

Sept. 18, 1962

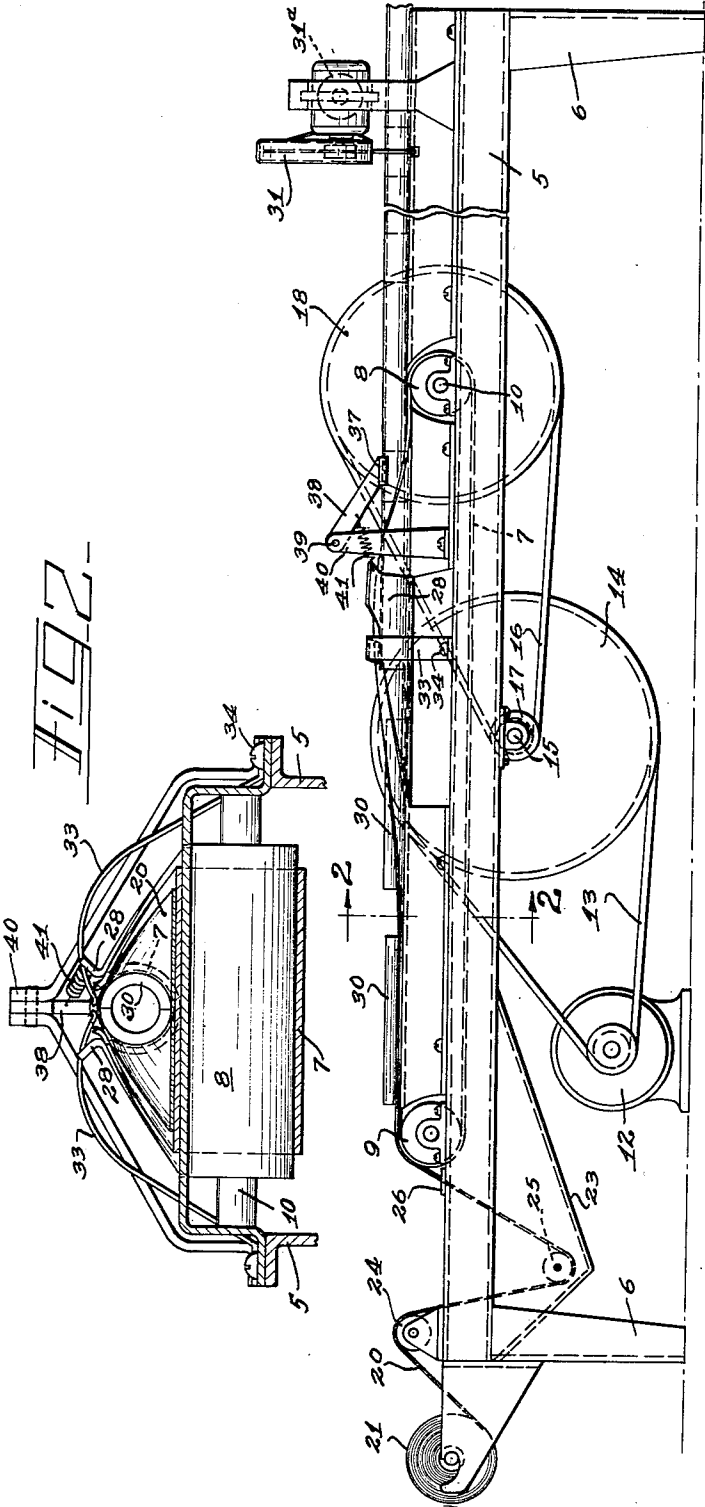
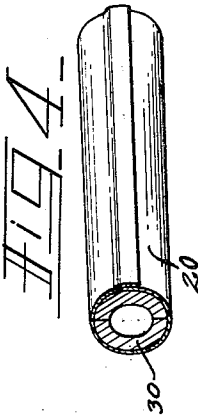
E. C. PIO

3,054,440

MACHINE FOR WRAPPING AND ADHERING CLOTH TO PIPE INSULATION

Filed July 14, 1955

2 Sheets-Sheet 1



INVENTOR
EMERICK C. PIO
BY
Paul H. Hoge
ATTORNEYS

Sept. 18, 1962

E. C. PIO

3,054,440

MACHINE FOR WRAPPING AND ADHERING CLOTH TO PIPE INSULATION

Filed July 14, 1955

2 Sheets-Sheet 2

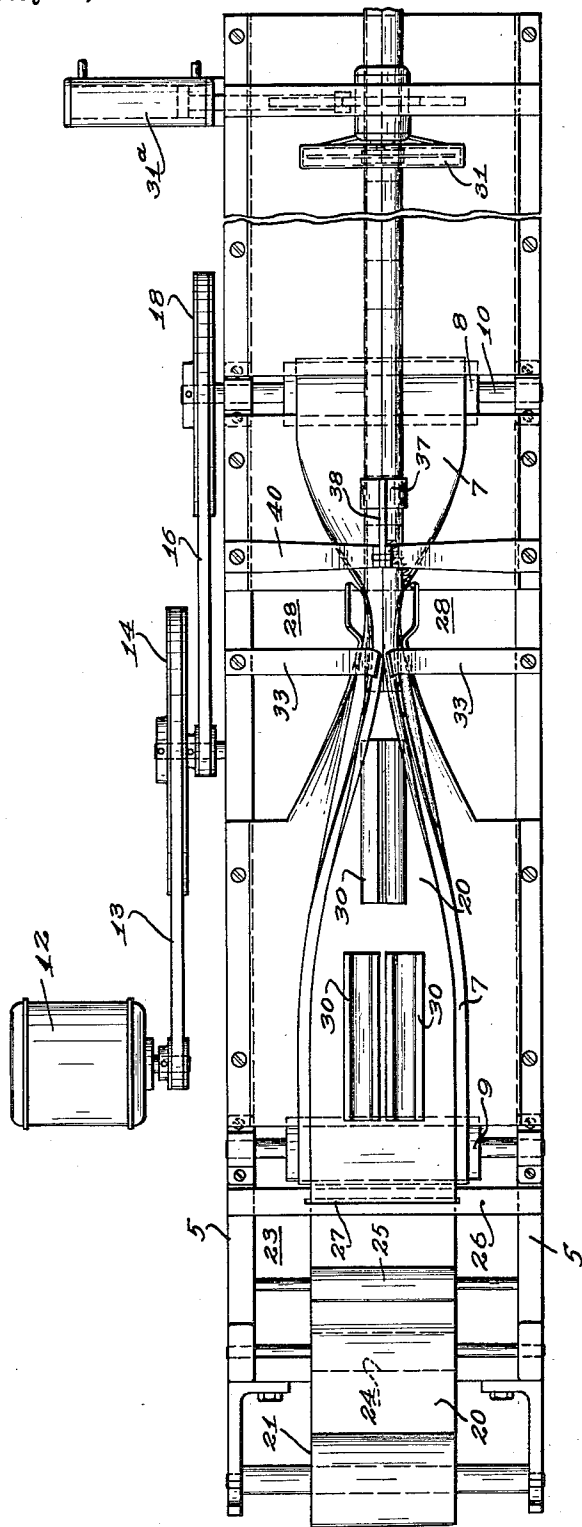


FIG. 3

INVENTOR
ENERICK C. PIO
BY *Paul and Hoge*
ATTORNEYS

1

3,054,440

MACHINE FOR WRAPPING AND ADHERING CLOTH TO PIPE INSULATION

Emerick C. Pio, Atco, N.J., assignor, by mesne assignments, to Owens-Corning Fiberglas Corporation, a corporation of Delaware

Filed July 14, 1955, Ser. No. 522,014

6 Claims. (Cl. 156-443)

My invention relates to means for applying a cloth covering to a cylindrical object or objects which for descriptive purposes only are herein depicted as insulation molded in tubular form and used for pipe covering or the like. Such insulation is commonly molded either in solid, one-piece tubes or in semi-cylindrical sections, pairs of which sections are then fitted together to form a tubular object or cylindrical casing of insulating material. The sections are united in pairs by wrapping a cloth or canvas covering around the sections and adhering it to the insulating material. When the insulation is molded as one-piece tubes they may be wrapped in like manner for protection or for decoration.

The present invention provides a machine or apparatus for wrapping cloth or canvas around such molded insulation and adhering the cloth to insulating material. The invention in its preferred form, as herein illustrated and described, comprises an endless traveling rubber belt conveyor, means for supporting a roll of cloth and drawing a web of the cloth through a pool of adhesive material and thence on to the traveling belt. The belt with the superimposed web of cloth passes through a die or wrapping device by which the belt and layer of cloth thereon are rolled to tubular form. When the invention is used in conjunction with semi-cylindrical sections of the insulating material the sections are placed in pairs on the web and pass therewith through the die so that the sections of insulation are brought together into tubular form with a web of cloth wrapped around them and adhered thereto. A cutting device operates to sever the cloth wrapped sections from the roll of cloth and separate successively wrapped tubular lengths of insulating material after passing beyond the wrapping die. The machine of course, is equally adapted for use in wrapping single-piece tubes.

The machine herein illustrated is particularly adapted for use in practicing one preferred embodiment of the present invention, but it will be understood that other machines or mechanisms may be used for wrapping and adhering sheet material to insulating tubes and the like in accordance with the concepts herein disclosed.

Referring to the accompanying drawings:

FIG. 1 is an elevational view of the machine;

FIG. 2 is a cross-section at the line 2-2 on FIG. 1;

FIG. 3 is a plan view of the machine; and

FIG. 4 is a part-sectional perspective view of a finished tube.

The operating parts are mounted on a framework comprising parallel longitudinal frame members 5 supported on legs 6. An endless traveling belt 7, preferably made of rubber, is trained over a drive roller 8 and a driven roller 9. The roller 8 is mounted on a drive shaft 10 journaled in the frame members 5 and driven continuously by an electric motor 12. The motor has driving connection with the shaft 10 through speed reduction gearing including a drive belt 13 trained over the motor pulley and a pulley 14 keyed to a shaft 15. A belt 16 is trained over a pulley 17 on the shaft 15 and a pulley 18 on the shaft 10.

A web 20 of canvas cloth or other wrapping material is drawn from a roll 21 of the material into a position to overlie the traveling belt 7 on which the web 20 is supported and carried away from the roll 21. A tank 23 positioned beneath the driven roller 9 contains paste or adhesive material in liquid form. The web 20 is drawn

2

over an idler pulley 24 and a pulley 25 immersed in the adhesive. As the web moves upwardly out of the pool of adhesive material it passes through a squeegee 26 which may consist of rubber to reduce frictional wear and damage to the moving web, the squeegee being in the form of a bar extending transversely between the frame members 5 and formed with a slot 27 through which the web is drawn, thereby removing excess adhesive material from the web.

The belt 7 and the superimposed web of canvas or cloth 20 are drawn through a wrapping device or die 28. Semi-cylindrical sections 30 of the insulating material are placed in pairs in side-by-side relationship on the web 20 in advance of the wrapping die 28 and are carried forward through the wrapping die. The latter is shaped to concurrently wrap the belt and web of cloth around the object or insulating material by gradually enfolding the marginal edges of the belt and web of cloth upwardly and inwardly around the insulating material. In this respect the wrapping die 28 has the general shape of a longitudinally segmented frusto conical member and defines a belt constricting opening disposed in the path of travel of the belt and converging in the direction of travel thereof. Also, the wrapping die 28 defines an open upper stretch extending longitudinally of the wrapping die and communicating radially with the belt constricting opening. The two sections of the insulating material which form a pair are thus rolled together by the constricting action upon the belt and web as they are drawn through the wrapping die 28 to form a cylinder. The belt 7 and web 20 as they pass through the die are wrapped around the insulating tube and the cloth adhered to the tube. The rubber belt upon emerging from the wrapping die 28 flattens out before it reaches the drive roll 8 while the web remains wrapped around and adhered to the mated sections of insulating material. The pairs of insulation sections 30 are spaced apart in succession lengthwise on the traveling belt thus leaving a gap between each successive cylinder which is formed. The web is severed between the adjoining ends of the successive insulating tubes by a cutter device, herein shown as a disk cutter 31. The cutter is driven by a piston motor 31^a which is operated periodically in timed relation to the forward movement of the insulated tubes, the operations being timed to sever the web between the spaced ends of the tubes, leaving a short section of the wrapping cloth for wrapping over the ends of the tubes as is common in this art.

Referring to FIG. 2, it will be seen that the width of the rubber belt 7 and the web 20 are substantially wider than the circumference of the tube 30 and the inner peripheral surface measurement of the wrapping die so that when the belt and web are wrapped around the tube their respective marginal edges protrude through the open upper stretch of the wrapping die 20 in spaced apart relationship. Resilient means in the form of resilient fingers 33 are attached by screws 34 to the frame members 5. The free ends of the fingers are disposed in the path of the protruding edges of the belt 7 and web 20 and act as a biasing means and bear with a yielding downwardly deflecting pressure on the marginal edges of the belt while concurrently drawing the protruding marginal edges of the web of cloth mutually together in upstanding relationship as the latter passes to and through the wrapping die, said fingers being shaped to guide and draw or separate the longitudinal edges of the web of cloth away from the belt and around the cylinder 30. The fingers also guide the web into the wrapping die while the web remains so drawn around the cylinder. Also, the fingers by this biasing or drawing action hold the web in position while the rubber belt unfolds and flattens out upon emergence of the belt from the wrapping die 28. Additional resilient means are provided for

3

applying pressure to the meeting longitudinal edges of the web and ironing out or smoothing the overlapping edges of the web and pressing it into intimate contact with the insulating material. Such additional resilient means includes an arc-shaped presser pad or foot 37 carried on an arm 38 connected by a pivot 39 to a standard 40. A coil spring 41 attached to the arm 38 applies downward pressure to the pad 37. Additionally, the presser pad or foot, by means of applying pressure to the overlapping seams of the web, aids the resilient fingers 33 in restraining the web from tending to adhere to the belt as the latter flattens out.

Modifications may be resorted to within the spirit and scope of my invention.

I claim:

1. Apparatus for wrapping a flexible web of covering material around a cylindrical object, said apparatus comprising the combination of an endless resilient belt mounted for horizontal travel, means for horizontally driving said belt, means for guiding said covering material in superimposed longitudinal relationship onto said belt for travel therewith, an object receiving station disposed along the path of travel of the belt supported covering material for receiving an object in a lengthwise position upon said covering material, a wrapping die receiving said belt and for receiving the belt supported covering material and object therethrough, said wrapping die being shaped in the form of a longitudinally segmented frusto conical member providing an inner wall surface defining a belt constricting opening disposed in the path of travel of said belt and converging in the direction of travel thereof, said wrapping die also defining an open upper stretch communicating with said belt constricting opening and extending along the length of said wrapping die, said inner wall surface of said wrapping die being operative to enfold the marginal edges of said belt and said covering material around said object to an upstanding position with the opposite marginal edges of said covering material protruding outwardly from said open upper stretch, resilient means overlying said belt and arranged to press the protruding marginal edges of said covering material into lengthwise mutual contact during the unfolding of said belt as it leaves the belt emergent end of said wrapping die and means for mutually securing said marginal edges to thereby retain said covering material around said object.

2. The apparatus as defined in claim 1, wherein said resilient means includes a presser foot mounted for shiftable vertical movements and positioned in adjacent overlying relationship to the belt emergent end of said wrapping die and resilient biasing means operatively linked with said presser foot and resiliently biasing same towards said belt to press the protruding marginal edges of said covering material together against said object.

3. Apparatus for wrapping a flexible web of covering material around a cylindrical object, said apparatus comprising the combination of an endless resilient belt mounted for horizontal travel, means for horizontally driving said belt, means for guiding said covering material in superimposed longitudinal relationship onto said belt for travel therewith, an object receiving station disposed along the path of travel of the belt supported covering material for receiving mating semi-cylindrical objects in side-by-side lengthwise position upon said covering material, a wrapping die receiving said belt and for receiving the belt supported covering material and objects therethrough, said wrapping die being shaped in the form of a longitudinally segmented frusto conical member providing an inner wall surface defining a belt constricting opening disposed in the path of travel of said belt and converging in the direction of travel thereof, said wrapping die also defining an open upper stretch communicating with said belt constricting opening and extending along

4

the length of said wrapping die, said inner wall surface of said wrapping die being operative to enfold the marginal edges of said belt and said covering material around said objects to an upstanding position with the opposite marginal edges of said covering material protruding outwardly from said open upper stretch thereby pivoting said objects together in mating edgewise relationship, resilient means overlying said belt and arranged to draw the protruding marginal edges of said covering material away from said belt and into mutual upstanding contact during the unfolding of said belt from the belt emergent end of said wrapping die and means for mutually securing said contacting marginal edges to thereby retain said covering material around said objects.

4. The apparatus as defined in claim 3, wherein said resilient means includes a pair of oppositely disposed resilient fingers mounted in transverse overlying relationship to the open upper stretch of said wrapping die, said resilient fingers having inner end surfaces biased resiliently together and arranged to receive the protruding marginal edges of said covering material therebetween and draw same away from said belt and into mutual upstanding contact.

5. Apparatus for wrapping cloth around tubes of insulating material, each said tube comprising a pair of semi-cylindrical insulating sections, said apparatus comprising an endless belt mounted to travel horizontally, means for driving the belt, means for supporting a roll of the wrapping cloth, a liquid adhesive tank, means for drawing the cloth from said roll and guiding it through said liquid adhesive tank and into position to overlie and adhere to the traveling belt and to be drawn forwardly thereby, a pre-shaping member beneath which the belt drawn cloth and semi-cylindrical insulating sections pass, said pre-shaping member having spaced apart resilient fingers arranged to engage the longitudinal edges of the cloth and pre-shape the cloth by drawing same away from the belt and around the semi-cylindrical insulating sections, means for rolling together a pair of said semi-cylindrical insulating sections in mating edgewise relationship to form a cylinder and for constricting the belt sufficiently to draw the overlying pre-shaped cloth snugly around said cylinder, said lastmentioned means comprising a wrapping die shaped in the form of a longitudinally segmented frusto conical member having an inner wall surface defining a belt constricting opening disposed in the path of travel of said belt and converging in the direction of travel thereof, said belt constricting opening receiving therethrough the belt with the overlying pre-shaped cloth thereon.

6. Apparatus for wrapping cloth around tubes of insulating material, each said tube comprising a pair of semi-cylindrical insulating sections, said apparatus comprising an endless belt mounted to travel horizontally, means for driving the belt, means for supporting a roll of the wrapping cloth, a liquid adhesive tank, means for drawing the cloth from said roll and guiding it through said liquid adhesive tank and into position to overlie and adhere to the traveling belt and to be drawn forwardly thereby, a pre-shaping member beneath which the belt drawn cloth and semi-cylindrical insulating sections pass, said pre-shaping member having spaced apart resilient fingers arranged to engage the longitudinal edges of the cloth and pre-shape the cloth by drawing same away from the belt and around the semi-cylindrical insulating sections, a wrapping die shaped in the form of a longitudinally segmented frusto conical member having an inner wall surface defining a belt constricting opening disposed in the path of travel of said belt and converging in the direction of travel thereof, said belt constricting opening receiving therethrough the belt with the overlying pre-shaped cloth thereon.

(References on following page)

References Cited in the file of this patent

UNITED STATES PATENTS

775,538	McConnell	Nov. 22, 1904
775,540	McConnell	Nov. 22, 1904
1,871,687	Hamersley	Aug. 16, 1932
2,006,376	Vogt	July 2, 1935
2,075,178	Copeman	Mar. 30, 1937

2,235,630

2,274,495

2,350,996

2,389,725

2,584,060

2,620,513

2,722,262

Fischer Mar. 18, 1941

Muench Feb. 24, 1942

Atkinson et al. June 13, 1944

Gillis et al. Nov. 27, 1945

Stephano Jan. 29, 1952

Cryor et al. Dec. 9, 1952

Eaton et al. Nov. 1, 1955