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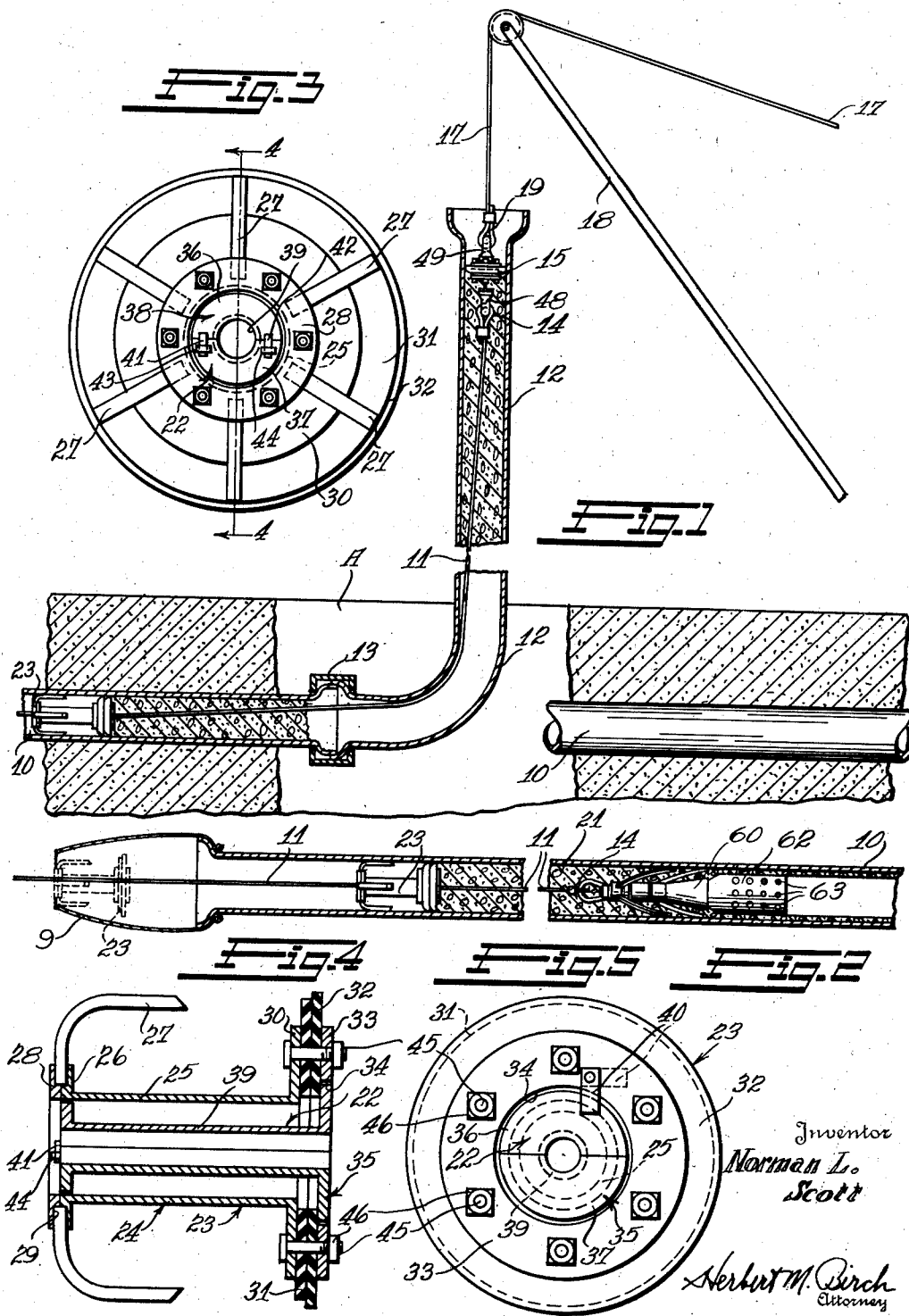
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2,293,365

METHOD AND APPARATUS FOR LINING PIPE

Filed March 3, 1941

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FIG. 6

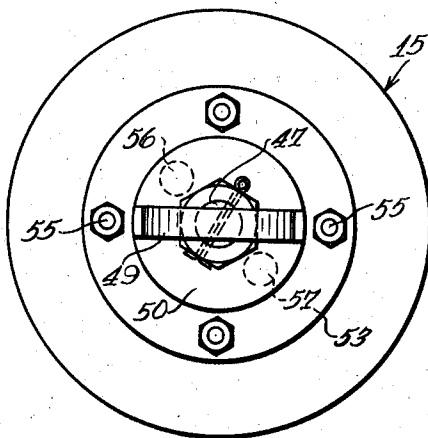
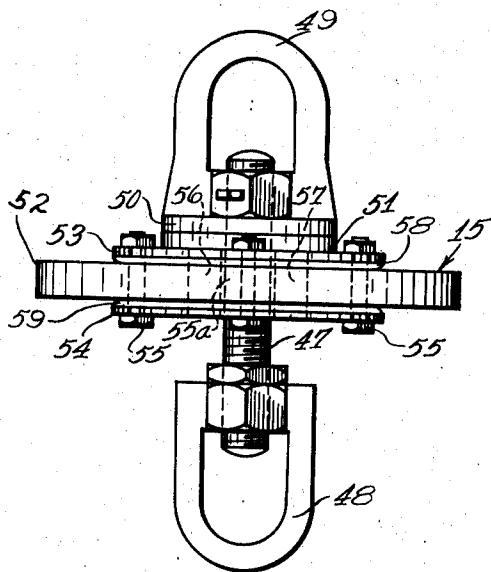


FIG. 7

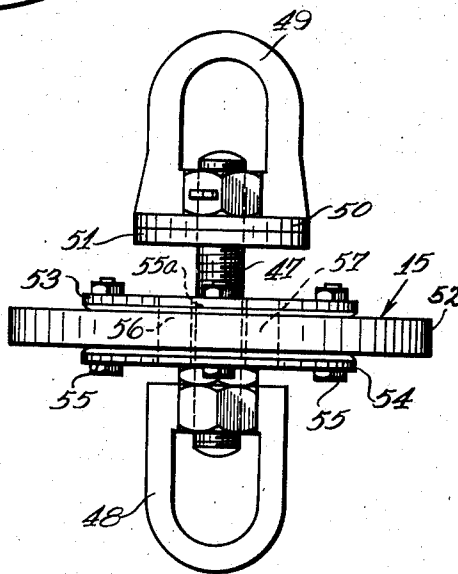


FIG. 8

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METHOD AND APPARATUS FOR LINING
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Application March 3, 1941, Serial No. 381,581

21 Claims. (Cl. 25—38)

This invention relates to the improved method and apparatus for lining pipe and more particularly to the method and apparatus for lining cast-iron water mains in situ with cementitious material.

It is a well proven and accepted fact by engineers and authorities bearing the responsibility of supplying water service to the consumer public that the commonly used cast-iron water mains are a decided economic problem. This problem is caused by the rapid formation of tubercles and rust coating within the pipe interior resulting in a diminished flow so severe that it is necessary to clean the water mains periodically to restore a reasonable rate of flow through the main. But even after cleaning the cast-iron pipes the formation of new tubercles is accelerated and it becomes more and more necessary to go to the periodical expense of cleaning.

It was not until about 1930 that William T. Tate of Sydney, Australia, began a series of successful experiments with a process or method to cement-mortar line cast-iron mains in situ. The equipment used to carry out the Tate method was patented in the United States March 13, 1934, Patent No. 1,951,221 and reissued July 25, 1939, No. 21,164. The Tate method and apparatus produces far superior results over cleaning, is durable and efficient and provides for lining the old cast-iron water mains while they are in position in the ground. Tate by his method eliminated the periodical necessity of cleaning the mains and restored the flow coefficients to maximum and in Sydney, Australia, alone has lined over one thousand (1,000) miles of water mains. The Tate method is now in operation in this country by the Tate Pipe Linings, Inc., of Andover, Massachusetts, but has been found to be imperfect in one respect in that the resulting cement-mortar lining has a flat bottom section caused by the deposit of excess water and fine sediment passing through the dehydrating orifices in the spreader and out the end of the spreader skirt as is taught by the Tate method.

It is an object of this invention to reduce this flat section in the bottom of the finished lining and to thereby increase the coefficient of flow.

Another object is to provide a mechanical method whereby it is now practical to load mortar having a lower slump test for lining pipes in position than was hitherto possible when loading by hand.

Another object is to provide a method of loading a predetermined charge of lining material

and uniformly lining the loaded pipe in situ by forcing the charge of lining material forward under substantially constant pressure.

A further object of my invention is to provide a method by which a cementitious material containing much less moisture content may be utilized to provide a more perfect finished lining.

A further object is to provide a novel loader plunger with a valve for mechanically introducing the lining material to the pipe to be lined.

Another object is to provide a new and novel improvement in mortar baffles for practicing the improved method of lining the pipes.

Another object is to provide means attached at the head end of the pipe being lined to maintain the lining charge pressure substantially constant, until the spreader clears the head end of the pipe to uniformly line the same from end to end.

Further objects and improvements will be apparent from the following description when read on the accompanying drawings.

Figure 1 is a cross sectional view of a pipe in the ground to be lined with the loader pipe and loader valve in position for the mechanical loading operation.

Figure 2 shows a cross section of a part of the pipe to be lined with the lining apparatus in place and the predetermined quantity or charge of cement-mortar lining mix intermediate the mortar baffle and the lining apparatus, and a catcher sleeve attached to the head of pipe being lined.

Figure 3 is a top plan view in elevation of the mortar baffle guide head.

Figure 4 is longitudinal cross section view of the mortar baffle along the line 4—4 of Figure 3.

Figure 5 is a plan view of the rear end of the mortar baffle in elevation.

Figure 6 is a top plan view in elevation of the loading valve.

Figure 7 is a side view in elevation of the loader valve in closed position.

Figure 8 is a side view in elevation of the loader valve in open or vacuum preventing position.

Broadly the present improved method of lining cast-iron water mains in position in cooperation with the Tate method and lining apparatus, comprises the following steps: ditches are first dug, as indicated at A in Figure 1 to expose about four feet of the approximate three hundred feet average length of the pipe 10 in the ground to be lined. A section of the exposed part of the pipe is then cut out for pull-outs to be later

replaced and the Tate pipe cleaning apparatus illustrated and described in co-pending application, Serial No. 240,189, filed November 12, 1938, is dragged through the pipe 10 from pull-out ditch to pull-out ditch by head cable 11 strung 5 through the underground pipe section. Following the cleaning operation an elongated catcher sleeve or bag 9, of cloth, rubber or other suitable material, later to be described in detail, is clamped around the outlet end of pipe 10 or the 10 end of the pipe opposite to the loading mechanism. The cable 11 is then strung through the bag and the pipe 10 to the loading ditch A. Next over the free end of cable 11 outside of pipe 10 is loosely strung a mortar baffle 23, which mortar-baffle is forced into the loading end of pipe 10 15 where it resists forward movement by frictional contact with the interior walls of pipe 10. The cable 11 is threaded through the loading pipe 12 and coiled on the ground surface to the side of ditch A, after which the loading pipe is attached to the loading end of pipe 10 by clamp 13. Then the loader plunger valve 15, to be hereinafter described in detail, is secured to the free end of head cable 11 by cable coupling 14 and loop nut 48 of said loader valve 15. Next a truck, not shown, is backed into position and tail cable 17 20 leading from boom 18 on the said truck is attached to loop nut 49 of the loader valve 15 through cable connection 19.

The loader pipe 12 shown in Figure 1 is now loaded with cementitious mix until the head of cement mix is substantially to the top of the loader pipe. Signal is now given to the truck driver at the opposite or head end of pipe 10 and cable 11 wound on a head winch carried by the truck, not shown, and the cable dragged down through the load pipe 12 and through the pipe 10. The cable 11 in turn drags loader valve 15 35 with the valve openings thereof closed, down through the load pipe 12 and forces the cement mixture into pipe 10 back of mortar-baffle 23.

When the loader valve 15 has been pulled forward in load pipe 12 sufficiently to exhaust the contents of the load pipe signal is given to pull 45 back with tail cable 17 on loader valve 15. When the pull of tail cable 17 is transmitted to loop nut 49 of valve 15 the said valve is opened, as to be hereinafter described in detail, and air is thereby admitted into the loader pipe 12 ahead 50 of the valve 15 to prevent any vacuum that would be created by the initial loading action and cause back pressure. The loading method is repeated until a predetermined charge of cementitious lining mixture is loaded into the pipe 10 to be lined. When the last load has been dispensed into pipe 10 valve 15 is left at the end of loading tube 12 in coupling 13 and then the loading pipe uncoupled, the valve plunger 15 55 removed and the lining apparatus shown in Figure 2 is connected to coupling 14 of cable 11. Next, the head cable 11 is wound to drag the lining apparatus forward through the pipe 10. As the lining apparatus 60 is pulled forward by cable 11 the charge of lining material 21 moves forward and is compressed between the mortar baffle 23 and the lining apparatus 60. The mortar baffle 23, after being contacted by the charge of lining material and after sufficient pressure and compacting of the lining material is built up by the forward movement of the lining apparatus, is forced toward the other end of the pipe 10. The mortar baffle as it retreats in frictional resistance with the pipe interior maintains the lining charge 21 at substantially constant pres- 75

sure. As the lining apparatus 60 proceeds forward the nose 61 thereof directs part of the lining charge 21 rearwardly to the skirt 62, which serves to spread the lining around the interior of pipe 10 and at the same time separates any moisture or semi-laitance material out through the dehydrating orifices 63 in the skirt 62, the details of which are more fully described in Reissue Patent 21,164. Obviously, as the lining apparatus is dragged forward the charge of lining material decreases in volume and the spreader gains on the baffle 23, but as stated above due to the frictional resistance of mortar baffle 23 within the pipe bore, the lining charge 21 is maintained 15 at a substantially constant pressure to provide for uniform distribution of the lining material by the skirt 62 around the interior of the pipe 10.

By the use of my novel mechanical loading mechanism a less fluent lining mixture is practical and a lining results with but a very small flat segment along the pipe bottom, which provides a finished lining with a very high rate of flow and a low coefficient of friction.

As the lining apparatus 60 continues to be dragged forward through the pipe toward the other end of pipe 10 the mortar baffle 23 retreats into and through bag 9 whereupon the core 22 25 of the mortar baffle 23 is extracted and removed from cable 11; and the bag 9 squeezed directly behind the baffle by workmen standing by to maintain the pressure formerly maintained by the mortar baffle 23 while it was in the pipe bore 10. All the while the lining apparatus 60 is being still dragged forward by cable 11 and the cement lining charge, which is always in excess of the exact amount required to line the section of pipe being worked, moves forward into the bag 9 until the nose of the lining apparatus finally engages within the mortar baffle 23, now on the cable outside the bag, in the opening left by core 22 when it was removed. By maintaining a constant pressure and head or volume of lining material to and beyond the end of pipe section 10 30 with bag 9 the pipe 10 is lined uniformly throughout its complete length end to end.

Now that the various steps of the method of lining the pipe 10 have been outlined, I shall describe in detail the several parts of apparatus utilized in carrying out the invention. It is to be understood, however, that any suitable mortar baffle may be used, any type of mechanical loading device may be used or any type of spreader apparatus may be used that will spread the lining material around the interior of the pipe while separating out excess moisture. However, I have by practice and study worked out a decidedly improved mortar baffle and loading devices and am using the Tate spreader apparatus owned by the Tate Pipe Linings, Inc. of Andover, Massachusetts, to which company this application and all apparatus and patents and applications herein mentioned a reassigned. First, the improved mortar baffle 23 comprises an outer shell 24 having a tubular body 25 with a flanged head 26, a plurality of guide arms 27 projecting and radiating outwardly therefrom and rearwardly back around the tubular body 25. The guide arms are secured to the flanged head by a flat clamp ring 28 bolted to the said head and adapted to clamp 70 the outwardly radiating ends of the guide arms between the flat surface of the clamp ring 28 and the flat outer surface of the flange head 26. The ring 28 and the head 26 may be counter-sunk on their opposed faces to provide sockets 29 for the ends of arms 27. At the other ex-

trernity of the tubular body 25 is another flanged head 30 slightly larger in diameter than the first flange head 26. Secured against the outer flat surface of flange head 30 are two or more flat rings 31 and 32 of rubber or other suitable material one slightly larger than the other so that the peripheral edge of ring 32 extends slightly beyond the peripheral edge of ring 31. To secure and clamp the said rings flange head 30 is provided with a metal clamp ring 33 with its outer peripheral circumferential edge in line with that of the flange head 30 so that the rings 31 and 32 project beyond the same in stepped formation. The clamp ring 33, however, is made of larger diameter around its inner peripheral edge than the diameter of the tubular body portion 25 of shell 24, whereby to form an annular seat 34 for reception of the enlarged flange 35 of core member 22 when the assembled core is inserted within the tubular body portion 25. The core 22 consists of longitudinally split two half sections 36 and 37, which when clamped together form a spool-shaped member of substantially the same shape as the shell 24, but of smaller size so that the said core 22 can be inserted and nested within the shell 24. The flange head 38 of core 22 is slightly smaller in diameter around its peripheral edge than the interior bore of the tubular body 25 so that said head 38 may be slid into the said body 25. The tubular section 39 of the core 22 is about $\frac{1}{8}$ of an inch larger than the diameter of the cable used and is formed when said sections are clamped together around the cable 11 and locked in shell 24 by virtue of its relatively larger flange end 35 which seats inside the clamp ring 33, which holds the rubber rings 31 and 32. Secured to the clamp ring 33 is a pivoted locking lug 40 which swings over the end of the core flange end 35 to lock the same within the shell 24. The small flange end 38 of the core is held together in alignment by lugs 41 and 42 on half section 36 which project through complementary loops or keepers 43 and 44 on half section 37.

In using the mortar-baffle 23 the core 22 is removed from shell 24 and the cable 11 and coupling 14 threaded through the tubular part 25 of the baffle. Then the core 22 is put together around the cable 11 intermediate the coupling 14 and the shell 24 and inserted within the tubular body 25, until flange 35 seats at 34 within ring 33. The ring 33 holds the rubber disk rings 31 and 32 by a plurality of bolts 45 and nuts 46 which bolts extend through flange head 39, rubber rings 31 and 32 and the said ring 33. The assembled baffle 23 is now pushed into pipe 10 and guide arms 27 frictionally engage with the interior walls of pipe 10 at the forward part of the baffle, while disk rings 31 and 32 are also in tight frictional engagement with the inner pipe walls. The baffle 23 fits in tightly so that considerable push or pressure is now required to move the baffle forward within the pipe 10. The retreating movement of the baffle 23 has been explained in my general description of the method, supra.

At this point it seems advisable to describe the cloth catcher bag or sleeve 9 strung on cable 11 at the head end of pipe 10. This sleeve member 9 is made of canvas, burlap, rubber or other suitable material and is clamped around the pipe end opposite the loading end and has the cable 11 strung therethrough. The elongated sleeve 9 is traversed by the baffle 23 when it is pushed out of the pipe end by the lining apparatus 60 toward

completion of the lining operation. As the baffle passes out of the sleeve 9 the sleeve is squeezed to keep the remainder of the cement charge 21 under constant pressure until the skirt 62 of the lining apparatus has been pulled out of the end of pipe 10 to complete the lining.

The loading mechanism is quite important and I utilize in combination a loader pipe 12 and a loader valve 15 to one side of which is attached for forward pull a head cable 11 and to the other side of which is attached a tail cable 17 for pull in the opposite direction. Each cable is connected to a drum so as to pull the loader valve 15 back and forth through the load pipe 12. In experimenting with the loading of cement mix by this method, I first used only a solid loading plunger, until I discovered that a better result would be obtained by constructing the load valve 15 so that on the down stroke no air could pass through the valve body, but upon the up stroke or return stroke of valve 15 air was needed to prevent a vacuum forming in the pipe 12 and to prevent the cement from coming back up with the valve 15. Accordingly, the valve 15 was made as shown in Figures 6, 7 and 8. The plunger valve 15 consists of a spindle 47 to each end of which is secured loop nuts 48 and 49, which may or may not swivel around the spindle 47. Welded to loop nut 49 is a metal washer 50 to which is secured or cemented a rubber disk 51 of substantially the same diameter. On and around the spindle 47 intermediate the loop nuts 48 and 49 is the main plunger 15 which consists of a rubber disk 52. On each side of rubber disk 52 are centered and bolted metal disks 53 and 54. Bolts 55 extend through the metal disks 53 and 54 and main rubber disk 52 to hold them together. Through the center of the rubber disk 52 and the supporting metal disks 53 and 54 is an opening 55a slightly larger in diameter than the diameter of spindle 47 to provide for longitudinal movement of the spindle within the said opening 55a. On each side of the opening 55a through members 52, 53 and 54 are openings 56 and 57, which openings are within the area covered by the disk 51 secured to the loop nut 49 through metal washer 50.

Cable 11 is attached to loop nut 48 through the loading pipe 12 to the head winch, not shown, and cable 17 is attached to loop nut 49 and the tail winch, not shown, which has cable 17 threaded over pulleys on boom 18, see Figure 1. The loading pipe 12 is filled with mortar and head winch winds cable 11 and pulls plunger 15 into loading pipe 12 forcing mortar 21 ahead of it, and at the same time sliding spindle 47 and washer 50 with the disk 51 against disk 53 to close openings 56 and 57. When the plunger valve 15 has been pulled in as far as desired the head winch is stopped and the tail winch started to wind cable 17, which removes the plunger valve 15 leaving the loading pipe 12 empty and ready for more mortar. The friction of the main rubber disk 52 on the sides of the loading pipe 12 will not allow return of the plunger valve 15 until spindle 47 has slipped as far as loop nut 48 permits, which acts as a stop to pick up the main rubber disk 52 and the supporting metal members 53 and 54. When the plunger slips to this position the openings 56 and 57 are exposed and air rushes in to prevent a vacuum.

It is to be noted that metal disks 53 and 54 are beveled or chamfered in toward the main rubber disk 52 around their peripheral edges 58

and 59 respectively to prevent the metal disks from cutting the rubber disk.

Without the valve action of the loader valve 15 a vacuum would form and would tend to return the mortar to the top of the pipe thereby leaving no chance to load more mortar. Also, it would tend to separate the water from the cement mixture resulting in an unsuitable mixture for lining the pipe 10.

In many cases it will be practical to line old pipe lying on top of the ground by this new method as well as in many instances we will have occasion to line new pipe before it is put into the ground and the claims are intended to cover pipe lined both above and below the ground.

While I have shown and described my invention in detail and specifically described certain apparatus for practising the invention, I wish it understood that the apparatus illustrated is the improved form only and the invention is not necessarily limited to such specific apparatus when lining pipes by my method within the scope of the appended claims.

What I claim is:

1. A mortar-baffle for use in lining the interior surfaces of tubes comprising an outer hollow shell and an inner separable cable enclosing means adapted to lock and nest within the outer hollow shell.

2. A mortar-baffle comprising a tube having a front flange head, a plurality of guides radiating outwardly and rearwardly over the tube secured to the front flanged head, a rear flange head adapted to support a plurality of rubber members and separable cable enclosing means removably locked within the tube.

3. A mortar-baffle comprising in combination an outer tube and an inner tube, said outer tube having rearwardly radiating guide arms at the front thereof and an elastic member secured to the rear thereof and lock means secured to the rear part of the outer tube adapted to secure the inner tube within the outer tube.

4. A mortar-baffle for use in lining pipe comprising an elongated hollow body adapted to traverse a cable through the interior of a pipe, said mortar-baffle having guide arms at one end thereof adapted to frictionally engage the interior walls of a pipe to be lined and elastic rings at the other end of the baffle adapted to frictionally engage the interior walls of a pipe to be lined.

5. A mortar-baffle for use in lining pipe comprising a main tube, a flange head at each end of the tube, a plurality of guide fingers clamped to one flange head and a plurality of rubber rings on the other flange head, rubber ring clamp means adapted to secure the said rings to the flange, a sectional core tube within the main tube having a flange head at each end, one of said core flange heads being slightly smaller in diameter than the main tube and the other of said core flange heads being larger in diameter than the main tube adapted to engage against the inner peripheral edge of the rubber ring, complementary pairs of fastening means carried by each section of the core tube to hold the core together and lock means on the said rubber ring clamp means adapted to engage the said larger core flange to secure the core within the main tube.

6. A mortar-baffle for use in coating pipe interiors comprising a hollow body, a head at each end of the body, guide means radiating from one head back around the said body adapted to fric-

tionally engage the interior of the pipe and gasket means secured to the other head adapted to conform to and frictionally bind against the interior of a pipe.

7. The device as described in claim 6 in which the gasket means comprises a plurality of rubber rings having their outer peripheral edges in stepped formation.

8. The method of loading pipes with cementitious material to be lined comprising the following steps: loading a charge of lining material in a tube attached to the tail end of the pipe section to be lined, then temporarily sealing the pipe above the charge of lining material, then mechanically applying pressure to the head of the charge of lining material to force said lining material through the tube into the pipe section and then mechanically releasing said mechanically applied pressure and then breaking the seal at the head of the charge of lining material after said charge has been forced within the pipe section to be lined.

9. The method of loading mortar in underground pipes to be lined comprising the following steps: locating the pipe underground and digging ditches at predetermined distances to expose a part of the underground pipe to be lined, then cutting and removing part of the exposed pipe section, then threading a cable through the underground pipe from one ditch to the other, then threading the cable through a load tube extending above ground, then connecting the load tube to an end of the underground pipe, then filling the load tube with mortar, then attaching the cable to the head of a plunger valve, then attaching another cable to the tail of the said plunger valve, then mechanically closing and pulling the plunger valve down through the load tube and extruding the mortar from the load tube into the underground pipe to be lined and then mechanically opening and pulling the plunger valve back through the load tube, then removing the plunger valve from the load tube and reloading the load tube with mortar.

10. The method of lining pipe including threading a cable through the pipe bore, threading a plug on the cable into frictional engagement within the pipe bore, loading the pipe with lining material of a predetermined amount behind the plug, then connecting a lining spreader to the cable outside the pipe and dragging the spreader through the pipe so as to spread and coat part of the lining material uniformly over the entire inner surface of the pipe while separating excess moisture from the part of lining material so spread and coated over the inner surface of the pipe, moving the remainder of lining material forward under substantially constant pressure between the plug and the spreader, then catching the retreating plug and excess lining material at the discharge end of the pipe and maintaining the lining material behind the plug under constant pressure until the spreader is pulled out the discharge end of the lined pipe.

11. The method of lining pipe including threading a cable through a flexible sleeve at the discharge end of a pipe, then threading the cable through the pipe, threading a plug on the cable into frictional engagement within the pipe bore from the opposite end, loading the pipe with lining material of a predetermined amount, then connecting the lining spreader to the cable outside the pipe and dragging the spreader through the pipe so as to spread and coat part of the lining material around the inner walls of the

pipe while separating excess moisture from the part of lining material so spread and coated around the inner walls of the pipe, moving the remainder of lining material forward under substantially constant pressure between the plug and the spreader, then passing the retreating plug through the said flexible sleeve at the discharge end of the pipe and trapping the excess lining material outside the discharge end of the pipe within the said flexible sleeve and maintaining constant resistance to the extrusion of the lining material, as it discharges from the end of the pipe, until the spreader is dragged completely free of the pipe end.

12. In an apparatus for loading pipe having an end exposed for loading with mortar, comprising in combination a loading tube adapted to be filled with mortar, clamp means to secure the loading tube to an end of the pipe to be loaded and a plunger so shaped and formed as to frictionally engage with the interior walls of the loading tube and power means coupled to each end of the plunger adapted to reciprocate the said plunger within the loading tube to clean out and force mortar into the exposed end of a pipe to be lined.

13. A plunger for use in loading pipe to be lined with cement comprising a spindle, coupling means on each end of said spindle, a plunger disk intermediate the coupling means loosely centered around the spindle having openings therein, and a valve disk carried by one of said coupling means adapted to seat on the said plunger disk to close the plunger disk openings when the spindle slides down through the plunger disk.

14. The device as described in claim 13 in which the plunger disk comprises the following elements: a rubber disk having a central opening and a plurality of openings around the said central opening in the disk, a pair of metal supporting disks of substantially equal diameters to each other but smaller in diameter than the rubber disk, each of said metal disks having their peripheral edges chamfered toward the said rubber disk with corresponding openings in alignment with the openings in the rubber disk, and fastening means adapted to secure the disks together in centered relation.

15. In combination apparatus for loading pipe to be lined with cement comprising a tube adapted to be filled with cement and a plunger valve adapted to conform to the interior of the tube comprising a rubber disk having openings therein in frictional contact with the tube walls, and a spindle centered through the disk adapted to slide up and down within the disk and means carried by said spindle adapted to open and close the openings in said disk.

16. A plunger for use in loading pipe to be lined with cement comprising valve operating means, perforated packing means loosely centered around the said valve operating means, valve means carried by said valve operating means above the said packing means adapted to seat over the openings in said packing means and operating means for said valve operating means.

17. A mortar baffle for use in coating pipe interiors comprising a tubular body, a flange at each end of the body, guide means secured to one of

said flanges and gasket means secured to the other of said flanges adapted to conform to and frictionally bind against the interior walls of a pipe to be lined.

18. The method of feeding cementitious material to underground pipes to be lined by mechanical means comprising the following steps: digging a plurality of ditches at predetermined distances to expose parts of the pipe to be lined, then cutting out and removing a section of the main pipe from each ditch and then connecting a load pipe to the tail loading end of the pipe extending from the first ditch to the second ditch after said section has been removed, then pulling a hauling cable through the said pipe connecting the first ditch with the second ditch from the head end of the pipe in the second ditch to the said tail end of the pipe in the first ditch and up through the load pipe, next filling the load pipe with mortar and forcing the mortar into the said tail end of the pipe from the load pipe and then admitting air to the head of the mortar in the tail end of the pipe to prevent formation of a vacuum preparatory to reloading the load pipe with more mortar.

19. In combination apparatus for lining pipe with mortar comprising a free floating mortar baffle in tight frictional contact with the interior walls of the pipe to be lined adapted to close off a section of said pipe, extending from the tail end of said pipe, draft means extending through the pipe and the mortar baffle from the head end of the pipe to the tail end of the pipe and a perforated mortar spreader means attached to said draft means in the tail end of the pipe, forming with the intervening section of pipe a reservoir for a charge of mortar, whereby when the draft means transmits pull to said spreader means the charge of mortar compacts under pressure against the friction tight mortar baffle to overcome the tight frictional resistance of said mortar baffle with the walls of the pipe and as the mortar baffle retreats the said spreader means advances and dehydrates said charge of mortar while moving said mortar forward against the resistance of the mortar baffle under substantially constant pressure.

20. The combination as described in claim 19 in which the perforated spreader means comprises a tapered nose, a flexible hollow perforated skirt extending from the tapered nose and guide means secured to the nose portion of the spreader adapted to engage with the interior walls of the pipe.

21. In an apparatus for loading pipe having an end exposed for loading with mortar, comprising in combination a loading tube adapted to be filled with mortar, means to secure the loading tube to the end of the pipe to be loaded and a plunger so shaped and formed as to frictionally engage with the interior walls of the loading tube, valve means carried by said plunger and power operated means coupled to each end of the said valve means adapted to reciprocate the plunger within the loading tube whereby upon downward movement of said plunger the valve means is closed and upon upward movement of said plunger the valve means is open.

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