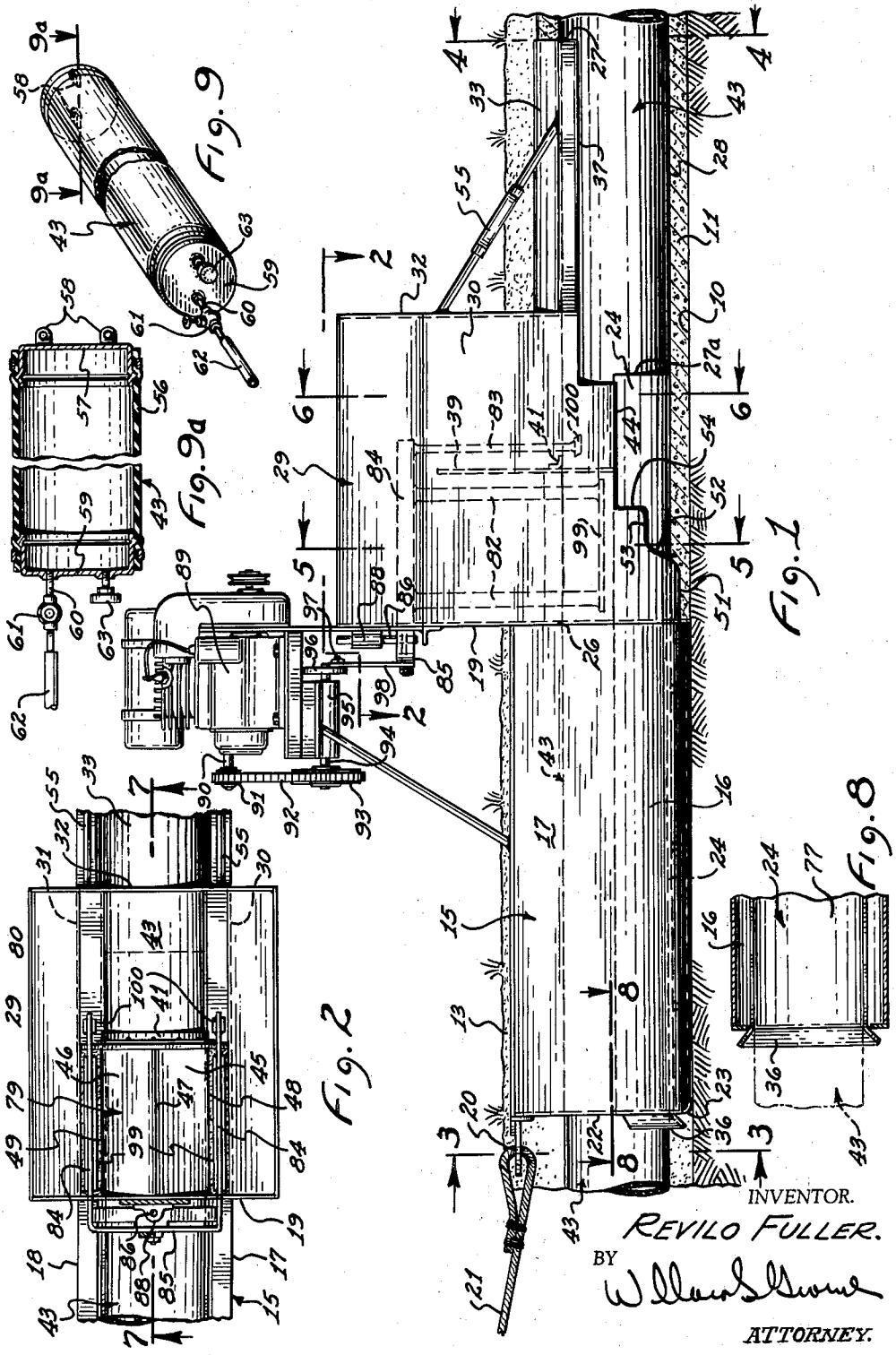
Jan. 31, 1961 R. FULLER 2,969,576

CONTINUOUS CONCRETE PIPE LAYING MACHINE

Filed Nov. 12, 1958 3 Sheets-Sheet 1



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CONTINUOUS CONCRETE PIPE LAYING MACHINE

Filed Nov. 12, 1958 3 Sheets-Sheet 2

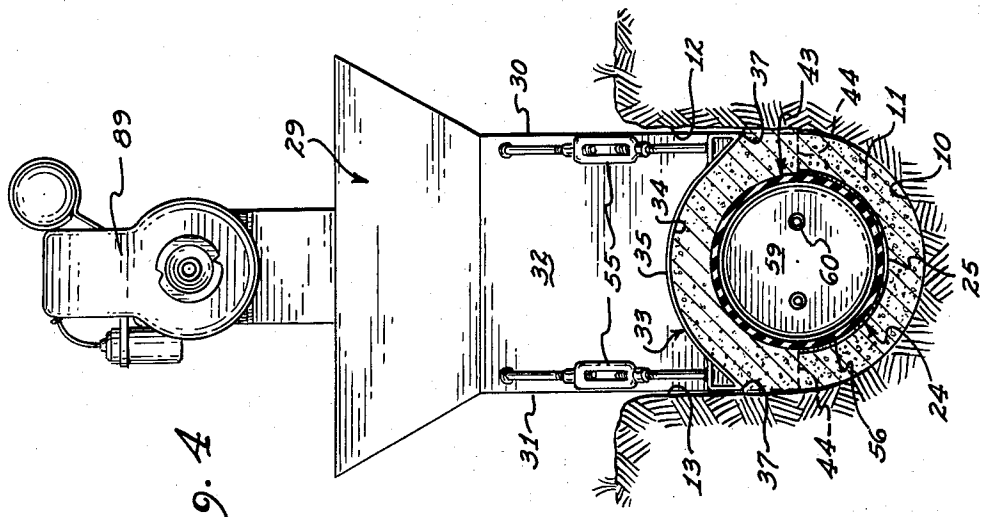


Fig. 4

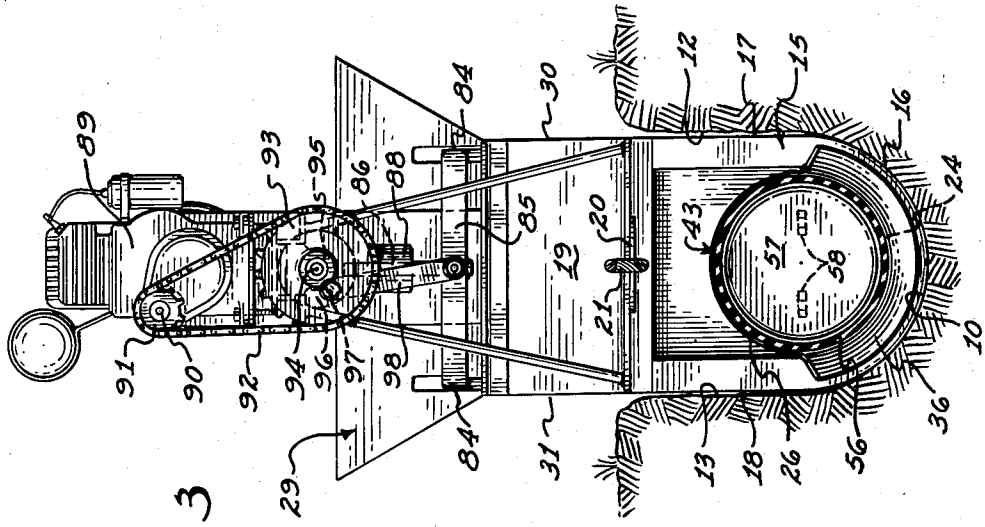


Fig. 3

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CONTINUOUS CONCRETE PIPE LAYING MACHINE

Filed Nov. 12, 1958 3 Sheets-Sheet 3

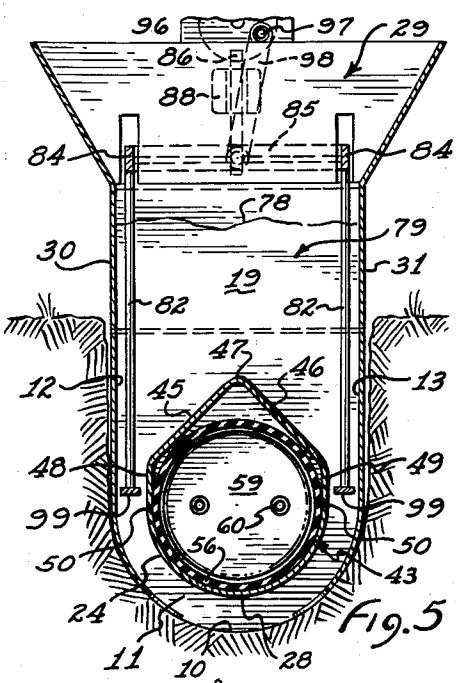


Fig. 5

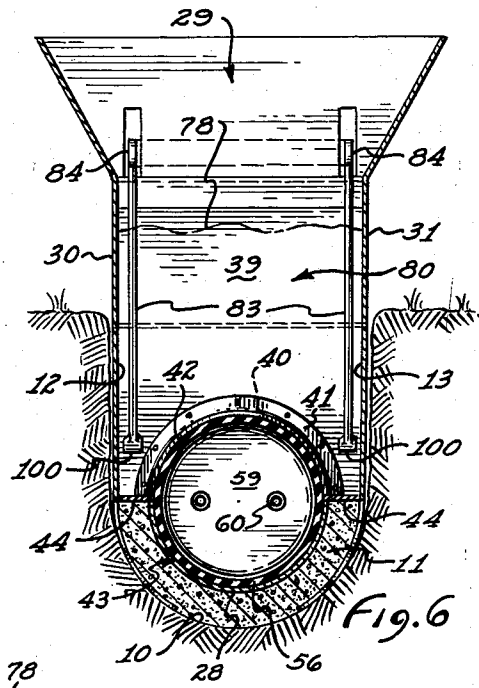


Fig. 6

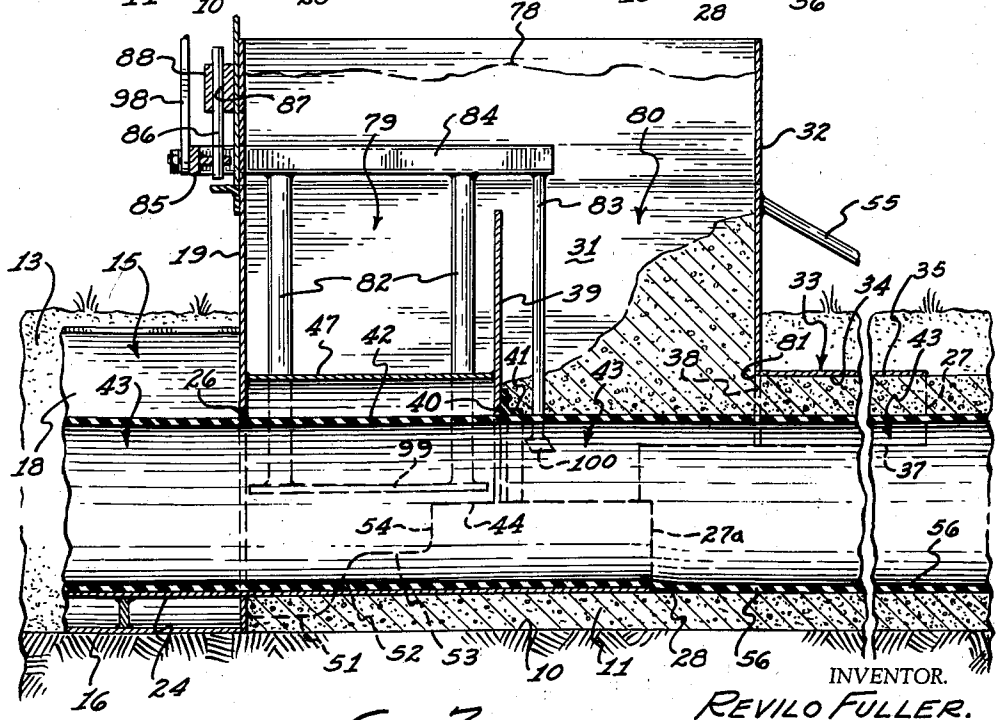


Fig. 7

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United States Patent Office 2,969,576 Patented Jan. 31, 1961

2,969,576

CONTINUOUS CONCRETE PIPE LAYING MACHINE

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Filed Nov. 12, 1958, Ser. No. 774,072

5 Claims. (Cl. 25—32)

This invention pertains to improvements in a continuous concrete pipe laying machine.

One of the objects of this invention is to provide a machine for continuously forming a pipe of concrete in a previously dug trench.

Another object is to provide a continuous concrete pipe laying machine which travels along in a trench and which receives the plastic concrete mud and automatically forms a continuous pipe thereof in the bottom of the trench as the machine is moved along in the trench.

Still another object is to provide a continuous concrete pipe laying machine having a special and superior means for presenting a continuous collapsible core in inflatable position in the formed pipes as the machine progresses along the trench.

It is a further object of this invention to provide in the pipe laying machine aforementioned a semi-circular cylindrical member which serves to support the continuous collapsible inflatable core during the supply and tamping of the concrete around it as received from the hopper of the machine and which member also serves to trowel the bottom half of the inside of the formed pipe and then to allow the longitudinally held continuous cylindrical core to be supportably presented on the troweled surface to support the top plastic portion until set.

It is also an object to form a continuous concrete pipe having a particular cross section shape to improve the distribution of the concrete during the setting up period and to provide a finished pipe of greater strength and rigidity when completed.

Another object of this invention is to continuously cast a concrete pipe in a pre-dug ditch while using a continuous collapsible inflated core over which travels the pipe forming machine in forming the pipe.

And a further object is to provide a continuous pipe laying machine and system adapted to small as well as large pipe in which a continuous inflatable inner core is automatically presented in the poured pipe and which core can be deflated and released from the pipe bore after the concrete has set up by release of air pressure from one end of the finished pipe line without the necessity of a person crawling into the pipe to release said core.

And a still further object is to provide a pipe casting machine utilizing a continuous inflated inner core which may be deflated from outside of the cast pipe without the necessity of using any spreaders or braces manually placed in the inner core as in former devices.

It is also an object of this invention to provide a pipe casting machine as described above in which the lower half of the pipe is poured independent of the collapsible inner core following which step the top half of the pipe is poured on the top half of said inner core while it is supported on its lower half and then slid off on the bottom half of the bore of the case pipe.

Further features and advantages of this invention will appear from a detailed description of the drawings in which:

Fig. 1 is a left hand side elevation of a continuous concrete pipe laying machine incorporating the features of this invention.

Fig. 2 is a fragmentary plan view of the apparatus shown in Fig. 1.

Fig. 3 is a front elevation of the machine indicated by the line 3—3 in Fig. 1.

Fig. 4 is a rear elevation of the machine indicated by the line 4—4 in Fig. 1.

Fig. 5 is a vertical transverse section on the line 5—5 of Fig. 1.

Fig. 6 is a vertical transverse section on the line 6—6 of Fig. 1.

Fig. 7 is an enlarged fragmentary vertical longitudinal section on the line 7—7 of Fig. 2.

Fig. 8 is a fragmentary section on the line 8—8 of Fig. 1.

Fig. 9 is a perspective view of the continuous inflatable sectional core.

Fig. 9*a* is an enlarged broken section of the pneumatically inflated core on the line 9*a*—9*a* of Fig. 9.

In this invention there is first formed a pre-dug ditch having an arcuate bottom **10** shaped to conform to the outside of the lower half **11** of the cast pipe, and having vertically disposed parallel sides **12** and **13** extending upwardly to ground level **14**. The machine comprises a guide portion **15** having a semi-cylindrical bottom **16** and upstanding sides **17** and **18** slidingly engaging the bottom and sides of the pre-dug ditch. To the rear end of the guide portion **15** is fixed a laterally disposed vertical baffle **19**. On the front of the guide portion **15** is provided a hitch connection **20** to which a towing cable **21** may be attached for pulling the machine along in the ditch during the pipe laying operation. Preferably, the front edge **22** of the guide portion **15** is turned inwardly at **23** to facilitate sliding of the device in the ditch without picking up dirt from the sides and bottom of the ditch.

Fixed to but spaced from the semi-cylindrical bottom **16** of the guide portion **15** is the core support member **24** having an arcuate shape conforming to the lower half **25** of the bore of the completed pipe. It will be noted that this core support member **24** extends from the front edge **22** of the guide portion **15** through the circular opening **26** formed in the baffle **19**, its rear end terminating at **27***a*. The bottom surface **28** of the core support member **24** rearwardly of the baffle **19** is spaced from the bottom **10** of the pre-dug ditch so as to form the desired thickness for the bottom half of the pipe and to effectively trowel the lower half of the pipe bore as the machine travels along the ditch.

In order to supply the plastic cement mud to the machine there is provided a hopper **29** comprising the sides **30** and **31** fixed to and extending rearwardly of the baffle **19** and connected at their rear edges to the rear transverse baffle **32**. Rigidly fixed to and extending rearwardly from the rear transverse baffle **32** is the semi-cylindrical top troweling member **33** having its inner concave surface **34** positioned to form the outside surface **35** of the top half of the pipe, the member **33** extending rearwardly to the rear end **27** of the machine. The rear transverse baffle **32** extends downwardly and terminates at the lower edges **37** of the top troweling member **33** and has an arcuate cut-out passageway **38** aligned with the inner concave surface **34** of the top troweling member.

Intermediate the baffle **19** and the rear transverse baffle **32** is a transverse partition **39** rigidly fixed to the sides **30** and **31** of the hopper **29**. This partition **39** has a semi-circular cut-out **40** in its lower edge just slightly larger than the bore of the pipe and preferably has a flexible seal **41** fixed around its edge which engages the upper half portion **42** of the pneumatically inflatable core

members 43 to prevent flow of liquid cement through the cut-out 40; the partition 39 terminating at its lower edge 44 with this portion of the sides 30 and 31 of the hopper.

Between the baffle 19 and the partition 39 is fixed a pair of divergently sloping plates 45 and 46, Fig. 5, connected together at an apex 47 and extending downwardly and merging with side plates 48 and 49 whose lower edges are rigidly fixed to the upper edges of the core support member 24 at the points 50 so as to form a completely enclosed tunnel between the baffle 19 and the partition 39 for relative sliding of the core members therethrough as the machine travels along the ditch. It will be noted that between the baffle 19 and the partition 39 the rear end of the guide portion 15 slopes upwardly as indicated at 51, 52, 53 and 54 to aid in the distribution and smooth flow of the concrete under the core support member into the lower half of the ditch. Also, stabilizing rods and turn buckles 55 may be provided between the upper portions of the rear transverse baffle 32 and the outer end of the top troweling member 33 if required.

In conjunction with the operation of this machine there is provided a continuous pneumatically supported core apparatus which relatively slides along on the concave upper surface of core support member 24. This core apparatus comprises a rubber or plastic tube 56 which may be collapsed and rolled up for easy handling or storage and which is closed on one end by a suitable header 57 having eyelet lugs 58 fixed to the outside face thereof for securing the core against longitudinal movement in the ditch during the pipe laying operations. The other end of the tube 56 has the supply headers 59 fixed therein to which is connected the air supply pipe 60 having a shut-off valve 61 to which is connected the fluid pressure supply pipe 62. A suitable pressure gauge 63 may be mounted on the supply header 59 so as to indicate the inflation pressure in the tube 56.

To prepare the core 43 for use, air pressure is applied from line 62 to inflate the tube 56 to required pressure. The machine is placed at one end of the previously dug trench and the inflated core is placed in the trench and its header end 57 passed through the machine, as shown best in Figs. 1 and 7. The eyelet lugs 58 of the header 57 are then suitably secured to prevent longitudinal movement of the core 43 during the initial stages of travel of the machine during the pipe laying operation.

With the core 43 assembled in the machine ready for the forming operation as above described, plastic concrete of suitable consistency and body is supplied at 78 filling the front compartment 79 and the rear compartment 80 of the hopper 29. The supply of material from the front compartment 79 flows down the sloping plates 45 and 46 in the bottom thereof and then down between the sides 30 and 31 of the hopper and the side plates 48 and 49 to fill the space between the bottom 10 of the ditch and the bottom surface 28 of the core support member 24, the lower edges 44 of the partition 39 screeding off the material as the machine is pulled along in the ditch to complete the lower half of the pipe.

In the rear compartment 80 the material is being presented directly against the top half 42 of the core 43 as it emerges from the cutout 40 and seal 41 and also against the top edges of the material just poured forming the lower half of the pipe. As the machine progresses to the left in Figs. 1 and 7 the core 43 is guided smoothly into the machine by the upwardly sloping lip 36 on the leading edge of the upper concave surface 77 of the core support member 24. The edge 81 of the passageway 38 in the rear transverse baffle 32 screeds off the top outside surface of the upper half of the poured pipe while the top troweling member 33 completes this surface to proper finish, thus completing the pipe structure. As the core 43 relatively passes out from the rear end 27 of the core support member 24, it comes in contact with and rests on the bottom troweled bore portion of the poured pipe and thereby supports the upper portion of the poured pipe until it has set, ready to deflate and remove the core 43.

In certain instances where the material requires it, suitable agitating devices or tampers may be utilized. Such tamping devices may comprise the downwardly extending tamper bars 82 and 83 which are rigidly fixed to the vertically reciprocatable yoke bars 84 connected together by the lateral bar 85 mounted on a suitable guide rod 86 vertically slidable in the guide bore 87 in the bracket 88 fixed to the baffle 19. A suitable drive motor 89, Fig. 1, mounted on the baffle 19 has an output shaft 90 and a sprocket 91 over which operates a chain 92 which in turn drives a sprocket 93 fixed to a shaft 94 journaled in a bracket 95 suitably fixed to the baffle 19. The other end of the shaft 94 has a disc 96 fixed thereto and a crankpin 97 on said disc is pivotally connected by a link 98 to the lateral bar 85 so that operation of the engine 89 effects vertical reciprocation of the tamper bars 82 and 83. The tamper bars 82 have tamping feet 99 located in the space between sides 30 and 31 of the hopper and the side plates 48 and 49 to facilitate the firm compaction of the concrete in the lower half 11 of the pipe while the tamper bars 83 have tamping feet 100 on their lower ends located between the sides 30 and 31 of the hopper and the upper half 42 of the core emerging from the partition 39 so as to get good compaction of the concrete for the upper half of the pipe.

While the apparatus herein disclosed and described constitutes a preferred form of the invention, it is also to be understood that the apparatus is capable of mechanical alteration without departing from the spirit of the invention and that such mechanical arrangement and commercial adaptation as fall within the scope of the appendent claims are intended to be included herein.

Having thus fully set forth and described this invention what is claimed and desired to be obtained by United States Letters Patent is:

1. In combination in a cylindrical concrete pipe laying machine using a fluid pressure inflatable core, a guide portion having a semi-cylindrical bottom and vertically disposed sides slidably engaging a mating semi-cylindrical bottom pre-dug trench to receive the pipe, a laterally disposed vertical baffle fixed to the rear end of said guide portion, an elongated horizontally disposed arcuate core support member fixed in spaced position from the inside surface of the bottom and sides of said guide portion and extending through a circular opening in said baffle and rearwardly of said baffle so as to define a space between the bottom of said trench and the underside of said core support member for troweling the lower half of the bore of said pipe to be formed, a hopper fixed to and extending rearwardly of said lateral baffle and located above said core support and troweling member, a top troweling member fixed to and extending rearwardly of said hopper, an intermediate transverse partition extending between the sides of said hopper forming a front and rear compartment in said hopper, a core receiving tunnel in the lower portion of said front compartment communicating with an opening in said transverse baffle and an arcuate cut-out in the bottom of said partition, passageways each side of said tunnel and the sides of said hopper connecting said front compartment to said space below said core support member including a guide portion sloping upwardly and rearwardly from said baffle to said partition each side of and spaced from said core receiving tunnel, said rear compartment being in direct communication with the top half of said core carried on said core support member upon emergence from said partition cut-out and with the top edges of the poured bottom half of said pipe and including a material discharge passageway above said core and top edges for supplying material under said top troweling

member upon movement of said machine in the trench.

2. In a concrete pipe laying machine as set forth in claim 1 wherein tamping devices including tampers provided on said hopper between said tunnel and said guide portions to agitate the material downwardly in the passageways between said tunnel and said guide portion below said front compartment and in the bottom of said rear compartment above the top edges of the poured bottom of said pipe each side of said core.

3. A cylindrical pipe laying machine as set forth in claim 1 wherein said opening in said transverse baffle and said arcuate cut-out in the bottom of said partition longitudinally guide and hold said inflatable core in aligned sliding contact with said core support during the distribution of concrete from said hopper around said core support and core as the machine traverses the pre-dug trench.

4. A cylindrical concrete pipe laying machine using a fluid pressure inflatable core, a guide portion having a semi-cylindrical bottom and vertically disposed sides slidably engaging a mating semi-cylindrical bottomed pre-dug trench to receive the pipe, a laterally disposed vertical baffle fixed to the rear end of said guide portion, an elongated horizontally disposed core support member having an upwardly facing arcuate semi-cylindrical core engaging surface fixed in spaced position from the semi-cylindrical bottom surface of said guide portion and extending through a circular opening in said baffle and rearwardly of said baffle, the portion of said core support member extending rearwardly of said laterally disposed vertical baffle being so positioned as to define a space between the bottom of said trench and the underside of said core support member whereby the convex under surface of said core support member provides a troweling surface for the lower half of the bore of said pipe to be formed and the concave top surface of said core support member provides a support surface for

slidingly engaging the lower half of said inflatable core, a hopper fixed to and extending rearwardly of said lateral baffle and located above said core support and bottom troweling member, a top troweling member fixed to and extending rearwardly of said hopper having a downwardly facing concave semi-cylindrical top troweling surface radially outwardly positioned from the surface of said inflatable core, a cut-out passageway formed in a rear transverse baffle of said hopper interconnecting said hopper interior with the space between said top troweling member and the top half of said inflatable core, and guide means on said guide portion sloping upwardly and rearwardly from said transverse baffle toward the rear of said hopper arranged to distribute a smooth flow of concrete from said hopper into and filling the space between said core support and the bottom semi-cylindrical surface of said pre-dug ditch.

5. A cylindrical pipe laying machine as set forth in claim 4 wherein the rear end of said core support terminates at a point intermediate the front and rear of said hopper so that the load in said hopper is carried on said inflatable core while said core is slidingly supported forwardly of said hopper on said core support and rearwardly of said hopper in fixed contact with the lower half bore of the pipe being formed.

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