Oct. 3, 1939. S. P. MILLER 2,174,754

PIPE WRAPPING MACHINE

Filed Jan. 27, 1936 3 Sheets-Sheet 1

Fig. 1.

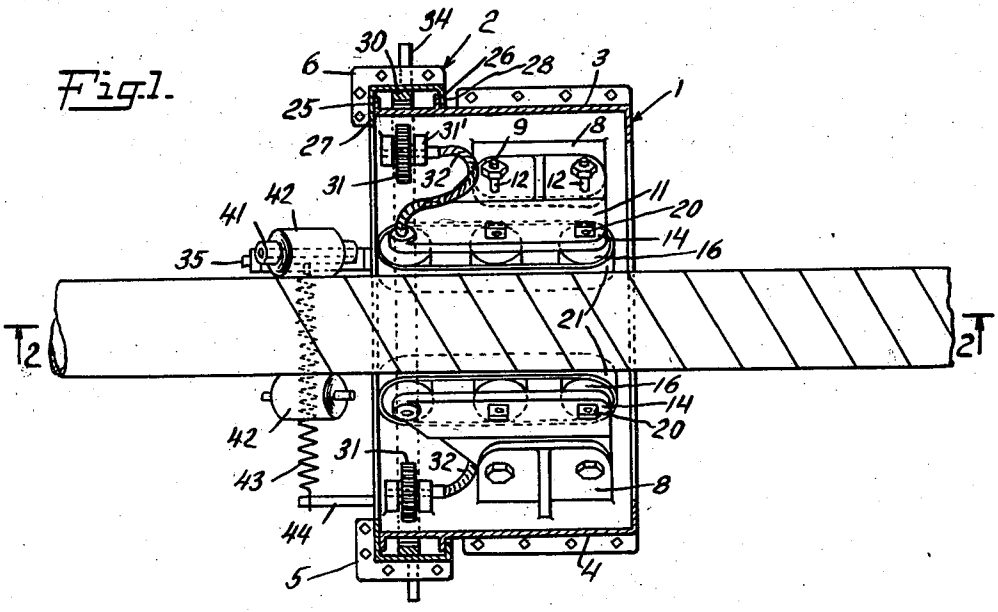
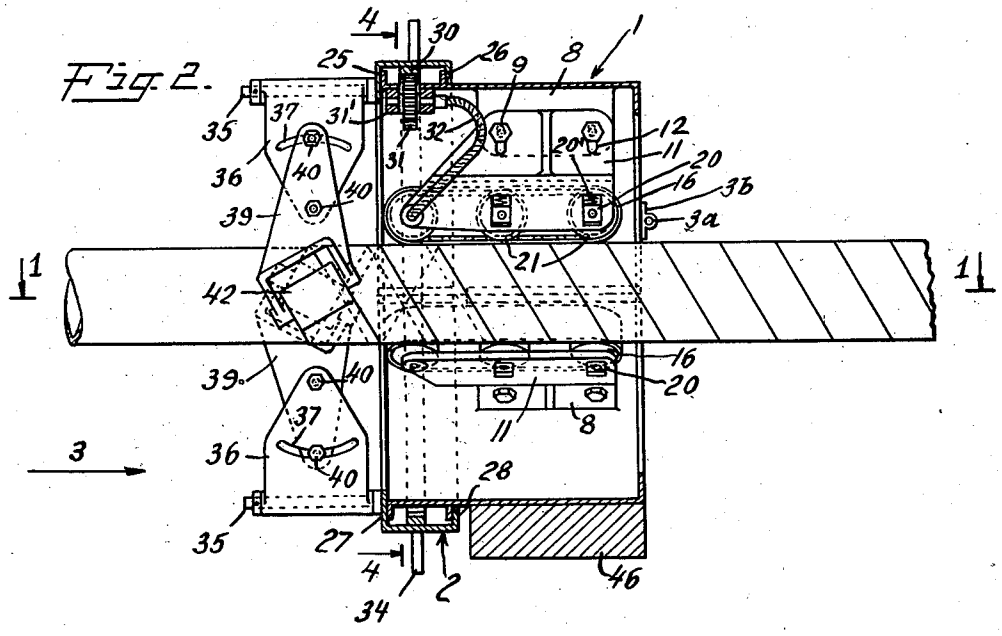


Fig. 2.



INVENTOR
Stuart P. Miller
BY
ATTORNEY

Oct. 3, 1939. S. P. MILLER 2,174,754

PIPE WRAPPING MACHINE

Filed Jan. 27, 1936 3 Sheets-Sheet 2

Fig. 3.

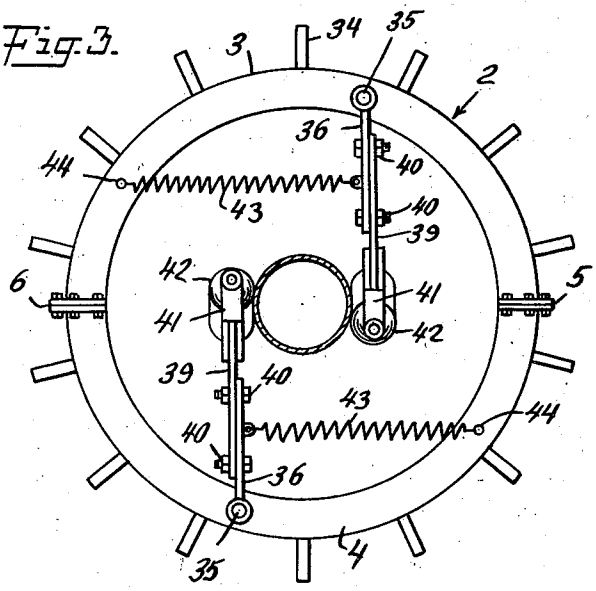


Fig. 5.

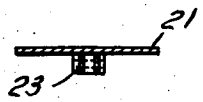


Fig. 6.

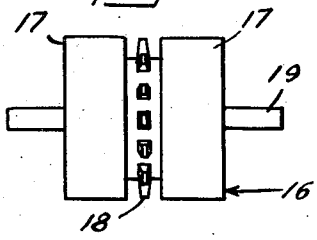


Fig. 7.

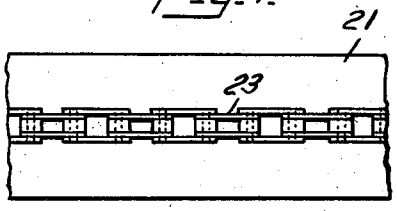


Fig. 4.

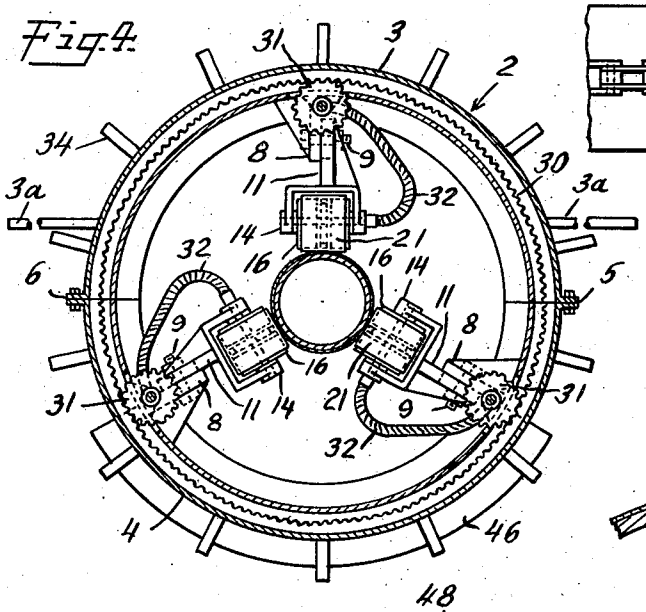


Fig. 8.

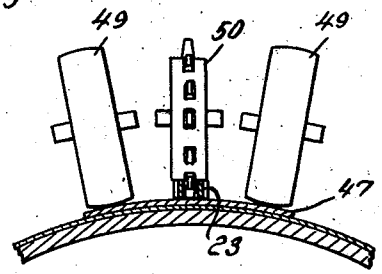
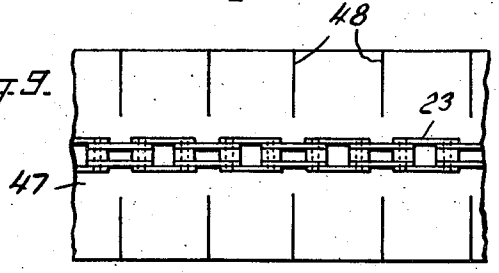


Fig. 9.



INVENTOR
Stuart P. Miller
BY
ATTORNEY

Oct. 3, 1939. S. P. MILLER 2,174,754

PIPE WRAPPING MACHINE

Filed Jan. 27, 1936 3 Sheets-Sheet 3

Fig. 10.

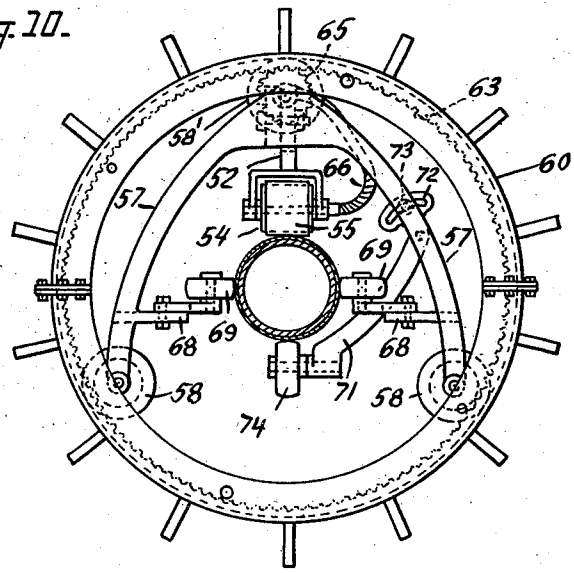


Fig. 11.

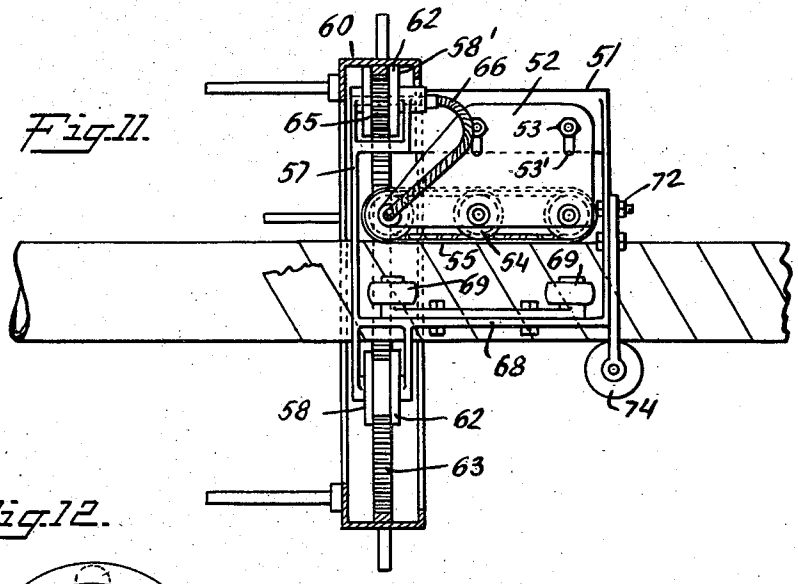
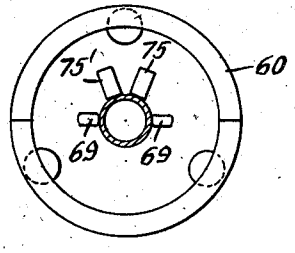


Fig. 12.



INVENTOR
Stuart P. Miller
BY Fosbury & Libby
ATTORNEY

Patented Oct. 3, 1939

2,174,754

UNITED STATES PATENT OFFICE

2,174,754

PIPE WRAPPING MACHINE

Stuart P. Miller, Scarsdale, N. Y., assignor to The Barrett Company, New York, N. Y., a corporation of New Jersey

Application January 27, 1936, Serial No. 61,003

8 Claims. (Cl. 242—11)

This invention relates to wrapping machines and more particularly to pipe wrapping machines adapted to be mounted upon a pipe and to move longitudinally of the pipe during the wrapping operation.

An object of this invention is to provide a relatively light-weight pipe wrapping machine which can readily be mounted upon an enamelled pipe and operated manually or from a suitable source of power such as an electric motor to apply wrapping material during relative longitudinal movement of the machine and pipe. The machine includes a normally non-rotating frame carrying adjustable traction members of such character as not to injure the enamel coating or the wrapping material, which traction members bear against the wrapped portion of the pipe, and a ring which may be rotated manually or by a suitable source of power. The ring carries a roll or rolls of wrapping material and is connected in driving relation to the traction members. The axes of the rolls of wrapping are inclined with respect to the longitudinal axis of the pipe and the peripheries of the rolls bear resiliently against the pipe. When the ring is rotated the wrapping material is wrapped around the pipe and motion of the ring is transmitted to the traction members. The rolls of wrapping material bearing upon the pipe and the traction members progressively move the wrapping machine longitudinally along the pipe.

For a more complete understanding of the invention reference should be had to the following detailed description and to the accompanying drawings illustrative of preferred embodiments of the invention, in which,

Fig. 1 is a central longitudinal sectional view through the wrapping machine taken on line 1—1 of Fig. 2, parts being shown in elevation;

Fig. 2 is a central longitudinal sectional view taken on line 2—2 of Fig. 1, parts being shown in elevation;

Fig. 3 is an end view of the machine taken in the direction of the arrow 3 of Fig. 2, the pipe being shown in section;

Fig. 4 is a transverse cross sectional view taken on line 4—4 of Fig. 2;

Fig. 5 is a transverse cross-sectional detail view through one of the traction members;

Fig. 6 is a detail view in elevation of a driving sprocket for the traction members;

Fig. 7 is a fragmentary elevational view of a traction member;

Fig. 8 is a fragmentary cross-sectional view illustrating a modified form of traction member and driving means therefor;

Fig. 9 is a fragmentary view in elevation of the traction member of Fig. 8;

Fig. 10 is an end view illustrating a modified form of pipe wrapping machine, the pipe being shown in section;

Fig. 11 is a side elevation of the machine illustrated in Fig. 10, parts being shown in section; and

Fig. 12 is a diagrammatic view showing a modification of the structure of Figs. 10 and 11.

The pipe wrapping machine of this invention includes a normally non-rotating cylindrical frame designated generally by the reference numeral 1 and a ring-like member indicated by the reference numeral 2 rotatably mounted on the frame. Frame 1 may include two semi-cylindrical segments 3, 4 secured together by any suitable means illustrated conventionally at 5 and 6. This securing means may conveniently consist of a hinge and any suitable fastener for ready mounting and demounting of the frame with respect to the pipe.

In the embodiment of the invention illustrated in Fig. 1 frame member 1 carries projecting inwardly from the interior walls thereof a plurality of members 8 provided with bolts 9. Roller supports 11 are adjustably secured to the members 8 by means of slots 12 which receive bolts 9. The free ends of supports 11 are provided with forks or journals 14 in which are rotatably mounted a plurality of rollers 16 (see particularly Figs. 4 and 6), constituted of cylindrical portions 17, sprocket central portions 18 and spindles 19. The spindles 19 of rollers 16 may be rotatably mounted in slidable bearings 20 resiliently urged toward the center of frame 1 by springs 20'. Each of the supports 11 of the illustrated embodiment of the invention carries three rollers 16 and upon each roller assembly is mounted a traction member 21 which is preferably a flexible caterpillar belt of such character as not to injure enamel or wrapped material. In order to secure a positive drive between the rollers and the traction belts 21, the inner runs of the belts may have secured thereto chain-like members 23 for engaging the sprocket teeth 18 of the rollers 16. Three belt and roller assemblies symmetrically arranged around the pipe are illustrated in the embodiment of the invention shown in Figs. 1 to 4. It will be appreciated the springs 20' resiliently urge the caterpillar belts 21 toward the pipe, and that upon actuation of the belts the cylindrical frame will be moved along the pipe at a rate

dependent upon the rate of movement of the belts.

Carried on the cylindrical frame adjacent the forward edge thereof are two upstanding substantially parallel flanges 25, 26. Ring member 2 is rotatably mounted on the frame 1 and may advantageously be provided with downwardly extending flanges 27, 28 which engage flanges 25, 26 to prevent lateral movement of the ring with respect to the frame. Ring member 2, like the cylindrical frame 1, is preferably constituted of two or more segments hinged or otherwise secured together to permit ready mounting of the machine about the pipe. Secured to the interior of the ring member is a ring gear 30 (see particularly Fig. 4) which meshes with gears 31 rotatably mounted in bearings 31' carried by cylindrical frame member 1. Each of the gears 31 drives a flexible shaft 32 which in turn is connected in driving relation to a roller 16 driving a traction member 21. Handles 34 project from the ring member 2 to allow ready manual rotation of the latter and it will be appreciated that upon rotation of the ring member, motion will be transmitted through gears 31, flexible driving connections 32, rollers 16 and traction members 21 to cause movement of the wrapping machine along the pipe.

If the wrapping machine is employed where power, such as an electric motor, is available, the ring member 2 may be rotated from such source of power. It will be understood that in the wrapping of pipe lines, for which this machine is particularly designed, the machine frequently must be employed in districts where power is not available. The light weight characteristics of the machine and its design, which is such that upon rotation of ring member 2 longitudinal propulsion of the traction member as well as rotation of the roll or rolls of wrapping material about the pipe take place, adapts this machine for manual operation. As the weight of ring member 2 is symmetrically distributed about the pipe, little energy is required to effect its rotation.

Projecting from the forward side of ring member 2 are pins or projections 35 upon which are pivotally mounted members 36, each provided with a segmental slot 37 and an aperture. Bolts 40 extend through the segmental slots 37 and apertures in the members 36 and adjustably secure thereto arms 39 which rotatably support between their forked free ends 41 rolls of wrapping material 42. Springs 43 attached to projections 44 and to roll-carrying arms 39 resiliently press the rolls of wrapping material against the pipe. The rolls of wrapping material are preferably placed under sufficient tension to insure the desired wrapping of the material as it is unwound from the rolls onto the pipe and for this purpose any suitable tension devices (not shown) may be employed. The inclination of the axes of the rolls of wrapping material with respect to the longitudinal axis of the pipe may be varied by suitable adjustment of the bolts 40 with respect to the segmental slots 37. A counterweight 46 may be secured to the lower portion of frame 1 to steady the frame on the pipe; the machine may also alternatively be steadied by hand by means of transverse handle bars 3a secured to segment 3 by sockets 3b.

The operation of the device may be briefly described as follows:

When it is desired to initiate the wrapping operation the frame member 1 and ring member 2 are mounted upon the pipe and secured thereabout by means of the fastening means provided for that purpose. The roll carrying arms 39 may be suitably adjusted to secure the proper inclination of the axes of rolls 42 with respect to the pipe and the pressure of the rolls against the pipe may be regulated by regulating the tension on springs 43.

The members 11 carrying traction members 21 may be adjusted by means of bolt and slot connections 9, 12 with respect to the cylindrical frame so that the traction members define circles corresponding to the exterior diameter of the pipe. Thereafter the operator grasps handles 34, and rotates the ring member 2. The motion of the ring gear is transmitted through gears 31, flexible driving connections 32 and roller 16 to the caterpillar traction members 21 and the resulting actuation of the latter causes longitudinal movement of the machine along the pipe. The caterpillar traction members travel upon the wrapped portion of the pipe and, since they move longitudinally but not rotatably with respect to the pipe, do not have a tendency to distort or otherwise injure the wrapping material. The rolls of wrapping material 42 bear resiliently against the pipe, and due to the inclination of their axes to the longitudinal axis of the pipe, aid the traction members in moving the wrapping machine and maintaining the machine balanced on the pipe with the weight of the machine and the rolls of wrapping material uniformly distributed about the pipe. Hence large rolls of wrapping material may be employed, and further, the energy required to operate the machine is minimized. Weight 46 has a tendency to prevent any unbalance or rotation of frame 1 on the pipe.

In Figs. 8 and 9 a somewhat modified form of traction member and mounting means therefor is illustrated. The traction member 47 of these figures is provided with transverse slits 48 extending laterally from the side edges towards the center thereof. Two spaced rollers 49 bear on the slit portions of the traction member adjacent the side edges thereof and sprocket 50 engages chain 23 and propels the traction member. The transverse slits 48 enable the traction member 47 to hug the pipe throughout the entire width of the traction member and hence more firmly grip the pipe to propel the machine therealong.

In Figs. 10 and 11 there is illustrated a modified form of the invention in which the frame member 51 is balanced upon the top of (see Fig. 11), but does not entirely surround, the pipe. Roller supporting member 52 is adjustably secured to the frame 51 by means of bolt and slot connections 53, 53' and rotatably supports rollers 54 which carry caterpillar traction belt 55. The supporting member 52, rollers 54 and traction member 55 may be similar to the corresponding elements of Figs. 1 to 4 hereinabove described and hence require no further description.

The frame member 51 is provided adjacent the front end thereof with two downwardly extending diverging arms 57. These arms carry at their apex and free ends a series of rollers 58, 58' which define a circle concentric with respect to the pipe and rotatably support ring member 60. The ring member 60 is preferably constituted of two semicircular segments hinged or otherwise secured together as described in connection with Fig. 1. Each of rollers 58, 58' is provided with a pair of parallel flanges 62 which receive therebetween a ring gear 63 rigidly secured to the interior of the ring member. It will be observed that the rollers cooperate with the ring member to rotatably support the latter on the frame. Rollers 58

act merely as guides for supporting the ring member during its rotation. Roller 58', however, performs a dual function and for this purpose may be provided between the flanges thereof with gear teeth 65 which engage the teeth of the ring gear 63 and impart rotation to the roller upon rotation of the ring member. The spindle of roller 58' is secured to flexible shaft 66 which is in turn connected in driving relation to the foremost of rollers 54 carrying traction member 55.

The frame 51 is provided with cross bars 68 on which may be adjustably mounted two pairs of rollers 69 for engaging the sides of the pipe and guiding the frame therealong during the wrapping operation. An additional roller carrying arm 71 may, if desired, be adjustably mounted on the rear end of the frame, as for example by bolt and slot connections 72, 73. The roller 74 may engage the under side of the pipe to steady the machine during its progress along the pipe.

A roll or rolls of wrapping material (not shown) may be mounted upon the front end of the ring member by mechanism similar to that shown in Figs. 1 to 4. Such rolls of wrapping material may bear resiliently against the pipe with their axes inclined to the longitudinal axis of the pipe.

In the operation of the device, the frame is placed upon the pipe and properly positioned with respect thereto by adjusting member 52, rollers 69 and roller 74 if used. The ring member 60 may then be assembled about rollers 58, 58' and the rolls of wrapping material adjusted to bear against the pipe at the desired inclination and with the desired pressure. The operator grasps the handles 34 on the ring member 60 and rotates the latter, thereby causing the wrapping material to be unwound from the rolls. The motion of the ring member is transmitted through ring gear 63, roller 58' and flexible driving connection 66 to the traction member 55. The traction member and the rolls of wrapping material cause the machine to progressively advance along the pipe at the desired speed. In case the frame shows a tendency to rotate around the pipe, suitable weights (not shown) may be secured to either side thereof to prevent such rotation.

While in Figs. 10 and 11 only one traction member has been illustrated it will be appreciated that one, two or more such members may be employed. Fig. 12 illustrates diagrammatically a modification of the construction of Fig. 10 in which two traction members 75, 75' bearing on opposite sides of the highest point of the periphery of the pipe are employed. These traction members may be driven from ring member 60 by driving connections such as those hereinabove described. In the illustrated embodiments of the invention, the traction members run on the wrapped portion of the pipe.

It will be evident that the traction members, instead of riding on the wrapped portion of the pipe as shown on the drawings, could ride directly on the enamel coating of the unwrapped portion of the pipe without injury thereto; for example, by reversing the direction of rotation of the rotatable ring member for wrapping the pipe from right to left in the manner shown in Fig. 1, the wrapping machine would wrap the pipe from left to right and the belts 21 would travel directly on the enamel coating of the pipe. If desired a motor or manual driving means may be connected directly to the traction members and the rotatable ring member driven from the traction members; or the ring member and traction members may be driven independently by separate motors or manual driving means.

While I have illustrated two rolls of wrapping material mounted upon the machine, it will be understood that any desired number of rolls may be employed to cover the pipe with any desired number of plies of material. Thus, for example, one, two or three or more rolls may be employed, and the spirals of material from one roll applied in lapped, butted or spaced relation. The spirals from another roll may be applied to cover the edges of the spirals of the first roll. Use of a plurality of rolls is preferred since it permits better balancing of the rotating parts.

From the hereinabove description it will be appreciated that I have provided a pipe wrapping machine simple in construction, easy to operate and adjustable for use in wrapping pipes of a wide variety of sizes. The combined tractive effect of the traction members and the rolls of wrapping material result in uniform longitudinal movement of the machine along the pipe, the rolls of wrapping material guiding the machine in its longitudinal movement along the pipe. The traction members bear upon the wrapped or unwrapped portions of the pipe but do not rotate therearound and hence have no tendency to seriously distort or injure the wrapping material or enamel coating which has been applied.

I claim:

1. A pipe wrapping machine comprising in combination a frame, a flexible belt traction member on said frame for engaging the pipe and supporting the weight of the wrapping machine on the pipe, a rotating gear mounted on said frame and engaged to be rotated about said pipe, means connecting said rotating gear with said traction member for moving said traction member along said pipe and a roll of wrapping material carried by said rotating gear and arranged to be revolved about said pipe to wind the wrapping material thereabout.

2. A manually operated pipe wrapping machine comprising a frame adapted to be mounted upon a pipe, a member rotatably mounted with respect to said frame, flexible belt traction members carried by said frame and a driving connection between said traction members and said rotatable member whereby rotation of said rotatable member actuates said traction members to propel said machine along the pipe.

3. A pipe wrapping machine comprising a non-rotatable frame adapted to surround the pipe, a plurality of traction members mounted on said frame and adapted to engage said pipe at spaced points therearound, means for adjusting said traction members to engage the peripheries of different sized pipes, guides on said frame, a rotatable member mounted upon said frame, driving connections between said rotatable member and said traction members whereby rotation of said rotatable member actuates said traction members, a roll of wrapping material mounted upon said rotatable member, said roll of wrapping material having its axis inclined with respect to the longitudinal axis of the pipe, means for resiliently pressing said roll of wrapping material against the pipe, said traction members and said roll of wrapping material cooperating, upon rotation of said rotatable member, to cause longitudinal movement of the machine along the pipe.

4. A pipe wrapping machine comprising, in combination, a frame adapted to be mounted

upon a pipe, a traction member mounted on said frame and adapted to engage the pipe, a roll of wrapping material supported on said frame for revolution about said pipe, the axis of said roll of wrapping material being inclined with respect to the axis of said pipe, means for pressing said roll of wrapping material against said pipe, means for revolving said roll of wrapping material about said pipe, means for actuating said traction member, said roll and said traction member cooperating to propel the wrapping machine along the pipe.

5. A pipe wrapping machine comprising in combination a non-rotatable frame adapted to surround a pipe, a plurality of flexible belt traction members carried by said frame, means for adjusting said traction members on said frame to contact with the periphery of said pipe, a ring member rotatably mounted on said frame, a roll of wrapping material mounted on said ring member with its axis inclined with respect to the longitudinal axis of the pipe, means for pressing said roll of wrapping material against said pipe, means for actuating said traction member, said traction member and said roll of wrapping material cooperating to move the wrapping machine longitudinally of the pipe.

6. A pipe wrapping machine comprising in combination a non-rotatable frame, flexible belt traction means on said frame for supporting said frame on said pipe, a member supported by said frame for rotation about said pipe, means for mounting a roll of wrapping material on said member for revolution about said pipe, means for rotating said member about said pipe to apply spiral convolutions of wrapping material thereto and means for actuating said flexible belt traction means to move said machine longitudinally along the pipe.

7. A pipe wrapping machine comprising a non-rotatable frame adapted to be mounted around a pipe, a plurality of supporting members arranged symmetrically around the interior of said frame, means for adjusting said members toward and from the longitudinal axis of said frame, rollers mounted on the inner portions of said supporting members, flexible belts mounted on said rollers, guides on the forward portion of said frame, a ring member rotatably mounted on said guides, a ring gear on said ring member, gearing connecting said ring gear with the rollers on which said flexible belts are mounted whereby rotation of the ring member results in actuation of the flexible belts, a plurality of arms mounted on said ring member, said arms being adapted to carry rolls of wrapping material, means for resiliently pressing said rolls of wrapping material against the pipe and means for adjusting the axes of the rolls with respect to the longitudinal axis of the pipe.

8. A pipe wrapping machine comprising in combination a frame adapted to be mounted upon a pipe, a supporting member mounted on said frame and projecting inwardly toward said pipe, means for adjusting said supporting member toward and away from said pipe, rollers carried by said supporting member, a traction belt positioned about said rollers and adapted to engage an upper portion of said pipe, adjustable roller supports carried by said frame, rollers carried by said adjustable supports an dadapted to engage said pipe in the neighborhood of its horizontal diameter, guides mounted on the forward portion of said frame, said frame being provided with means for preventing rotation of the same about the pipe, a ring member rotatably mounted on said guides, a ring gear carried by said ring member, a driving connection including a flexible shaft between said ring gear and said flexible traction belt, a plurality of arms pivoted on said ring member, said arms being adapted to carry rolls of wrapping material, means for resiliently pressing said rolls of wrapping material against said pipe, and means for adjusting the axes of said rolls of wrapping material with respect to the axis of said pipe.

STUART P. MILLER.