July 4, 1972 R. J. HARRIS ET AL 3,674,546

METHOD FOR COATING PIPE

Filed Jan. 6, 1971 2 Sheets-Sheet 1

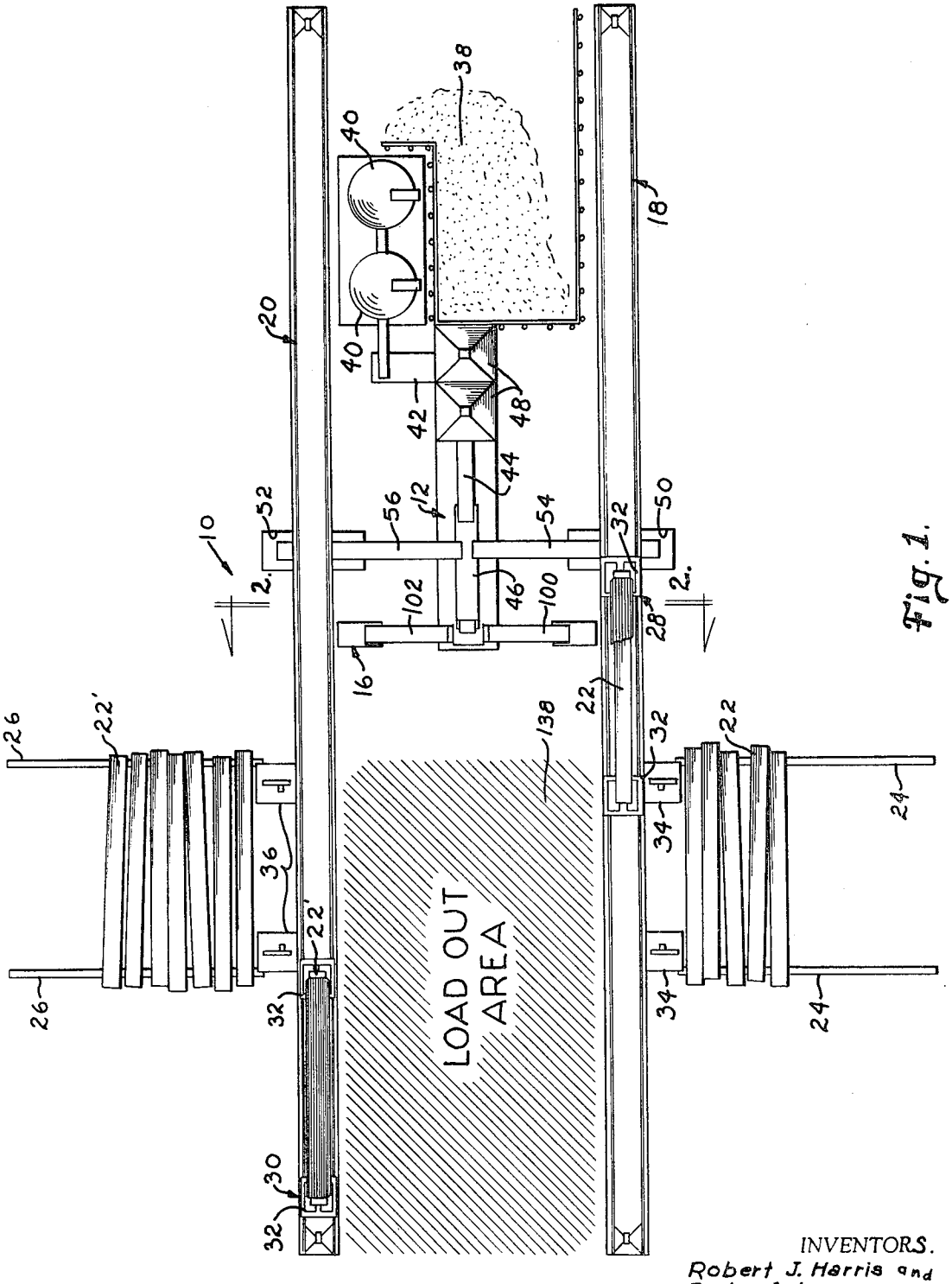


Fig. 1.

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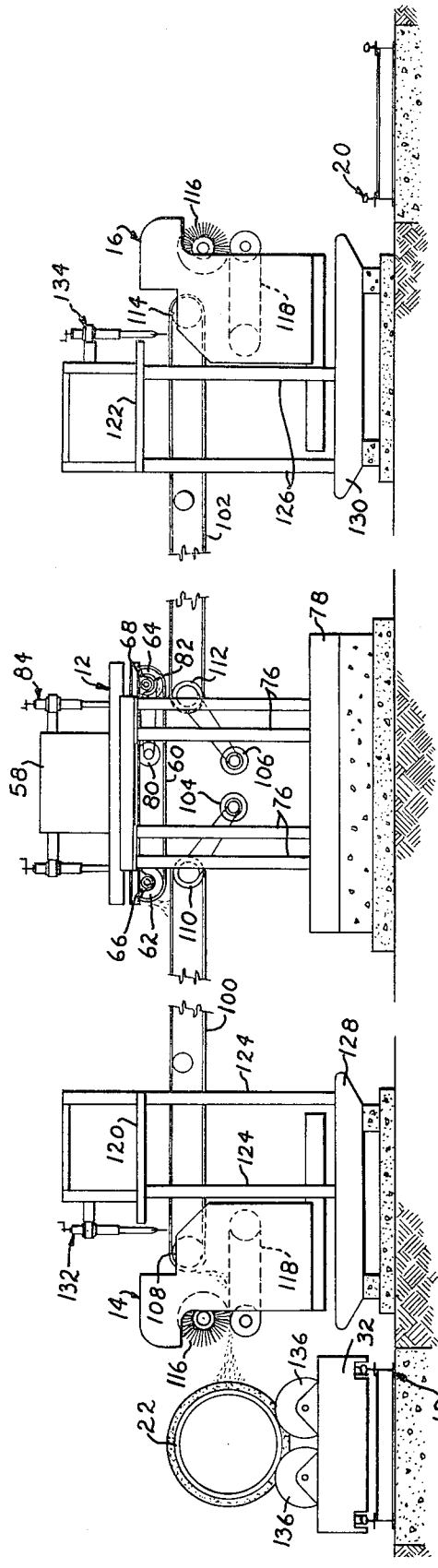


Fig. 2.

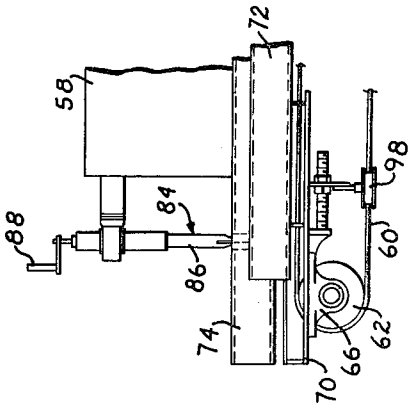


Fig. 4.

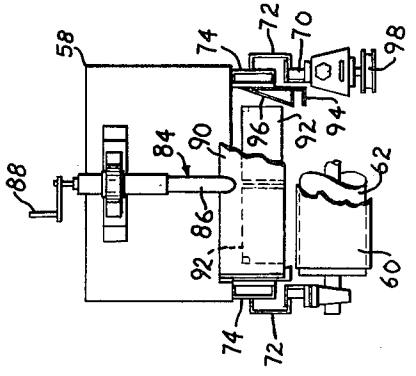


Fig. 3.

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METHOD FOR COATING PIPE

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U.S. Cl. 117—94 7 Claims

ABSTRACT OF THE DISCLOSURE

A method and apparatus for coating a pair of pipe sections utilizes spaced, parallel, track vehicles for moving the sections on opposite sides of a central coating station. Coating material is alternately supplied from the station to two applicators, which are located adjacent and perpendicular to the respective tracks, by a reversible feeder belt. Movement of the sections is forward to the coating station and then backward away from the station. The pipe sections are spaced apart in their directions of travel so that their paths are 180° out of phase and one of the sections is at the forward end of its path of travel while the other is at the backward end of its path of travel. Thus, one section can be subjected to the coating step while the other section is being removed from the track vehicle.

This invention relates to a coating apparatus and method, and more particularly, to a method and apparatus for expediting the coating of pipe sections.

It has long been the practice to provide a protective coating for pipe sections to be buried in the ground and also for pipe lines placed in marine applications. The coating is usually either a concrete aggregate material or a mastic material with a bituminous asphaltic base.

While several methods of coating the pipe sections have been utilized, one of the most desirable from a cost standpoint makes use of a rapidly rotating brush to impinge the coating material onto the pipe sections as the latter move relative to the rotating brush. This method, which was initially limited to concrete coatings, has recently been successfully extended to mastic coatings.

The primary object of the present invention is to provide a method and apparatus for coating pipe sections which includes throwing, spraying, or impinging the coating onto the sections and wherein the coating time per unit is substantially reduced by using spaced, parallel coating lanes on opposite sides of a central coating preparation station.

An important object of this invention is also to minimize the equipment required for the coating of pipe sections by utilizing a central supply facility and pug mill for supplying duel applicators located on opposite sides of the pug mill, to permit handling of a pair of pipe sections with less than twice the equipment previously required to coat a single pipe section.

Still another object of the invention is a method and apparatus for coating a pair of pipe sections wherein dual applicators are utilized and a reversible feeder belt allows both applicators to be applied from a single source by simply reversing the direction of travel of the belt.

These and other important objects of the invention will be further explained or will become apparent from the following specification and claims.

In the drawings:

FIG. 1 is a top plan view of the coating apparatus of the present invention;

FIG. 2 is an enlarged cross-sectional view of the apparatus taken along line 2—2 of FIG. 1;

FIG. 3 is an enlarged front elevational view of one of the control gates which maintain a uniform level of the coating material along the feeder belt, with portions being broken away for purposes of illustration; and

FIG. 4 is a partial side elevational view of the apparatus shown in FIG. 3.

Referring initially to FIG. 1, a pipe coating plant constructed according to the present invention is designated generally by the numeral **10** and includes a central coating station **12** from which coating material is delivered to a pair of identical coating applicators **14** and **16**. A pair of spaced, parallel tracks **18** and **20** are disposed perpendicular and adjacent to the respective applicators **14** and **16**. The tracks **18** and **20** are longitudinally extending past a pair of loading stations where pipe sections **22** and **22'** are supported upon two sets of pipe racks **24** and **26** respectively.

A pair of pipe-coating vehicles **28** and **30** are each comprised of a pair of individual coating buggies **32**. The pipe sections **22** and **22'** are moved from the supporting racks **24** and **26** and onto the vehicles **28** nd **30** by loading jacks **34** and **36** respectively.

The coating station **12** includes a storage area which encloses a quantity of sand **38** used in preparing the concrete coating, and a pair of tanks **40** store a supply of cement which is fed through a conveyor **42** and a chute **44** to a pug mill **46**. A pair of hoppers **48** provide structure for introducing the sand **38** into the pug mill **46** through the chute **44**. Any of the concrete coating material which does not adhere to the pipe section being coated drops into areas **50** and **52** beneath the tracks **18** and **20** respectively from which it is conveyed to the pug mill **46** by conveyors **54** and **56** respectively.

Referring now to FIGS. 2–4, wherein further details of the coating station **12** are shown along with details of the two applicators **14** and **16**. The pug mill **46** includes a hopper **58** at the forward end thereof for delivering the concrete coating material onto a reversible feeder belt **60**. The feeder belt **60** is supported by a pair of rollers **62** and **64** at opposite ends with each of the rollers having its shaft journaled in appropriate bearing housings **66** and **68**. The bearing housings **66** and **68** are in turn supported by a frame **70** which is rigid with a first pair of C-channels **72** which are welded or otherwise rigidly secured to a second pair of C-channels **74**. A plurality of upright standards **76** support the entire assembly of the belt **60** and rollers **62** and **64**, along with the hopper **58** upon a platform **78**. The belt **60** is driven by a reversible motor **80** through a pulley and belt assembly **82**.

At each side of the hopper **58** a control gate designated generally by the numeral **84** is located for assuring that the coating material deposited upon the belt **60** is uniformly distributed. Each of the gates **84** comprises an upright support rod **86** which is operably coupled with a handle **88** for moving the gate **84** in a vertical plane. At the end of the rod **86** opposite the handle **88** a generally planar, vertically disposed gate member **90** extends transversely of the belt **60** in vertically spaced relationship to the latter. Extending rearwardly from the member **90** are a pair of outwardly flared vanes **92** which converge toward the member **90** in a V-shaped configuration.

It is also to be noted from FIG. 3 that a pair of legs **94** which depend from the hopper **58** are configured to form a slot for receiving the belt **60** and also include an inclined surface **96** for directing the coating material onto the belt **60**. A roller **98** at one side of the belt **60** restricts lateral movement of the latter and a similar roller is normally provided at the opposite side to restrict lateral movement of the belt in the opposite direction.

A pair of conveyor belts **100** and **102** which are driven by motors **104** and **106** respectively, transport the coating material from the feeder belt **60** to the respective applicators **14** and **16**. The delivery belts **100** and **102**

are supported by rollers **108**, **110**, **112** and **114** disposed to assure direct fore and aft alignment between the belts and the respective applicators.

As each of the applicators **14** and **16** are identical, only one of the same will be described in detail. Each of the applicators, such as **14**, acts as an impinger and is comprised of a brush **116** and a belt **118**. Both the brush **116** and the belt **118** are driven at relatively high speeds by an appropriate drive mechanism (not shown).

A pair of operator's platforms **120** are disposed upon upright supports **124** and **126** respectively which are in turn mounted upon platforms **128** and **130**. From the platforms **120** and **122** the operator is in position to move the control gates **132** and **134** which are identical in construction to control gate **84** previously described.

As will be noted from viewing the coating buggy 32 which is visible in the far lefthand corner of FIG. 2, each of the buggies is provided with a pair of rollers **136** upon which a pine section **22** rests during the coating operation. The rollers **136** are rotated by an appropriate prime mover (not shown). This allows the section **22** to be rotated to permit its entire exterior surface to be coated as the coating vehicle moves the pipe section past one of the coating applicators.

In operation, the vehicles **28** and **30** are first loaded with the pipe sections **22** and **22'** and then moved forwardly along the tracks **18** and **20** to the applicators **14** and **16**. It is desirable to space the vehicles **28** and **30** apart in their directions of travel so that their paths of travel are approximately 180° out of phase with each other. In this manner, one of a pair of pipe sections being coated is at the forward end of its path of travel and adjacent the applicator **14** while the other section which has been previously coated is at the backward end of its path of travel and adjacent a load out area **138**. Coating material is directed to either the applicator **14** or the applicator **16** depending upon the direction of rotation of the feeder belt **60**. Movement of the feeder belt **60** in one direction delivers coating material to the belt **100** and applicator **14** while movement in the other direction delivers coating material to the belt **102** and applicator **16**. As the coating material drops onto the belt **118** which is moving at a high rate of speed, it is flung onto a pipe section **22** by the action of the rapidly rotating brush **116**. The latter also serves to assure that the coating material remains sufficiently particulate to provide a compactable, adherent mass for contact with the outer surface of the pipe section. It is to be understood, of course, that in applying certain coatings it is necessary to include a layer of reinforcing material (not shown) which is wrapped around the pipe section simultaneously with the coating operation. The control gates **88**, **132** and **134** are raised or lowered to assure a uniform and evenly distributed layer of coating material upon the belts **60**, **100** and **102**.

It is to be understood that in normal operation the motor **80** will be timed to reverse its direction periodically to deliver coating material to either the belt **100** or the belt **102** depending upon which of the coating vehicles **28** or **30** is in alignment with an applicator **14** or **16**. It will be appreciated that by utilizing the coating method of the present invention, which includes providing a central coating station from which a coating material is delivered, moving a pair of pipe sections forward and backward 180° out of phase along spaced, parallel paths of travel on opposite sides of the station, and alternately impinging the coating material onto the pipe sections as the latter are rotated and brought into alignment with the coating station, a pair of pipe sections can be coated in only slightly greater time than has been previously required for coating a single pipe section. This is accomplished with less than twice the equipment and labor that has previously been required for coating a single pipe section.

It will, of course, be apparent to those skilled in this art that the construction might be varied somewhat without departing from the principles of this invention. For example, a single belt could extend between applicators **14** and **16**. This single belt would be reversibly driven to provide the feature of alternate directions of travel for the coating material to the respective applicators. Such construction, while capable of accomplishing most of the objects of the invention, would also permit elimination of the reversible belt **60**. On the other hand, this construction is believed less efficient in overall operation because of the necessity for repeatedly reversing the direction of a single, relatively long belt rather than the substantially shorter belt **60** utilized in applicant's presently preferred construction.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A method of coating a pair of pipe sections comprising the steps of:

providing a coating station from which a coating material is delivered;

moving the pipe sections to be coated along spaced paths of travel on opposite sides of said station,

said sections being spaced from each other in their directions of travel so as to alternately bring said sections into alignment with said station; and

alternately directing the coating material in opposite directions onto the pipe sections as the latter move into alignment with the coating station.

2. A method as set forth in claim **1**, wherein said moving step includes moving said sections along parallel paths of travel which paths are perpendicular to said coating station.

3. A method as set forth in claim **1**, wherein said moving step includes moving said sections forward to said coating station and backward away from said station along said paths of travel and removing said sections from said paths after said backward movement is completed.

4. A method as set forth in claim **3**, wherein is included the step of spacing said sections so that their paths of travel are 180° out of phase whereby one of said sections is at the forward end of its path of travel when the other of said sections is at the backward end of its path of travel.

5. A method as set forth in claim **3**, wherein said directing step includes impinging said coating on said pipe sections.

6. A method as set forth in claim **5**, wherein is included the step of rotating said pipe sections during impinging of said coating.

7. A method as set forth in claim **5**, wherein is included the step of collecting any of said material not adhering to said sections and returning the same to said coating station.

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117—168, 169 A; 118—313, 321, Dig. 11, Dig. 16