Aug. 18, 1936. J. S. CARROLL ET AL 2,051,634

PIPE WRAPPING MACHINE.

Filed Oct. 22, 1931 6 Sheets-Sheet 1

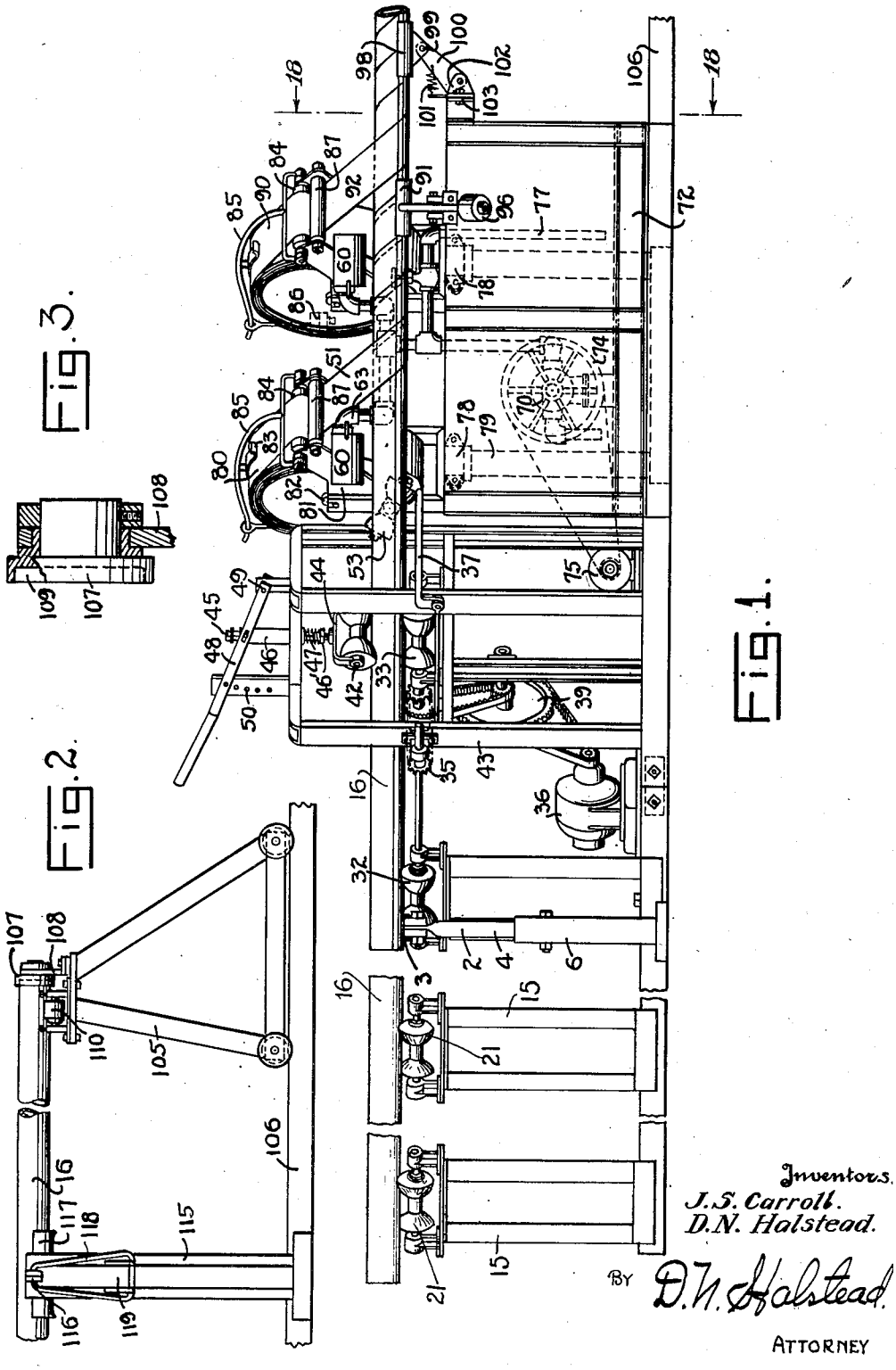


Fig. 1.

Fig. 2.

Fig. 3.

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PIPE WRAPPING MACHINE

Filed Oct. 22, 1931 6 Sheets-Sheet 2

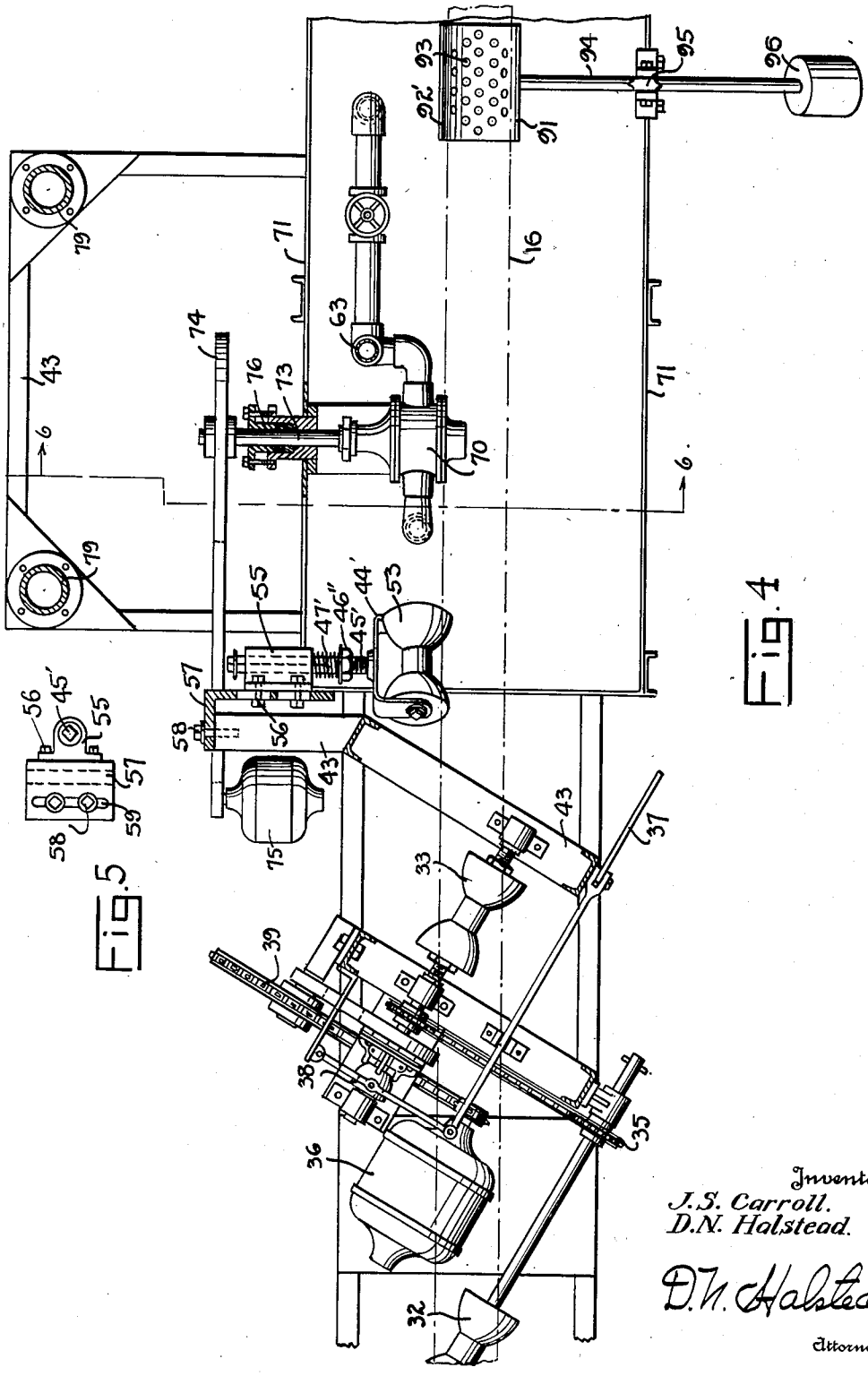


Fig. 4

Fig. 5

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PIPE WRAPPING MACHINE

Filed Oct. 22, 1931 6 Sheets-Sheet 3

Fig. 18.

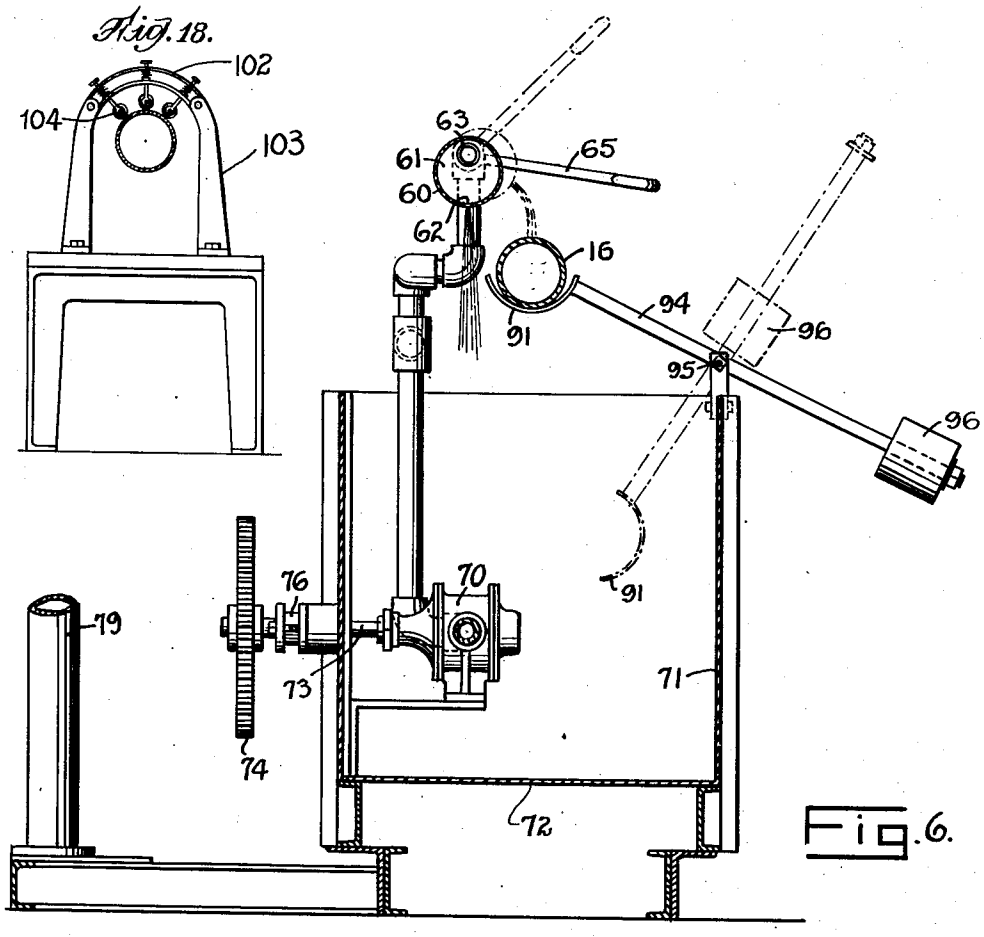


Fig. 6.

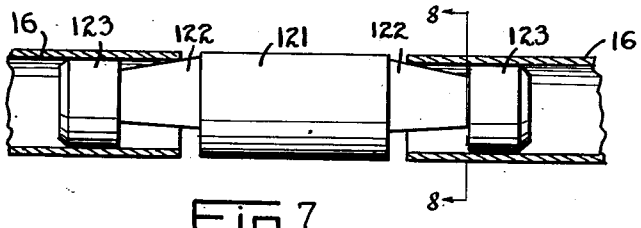


Fig. 7

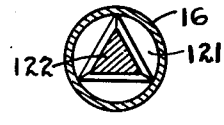


Fig. 8.

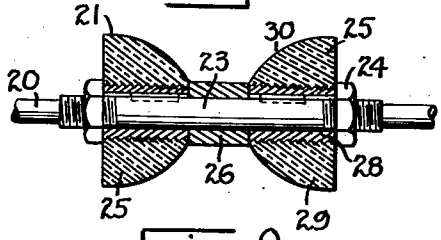


Fig. 9.

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PIPE WRAPPING MACHINE

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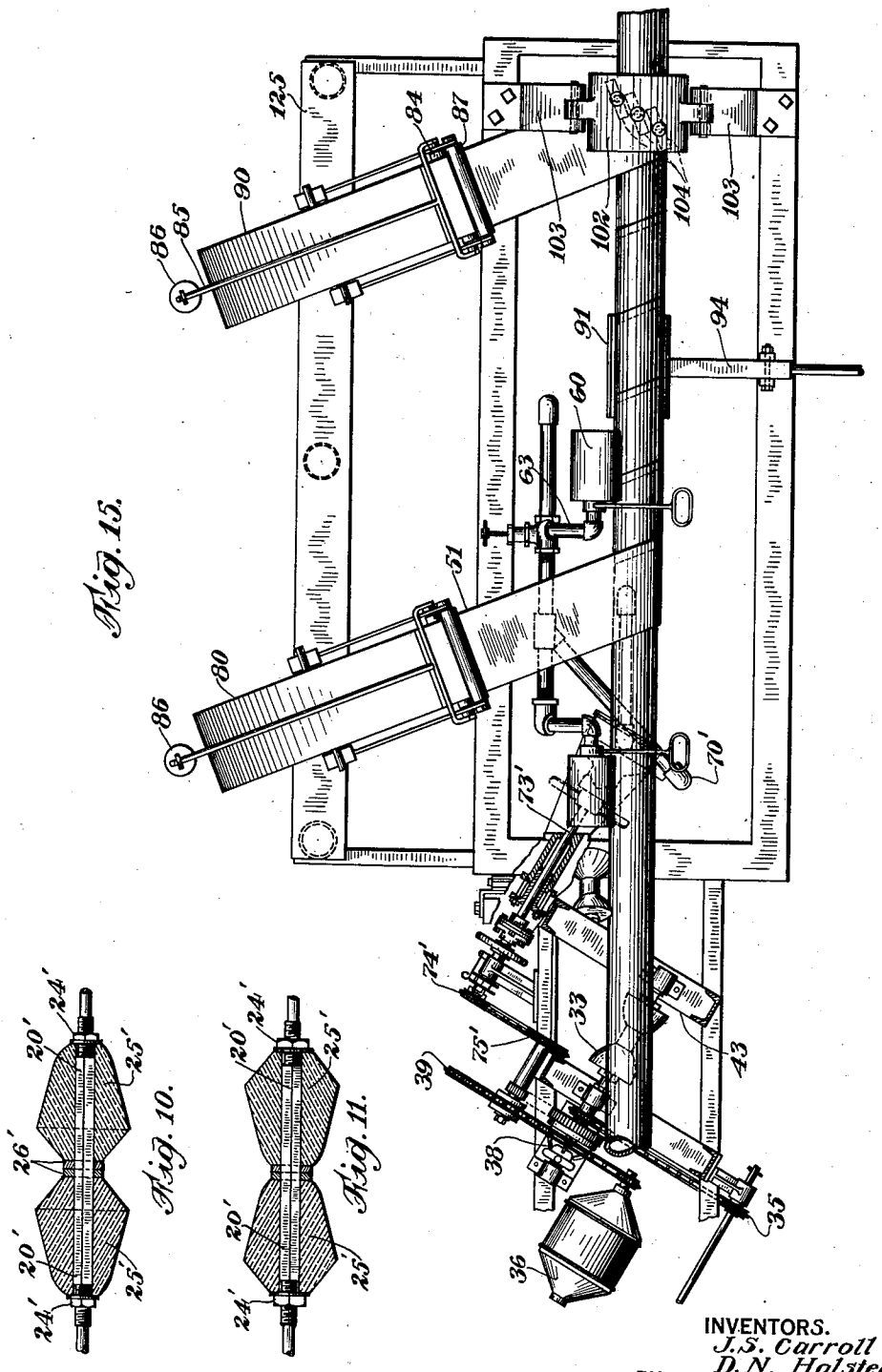


Fig. 15.

Fig. 10.

Fig. 11.

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PIPE WRAPPING MACHINE

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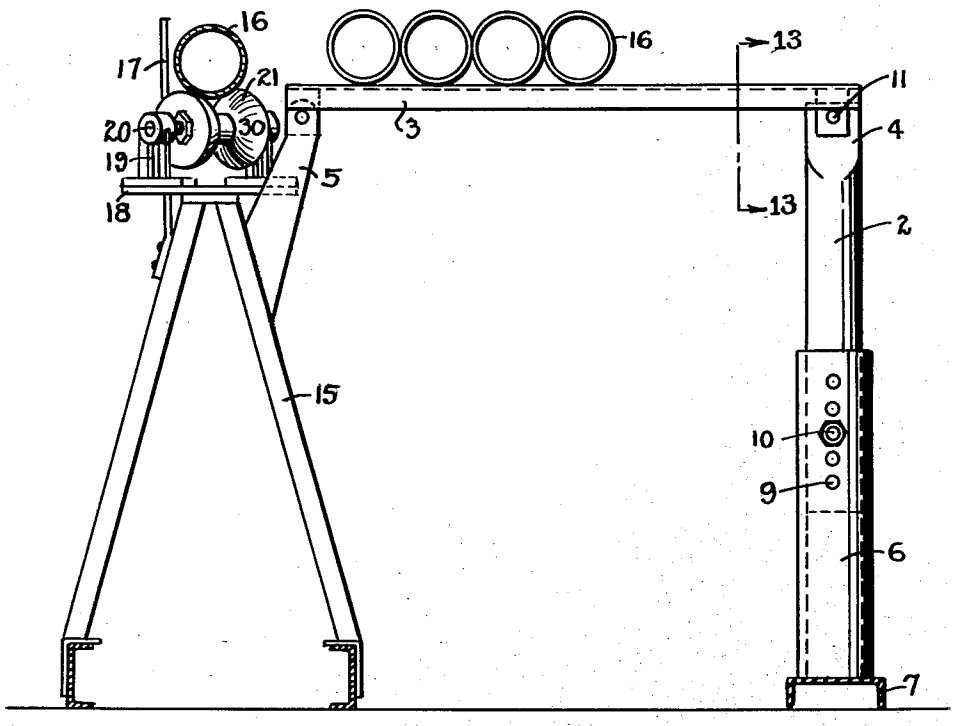


Fig. 12.

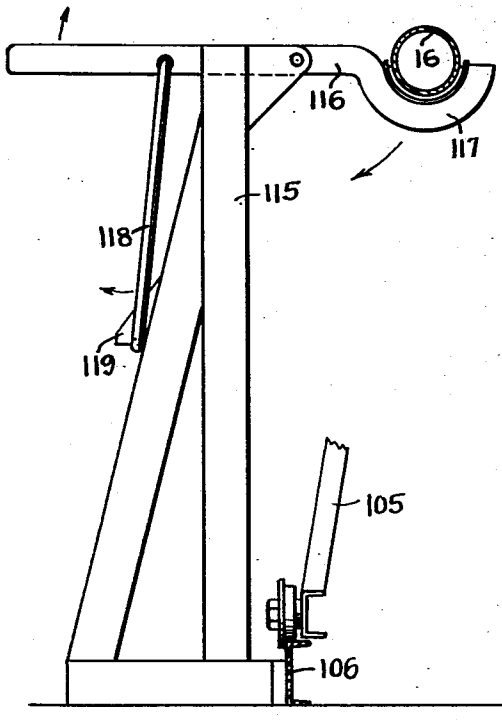


Fig. 14.

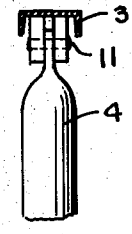


Fig. 13.

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PIPE WRAPPING MACHINE

Filed Oct. 22, 1931 6 Sheets-Sheet 6

Fig. 16.

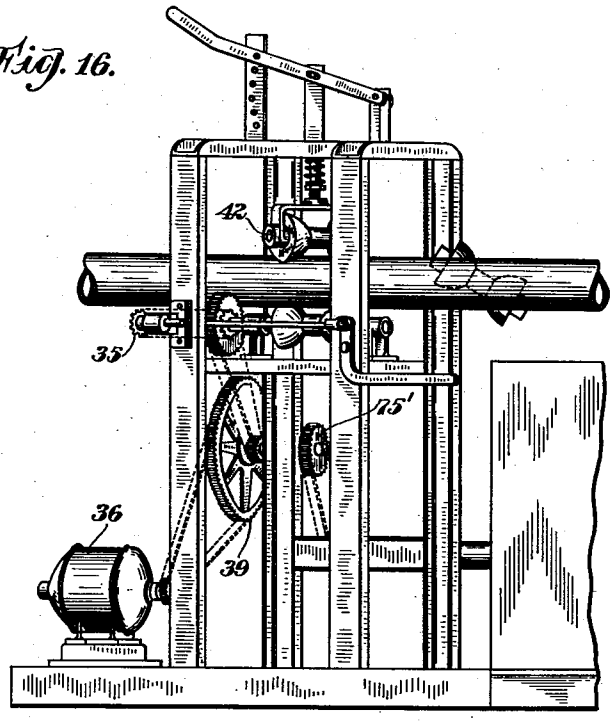
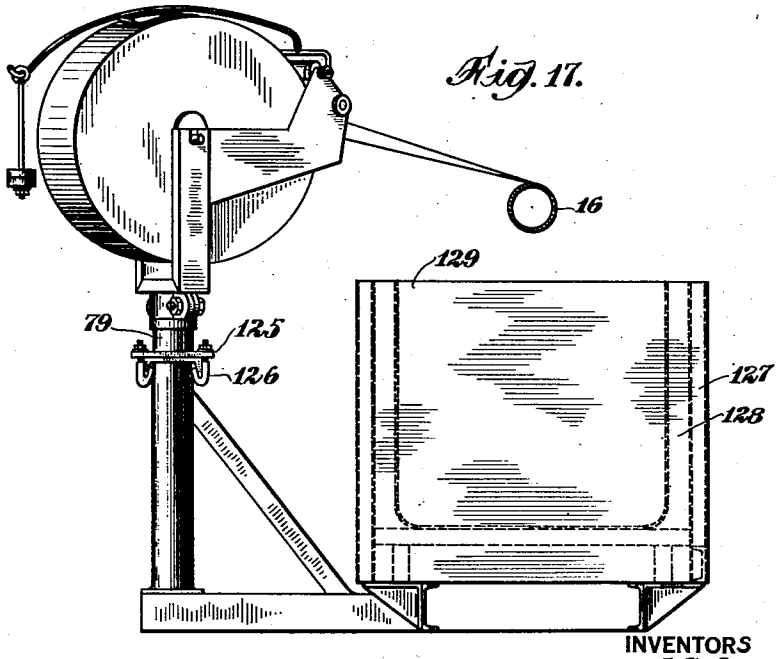


Fig. 17.



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UNITED STATES PATENT OFFICE

2,051,634

PIPE WRAPPING MACHINE

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Application October 22, 1931, Serial No. 570,296

5 Claims. (Cl. 242—11)

The invention relates to an improvement in pipe wrapping machines of the stationary type wherein the pipe to be wrapped is caused to travel through the machine.

It is one of the objects of the invention to provide an improved pipe wrapping machine wherein the pipe will be passed through the machine at a uniform rate of spiral travel so that the wrapping material may be applied thereto evenly and smoothly.

Another object of this invention is to provide a pipe rotating and advancing means, having a plurality of surfaces upon a shaft, whereby pipes contacting or supported thereby are rotated and longitudinally advanced upon rotation of the shaft.

Another object of the invention is to provide a conveying means for the pipe in the form of a roller which will support and convey different sizes of pipe without vertical or angular adjustment.

Another object of the invention is to provide both a pressure and a thrust roller for maintaining the pipe in proper alignment during its travel through the machine.

A still further object of the invention is to provide a roller which automatically rotates different sizes of pipe at different rates while maintaining the longitudinal travel of the pipe at about the same rate for all sizes of pipe.

Another object of the invention is to provide a feeding roller which will compensate for different degrees of lead or lap of the wrapping material.

The invention will be readily understood by those skilled in the art when the following description is considered in connection with the accompanying drawings wherein

Fig. 1 is a side elevation of the improved machine showing the general arrangement of the parts.

Fig. 2 is a broken detail view of one form of device which can be used for supporting the end of the pipe after it has been wrapped when pipes of considerable length and diameter are being handled.

Fig. 3 is a sectional view showing the rotatable cap member which may be used with the Fig. 2 support structure.

Fig. 4 is a top plan view of the invention with certain parts removed in order to show the arrangement of the driving mechanism.

Fig. 5 is a detail of the mounting for the lateral thrust roller used to maintain the pipe in proper alignment.

Fig. 6 is a section taken on the line 6—6 of Fig. 4, and looking in the direction of the arrows.

Fig. 7 is an elevation of a connecting member used to couple two pipe sections together in passing them through the machine.

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

Fig. 9 is a central vertical section of the improved type of roller or support used in combination with the machine to transport the pipe so that it will receive a spiral movement.

Figs. 10 and 11 disclose slightly modified forms of rollers.

Fig. 12 is a transverse elevation of a loading rack which may be used in combination with the machine.

Fig. 13 is a section taken on the line 13—13 of Fig. 12.

Fig. 14 is a transverse elevation of the supporting structures used for the outgoing pipe and disclosing a view which is substantially at right angles with the elevation shown in the Fig. 2 embodiment as regards the structure shown in the lefthand side of Fig. 2.

Fig. 15 is a plan view of a modification of the improved machine including a modified form of driving mechanism for operating the drive rollers and pump for circulating the coating material.

Fig. 16 is a fragmentary side view corresponding to Fig. 15 illustrating the details of the drive mechanism.

Fig. 17 is an end view corresponding to Fig. 15 taken in the direction of the pipe travel and omitting the pipe driving mechanism.

Fig. 18 discloses a modified form of roller arrangement which may be disposed on the framework of the machine subsequent to the point of application of the wrapping material to the pipe for ironing the wrapping material to the pipe.

The pipe is introduced into the machine from a loading rack indicated generally at 2, see Fig. 12, which is in the form of a platform or loading rails 3, which are supported at one side or end on the upright 4 and at the opposite end upon brackets 5. The post 4 is shown as adjustable by being moved vertically inside the base post 6, which is mounted upon a suitable support 7. A plurality of openings 9 are provided in the post 6 to receive the bolt or pin 10, which is adapted to also pass through corresponding holes in the post 4. In this manner the inclination of the platform or rails 3 may be adjusted so that the pipe can be easily rolled into position for introducing it into the machine. The connection between the rails 3 and post 4 is indicated at 11, and is seen in elevation in Fig. 13.

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The brackets 5 may be mounted on the framework 15 or on any other convenient structure which serves to support the pipe in its introduction into the machine. The rails 3 are pivoted to the brackets 5 so that they can move when the posts 4 are adjusted. A stop arm 17 is provided on top of the framework 15, serving to limit the movement of the pipe, one of which is indicated in operative position at 16. Thus the operator need not waste any effort in rolling the pipe sections onto the machine because the stop arm serves to prevent the pipe from rolling on across the trackway.

The framework 15 carries a top plate 18, which is adapted to receive the uprights 19, which carry a shaft 20. These uprights 19 may be adjustable on the plate 18 if desired, but it has been found that with the particular type of roller 21, which is to be used in connection with the present invention, the angular adjustment is unnecessary, because of the peculiar construction of the roller which compensates for different sizes of pipe to be carried thereby. However, it may be desirable to adjust the angularity of the roller or to adjust the roller laterally for purposes of alignment, and, with this in view, the uprights 19 may be adjustable on the plate 18, if desired by any conventional arrangement, such as clamping bolts engaging in oversized slots in said plate. Generally speaking the machine has idle rollers 21 disposed at its head end for receiving the pipes, which are fed therefrom onto the power driven rollers 32 and 33. The idle and power driven rollers are all substantially the same shape and disposed at substantially the same angle which is inclined to the axis of the machine or the axis of the pipe wrapped, so that there is no resistance or tendency to drag the movement of the pipe.

The particular type of roller 21 used for supporting the pipe and causing it to travel through the machine is disclosed in section in Fig. 9. This roller includes the shaft 20, which includes an enlarged portion 23. The enlarged part 23 of this shaft is threaded at opposite ends to receive the lock nuts 24. These nuts serve to hold in position the two contact elements or supporting members 25, which are of special configuration in order to accomplish the purposes in view. Said elements 25 are separated from each other by means of the spacer 26. Each of these elements 25 is preferably keyed to the shaft 20 and includes a core of metal or other rigid material 28, upon which is molded or otherwise formed a body of material 29 which in the preferred form comprises a resilient material, such as rubber or the like. With this construction the elements 25 may be made up and spare parts kept available so that a roller may be readily repaired or replaced upon short notice.

Particular attention is directed to the curved configuration of the body portion 29 of the roller, which is formed of conoidal shape. The curvature of the conoidal surface 30 of these rollers is such that when the roller is placed at an angle to the longitudinal path of travel of the pipe, the pipe will contact one element 25 on one side of the supporting shaft, and contact the opposite element 25 on the far side of the shaft 20. In other words, the pipe will be positioned upon the roller, as best seen in Fig. 12, so that, due to the angular position of the roller, a rotative movement may be imparted to the pipe and a uniform longitudinal movement of the pipe will also be accomplished.

The curvature of the contacting surface 30 is such that different sizes of pipe may be positioned upon the same rollers while they are arranged at the same angular position. This is due to the fact that the surface is curved in accordance with the diameter of the pipe sections which are to be received, and in this manner the speed of rotation of the pipe is a function of the size of the pipe. Where small pipe sections are positioned on the same rollers used for larger pipe sections they necessarily have a lesser circumference than the larger pipe sections, and inasmuch as the drive rollers rotate at a uniform rate, the smaller pipe would have a higher rotational rate, because the peripherial speed of the roller is substantially constant at all its points of contact with different sizes of pipe. The smaller pipe sections do, however, contact the curved surfaces 30 at points closer together or at points more closely adjacent to the spacer 26 than do larger pipe sections. It is, therefore, apparent that the pitch of the spiral movement imparted to the smaller pipe will be less per revolution of the pipe than will be imparted to larger pipe, and even though the rotational rates of smaller pipes are greater than larger pipes, the longitudinal travel of all sizes of pipe is practically the same per revolution of the roller. It will, therefore, be apparent that with this type of roller the amount of lead imparted to the pipe, and accordingly the amount of lap of the wrapping material, will be automatically compensated for, and no further adjustment of the rollers will be necessary when wrapping different diameters of pipe.

It is understood that the width of the wrapping material for different diameters of pipe varies in accordance with the diameter of the pipe, and that the roller to be used with this machine has been so designed and constructed that it automatically imparts to the pipe the proper lead so that sufficient lap of the wrapping material will occur as the pipe passes through the machine. This is one of the essential features of the present invention because it eliminates constant adjustment of the rollers and other parts of the machine to compensate for different sizes of pipe. and where the machine is mounted for operation in a pipe yard or plant where a considerable number of sizes of pipe sections are to be wrapped, this is of material advantage.

Figs. 10 and 11 disclosed other modified forms of roller structures which may be used for rotating and advancing pipe, having the elements 25' and 26' locked upon the squared portion of the shaft 20' by nuts 24'. It will be noted that the supporting elements differ in shape at the ends, thereby adapting the rollers to be reversed on the shafts to provide varied shaped pipe supporting and driving surfaces.

It will be apparent by the above arrangement of opposed drive rollers carried upon the same shaft that any end thrusts produced by pipes riding on and against the opposed curved surfaces of the rollers are transmitted to and through the shaft, thereby counterbalancing or neutralizing each other and eliminating the necessity of any end thrust bearings, which is a very important feature and advantage of this invention.

It is to be understood that any desired number of brackets 15 may be provided in order to position a sufficient number of supporting rollers which will conduct the pipe into the machine. As seen in Fig. 1, there is one of these support

frames 15 positioned to the left of the first drive roller indicated at 32. The pipe is indicated at 16 and enters the machine by passing over the first drive roller 32, adjacent which is positioned the inner end of the loading rack 2.

In the form of the invention here illustrated, two drive rollers have been provided. The first drive roller is indicated at 32 and the second, or main drive roller is indicated at 33. As seen in Fig. 4, the drive rollers 32 and 33 are driven by a chain drive 35, which receives its power from a unit 36, which is preferably an electric motor such as illustrated. A control handle 37 is positioned adjacent the operator who is using the machine, and this handle is connected to a clutch 38 for controlling the starting and stopping of the rollers. It is contemplated that a conventional speed transmission may be incorporated in combination with the drive machine, if desired, but in view of the fact that the speed of travel of the pipe is compensated for by the contour of the rollers, it has generally been found that such a speed-changing device is unnecessary and none has been illustrated. The power from the unit 36 to the drive chain 35 is by means of a train of reduction gears or chains 39, as disclosed in Figs. 1 and 15.

As seen in Figs. 1 and 4, the pipe moves longitudinally through the machine and rests or is supported upon the rollers 21, 32 and 33. Any resistance to turning of the pipe 16, such as the resistance applied due to the tension of the wrapping material, tends to cause the pipe to climb up on the curved surface 30. In order to retain the pipe in proper alignment a pressure roller 42 has been positioned on the framework 43, which also carries the driving mechanism for the rollers 32 and 33. This pressure roller 42 is preferably of the same configuration as the rollers 21, 32 and 33, but its angularity with respect to the longitudinal axis of the pipe has been reversed, due to the fact that it is positioned on the opposite side or above the pipe. The reverse angularity of this roller with respect to the longitudinal axis, however, is of the same degree as the supporting rollers. As best seen in Fig. 1, the rollers 33 and 42 oppose each other and serve to substantially embrace the pipe so that its position is fixed. There can, therefore, be no chattering of the pipe during its movement, and its rotation and travel will be smooth and uniform so that the wrapping and coating will also be applied in a uniform manner.

The roller 42 is mounted on a yoke 44, which is in turn connected to the spindle 45. This spindle passes through a sleeve 46, which serves as one abutment for a spring 47, which normally presses the spindle 45 and roller 42 toward the pipe. A nut 46' serves to adjust the compression of the spring to vary the tension on the roller. The spindle 45 is shown as square in the upper portion so that it will not turn in the sleeve 46, but will remain at the proper angle with respect to the pipe.

The entire sleeve 46 and roller structure is mounted upon a lever 48, pivoted to the frame 43, as at 49. Suitable pins or other stop members 50 are provided on the frame so that the elevation of the roller 42 may be adjusted to accommodate different sizes of pipe. The direct positioning of the roller 42 above the roller 33 should be noted, because in this manner there is a fixed bearing for the pipe which steadies the same and adds materially to the successful operation of the machine.

In order to resist the thrust placed upon the pipe, due to the tension on the band 51, a thrust roller 53 is provided on the side of the pipe where the tension or pull is applied. This thrust roller is similar to the rollers previously described and is mounted in a manner somewhat similar to the roller 42. The mounting of this thrust roller is best seen in Fig. 4 wherein the roller 53 is mounted on a yoke 44', which in turn is connected to spindle 45'. This spindle passes through a sleeve 55 which serves as an abutment for a spring 47' engaging against an adjustable nut 46'' on the spindle. The sleeve 55 is in the form of a bracket, which is adjustably mounted by means of the bolts 56 upon an arm 57, which is carried by the frame 43. This arm 57 is adjustable vertically of the frame 43 by means of the bolts 58, which are adjustable in a slot 59 formed in the head of the arm as shown in Fig. 5. With this construction it will be apparent that the arm 57 may be adjusted vertically so that the roller 53 will be positioned opposite the center line of different sizes of pipe and that the bracket 55 may be adjusted laterally of the arm 57, so that the roller will contact the different diameters of pipe.

With these two adjustments it is possible to position this thrust roller at any desired elevation or in any desired vertical plane to properly resist the pull of the wrapping web. It is, therefore, apparent that the rollers 33 and 42 position the pipe in a vertical direction and that the thrust roller 53 and the web of wrapping material position it in a horizontal direction. These two bearing supports for the pipe are spaced longitudinally apart so that there is no chattering of the pipe as the pipe passes through the machine. Therefore, the wrapping material 51 will be evenly applied to the pipe.

After the pipe passes beyond the thrust roller 53 the first coating of adhesive material is applied from a discharge nozzle 60. This nozzle is best seen in end elevation in Fig. 6 and comprises a cylindrical housing which forms a chamber 61. This chamber is provided with a discharge port 62, which is in the nature of a narrow slot of substantially the length of the nozzle. This particular construction has been devised in order that the coating material will be applied to the pipe with a pouring action as distinguished from the usual method of spraying the material against the pipe.

As seen in Fig. 6, this nozzle or reservoir 60 is eccentrically mounted on the pipe 63, which is the supply pipe for the nozzle. The nozzle is thus mounted in order that rotation thereof will cause it to move both laterally and vertically so that the stream may be poured upon different sizes of pipe, or be directed vertically downward, as seen in Fig. 6, to avoid striking the pipe.

In order that movement of the nozzle may be accomplished, a handle 65 is provided on one end of the nozzle and this handle may be moved to the dotted line position, as shown in Fig. 6, or it may be moved beyond this position, dependent upon the size of pipe which is to be coated.

The enlarged chamber 61 is of advantage because a quantity of material may accumulate in the chamber and in this manner an even flow will be insured. When the nozzle is not in use the stream will be directed downwardly to avoid the pipe. When the ends of the pipe sections pass the coating nozzle the operator may sharply depress the handle 65 for an instant until the ends of the pipe have passed and it will then be raised so that coating will again be applied to

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the pipe. In this manner no coating is applied to the pipe a short distance from each end. This is of advantage because the wrapping material does not then adhere to the pipe adjacent the ends and they are clean and ready to be fixed together when the pipe line is being assembled.

In order that a supply of coating material may be fed to the nozzle 60, a supply pump 70 is positioned within the vat or tank 71. It is intended that this tank will be heated by suitable means positioned in the area 72 beneath the tank so that the material will be maintained in a molten condition. It is usual to employ tar, asphalt or similar materials as coating, and inasmuch as these are solid at normal temperatures and pressures, it is necessary to heat them in order to properly apply them to the pipe.

The pump 70 has been submerged in the tank and in the molten material with a specific purpose in mind, which is to maintain the pump in heated condition so that it will operate satisfactorily at all times. Pumps for molten materials have been unsatisfactory when located in the atmospheric temperature, because the material would solidify in the pump and otherwise interfere with its operation. However, where the pump is located in the molten material it is only necessary to heat the tank 71 and the material contained within the pump is also heated and transformed into a liquid so that the pump may be readily started. The pump is operated by means of a drive shaft 73, which is rotated by the drive wheel 74, which is in turn driven by a power unit 75, or may be driven directly from the source of power 36.

A modified form of the device wherein both the pump and pipe actuating means are driven from the same primary source of power 36 is disclosed in Figs. 15 and 16. In this embodiment a sprocket 75' is provided at the end of the shaft bearing sprocket 39. Pump 70' is disposed in the tank so that its driving shaft 73' lies in a plane parallel to that of the shaft carrying sprocket 75' and the end of shaft 73' is provided with sprocket 74' which is driven by a suitable driving mechanism such as chain from sprocket 75'.

A stuffing box 76 is provided about the drive shaft 73 to resist leakage of the fluid from the tank 71. A bypass line 77, having a valve therein, is provided for the supply pipe 63, and is shown in Fig. 1. This valve in this line serves to regulate the flow to the reservoirs or nozzles 60.

The roll of wrapping material, which is applied to the pipe, is indicated at 80, and may be of any desired width, which is determined by the diameter of the pipe which is being wrapped. This roll of material is removably supported upon the standards 81, which are in turn carried by the posts 79, and are clamped thereon by means of an adjustable clamp 78, so that the angular position of the roll of wrapping material with respect to the longitudinal axis of the pipe may be adjusted to obtain the proper directional feeding of the material on the pipe. Due to the provision of the special type of rollers or supports, however, in the present machine, no adjustment of the rolls of felt is contemplated. A shaft 82 supports the roll 80, upon the standards 81.

In the modification shown in Fig. 17 the posts 79 supporting the felt rolls are adjustably secured to a horizontal frame member 125 by means of clamps 126 (Fig. 17) so that the application of the felt may be varied so as to occur at the optimum time interval after application of the coating material.

A drag 83 is provided on the roll so that it will not unwind faster than it is applied to the pipe. This drag is carried by the arm 85, which is mounted for turning on the ends of the shaft 84, which is in turn carried by the standards 81. This arm projects over the top of the roll of paper and a suitable number of weights 86 may be applied thereto in order that sufficient resistance to rotation of the roll 80 will be provided. By varying the amount of these weights the amount of tension placed upon the band of wrapping material may be varied.

In order that the felt or band of wrapping material will be directed onto the pipe at the proper angle, the guide roller 84 has been provided. This roller is mounted on the standards 81, and is arranged to rotate with the web of wrapping material passing over the top thereof. In order that any wrinkles or slack material will be eliminated from the web before it is applied to the pipe, a skid bar 87 has been provided. This bar is nonrotatably mounted in the standards 81 at a point closely adjacent the roller 84. The friction of the wrapping material against this bar serves to stretch the same somewhat and in this manner any wrinkles are avoided at a point directly ahead of the application of the material to the pipe.

The proximity of the discharge nozzle or reservoir 60 and the point of application of the web of material 51 should be particularly noted. When the coating material is poured on the pipe, as seen in Fig. 6, with the pipe rotating in a spiral direction, an even coating of material is applied directly ahead of the wrapping material so that the coating is still in a fluid condition at the time the wrapping material is applied and a positive and efficient bond is obtained between the pipe and the wrapping material.

The excess tension applied to the web of wrapping material by the skid bar 87 insures the elimination of air bubbles between the pipe and the wrapping material and in fact pipe wrapped with the present machine and method has the appearance of a unitary structure comprising the pipe and the wrapping material.

Immediately following the application of the wrapping web 51 a second coating of adhesive material is preferably applied. This second coating is applied directly to the surface of the wrapping material and while the first coating of material is still in a fluid condition. This second coating is applied by means of a second nozzle 60, which is similar in all respects to the first nozzle described and which receives its supply of material from the pump 70.

The pipe which is being wrapped in accordance with the present description is first coated as described and a wrapping of felt or similar material applied. A second coating of adhesive material is then placed on the felt wrapping material and this second coating of adhesive is then covered either with a second layer of felt or with a layer of suitable paper. Kraft paper is usually used for this purpose and a roll of such paper is indicated at 90. The mounting of this roll 90 is similar in all respects to the mounting for the roll 80 and it is not believed necessary to repeat the description of this detailed structure.

The finished pipe should present a neat appearance with as small an amount of adhesive material protruding from between the laps of the paper as possible and with this object in view a wiper 91 has been provided between the second nozzle 60 and the web 92 of the paper being ap-

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plied to the pipe. This wiper is best seen in top plan view in Fig. 4 and in Fig. 6 and comprises an arcuate trough 92', which is provided with a plurality of perforations 93. As seen in Fig. 1, this wiper embraces the lower portion of the pipe and serves to uniformly spread the material into all of the interstices of the surface of the wrapping material 51 and into the crevices adjacent the edges of this band of material where the lap occurs.

This wiper 91 is mounted upon a pivoted arm 94, which is supported in a bearing 95 on the frame of the machine. A weight 96 is provided, which weight is slidably mounted upon the arm 94 so that it will be slidable to position the arm as seen in dotted lines in Fig. 6. Thus when no pipe is being passed through the machine the arm may be tilted up to the dotted line position of Fig. 6 so that it will not interfere with operations in and about the machine.

After the pipe passes the wiper 91, the web of kraft paper is applied and inasmuch as the wiper has removed all excess of the coating or adhesive material very little of such adhesive or coating will be pressed from beneath the layer of the paper. In some instances, however, small amounts of the coating material will ooze from between the lap of the paper, and in some instances air bubbles beneath the paper or wrinkles in the paper may occur. It is desirable to eliminate these if possible while the coating is still in a molten condition, and with this in view an ironer 98 is provided. This ironer is in the form of an arcuate support or shoe, which is pivotally mounted at 99 upon an arm 100. This arm is pivoted for swinging movement in a vertical plane which is in alignment with the longitudinal axis of the pipe. It is, therefore, apparent that this arm may swing vertically and that the contact piece 98 can also pivot on the arm. With this structure the device is capable of contacting different sizes of pipe without adjustment, due to the fact that a spring 101 serves to normally raise the arm 100 upwardly and cause a pressure of the ironer against the surface of the pipe. It is contemplated that this ironer will be covered with a suitable cushioning surface, and it has been found that a piece of carpeting material accomplishes the desired result by ironing the surface of the paper and smearing any excess of coating which has oozed from between the paper.

It is intended that from time to time small quantities of talc or flour may be deposited on the ironer 98 in order to cover the smears of coating material so that when the pipes are placed in storage they will not adhere to each other.

A stop lug 102 is provided on the arm 100, which is adapted to abut against the bracket 103, which is attached to the frame of the machine. In this manner the upward swinging movement of the ironer is limited to substantially the elevation of the smallest diameter of pipe which it is contemplated will be wrapped in the machine. Thus the operator need not attend this ironer during the operation of the machine because, as an end of pipe passes, the ironer will merely move upwardly a slight distance until stopped by the lug 103. The ironer 98 is so pivoted on the arm 100 that the center of gravity lies above the arm 100, and when no pipe is present on the top of the ironer it will tilt inwardly toward the machine so that when the end of the pipe approaches from the machine it will strike the inclined surface of this ironer and tilt it up to a horizontal position without further attention or adjustment on the part of the operator.

Fig. 18 discloses a modified form of ironing arrangement disposed adjacent and subsequent to the point of application of the wrapping material to the pipe, as disclosed in Fig. 15, comprising an arcuate frame 102 supported by brackets 103 carried on the frame of the machine which carries a plurality of adjustable spring pressed rollers 104 for riding upon the applied felt or paper for ironing the same to the pipe. Preferably these rollers are made of rubber or a resilient material and are offset from each other and of sufficient combined width with a slight overlapping to completely iron the strip of wrapping material to the pipe.

As the end of the pipe passes from the machine it is desirable to support the same so that excessive bending moments will not be applied to the rollers and other supports of the machine. With this in view a carriage 105 has been provided which is mounted on the rails 106. This carriage comprises a bearing cap 107, which is mounted on an upright 108. This bearing cap is best seen in detail in Fig. 3 and comprises a cap member having a recess 109 to receive the end of the pipe. This cap member 107 rotates in the upright 108 so that excessive friction or resistance to rotation will not be applied to the pipe. As the pipe 16 emerges from the machine, one of the operators will merely place the end thereof in contact with the cap 107 and with the principal weight of the pipe resting on the rollers 110, which are also mounted on the carriage 105. As the pipe emerges from the machine the pressure thereof will cause the carriage 105 to travel along the rails 106 and when the entire section of pipe has emerged from the machine it is only necessary for the operator to roll the same from the carriage onto a suitable receiving rack from whence it may be moved to storage.

When long sections of pipe are being wrapped it is desirable that some support be provided intermediate the ends of the pipe as it emerges from the machine in order to prevent whipping of the pipe. With this in view an intermediate support structure 115 as disclosed in Figs. 2 and 12 has been provided adjacent the rails 106 which support the carriage 105. This intermediate support structure carries a pivotal arm 116, which has a curved end 117 thereon, which is adapted to be positioned beneath the pipe and serve as a temporary support therefor. This arm 116 is pivoted on the support structure and is arranged to be fastened in a substantially horizontal position by means of the latch link 118. This link passes beneath the lug 119 on the side of the support structure so that the arm 116 will support the weight of the pipe thereon.

In order that the carriage 105 may pass this support, the link 118 is readily removable. When the end of the pipe emerges from the machine it is received by the carriage 108, which may pass in front of the intermediate support structure 115. However, when the carriage 105 has passed the support structure the arm 116 is moved upwardly to the position shown in Fig. 14 and the link 118 passed beneath the lug 119. In this manner a support is provided between the carriage 105 and the machine. It is to be understood that when short sections of pipe are being wrapped that the arm 116 need not be used and the link 118 will then be released so that the arm will normally hang in a vertical position and not interfere with the passage of the carriage 105.

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When small diameters of pipe sections are being wrapped which can be easily handled by the operator, the carriage 105 may not be necessary, as the sections may emerge directly onto the supports 115 and be rolled to storage with ease.

Figs. 7 and 8 show a form of coupling of connecting member which may be used between the ends of the pipe sections being passed through the machine. This coupling includes a body 121, which has formed thereon the neck portions 122, and with an enlarged head 123 on each of the neck portions. The neck is best seen in section in Fig. 8, and Fig. 7 shows the heads 123 positioned inside of the ends of the pipe. In this manner the continuity of the pipe passing through the machine will be maintained and the ends of the pipe held in alignment so that they will pass through the rollers, the wiper and the ironer, as well as the other support members. The neck portions are shown as triangular with rather sharp corners 124 which merge with the body 121 at a point spaced outwardly from the center a little greater distance than the inside radius of the pipe sections. Thus the corners 124 may have a frictional contact with the adjacent ends of the pipe so that the rotation of the two pipe sections will be insured.

It will be seen that the pipe sections may be readily disconnected by sliding them longitudinally to remove the connecter. During the passage of the pipe through the machine the coating nozzle 60 will be moved to a position such that no coating will be applied adjacent the ends of the pipe and the wrapping material applied to the ends will not adhere to the pipe so that the coupling 121 may be readily removed after the pipes have passed through the machine by breaking the webs of felt and paper.

In the operation of this machine the pipe to be wrapped is rolled from the loading rack 2 onto the angularly disposed idle rollers 2' at the head end of the machine and one end of a coupling plug 121 is then inserted in the forward end of the pipe which is then thrust forward by the workman on to the power driven roller 32 with sufficient speed to bring the forward end of the coupling into engagement with the inside of the rear end of a forward advancing pipe section. In view of the fact that the idle rollers are the same shape as the power driven rollers and disposed at substantially the same angle to the longitudinal axis of the machine, the rear pipe sections are caused to rotate as they advance, and as they approach the rear end of the forward pipe sections they will have substantially the same rotative speed, so that the sections will readily connect together in a continuous line for spirally passing by the coating and wrapping means.

As the pipe line advances along it passes beneath the roller 42, which not only maintains the sections in proper alignment but also presses the same into engagement with the power driven rollers, to prevent any slipping.

As the line advances along under the first discharge nozzle 60 it is coated with an adhesive material such as tar or asphalt pumped up from the tank 71 by the pump 70.

After application of the asphalt the pipe advances in front of the first roll of wrapping material, which is drawn onto the pipes in a spiral overlapped relation through the tension means 82—87 for maintaining the wrapping material in a stretched condition to avoid any wrinkles as it is applied to the pipe.

A second coating of adhesive material is then applied to the pipe on the wrapping material by the second discharge nozzle 60, and is uniformly spread thereon by the wiper 91, after which a second coating of wrapping material such as kraft paper is drawn onto the pipe from roll 90 in a similar manner as the first layer of wrapping material. The second layer of wrapping material is then smoothed down by an ironer 98, or a roller arrangement as disclosed in Figs. 15 and 18.

As the end of the wrapped pipe passes from the machine it is supported by the carriage 105, which is pushed along on the rails 106 by the pipe, and when the entire section of pipe has emerged from the machine it is only necessary for the operator to thrust it ahead to disengage it from the coupling of the following pipe, and then roll the same from the carriage onto a suitable receiving rack from whence it may be moved to storage.

What I claim is:

1. A pipe wrapping machine including supporting rollers for the pipe being wrapped, each of said rollers comprising a pair of opposed convex contact surfaces disposed at an angle to the direction of travel of the pipe whereby different sizes of pipe will contact said surfaces at different points and thereby travel at different rotation rates and with substantially the same longitudinal travel.

2. In a pipe wrapping machine for advancing and rotating a pipe comprising a frame, a shaft supported on the frame at an angle inclined to the longitudinal axis of the machine, opposed convex curved surfaces carried on the shaft adapted to contact with a pipe, and adjustable means for supporting the curved surfaces on the shaft.

3. A machine for spirally wrapping pipes comprising a frame, a shaft supported on the frame at an angle inclined to the longitudinal axis of the machine, a roller on said shaft having opposed conical faces with relatively short bearing surfaces contacting with the pipe, whereby the pipe is rotated and advanced longitudinally of the machine upon rotation of the shaft.

4. A machine for spirally wrapping pipes comprising a frame, a shaft supported on the frame at an angle inclined to the longitudinal axis of the machine, a roller carried on the shaft having opposed conical faces with relatively short bearing surfaces contacting with the pipe, whereby the pipe is rotated and advanced longitudinally of the machine upon rotation of the shaft, and resilient pressure means for holding the pipe in contact with the conical bearing surfaces.

5. A machine for spirally wrapping pipes comprising a frame, a shaft supported on the frame at an angle inclined to the longitudinal axis of the machine, a roller carried by said shaft having opposed conical faces with relatively short bearing surfaces contacting with the pipe, whereby the pipe is rotated and longitudinally advanced upon rotation of the shaft, said bearing surfaces being independently mounted upon the shaft whereby they may be adjusted towards or away from one another to accommodate pipes of various diameters, and means for locking said bearing surface in adjusted position.

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