

Oct. 6, 1931.

E. L. CHAPPELL

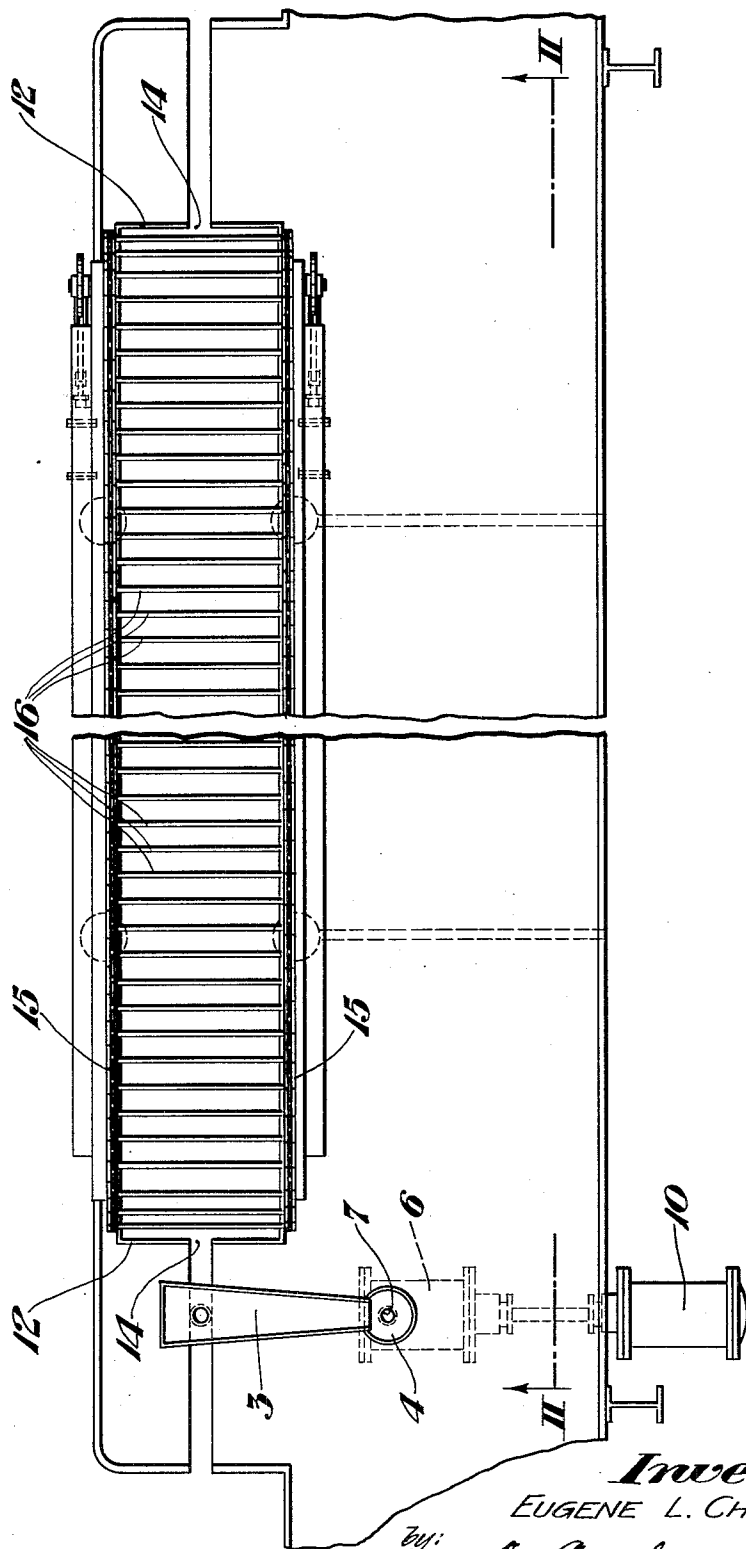
1,826,301

METHOD OF COATING

Filed May 31, 1928

3 Sheets-Sheet 1

Fig. 1.



Inventor:
EUGENE L. CHAPPELL,

by: *D. Anthony Usina*
his Attorney.

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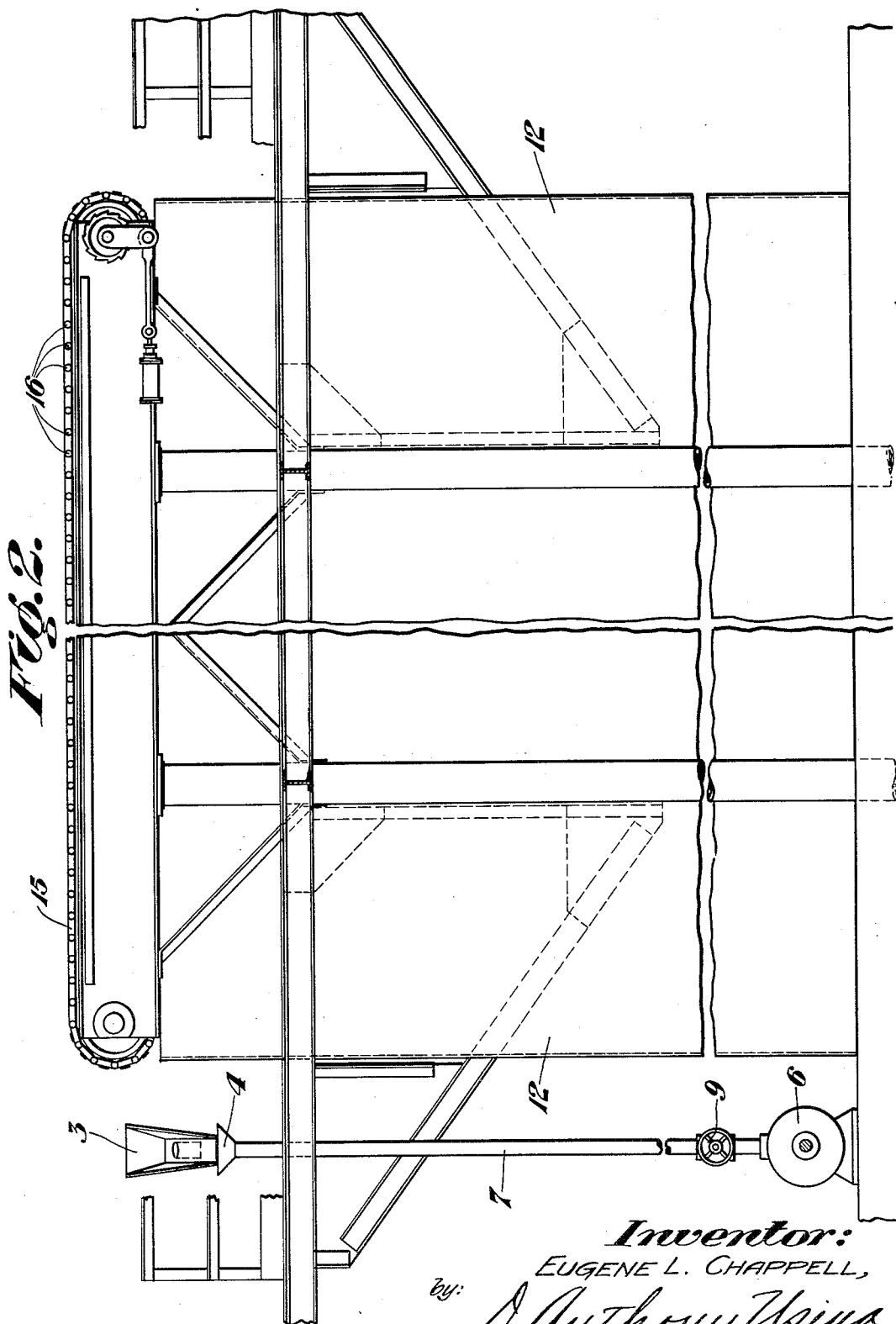
E. L. CHAPPELL

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Inventor:
EUGENE L. CHAPPELL,
by: *D. Anthony Usina*
his Attorney.

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Fig. 3.

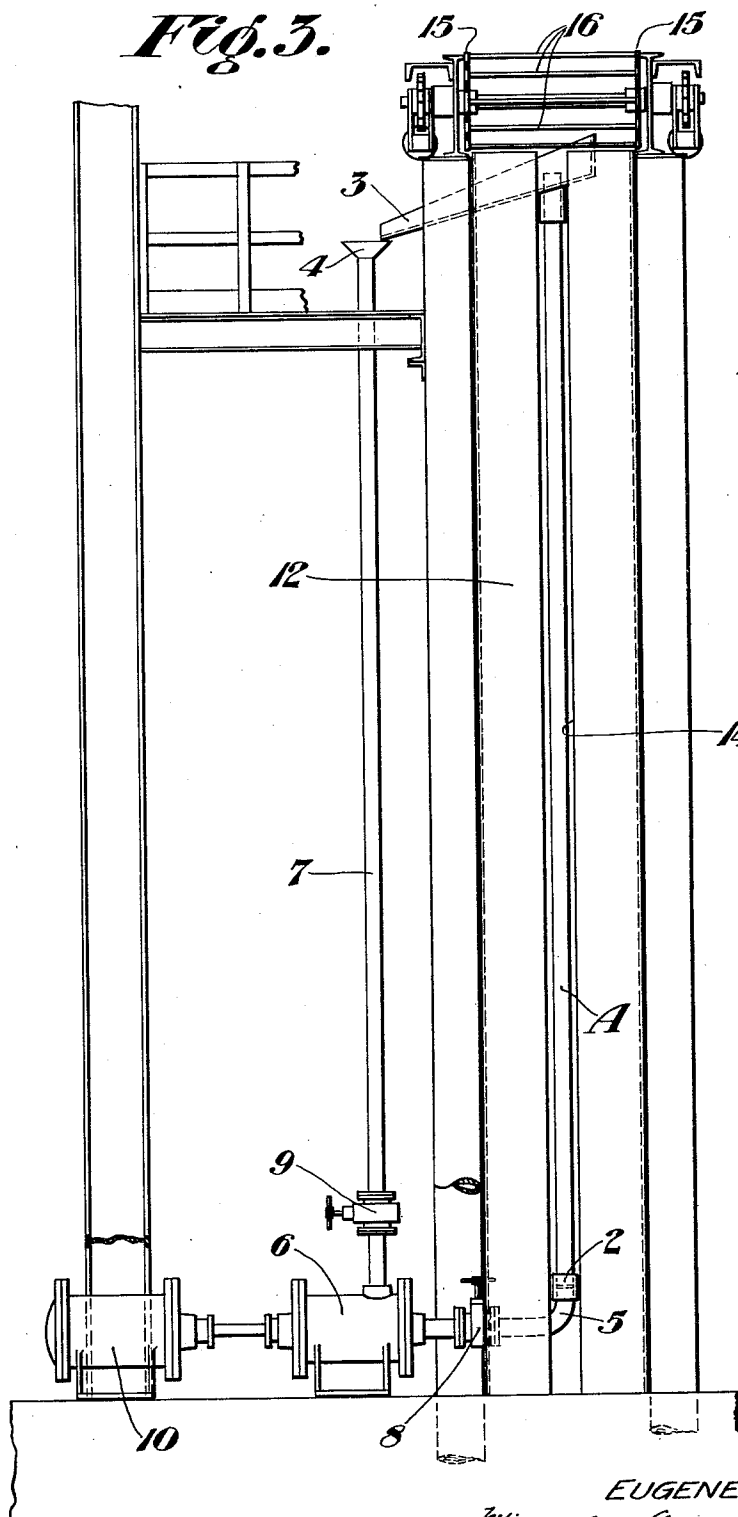


Fig. 4.

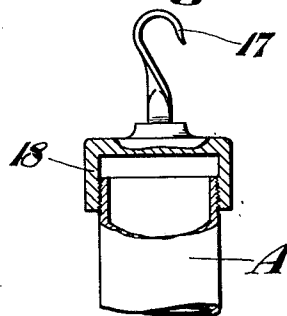


Fig. 5.

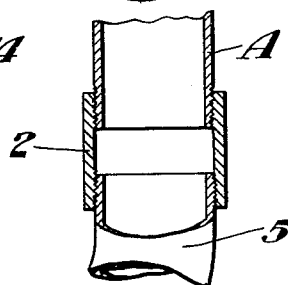
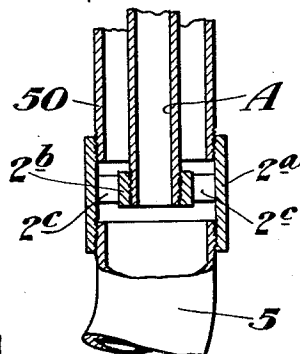


Fig. 6.



Inventor:

EUGENE L. CHAPPELL,

by:

D. Anthony Usina
his Attorney.

UNITED STATES PATENT OFFICE

EUGENE L. CHAPPELL, OF MCKEESPORT, PENNSYLVANIA, ASSIGNOR TO NATIONAL TUBE COMPANY, A CORPORATION OF NEW JERSEY

METHOD OF COATING

Application filed May 31, 1928. Serial No. 281,789.

This invention relates to methods of coating pipes and, while not limited thereto, relates more particularly to a method of coating pipes and other metal surfaces with a coating of mineral cement, and has for its object the provision of a method whereby a dense and uniform layer of coating may be applied to the pipe surfaces at a relatively low cost.

Heretofore, cement coatings have generally been applied only to the inside surfaces of metal pipes and the methods employed have consisted either of spreading the cement over the inner surface of the pipe by drawing a mandrel through the pipe, or of spreading a layer of cement in the pipe by whirling the pipe centrifugally.

In the drawings:

Figure 1 is a plan view of an apparatus used in carrying out the method of this invention.

Figure 2 is a side elevation thereof.

Figure 3 is an end elevation thereof.

Figure 4 is a detail view illustrating the suspension member used to suspend the coated pipes from the conveyer.

Figure 5 is a sectional detail illustrating the manner of mounting the pipe to be internally coated.

Figure 6 is a view similar to Figure 5, showing the modified coupling used to mount pipes to be coated on both the inside and outside surfaces, or when large diameter pipes are to be coated on the inside only.

In carrying out the method of applying a coating to the interior surface of a pipe, the pipe A is threaded or otherwise secured in the coupling member 2 of the coating apparatus and extends vertically in the apparatus. An inclined overflow trough 3 is then fitted over the upper end of the pipe to be coated, with its discharge end positioned over a hopper 4 adapted to receive the overflow of coating material.

The coupling member 2 is connected to a coating supply conduit 5 which leads from a coating cylinder 6 adapted to contain a supply of the coating material. The hopper 4 is also connected to the cylinder 6 by a conduit 7, so that additions of cement may be readily fed into the cylinder 6 from the hop-

per 4, and also the overflow from the pipes being coated may also be returned to the cylinder.

A valve 8 is provided in the conduit 5 adjacent the cylinder 6, and a second valve 9 is provided in the conduit 7 adjacent the cylinder 6. When it is desired to draw the overflow or new charge of cement from the hopper 4 and conduit 7, the valve 9 is opened and the valve 8 is closed, while when the pipe is being coated the valve 9 is closed and the valve 8 is opened.

A fluid pressure cylinder 10 is provided for operating the plunger of the coating cylinder 6.

A setting chamber 12 is arranged to one side of the coating apparatus with its one end adjacent the pipe being coated. The chamber 12 is of greater height than the pipe to be coated so that the coated pipes may pass therethrough in a vertical position. The end walls of the chamber 12 are slotted, as at 14, to permit the coated pipes to enter and leave the chamber.

A conveyer mechanism, consisting of a pair of endless chains 15 having cross-bars 16 therebetween, is mounted above the chamber 12, and the coated pipes are adapted to be removably suspended from the conveyer cross-bars 16 by hooks 17 which have threaded sleeve portions 18 adapted to be threaded on the upper ends of the coated pipes. The conveyer mechanism is adapted to move the pipes slowly through the chamber 12, which chamber may or may not have a relatively high temperature water saturated atmosphere.

After the pipe to be coated has been mounted in the coupling member 2, and the overflow trough 3 has been mounted over the upper end of the pipe, the fluid pressure cylinder 10 will be operated to move the plunger of the coating cylinder 6 forwardly so as to expel the plastic cement from the cylinder 6 through the conduit 5 and the pipe A to be coated. The cylinder 6 is of such size that it will contain an excess of coating material over the volume necessary to fill the pipe being coated. Therefore, when the plunger of the cylinder completes its forward stroke,

the coating cement will have completely filled the pipe A and overflowed into the trough 3.

After the pipe has been completely filled with coating cement, the cylinder 10 will be reversed so as to reverse the plunger of the cylinder 6. This will create a vacuum in the cylinder 6 which will withdraw the excess cement from the pipe back into the cylinder, leaving the pipe A coated with a substantially impervious coating of plastic cement having an even thickness throughout its length.

After the excess plastic cement has been removed from the pipe, the overflow trough 3 will be removed and one of the hooks 17 threaded on the upper end of the pipe. The hook 17 will then be engaged with one of the cross-bars 16 of the conveyer and the pipe will be conveyed in a vertical position through the drying or setting chamber 12, so as to set the coating.

After the coating has set, the pipe will be removed from the conveyer and the coating may be cured in any of the usual manners of curing cement.

In case both the inside and outside surfaces of the pipe are to be cement coated a modified form of coupling 2^a is substituted for the coupling 2. The coupling 2^a is of materially larger diameter than the pipe to be coated and a large diameter pipe 50 is threaded in the coupling to form an enclosing tubular casing for the pipe to be coated. The coupling 2^a is provided with a centrally arranged sleeve 2^b, supported by spider members 2^c, and the pipe to be coated is threaded in this sleeve 2^b.

The coating cement is forced through the conduit 5 and coupling 2^a in the usual manner from the cylinder 6 and, instead of being confined to the interior of the pipe to be coated, it also is forced up within the large diameter pipe or casing 50, so that when the excess cement is withdrawn the outside and inside surfaces of the pipe are coated.

The same class of coupling fitting 2^a may be conveniently used when it is desired to coat the inside surfaces of large diameter pipes, in which case the pipe to be coated will be threaded in the coupling proper and a mandrel having a closed lower end will be threaded in the sleeve 2^b, so that the coating cement need only fill the space between the mandrel and the interior surface of the pipe. By using this method with large diameter pipe less cement need be handled.

If desired, the excess cement coating material may be permitted to drain or flow out of the pipes by gravity, although this procedure will be slower and less efficient than when the excess cement is forced out of the pipes by suction.

It will also be understood that while this method is particularly adapted for applying mineral cement coatings to pipes, it is not limited specifically thereto, since other coat-

ings may be advantageously applied by the specific method of this application, which consists in forcing an excess of the coating material through the pipe and then withdrawing the excess.

While I have shown and described one form of apparatus for carrying out my invention, it will be understood that I do not wish to be limited to the use of such apparatus, since various other forms of apparatus may be used to carry out the method of this application without departing from the scope thereof as defined in the appended claims.

I claim—

1. The method of coating the surfaces of metal pipe with mineral cement which consists in forming an excess body of the cement in a plastic state over the pipe surface to be coated while said pipe is in a substantially vertical position, then removing the excess cement from said surface, and then setting said coating in a water saturated atmosphere at a relatively high temperature and while said pipe is still maintained in a substantially vertical position.

2. The method of coating the surfaces of metal pipe with mineral cement which consists in forcing an excess of plastic cement in a confined flow-body over the surface to be coated, and then withdrawing the excess cement from the pipe by suction.

3. The method of coating the surfaces of metal pipe with a flowable mixture of mineral cement, which consists in forcing an excess of said cement through the pipe in a continuous flow-body while said pipe is maintained in a vertical position, then applying a vacuum to the lower end of said pipe to withdraw the excess from the interior of said pipe leaving a coating of substantially equal thickness over the entire interior surface of said pipe, and then maintaining said pipe in a vertical position until said coating is set.

4. The method of coating the surfaces of metal pipe with a flowable mixture of mineral cement, which consists in forcing an excess of said cement through the pipe in a continuous flow-body while said pipe is maintained in a vertical position, then applying a vacuum to the lower end of said pipe to withdraw the excess cement from the interior of said pipe leaving a coating of substantially equal thickness over the entire interior surface of said pipe, and then maintaining said pipe in a vertical position in a water saturated atmosphere at a relatively high temperature until said coating is set.

In testimony whereof, I have hereunto set my hand.

EUGENE L. CHAPPELL.