

July 15, 1952

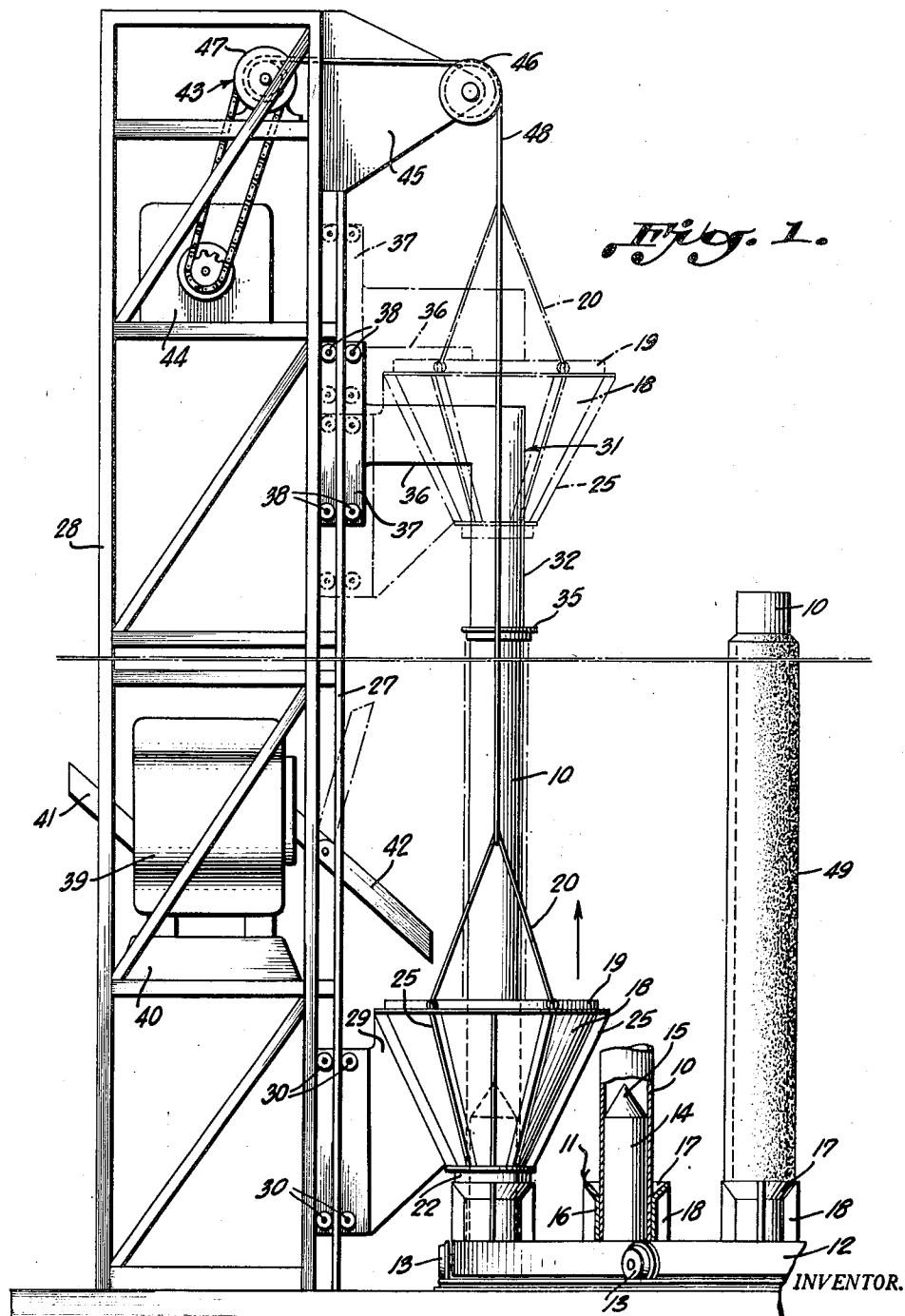
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2,602,980

APPARATUS FOR COATING PIPES

Filed Oct. 14, 1949

3 Sheets-Sheet 1



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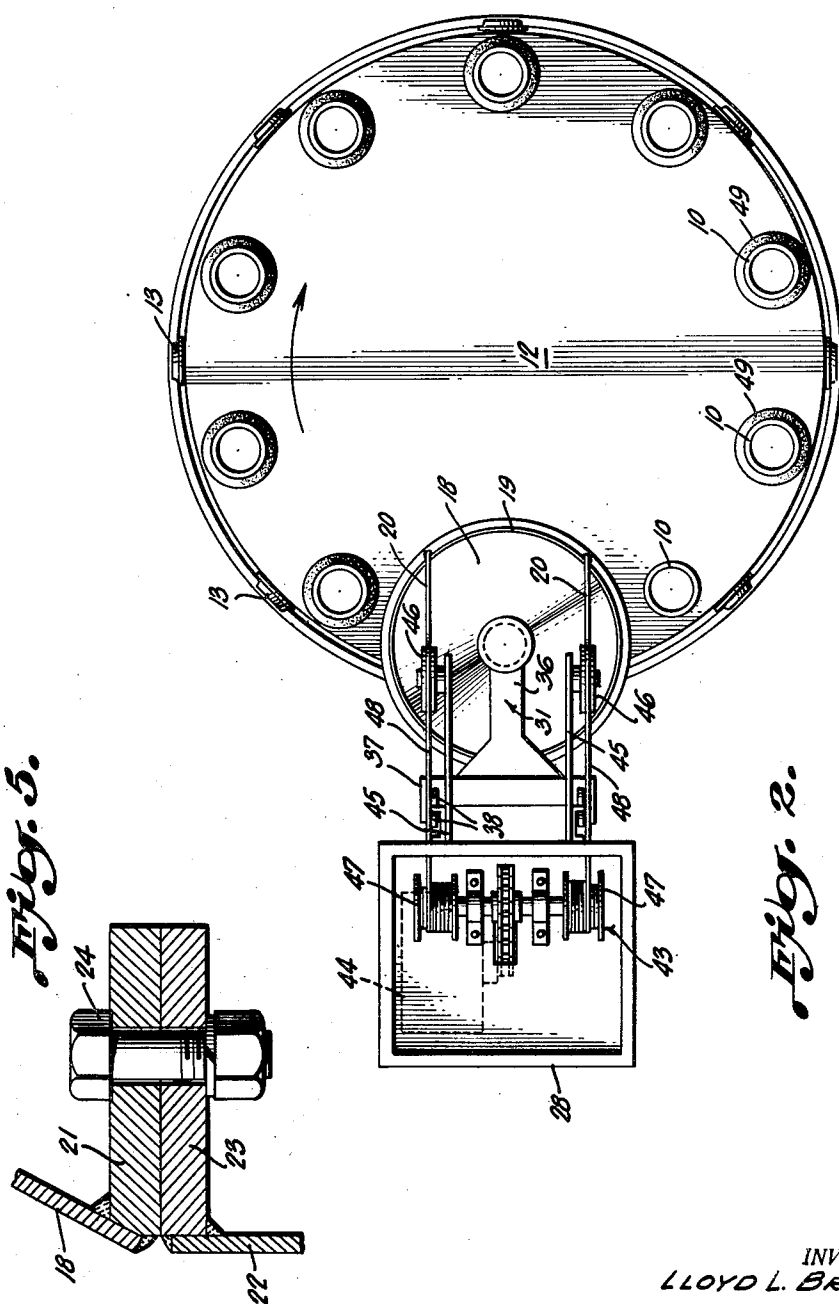
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3 Sheets-Sheet 2



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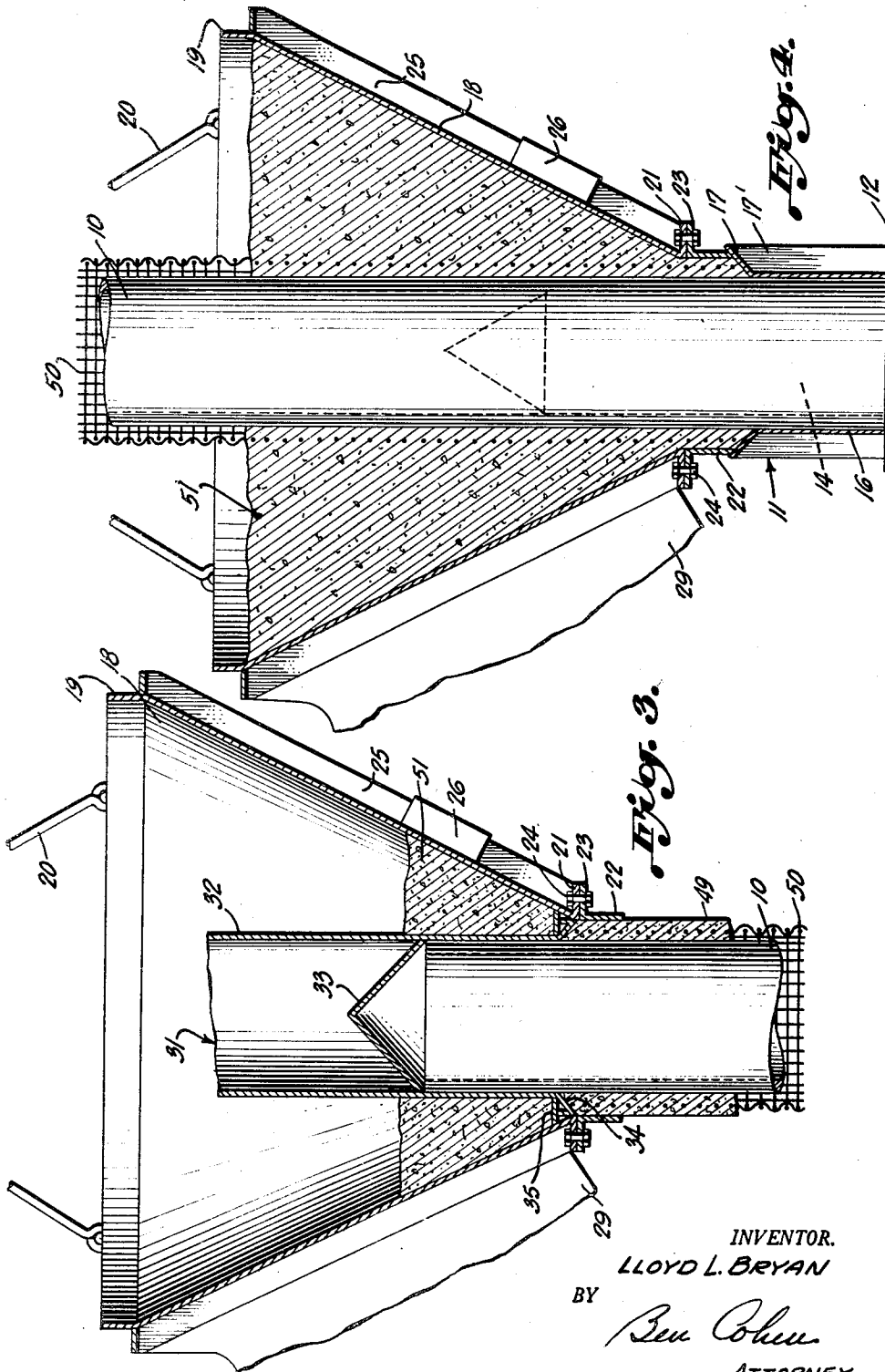
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3 Sheets-Sheet 3



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2,602,980

APPARATUS FOR COATING PIPES

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Application October 14, 1949, Serial No. 121,439

14 Claims. (Cl. 25—38)

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The present invention relates to a novel method and apparatus for applying a coating such as concrete mortar to the surface of certain structures, such as pipe, piling, columns and the like.

The invention is particularly applicable to the external coating of metal pipe of large diameter used in the construction of pipelines with concrete or similar material for the purpose of protecting the metal against corrosive and other deleterious influences.

An important feature of the present invention is the provision of an apparatus which deposits a relatively thick coating material to a pipe while in an upright position in order to insure a coating of uniform thickness. The apparatus comprises generally a circular trowel having a hopper associated therewith, means for raising and lowering the trowel assembly and a turntable for supporting a plurality of pipes in an upright position and conveying one pipe at a time to the trowel assembly for performing the coating operation.

A primary object of the present invention is to provide an apparatus for applying a relatively thick coating to a pipe wherein the coating is substantially uniform in thickness.

A further object of the invention is to provide a novel arrangement for properly centering the pipe being coated during the coating operation.

A further feature of the invention is the provision of a novel turntable arrangement whereby the pipes are properly supported in an upright position and wherein the pipes can be readily applied to and removed from the turntable.

A still further feature of the present invention is the provision of a novel form of vibratory hopper and trowel assembly which facilitates the proper application of the coating material in a simplified manner.

Other objects, features and advantages of the present invention will be more fully apparent from the following detailed description and from the accompanying drawings showing a preferred embodiment of the invention wherein:

Figure 1 is an elevational view of the improved apparatus forming the subject matter of the present invention with certain parts broken away and shown in section.

Figure 2 is a top plan view of the apparatus.

Figure 3 is a vertical sectional view through

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the hopper and trowel assembly at the completion of the coating operation.

Figure 4 is a similar view at the beginning of the coating operation.

5 Figure 5 is a detail view of a constructional feature of the hopper and trowel assembly.

Referring to the drawings in detail, the article to be coated is shown as a metal pipe 10 supported in a vertical position on a rack 11 positioned adjacent the circumference of a turntable 12 rotatably supported on rollers 13. As shown in the present embodiment there are ten such racks but it is readily apparent that a larger or smaller number of racks can be used.

15 The rack consists of a spud 14, terminating in a conical portion 15 adapted to fit within the lower open end of the pipe 10. The spud 14 is rigidly secured to the turntable but may be removable in order that spuds of different diameters can be substituted to accommodate pipes of different diameters. Surrounding each spud and spaced therefrom a distance slightly greater than the thickness of the pipe being coated is a cylindrical tube 16 having its lower edge secured to the turntable and its upper edge flared outwardly at 17 to form a bottom funnel. Suitable flanges 17 are provided for reinforcing purposes.

The hopper 18 comprises a frusto-conical member terminating at its upper end in a vertical flange 19 to which a pair of bail members 20 are suitably secured. The lower end of the hopper is open and is provided with a horizontal flange 21 to which a circular trowel 22 is secured through a complementary horizontal flange 23 and bolts 24. The lower opening of the hopper is co-extensive with the diameter of the interior of the circular trowel and when lowered over the pipe to be coated is spaced therefrom a distance equal to the thickness of the coating to be provided. As shown in Figures 1 and 4, in the lowermost position of the hopper, the lower edge of the circular trowel rests on the lower funnel member 17 and is centered thereby. A plurality of circumferentially spaced flanges 25 add rigidity to the hopper body. The hopper wall is also provided with conventional vibrators, either air or electrically operated, indicated by numeral 26.

Although any conventional means such as a crane may be provided for raising or lowering the hopper and trowel assembly, a novel feature

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of the present invention is the provision of a vertical track or guide for mounting the hopper whereby the hopper may be held in proper concentric relationship with the pipe or cylindrical object. Referring to Figure 1, the vertical track or guide comprises a pair of spaced vertical rails or tracks 27 mounted along one side of a skeleton tower 28. A bracket 29 rigidly secured to the outer sloping wall of the hopper extends laterally therefrom and is provided with suitable rollers 30 for slidably engaging the rails 27.

The upper end of the pipe being coated is provided with a special cap assembly indicated generally by the numeral 31. This cap member comprises a vertical tubular section 32 of sufficient diameter to encircle the upper end of the pipe 10. Spaced from the lower edge of said tubular section and secured to the interior surface thereof is a cap member 33 adapted to rest on the upper edge of the pipe section, thereby serving as a stop for limiting the downward movement of the cap assembly. The lower edge of the tubular section 32 is flared outwardly at 34 to more readily receive the upper edge of pipe 10, and carries a horizontal circular flange 35 whose outer diameter is slightly greater than the inner diameter of the lower open end of the hopper for a purpose to be described.

The upper end of the tubular section 32 is connected to a horizontal tubular support 36 carried by an upper car 37. The car 37 is provided with suitable rollers 38 slidably engaging the rails 27. It will be readily apparent that the cap assembly, when in place on the pipe cooperates with the rack 11 to rigidly support the pipe in a definite spaced relationship with the tower.

As seen in Figure 1, a concrete mixer 39 for supplying the coating material is supported on a suitable platform 40 carried by the skeleton tower 28. The mixer includes the usual supply chute 41 and a pivoted delivery chute 42. The mixer is supported at a height above the base of the tower to clear the upper edge of the hopper when in lowermost operative position.

The raising and lowering apparatus for the hopper comprises a winch assembly 43 geared to a motor 44 mounted at the upper end of the skeleton tower 28. A pair of brackets 45 extend laterally from the tower adjacent the winch assembly and carry rollers 46 positioned above the cap assembly 31. The winch drums 47 are provided with the usual cables 48 which extend over the rollers 46 and connect to the bails 20.

The operation of the apparatus is as follows:

The pipes 10 which are to receive the concrete or cement coating 49 are positioned on the studs 14. If it is desired to provide wire mesh reinforcing, which is only required in heavier coverings, tubular sections of wire mesh indicated by the numeral 50 are dropped over the pipe and rest on the lower funnel 17. It will be noted that the diameter of the tubular sections of wire is such as to be completely embedded in the covering of concrete mortar. The hopper assembly is then lowered over the pipe adjacent the tower until the lower edge of the circular trowel comes to rest on the bottom funnel 17. The chute 42 is then positioned over the hopper and sufficient concrete mortar indicated by numeral 51 is supplied to the hopper to cover one section of pipe which is generally about forty feet in length. The cap assembly is then lowered over the top end of the pipe thus anchoring the pipe in position. The cap assembly also serves as a

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of concrete covering, and as a gate for the bottom of the hopper as will be pointed out.

The winch assembly, which lowered the hopper onto the pipe, is then reversed slowly drawing the hopper upward. As the hopper moves upwardly, the vibrators 26 are actuated thereby urging the mortar downwardly to be deposited uniformly around the pipe. The circular trowel 22 insures a smooth surface. It will be understood that the upward rate of travel will be synchronized with the proper deposit of mortar around the pipe 10. When the upper end of the pipe is reached, the lower end of the hopper engages the flange 35 on the cap assembly and lifts the cap off the pipe. In this position, the cap assembly serves as a gate for the bottom of the hopper so that excess concrete will not drop out of the hopper.

At this point the vibrators 26 are shut off, the turntable rotated to bring the next pipe section into position and the hopper lowered over said next pipe section. As the hopper is lowered, the cap assembly is automatically set in place on top of the next section. When the hopper is positioned on the bottom funnel, it is recharged from the concrete mixer, the vibrators are re-started and the operation repeated.

Although a specific embodiment of the present apparatus has been illustrated and described, it will be apparent that numerous changes may be made without departing from the inventive concept. For example, in place of the tower supporting the hopper and the operating means, a crane can be used for raising and lowering the hopper. It is also within the concept of the present invention to make the supporting rack and hopper member replaceable to accommodate pipes of different diameters. Accordingly, I do not wish to be limited precisely to the details of construction herein shown and described except as may be required by the scope of the appended claims.

Having thus described the invention, what is claimed is:

1. Apparatus for the coating of pipes and like bodies with a cementitious material comprising means for supporting a pipe in an upright position, said means comprising an upright support, a funnel surrounding said support, said pipe being positioned between said support and said funnel, a hopper for containing cementitious material adapted to surround said pipe and reciprocate vertically along said pipe for depositing said material on said pipe and means for reciprocating said hopper.

2. Apparatus for the coating of pipes and like bodies with a cementitious material comprising means for supporting a pipe in an upright position, said means comprising an upright support, a funnel surrounding said support, said pipe being positioned between said support and said funnel, a hopper for containing cementitious material adapted to surround said pipe and reciprocate vertically along said pipe for depositing said material on said pipe, said hopper in its lowermost position adapted to rest on said funnel, a circular trowel depending from the lower edge of said hopper and co-extensive therewith and means for reciprocating said hopper.

3. Apparatus for the coating of pipes and like bodies with a cementitious material comprising, a turntable, a plurality of means positioned circumferentially on said turntable, each of said means adapted to support a pipe in an upright

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position, a hopper for containing cementitious material adapted to surround said pipe and reciprocate vertically along said pipe for depositing said material on said pipe, and means for reciprocating said hopper.

4. Apparatus for the coating of pipes and like bodies with a cementitious material comprising, a turntable, a plurality of means positioned circumferentially on said turntable, each of said means adapted to support a pipe in an upright position, said means comprising an upright support, a funnel surrounding said support, said pipe being positioned between said support and said funnel, a hopper for containing cementitious material adapted to surround said pipe and reciprocate vertically along said pipe for depositing said material on said pipe, and means for reciprocating said hopper.

5. Apparatus for the coating of pipes and like bodies with a cementitious material comprising, a turntable, a plurality of means positioned circumferentially on said turntable, each of said means adapted to support a pipe in an upright position, said means comprising an upright support, a funnel surrounding said support, said pipe being positioned between said support and said funnel, a hopper for containing cementitious material adapted to surround said pipe and reciprocate vertically along said pipe for depositing said material on said pipe, a circular trowel depending from the lower edge of said hopper and co-extensive therewith, a vibrator mounted on said hopper and means for reciprocating said hopper.

6. Apparatus for the coating of pipes and like bodies with a cementitious material comprising, means for supporting a pipe in an upright position, a hopper for containing cementitious material adapted to surround said pipe and reciprocate vertically along said pipe for depositing said material on said pipe, means for reciprocating said hopper, and a cap member supported on the upper end of the pipe, said cap member adapted to close off the lower end of the hopper when in contact therewith.

7. Apparatus for the coating of pipes and like bodies with a cementitious material comprising, means for supporting a pipe in an upright position, a vertical trackway adjacent said pipe, a hopper for containing cementitious material adapted to surround said pipe and reciprocate vertically along said pipe for depositing said material on said hopper, means extending from said hopper and slidable along said trackway, and means for reciprocating said hopper.

8. Apparatus for the coating of pipes and like bodies with a cementitious material comprising, means for supporting a pipe in an upright position, a hopper for containing cementitious material adapted to surround said pipe and reciprocate vertically along said pipe for depositing said material on said pipe, a cap member supported on the upper end of the pipe, said cap member adapted to close off the lower end of the hopper when in contact therewith, a vertical trackway adjacent said pipe, means extending from said cap member and slidable along the trackway, and means for reciprocating said hopper.

9. Apparatus for the coating of pipes and like bodies with a cementitious material comprising, a turntable, a plurality of means positioned circumferentially on said turntable, each of said means adapted to support a pipe in an upright position, a hopper for containing cementitious material adapted to surround said pipe and re-

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ciprocate vertically along said pipe for depositing said material on said pipe, a tower adjacent said turntable, a concrete mixer supported in said tower for supplying concrete to said hopper, and motor operated means at the upper end of the tower for raising or lowering the hopper.

10. Apparatus for the coating of pipes and like bodies with a cementitious material comprising, a turntable, a plurality of means positioned circumferentially on said turntable, each of said means adapted to support a pipe in an upright position, said means comprising an upright support, a funnel surrounding said support, said pipe being positioned between said support and said funnel, a hopper for containing cementitious material adapted to surround said pipe and reciprocate vertically along said pipe for depositing said material on said pipe, a cap member supported on the upper end of the pipe, said cap member adapted to close off the lower end of the hopper when in contact therewith, and means for reciprocating said hopper.

11. Apparatus for the coating of pipes and like bodies with a cementitious material comprising, a turntable, a plurality of means positioned circumferentially on said turntable, each of said means adapted to support a pipe in an upright position, said means comprising an upright support, a funnel surrounding said support, said pipe being positioned between said support and said funnel, a hopper for containing cementitious material adapted to surround said pipe and reciprocate vertically along said pipe for depositing said material on said pipe, a vertical trackway adjacent said pipe, means extending from said hopper and slidable along said trackway, and means for reciprocating said hopper.

12. Apparatus for the coating of pipes and like bodies with a cementitious material comprising, a turntable, a plurality of means positioned circumferentially on said turntable, each of said means adapted to support a pipe in an upright position, said means comprising an upright support, a funnel surrounding said support, said pipe being positioned between said support and said funnel, a hopper for containing cementitious material adapted to surround said pipe and reciprocate vertically along said pipe for depositing said material on said pipe, a tower adjacent said turntable, a concrete mixer supported in said tower for supplying concrete to said hopper, and motor operated means at the upper end of the tower for raising or lowering the hopper.

13. Apparatus for the coating of pipes and like bodies with a cementitious material comprising, a turntable, a plurality of means positioned circumferentially on said turntable, each of said means adapted to support a pipe in an upright position, a hopper for containing cementitious material adapted to surround said pipe and reciprocate vertically along said pipe for depositing said material on said pipe, a vertical trackway adjacent said pipe, means extending from said hopper and slidable along said trackway, a tower adjacent said turntable, a concrete mixer supported in said tower for supplying concrete to said hopper and motor operated means at the upper end of the tower for raising or lowering the hopper.

14. Apparatus for the coating of pipes and like bodies with a cementitious material comprising, a turntable, a plurality of means positioned circumferentially on said turntable, each of said means adapted to support a pipe in an upright position, a hopper for containing cementitious

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material adapted to surround said pipe and reciprocate vertically along said pipe for depositing said material on said pipe, a cap member supported on the upper end of the pipe, said cap member adapted to close off the lower end of the hopper when in contact therewith, a vertical trackway adjacent said pipe, means extending from said cap member and slidable along the trackway, a tower adjacent said turntable, a concrete mixer supported in said tower for supplying concrete to said hopper, and motor operated means at the upper end of the tower for raising or lowering the hopper.

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