2.

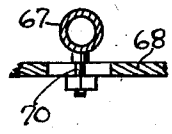


Fig. 3.

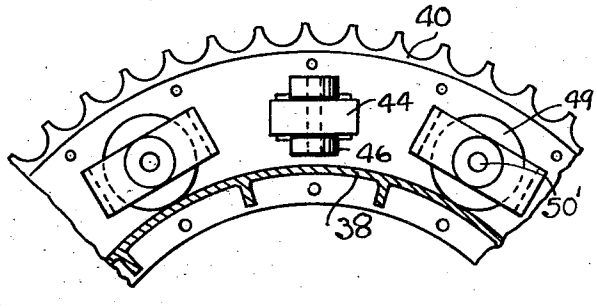


Fig. 4.

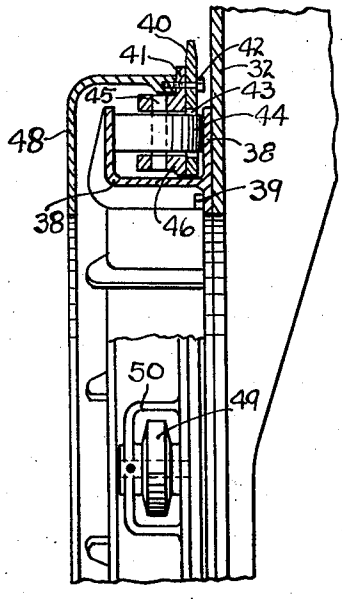


Fig. 5.

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POWER DRIVEN PIPE WRAPPING AND COATING MACHINE

Filed Jan. 13, 1930 3 Sheets-Sheet 3

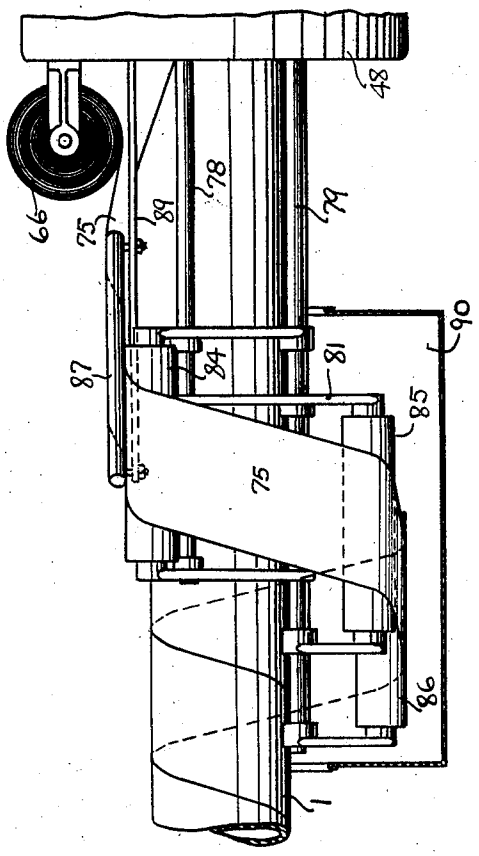


Fig. 6.

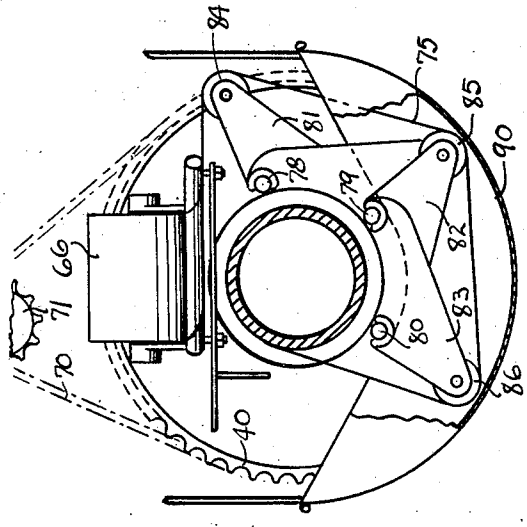


Fig. 7

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UNITED STATES PATENT OFFICE

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POWER DRIVEN PIPE WRAPPING AND COATING MACHINE

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Application January 13, 1930, Serial No. 420,403

18 Claims. (Cl. 242—11)

Our invention relates to machines for wrapping pipe. It is particularly applicable to machines for wrapping pipe of the larger sizes with a protective web of material such as paper or felt to prevent corrosion of the pipe in use.

Particularly in oil and gas field work it is necessary to lay long lines of pipe about the field and across country to provide a conduit for the oil or gas to more distant points. The invention is applicable to this work and to water and gas mains and for other similar uses. Before the pipe is laid in the ground it is common to provide coating for the pipe by wrapping about the pipe a layer of tarred paper or felt or other similar material, said web of material being covered on both sides with an asphaltic coating so that it will better adhere to the pipe to form a corrosive-resisting covering for the same.

Old methods of applying wrapping to the pipe involved the painting or covering of the pipe first with a protective coating of material, such as asphalt or asphaltic compound, and then, after wrapping the web of material around the pipe, a second coating of the asphaltic compound is applied to the outer surface of the wrapping material. This is a rather long and expensive process.

It is an object of our invention to provide means for coating the wrapping material on both sides before it is applied to the pipe, thus performing all three operations at once.

We desire to provide a machine which is capable of traveling along the pipe which is to be covered and to mount thereon a roll of wrapping material, and to provide means whereby the web of wrapping material will be dipped into the coating material and thus apply to said wrapping a coating of paint or asphaltic material on both sides before the material is wrapped about the pipe.

The invention lies in the construction of the device whereby the wrapping material is mounted for smooth and even wrapping upon the pipe, said mounting being adjustable so as to accommodate the device to different sizes of pipe and to different speeds of application.

The invention also includes the mounting of the wrapping apparatus so that the wrapping material may be dipped into a coating of paint or similar preserving material so that it may be surfaced on both sides therewith before it is applied to the pipe.

In the drawings herewith, Fig. 1 is a side elevation of a device whereby the wrapping may be applied, said device being constructed in accordance with our invention, certain parts of the apparatus being broken away for greater clearness.

Fig. 2 is a transverse section taken at the left of the view shown in Fig. 1.

Fig. 3 is a broken detail taken in section on the plane 3—3 of Fig. 2.

Fig. 4 is an end view of the gear ring whereby my device is supported and driven, the same being shown in section through the housing thereof.

Fig. 5 is a similar view taken in section at right angles to the view shown in Fig. 4.

Fig. 6 is a side elevation of a further modification of the invention.

Fig. 7 is an end view of the Fig. 6 embodiment, the housing being partly broken away.

Our device as disclosed herein is adapted to be supported upon and carried by the pipe 1, which is to be coated. The device comprises a frame work made up of upright posts 2 and 2', in the forward and central portions, respectively, the said uprights being connected at the upper end by longitudinal frame members 3, preferably of tubular construction. These longitudinal members are connected transversely by cross members 4, which may be made of angle iron or other metal construction. This frame is further reenforced by truss members 6, shown in Fig. 1.

Upon the frame thus supported are downwardly extending legs 9 on each side, to which are pivotally connected legs 10 and 11. The legs 10 extend forwardly from the supporting leg 9 and are connected to a shaft 12, upon which is pivotally mounted a traction wheel 13. The shaft 12 of this traction wheel is supported in adjusted position relative to the frame by means of legs 14. The traction wheels 13 are toothed to engage the pipe and it is to be understood that the periphery of this traction wheel is shaped to engage with the outer surface of the pipe. The rearward leg 11 is similarly connected to a shaft 15, upon which a traction wheel 16 is mounted, said wheel being supported in adjusted position by the leg 17, as in the case of the forward wheel. There is a further wheel or roller 18 at the forward end of the frame, which bears against the lower side of the pipe. It is mounted upon a shaft 19, supported upon rods 20, held resiliently upward by means of springs 21 bearing against the washer 22 at the upper end of the shaft and against a collar 23 through which the shaft is slidable. This structure is similar to that shown in our prior application Serial No. 352,451, filed April 4, 1929.

The wheels 13 and 16 are propelled by means of sprocket chains 24 and 25, said wheels being

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driven by connection with a motor 27 mounted at the upper side of the frame. Said motor may be of any desired construction but we have shown an internal combustion motor, the fuel for which is contained in tank 28. The said motor is connected by means of a belt 29 to a wheel 30, the power from said wheel being applied to the shaft upon which the sprocket wheel 26 is mounted through a transmission housed within the housing 31. This mechanism is no part of the present invention and need not be further described.

The pipe wrapping device is carried at the rearward end of the supporting structure just described. To the rear of the drive wheel 16, and mounted upon the transverse frame members 3, are two hangers 32, which are secured to the said frame members by means of a clamping plate 33 secured to the main body of the plate by through bolts 34. The plate 33 and the upper end of the hanger 32 are provided with a plurality of openings 35 longitudinally arranged so that the hangers may be secured to the frame members 33 in a plurality of vertically arranged positions so as to accommodate the wrapping device to different sizes of pipe. The lower ends of the hangers are extended downwardly and curved about the pipe which is to be raised and are joined together to make in effect a U-shaped hanger, the upper ends of the legs being secured to the frame members 3, as will be understood from Fig. 2. There are a plurality of cross braces 37 which serve to reenforce the supporting structure.

With reference to Fig. 5 it will be seen that the hangers 32 are connected to a circular frame member 38, which is adapted to surround the pipe which is to be wrapped. This ring-shaped frame member is formed in channel iron shape and has a lateral flange 39 by means of which it may be bolted to the hangers. The channel within the supporting member 38 is adapted to receive the roller mounting of a sprocket gear 40. Said gear is mounted upon a circular angle iron member 41 and is secured to said member by cap screws 42. The gear member 40 has a plurality of openings 43 therein to receive the inner sides of rollers 44. Said rollers are mounted upon pins 45, which are extended through the angle iron ring 41 and into a similar ring 46 on the inner face of the gear ring. I have a series of said rollers 44 mounted about the gear ring, the inner faces of which bear against the plate 38 of the channel frame member.

The rollers 44 are housed partly by the channel member 38 and partly by a housing 48, which is connected to the ring 41 on one side and is curved inwardly around the outer side of the gear ring as will be understood from Figs. 2 and 5.

The rollers 44 support the gear ring 40 against end thrust of the said gear. We also provide rollers, shown at 49 in Figs. 4 and 5, which bear inwardly against the inner wall of the channel member 38, said rollers being mounted upon yokes 50, secured to the rearward side of the ring 41 and supported upon shafts 50' mounted in said yokes. These rollers bear against the channel member and take up the lateral thrust of the gear ring in operation.

Projecting rearwardly from the gear ring and the frame just described are a pair of arms 51. Said arms are spaced apart from each other a suitable distance as is shown in Fig. 2. They are connected adjacent their rearward ends by a cross plate 52, which serves as a support for a bearing member 53. With particular reference to Fig. 2 it will be seen that the bearing member 53 is made up of an inner plate bolted to the cross plate 52 and provided on its outer side with a socket 54 adapted to receive a ball from upon the end of a shaft 55. Said ball is held within said socket by outer plates 56 secured about the said ball and bolted to the outer ends of the bearing member 53. The post 55 is connected with a plate 57, which is in turn rigidly connected with a frame member made up of two bars 58 extending transversely of the frame and adapted to support at their ends rollers 59 and 60. There is a third roller 61 supported upon a cross shaft 62 mounted on laterally extending arms 63 on the two bars 58. It will be seen from Fig. 2 that the three rolls 59, 60 and 61 are set in a position to form an elongated triangle and that the position of this frame may be adjusted through the ball and socket joint 54 to different angular positions relative to the supporting arms 51.

The arms 51 also support a roller-holding yoke 64, which is bolted at 65 to the side of one of the arms 51. It is extended at an angle to the frame and supports a roll 66 of wrapping material, such as felt or paper, as may be desired. It is from this roll that the wrapping material for the pipe is unrolled in the wrapping operation.

As a guide for the web of wrapping material we support a cylinder arm 67 upon the outer end of a third supporting arm 68. Said arm 68 is secured to the forward side of the housing 48, as shown in Fig. 2. It extends forward to a point slightly in advance of the roller-supporting frame 58 and is shaped to receive thereon the guide arm 67 previously described. Said arm 67 is secured to the arm 68 by spacing bolts 70, as will be understood from Figs. 2 and 3. The bolts 70 are adjustable somewhat in the arm 68, as will be seen from Fig. 3, so as to provide for the proper angular position of the arm 67 and also to secure the proper tension upon the wrapping material.

The frame including the sprocket gear wheel 40 with the rollers 44 and 49 thereon and with the arms 51 and 68 extending rearwardly relative thereto are rotatable about the pipe 1, which is to be wrapped. This rotation is performed by a sprocket chain 70, shown in Fig. 2, said chain being connected to the gear ring 40 and to a drive sprocket 71, mounted upon a shaft 72 supported in the frame. As will be seen from Fig. 1 the sprocket wheel 71 may be driven by a worm gear 73 thereon, driven from a gear 74 from the shaft of the drive wheel 30.

In operating our device, the frame, together with the wrapping apparatus already described, will be moved slowly along the pipe upon which it is supported. At the same time the gear wheel 40, with the arms and rollers supported thereon, will be rotated about the pipe. The web of wrapping material, shown at 75, will be fed from the roller 66 about the guide arm 67 and downwardly about the three rollers 59, 60 and 61, and from thence around the pipe which is to be wrapped. Below the frame including the wrapping material we provide a pan 76, into which the frame 58 with its rollers thereon may pass. This pan will ordinarily be filled with coating material such as asphalt or paint which is to be used to preserve the pipe. Thus when the frame is rotated about the pipe the frame with the wrapping material thereon will be periodically dipped into the paint. The sides of the frame are so arranged that the wrapping material which is dipped at each time will be

of sufficient length to wrap more than once about the pipe. In this way the paper will be submerged at least once before it is applied to the pipe. The guide arm 67, however, is spaced so closely to the pipe that it will not at any time be submerged in the coating material.

As will be understood from Fig. 1, the angle at which the paper is fed to the pipe will be such that as the machine is moved forwardly along the pipe the wrapping material will be fed at the proper angle to the pipe to be applied in a somewhat spiral wrapping, the edges of which slightly overlap. There will be a coating of the paint or asphalt on both sides of the wrapping material and the said wrapping material will be applied to the pipe so that the coating will be accomplished in one operation. We are thus enabled to entirely finish the coating and wrapping of the pipe in one operation. Our device is simple and strong in construction and will not easily get out of order and is economical to construct.

In Figs. 6 and 7 we have shown how the device may be modified to carry out the invention. In this construction the rearward side of the housing 48 serves as a support for the roll 66 of wrapping material. The frame upon which the guide rollers are mounted comprises three rearwardly extending arms 78, 79 and 80, which serve as a support for arms 81, 82 and 83, connected thereon. Said arms 81, 82 and 83, as seen from Fig. 7, are plates the ends of which are mounted upon a plurality of said arms 78, 79 and 80. Said arms serve as a support for shafts upon which the guide rollers 84, 85 and 86 are supported. As will be seen from Fig. 7, the arms are spaced apart approximately 90°.

The wrapping material 75 is fed from the roller about a cylindrical guide arm 87, which turns said web of wrapping material from a horizontal position extending directly backward from the frame into a lateral position to curve about the roller 84 and from thence about the rollers 85 and 86 to be wrapped about the pipe. The guide arm 87 is mounted adjustably upon a plate 89 extending rearwardly from the frame 48. The three rollers with the paper mounted thereon may be dipped into the pan 90 so as to be covered with the paint or asphalt as in the previous embodiment.

This form of invention is adapted to operate in practically the same manner as is the previously described embodiment and it will be seen that a wrapping material may be applied to the pipe in a smooth, even coating with the paint or preserving material applied on both sides of the web of wrapping material. This is a particularly advantageous and convenient manner of applying the same.

What we claim as new is:

1. In a pipe wrapping machine, a support, a gear ring rotatable thereon, arms on said gear ring, a plurality of rollers on said arms, means to feed a web of wrapping material to said rollers, means in the path of travel of said rollers to coat both sides of said web, and means to traverse said support and pipe relative to each other.

2. In a pipe wrapping machine, a support, a gear ring rotatable thereon, rollers mounted for movement with said ring about a pipe, means to feed a web of wrapping material to said rollers, means in the path of travel of said rollers to coat both sides of said web, and means to traverse said support and pipe relative to each other.

3. In a pipe wrapping machine, a support, a gear ring rotatable thereon, arms on said gear ring, a plurality of rollers on said arms, a roll of wrapping material, means to guide said wrapping material to said rollers, means in the path of travel of said rollers to coat both sides of said web, and means to traverse said support and pipe relative to each other.

4. In a pipe wrapping machine, a support, a gear ring rotatable thereon, arms on said gear ring, a plurality of rollers on said arms, means to feed a web of wrapping material to said rollers, a container having coating liquid therein, said container being positioned in the path of said rollers, whereby said rollers and said web will be submerged in said liquid on each rotation of said gear.

5. In a pipe wrapping machine, a support, a gear ring rotatable thereon, arms on said gear ring, a plurality of rollers on said arms, means to feed a web of wrapping material to said rollers, a container having coating liquid therein, said container being positioned in the path of said rollers, whereby said rollers and said web will be submerged in said liquid on each rotation of said gear, and means to cause a relative traversing movement of said pipe and support, and means to adjust the angularity of said rollers.

6. In a pipe wrapping machine, a support, a frame thereon mounted to rotate about a pipe, means on said frame comprising guide rollers and movable therewith to feed wrapping material to be wrapped about said pipe, and a container into which said wrapping material is submerged as it is fed to said pipe.

7. A pipe wrapping machine including a traveling frame, means to traverse said frame along a pipe, hangers on said frame, a ring mounted thereon to encompass and rotate about the pipe as an axis, a roller supporting frame mounted on said ring at one side of the pipe, rollers on said roller supporting frame, a coating liquid container below said pipe into which said rollers will dip on their rotation about the pipe, and means to feed wrapping material to said rollers.

8. A main frame, hangers on said frame, a ring mounted thereon to encompass and rotate about the pipe as an axis, a roller supporting frame mounted on said ring at one side of the pipe, rollers on said roller supporting frame, a coating liquid container below said pipe into which said rollers will dip on their rotation about the pipe, and means to feed wrapping material to said rollers.

9. In a pipe wrapping machine, a frame, a plurality of rollers mounted thereon at one side, means to move said rollers in a planetary orbit about the pipe, means to feed wrapping material to said rollers to be wrapped about the pipe, and a container for coating liquid positioned in the path of said rollers.

10. In a pipe wrapping machine, a frame, a plurality of rollers mounted thereon, means to move said rollers about said pipe, means to feed wrapping material to said rollers to be wrapped about the pipe, and a container for coating liquid positioned in the path of said rollers.

11. In a pipe wrapping machine, a frame, a plurality of rollers mounted thereon at one side, means to adjust the angularity of the rollers, means to move said rollers in a planetary orbit about the pipe, means to feed wrapping material to said rollers to be wrapped about the pipe, means to cause a relative traversing movement between said pipe and frame, and a container for coating liquid positioned in the path of said rollers.

12. In a pipe-wrapping machine, a frame, a gear ring mounted thereon to encompass and rotate about the pipe as an axis, means to adjust said ring vertically upon said frame, arms on said ring, means on said arms to guide the wrapping material, means to feed the wrapping material to said guide means, and means to coat said material as it is wrapped about the pipe.

13. In a pipe-wrapping machine, a frame, a gear ring mounted thereon to encompass and rotate about the pipe as an axis, means to adjust said ring vertically upon said frame, arms on said ring, means on said arms to guide the wrapping material, means to feed the wrapping material to said guide means, means to rotate said ring to give said rollers a planetary movement about said pipe, and means to coat said material as it is wrapped about the pipe.

14. In a pipe-wrapping machine, a support, a ring thereon through which the pipe may project, means to rotate said ring, arms projecting from said ring, guide rollers on said arm at one side of said ring, means to deliver wrapping material over said rollers to said pipe, and a container below said pipe for coating material, said rollers and wrapping material being adapted to dip into said container as they are moved about said pipe.

15. In a pipe-wrapping machine, a support, a ring thereon through which the pipe may project, means to rotate said ring, arms projecting from said ring, guide rollers on said arm at one side of said ring, means to deliver wrapping material over said rollers to said pipe, and a container below said pipe for coating material, said rollers and wrapping material being adapted to dip into said container as they are moved about said pipe, and means to traverse said support along said pipe as said pipe is wrapped.

16. A supporting frame, a ring thereon rotatable about the pipe as an axis, means to cause a relative traversing movement between said pipe and said frame, a roll for a web of wrapping material on said ring, means to guide said material to wind said material about the pipe, and means into which said material is dipped to apply coating material to both sides thereof.

17. A supporting frame, a ring thereon rotatable about the pipe as an axis, means to cause a relative traversing movement between said pipe and said frame, a roll for a web of wrapping material on said ring, means to guide said material to wind said material about the pipe, and a container for coating material, placed in the path of said guide means whereby said wrapping material is dipped and coated on both sides as said ring is rotated.

18. In a pipe wrapping machine a frame, hangers thereon, a supporting ring of channel shape the open side thereof presented outwardly and supported on said hangers, a gear ring rotatable about said supporting ring, rollers on said gear ring adapted to ride on the bottom and sides of said channel shaped ring, and pipe wrapping means on said gear ring.

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