Aug. 13, 1935. J. COLEMAN ET AL 2,011,172

PIPE WRAPPING MACHINE

Filed Oct. 28, 1930 3 Sheets-Sheet 1

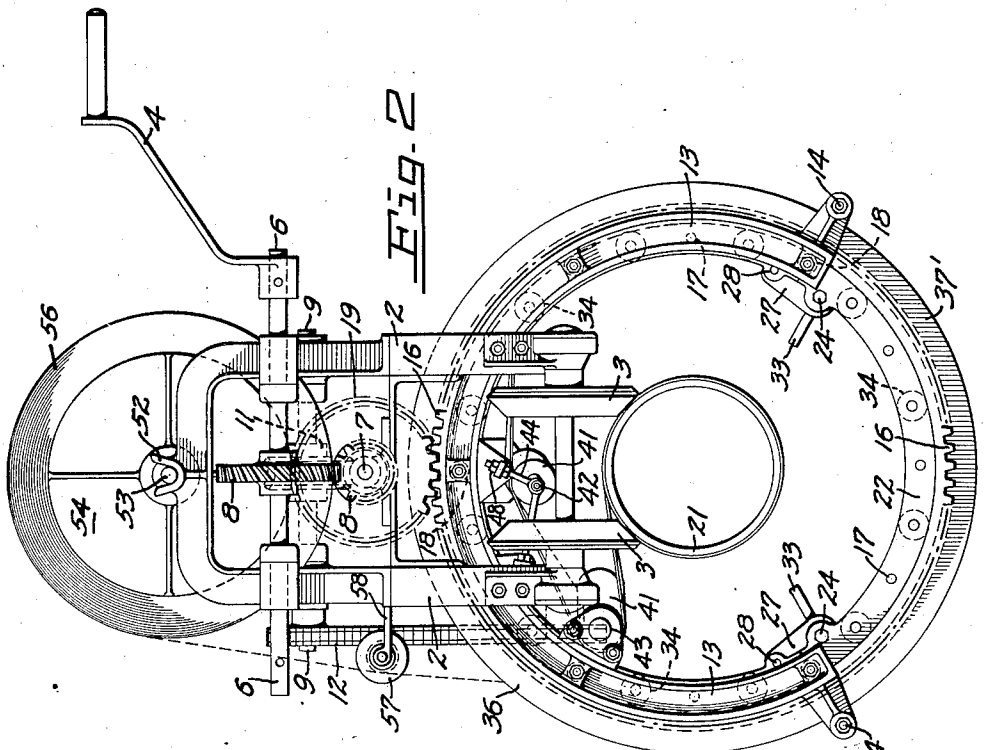

Fig. 2

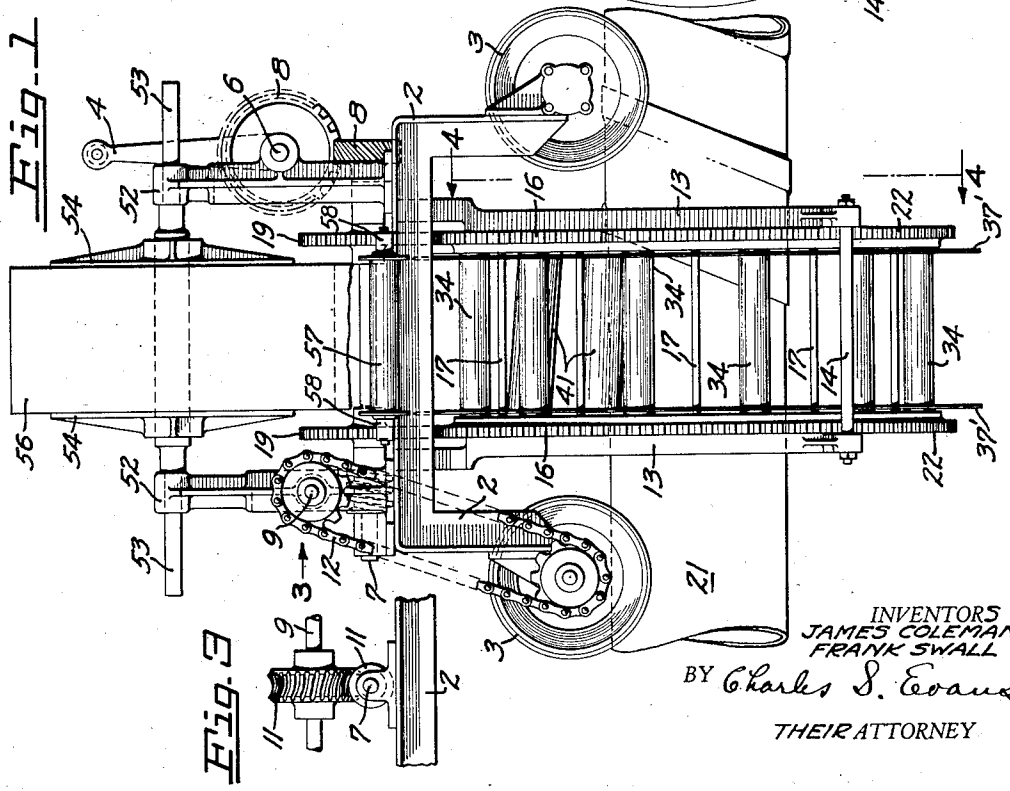

Fig. 1

Fig. 3

INVENTORS
JAMES COLEMAN
FRANK SWALL
BY Charles S. Evans
THEIR ATTORNEY

Aug. 13, 1935. J. COLEMAN ET AL 2,011,172

PIPE WRAPPING MACHINE

Filed Oct. 28, 1930 3 Sheets-Sheet 2

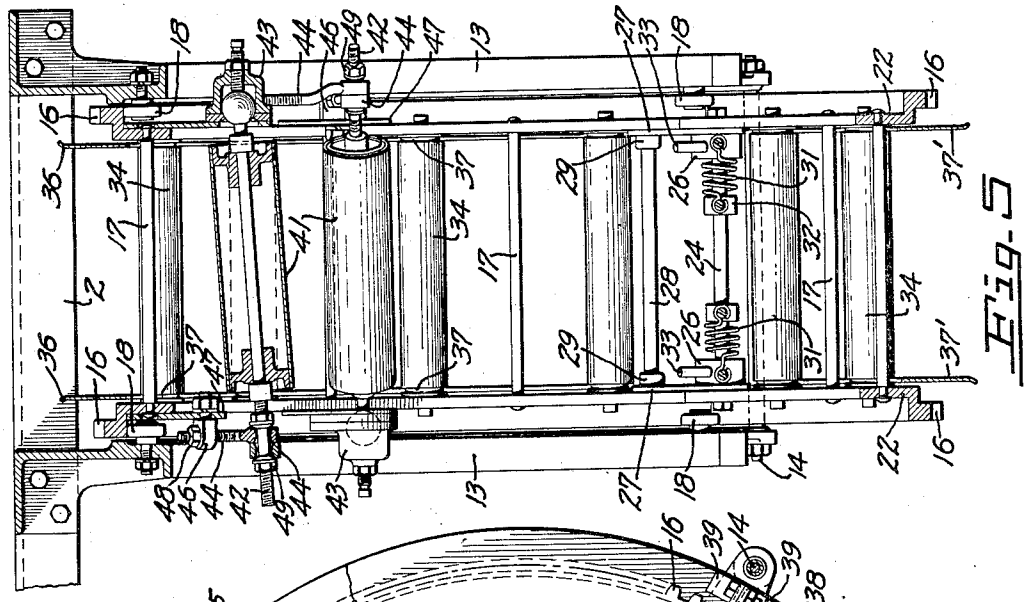

Fig. 5

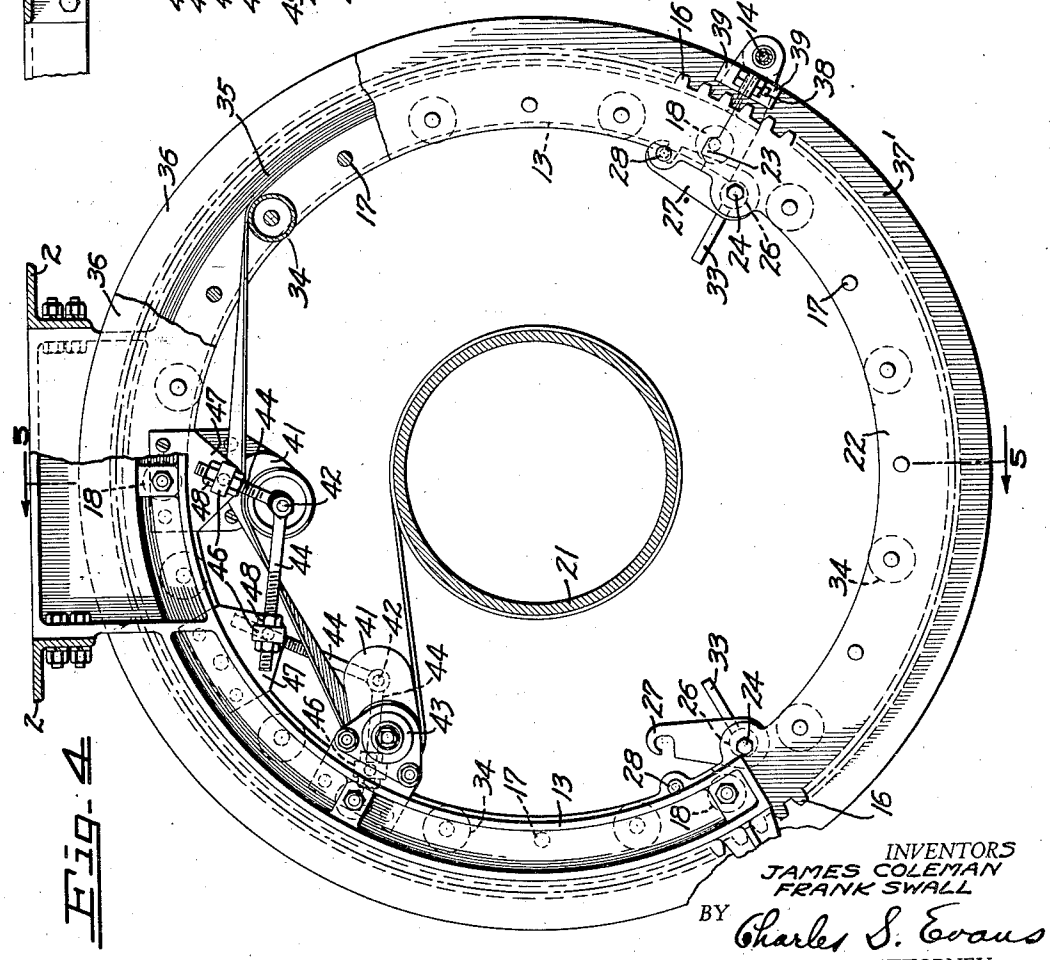

Fig. 4

INVENTORS
JAMES COLEMAN
FRANK SWALL
BY Charles S. Evans
THEIR ATTORNEY

Aug. 13, 1935. J. COLEMAN ET AL 2,011,172

PIPE WRAPPING MACHINE

Filed Oct. 28, 1930 3 Sheets-Sheet 3

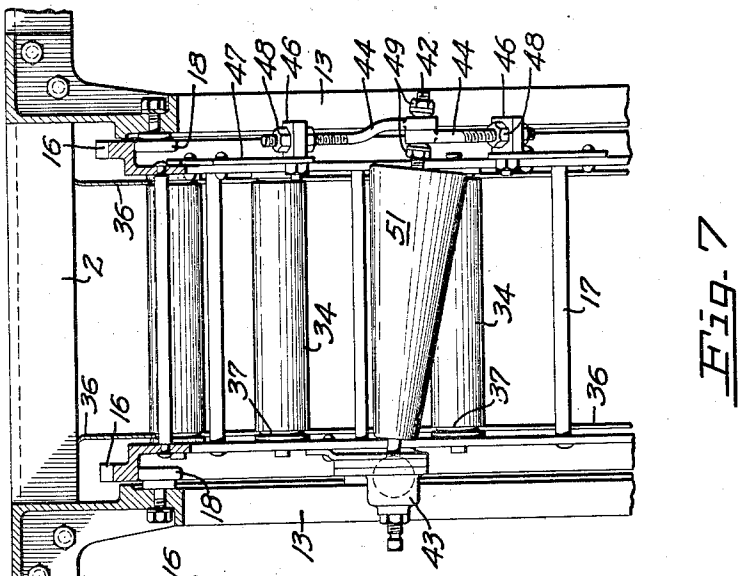

Fig. 7

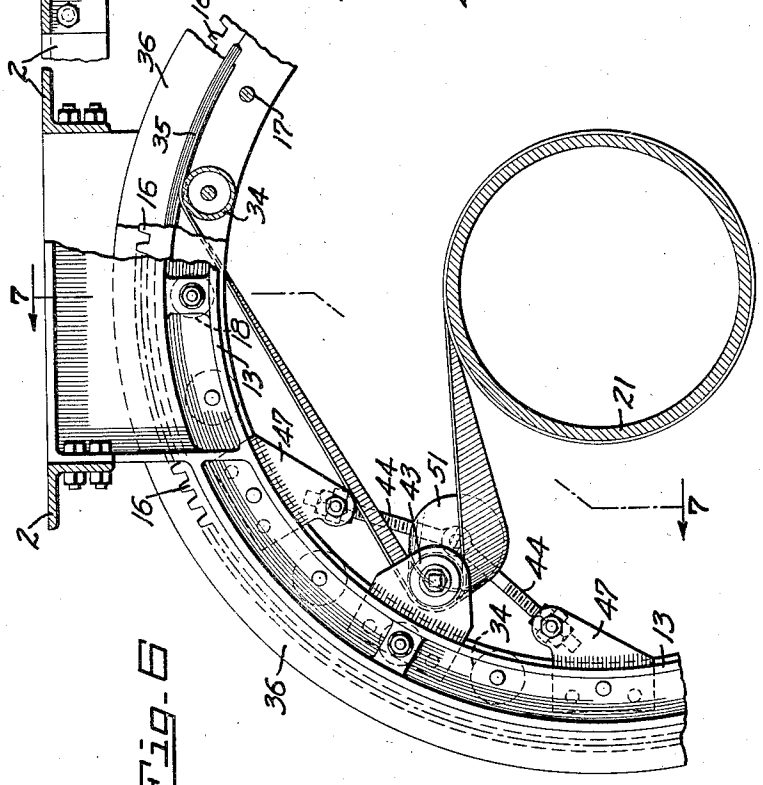

Fig. 6

INVENTORS
JAMES COLEMAN
FRANK SWALL
BY Charles S. Evans
THEIR ATTORNEY

Patented Aug. 13, 1935 2,011,172

UNITED STATES PATENT OFFICE

2,011,172

PIPE WRAPPING MACHINE

James Coleman, Emeryville, and Frank Swall, San Francisco, Calif., assignors to The Paraffine Companies, Inc., San Francisco, Calif., a corporation of Delaware

Application October 28, 1930, Serial No. 491,709

11 Claims. (Cl. 242—11)

Our invention relates to a pipe wrapping machine, and particularly to a machine which applies a strip of wrapping material to a pipe without the use of fluid adhesives.

It is among the objects of our invention to provide a pipe wrapping machine embodying improved means for transferring the wrapping material from supply rolls to the pipe during the operation of the machine, so that wrapping process may proceed as a substantially continuous operation.

Further objects of our invention include the provision of a comparatively light and conveniently portable machine, which is manually operable, and which will wrap a protective strip of material about an installed pipe line.

Our invention possesses numerous other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of our invention. It is to be understood that we do not limit ourselves to this disclosure of species of our invention, as we may adopt variant embodiments thereof within the scope of the claims.

Referring to the drawings:

Figure 1 is a side elevation of the pipe wrapping machine embodying our invention; and

Figure 2 is an end elevation of the same.

Figure 3 is detail view showing a portion of the drive mechanism, taken in a plane indicated by the arrow 3 of Figure 1.

Figure 4 is vertical sectional view of portions of the machine taken in a plane indicated by the line 4—4 of Figure 1, and shows the wrapping material holding reel in end elevation.

Figure 5 is a vertical sectional view of the reel, taken in a plane indicated by the line 5—5 of Figure 4.

Figure 6 is a fragmentary side elevation of the reel showing an alternate construction for the wrapping material guide means; and

Figure 7 is a vertical sectional view of the same, taken in a plane indicated by the line 7—7 of Figure 6.

Broadly stated, the pipe wrapping machine embodying our invention comprises a frame mounted for movement along the pipe to be wrapped. A reel, adapted to encircle the pipe, is journaled on the frame, and is arranged to hold the wrapping material in a coil coaxial with the pipe. Means, preferably manualy operable, are provided for moving the frame along the pipe and rotating the reel. Guide means for directing the wrapping material from the reel to the pipe are also provided, so that as the reel moves the material is wound on the pipe in a helical wrapping. It is preferred to journal a supply roll of wrapping material on the frame, and as the wrapping material is pulled off the coil and wrapped on the pipe additional material is simultaneously peeled off the supply roll and wound on the coil.

In greater detail, the pipe wrapping machine embodying our invention comprises a frame 2 mounted for movement along the pipe on the spaced bevel wheels 3. The frame is moved along the pipe by a hand crank 4 mountable on either end of a frame journaled shaft 6. The crank shaft 6 is connected to a main shaft 7 thru the helical gears 8, and the main shaft is in turn connected to a cross shaft 9 thru the worm gears 11. A chain drive 12 connecting the cross shaft 9 with the forward pipe engaging wheels 3 serves to propel the frame along the pipe as the crank 4 is turned.

Means are provided for holding the wrapping material in a coil encircling the pipe. A pair of spaced semi-circular brackets 13 are mounted on the frame 2, and are arranged to extend downwardly and straddle the pipe so that the semi-circular brackets are coaxial with the pipe. The cross rods 14 tie the ends of the brackets together. These brackets provide a journal support for a pair of ring gears 16, held spaced by the tie rods 17; the bracket rollers 18 engage the inner faces of the gears at spaced points about their circumferences to provide the journal. A pair of spur gears 19, mounted on the main shaft 7, are meshed with the ring gears 16, and serve to rotate the ring gears when the hand crank 4 is turned

The ring gears 16 are adapted to be positioned about a pipe 21 at any point in an installed line. Referring particularly to Figure 4, a demountable section 22 is provided in each ring gear 16. These demountable sections are substantially equal in length to the distance between the lower open ends of the semi-circular journal brackets 13, so that the sections may be dropped out of the mounting. This permits the assembly to be lowered over the pipe, and when the gear sections are replaced the pipe is encircled. The sections 22 are provided with the tongues 23 arranged to slide endwise into suitable engaging grooves formed in the complementary portions of the ring gears.

Latch means are provided for securing the gear sections in proper position. A rod 24 is arranged across each end of the sections. Journaled on the rod 24 adjacent its ends are the collars 26 which provide an eccentric mounting for the latch hooks 27. These hooks engage a second

rod 28 arranged across the ends of the complementary ring portions. A pair of rod fixed collars 29, spaced from the sides of the ring gears, provide annular grooves for receiving the hooks. Suitable coil springs 31, connected between the journaled collars 29 and the rod fixed collars 32, operate to rotate the collars 29 and tension the eccentrically mounted hooks, thereby holding them securely in the locked positions. A handle 33 is provided on each of the journaled collars 29 for rotating the collars and loosening the hooks to disengage the latches.

A reel, arranged coaxial with the pipe, is provided for holding the wrapping material in a coil encircling the pipe. A plurality of rollers 34 are journaled in the ring gears 13 between the tie rods 17. As best illustrated in Figure 4, these rollers form the reel upon which the wrapping material may be wrapped to form the coil 35. A pair of annular plates 36 are journaled in the roller grooves 37, and provide the flanges for the reel. Each of the flange plates 36 has a removable section 37' similar to the demountable sections 22 of the ring gears. The clamping bolts 38 passing thru suitable abutting brackets 39 serve to secure the sections 37' to the complementary portions of the flange rings.

Guide means, preferably arranged between the reel and the pipe, are provided for guiding the wrapping material from the reel to the pipe. Referring particularly to Figures 4 and 5, a pair of guide rollers 41 are arranged to transfer the wrapping material from the coil 35 to the pipe 21, so that the material is drawn off the inner side of the coil and thence directed to the pipe at the proper angle. The shafts 42 of the rollers are pivotally mounted, one shaft on one ring gear and the other shaft on the other ring gear, in the ball and socket joints 43.

The free ends of the roller shafts are adjustably mounted on the opposite ring gears. A pair of eye bolts 44 are pivotally and adjustably mounted on the ring gear in suitable studs 46 pivoted in the brackets 47; the bolt nuts 48 serving to hold the eye bolts in the stud. The loop ends of these bolts encircle the free end of the roller shaft 42 and are secured by the nuts 49. By loosening the nuts 48 and changing the length of the eye bolts the rollers may be adjusted to a selected position.

An alternate construction for the guide means is shown in Figures 6 and 7. In this modification of our invention the rollers 41 are replaced by a single conical roller 51; the mounting of this roller being similar to the adjustable mounting described in connection with the rollers 41. The conical shape of the guide roller 51 permits the single roller to transfer the material from the coil 35 to the pipe, so that the material is directed to the pipe at the proper angle. The advantages of the single guide roller over the plurality of rollers are that it involves a simpler construction, and that it may be more easily and quickly adjusted. Both in the case of the plurality of cylindrical rollers and of the single conical roller, a plurality of faces are provided inclined to the axis of the coil and over which the material passes to effect the proper directing of the material as it passes to the pipe at a given selected angle.

Means are provided for holding a supply of wrapping material. Journaled in the upper portions of the frame 2 in the open bearings 52 is a spindle 53 carrying a pair of flange plates 54. A roll 56 of wrapping material is held on the spindle between the flange plates. The spindle 53 extends parallel with the axis of the pipe, and the supply roll 56 is positioned directly above the reel provided by the plurality of rollers 34, so that the wrapping material may be peeled off the supply roll and wound about the reel to form the coil 35. A guide roll 57, mounted on a frame bracket 58, serves to direct the wrapping material on the reel as it is peeled off the supply roll.

Operation: An operator removes the demountable sections 22 and 37' of the reel assembly and lowers the machine over the pipe 21 until the frame supporting rollers 3 rest on the pipe at the point where the wrapping is to begin. The ring gear sections 22 are then slid endwise back into position, and are locked by engaging the latch hooks 27; the reel flange section 37' also being replaced and secured by the bolts 38. The assembled unit thus formed provides a reel encircling and coaxial with the pipe.

The operator then places a supply roll 56 of wrapping material on the spindle 53. This material may be any suitable wrapping strip, such as a web of fibrous material saturated and/or coated with a bituminous material. The free end of the material is peeled off the supply roll, passed over the guide roll 57, and then looped around the reel provided by the rollers 34. The end of the material is then threaded thru the bottom of the reel, over one of the reel rollers 34 adjacent the first guide roller 41, and is passed over the guide rollers and thence given a turn about the pipe and secured by any suitable means.

The machine is now ready for operation and the operator starts turning the handle 4. As a result, the frame is moved along the pipe, and the ring gears 16 including the reel are rotated about the pipe. This causes the reel and consequently the guide rolls 41 to move relative to the pipe with a combined rotary and longitudinal motion. Since the reel and supply roll are both mounted on the frame 2 their relative movement is merely one of pure rotation, and the wrapping material is peeled off the roll and wound on the reel to form the coil 35.

As the reel rotates and simultaneously moves along the pipe the guide rollers 41 pull the wrapping material out from the bottom of the coil 35. Since the coil is held by the freely journaled reel rollers 34 the coil may easily slip around the reel, thus permitting the inner layer to be readily pulled out. The wrapping material is applied to the pipe in a helical wrapping with the turns overlapping to form a tight covering. The angular position of the guide rollers 41 depends upon the pitch of the wrapping, and they are set to direct the material with its surface tangent to the pipe.

The rate at which the wrapping material is transferred from the supply roll to the reel is greater than the rate at which it is being applied to the pipe. Consequently, there will become a time during the wrapping process when the reel is completely filled. At this time the operation of the machine is momentarily stopped and the material cut between the reel and the supply roll; the end of the strip being secured on the next layer of the coil by a suitable adhesive. After this brief interruption the wrapping may be continued until the reel is empty, at which time the free end of the strip may be spliced with the end from the supply roll. The splicing operation requires but a few minutes and when it is completed the wrapping may be continued until the reel is again filled. Since the interruptions are comparatively few, and in themselves involve

only short lapses of time, the wrapping is carried on as a substantially continuous operation.

The pipe wrapping machine embodying our invention is of comparatively light weight and is conveniently portable. This factor is of considerable importance in installed pipe line machines where the wrapping is carried on in the field. Furthermore, the machine is small and does not require an unduly large trench about the pipe for its operation.

We claim:

1. A pipe wrapping machine comprising means for holding a supply roll of wrapping material, means for holding the wrapping material in a coil encircling the pipe, means for rotating the holding means to transfer the wrapping material from the supply roll to the coil and simultaneously transfer the wrapping material from the coil to the pipe, and means for moving the holding means along the pipe.

2. A pipe wrapping machine comprising means for holding a supply roll of wrapping material, means for holding the wrapping material in a coil encircling and coaxial with the pipe, means for rotating the holding means to transfer the wrapping material from the supply roll to the coil and simultaneously transfer the wrapping material from the coil to the pipe, and means for moving the holding means along the pipe.

3. A pipe wrapping machine comprising means for holding a supply roll of wrapping material, means for holding the wrapping material in a coil encircling the pipe, and means for moving the holding means with a combined rotary and longitudinal motion to transfer the wrapping material from the supply roll to the coil and simultaneously transfer the wrapping material from the coil to the pipe.

4. A pipe wrapping machine comprising a frame mounted for movement along the pipe, a supply roll of wrapping material journaled on the frame, a reel journaled on the frame and adapted to encircle the pipe for holding the wrapping material in a coil coaxial with the pipe, and means for moving the frame along the pipe and rotating the reel to transfer the wrapping material from the supply roll to the coil and simultaneously transfer the wrapping material from the coil to the pipe.

5. A pipe wrapping machine comprising a rotor for holding the wrapping material in a coil encircling and spaced from the pipe, a guide roller in the space between the coil and pipe and angularly disposed relative to the latter for directing the material from the inside of the coil to the pipe, means on the rotor for pivotally supporting one end of the roller, and adjustable means on the rotor for supporting the other end of the roller to hold the latter in a selected angular position relative to the pipe.

6. A pipe wrapping machine comprising a rotor for holding the wrapping material in a coil encircling and spaced from the pipe, a guide roller in the space between the coil and pipe and angularly disposed relative to the latter for directing the material from the inside of the coil to the pipe, means on the rotor for pivotally supporting one end of the roller, a pair of angularly disposed legs mounted on the rotor for supporting the other end of said roller, and means adjustable to vary the relative lengths of said legs for altering the angular position of the roller relative to the pipe.

7. A pipe wrapping machine comprising a frame mounted to ride on the pipe as a track, a reel journaled on the frame and adapted to surround the pipe for holding the wrapping material in a coil encircling the pipe, a second reel journaled on the frame for holding a supply roll of the wrapping material, and means for rotating the pipe encircling reel and advancing the frame along the pipe to transfer the wrapping material from the supply roll to the coil and simultaneously transfer the material from the coil to the pipe.

8. A pipe wrapping machine comprising a frame mounted to ride on the pipe as a track, a reel journaled on the frame and adapted to surround the pipe for holding the wrapping material in a coil encircling the pipe, a second reel journaled on the frame for holding a supply roll of the wrapping material, means for rotating the pipe encircling reel and advancing the frame along the pipe to transfer the wrapping material from the supply roll to the coil and simultaneously transfer the material from the coil to the pipe, and a guide roller interposed between the latter reel and the pipe for directing the wrapping material from the coil to the pipe.

9. A pipe wrapping machine comprising a frame mounted for movement along the pipe as a track, a reel on the frame and surrounding the pipe for holding the wrapping material in a coil encircling the pipe, and means mounting a roll of wrapping material on the frame for continuously supplying material to said coil.

10. A pipe wrapping machine comprising a frame mounted for movement along the pipe as a track, means for moving the frame along the pipe, a reel on the frame and surrounding the pipe for holding the wrapping material in a coil encircling the pipe, and means mounting a roll of wrapping material on the frame for continuously supplying material to said coil.

11. A pipe wrapping machine comprising a frame mounted for movement along the pipe as a track, a reel on the frame and surrounding the pipe for holding the wrapping material in a coil encircling the pipe, means mounting a roll of wrapping material on the frame, and means for rotating the reel to transfer the wrapping material from the roll to the coil and transfer material from the coil to the pipe.

JAMES COLEMAN.
FRANK SWALL.