Nov. 12, 1940. A. O'RAHILLY 2,220,975

CONCRETE PIPE MANUFACTURING MACHINE

Filed Feb. 3, 1939

Fig. 1.

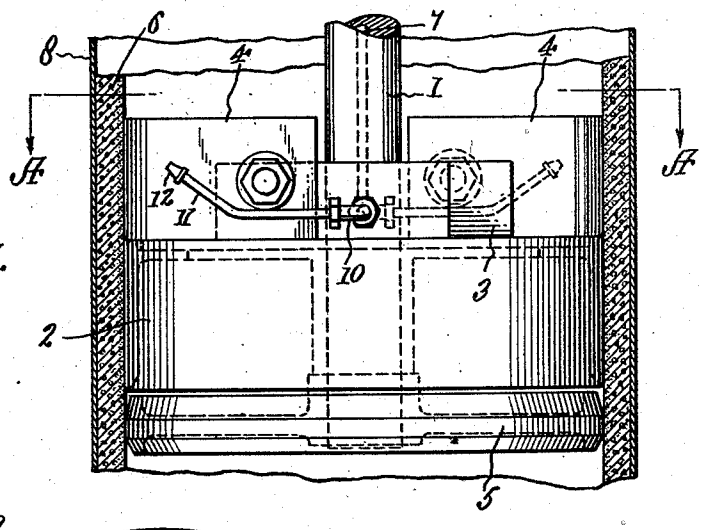


Fig. 2.

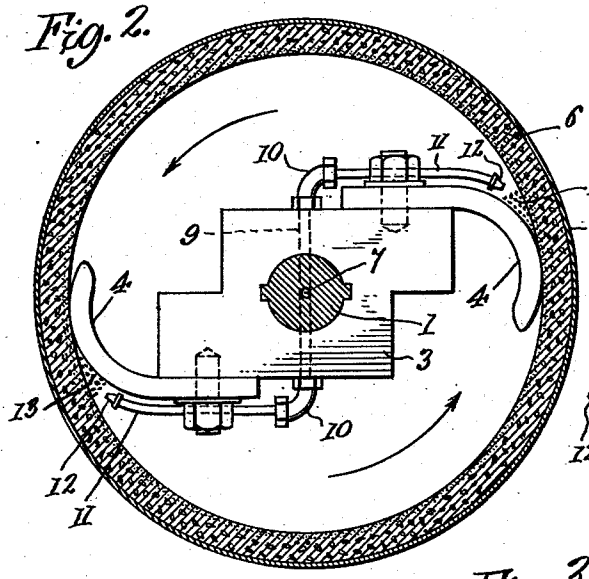


Fig. 4.

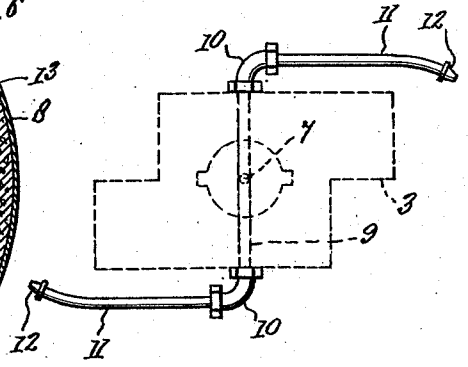
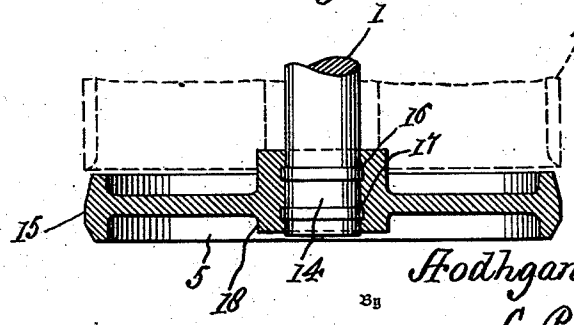


Fig. 3.



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UNITED STATES PATENT OFFICE

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CONCRETE PIPE MANUFACTURING MACHINE

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Application February 3, 1939, Serial No. 254,401
In Ireland July 5, 1938

4 Claims. (Cl. 25—36)

My invention relates to the manufacture of concrete pipes or tubes intended for the conveyance of liquids such as water, sewage and the like, and has for its object the provision of a means whereby the wall of the pipe or tube may be rendered impermeable without the addition of any subsidiary lining material whilst at the same time the solidity of the structure is maintained so as to permit removal of the pipe from its mould immediately after its manufacture.

The invention relates to concrete pipes manufactured by what is known as the packer head process in which a semi-dry mix of concrete is delivered into a vertical mold and is there compressed by packing wings against the interior wall of the mold so as to form the wall of the pipe. When pipes thus manufactured are subjected to the usual hydrostatic tests there is found to be a tendency for the test water to sweat through the wall of the pipe.

By substituting a mix that is substantially wetter for the semi-dry mix ordinarily employed, the aforementioned sweating tendency can be lessened or even entirely obviated if the substituted mix is sufficiently wet. The employment of such a wet mix gives rise however to the serious manufacturing disadvantage that the mold cannot be stripped for a considerable time after the construction of the pipe owing to the inability of the latter to retain its formation whilst in the semi-plastic condition due to the superadded water.

To meet these objections it has already been proposed in the manufacture of concrete pipes by the aforementioned packer head process to lead water or other liquid down through the central revolving shaft of the pipe making machine and to radially project it from a single discharge nozzle in the said shaft on to the portion of the concrete midway between two of the packer wings that is about to be formed into the inner wall of the pipe.

It has been found in practice that this method of applying the extra liquid did not produce satisfactory results. Some portions of the concrete received an excess of superadded liquid so that it was unable to retain its molded form in the pipe wall while the remaining portions of the concrete received no superadded liquid. The resulting pipe showed a series of wet bands alternating with a series of dry bands throughout the length of the pipe.

According to the present invention an appropriate quantity of water or other liquid is fed from the central shaft or from a pipe attached thereto to a nozzle carried on the operating face of each packing wing whence it is discharged obliquely into that portion of the semi-dry mix in the mold that is on the point of being formed into the pipe wall, in such a manner and to such an extent that the inner periphery and part of the pipe wall adjacent thereto will be composed of concrete with the superadded water, whilst the outer periphery and part of the pipe wall adjacent thereto will be composed of the semi-dry mix concrete. This arrangement ensures that the superadded water or other liquid is evenly distributed over the entire mass of the concrete forming the inner wall of the pipe.

The invention will now be described having reference to the accompanying drawing in which:

Fig. 1 shows in elevation portion of the central shaft of the packer head machine to which is connected the member known as the packer head fitted with the water distributing apparatus, the whole being situated within portion of a pipe shown in cross section.

Fig. 2 is a cross section along line A—A in Fig. 1.

Fig. 3 is a section of the trowelling member.

Fig. 4 shows the water distributing apparatus disconnected from the known parts of the machine to which it is applied.

The same reference numerals refer to the same parts throughout.

Referring to the drawing, numeral 1 is the vertical revolving shaft of the machine, to the lower end of which is connected the known form of packer head comprising the long bottom 2, the center block 3 and two packing wings 4, 4. At the lower extremity of the vertical shaft 1 below the long bottom 2 is a circular member 5, hereinafter referred to as the trowelling member, which is supported on the said shaft in such a manner as to be freely revolvable independently of the packer head and of the shaft aforementioned. The object of this trowelling member is to smooth off imperfections that may show themselves on the inner periphery of the pipe wall during the course of construction. The wall of the concrete pipe in the course of manufacture within the mold 8 is indicated by numeral 6.

A central passage 7 having a suitable connection with a water supply extends downwards from the upper end of the vertical shaft 1 to a point substantially central with the center block 3, from which point passages 9,9, Fig. 2 lead to that outer surface of the wings 4,4, which comes into operative contact with the semi-dry concrete mix to be compressed. Connections 10,10 are pro-

vided each to take a tube 11 terminating in a discharge nozzle 12. The passages 9,9 from the central passage 7 may if desired be carried through to the outer periphery of the vertical shaft 1 at a convenient distance above the center block 3 instead of being brought through the block itself. In this case, to avoid weakening the vertical shaft one of the passage 9 may be omitted, and one connection 10 is fitted to the outlet of the remaining passage 9 and adapted to take both the tubes 11.

In order to diminish risk of damage the tubes 11 are caused to lie as closely as possible against the operative faces of the wings 4,4. The nozzles 12 are so positioned that water discharged therefrom will impinge on and consequently further moisten that portion of the semi-dry concrete mix (shown by numeral 13 in Fig. 2) that is about to be compressed to form the portion of the wall adjacent to the inner periphery of the pipe.

Fig. 3 illustrates in cross section the trowelling member 5 aforementioned. The said member is supported on an extension 14 of the vertical shaft 1 and is of piston-like form of appropriate depth and of diameter substantially that of the bore of the pipe being manufactured. The periphery 15 is very slightly tapered, the diameter of the upper face being somewhat less than that of the lower face, the object being that as the member rises with the packer head during operation, its application against the inner wall of the pipe will be gradual and any dragging of the finished surface avoided.

The said trowelling member is freely supported on the shaft extension 14 on ball or roller bearings 16 and 17 of any known make, the hub 18 being enlarged for housing them; the member 5 can thus revolve independently of the main vertical shaft 1.

It is to be understood that the aforementioned construction for the support of the trowelling member is given by way of illustration of one form only; any other known suitable support or connection with the shaft 1 may be arranged, the essential point being that the said member is supported that in operation it does not revolve with the central vertical shaft but rises with it smoothly off the interior of the pipe wall.

In operation the semi-dry mix of concrete is fed into the machine in the usual way and falls on the upper face of the long bottom 2. As the semi-dry mix is compressed outwards against the pipe mold by the packing wings 4,4, water under pressure is directed through the passage 7 in the vertical shaft 1, passes through the openings 9,9 and is sprayed through the nozzles 12,12 obliquely on to that portion of the mix which will form the inner periphery of the pipe wall, which is thus formed of a wetter and denser concrete. The quantity of water can be regulated by any known customary means and is varied according to the thickness of the wall of the pipe under construction in such a manner that the water from the nozzles 12 has not time to penetrate the entire mass of concrete; consequently that portion of the mix which will form the outer periphery and that part of the pipe wall adjacent thereto remains in its original semi-dry condition. By adjusting the position of the nozzles and/or varying the quantity of water supplied the extent of penetration of the latter can be varied and hence the thickness of that portion of the pipe wall having the superadded water can be varied.

It is to be understood that the drawing illustrates only one embodiment of the inventon and that changes in construction may be effected without departing from the spirit thereof. For example in the center block 3 only one water outlet 9 may be arranged and fitted with any suitable known type of connection to take the requisite number of tubes 11 leading to the spraying nozzles 12. Further instead of directing the water through a central hole in the vertical shaft, it may be conveniently led through a pipe exteriorly attached to the said shaft and suitably connected with the outlet nozzles aforementioned.

I claim:

1. A concrete pipe manufacturing machine comprising a central shaft vertically movable and rotatably mounted within a mold, carrying a packer head and a center block with packing wings secured thereon, piping on the head in communication with a source of water supply, a nozzle connected to the piping and carried on the operating face of two or more packing wings, said nozzle being so relatively arranged with respect to said packing wings and the interior portion of the pipe being formed as to cause the water issuing from said nozzle to impinge obliquely in that portion of the concrete mix about to be formed into the inner periphery of the pipe wall and part adjacent thereto.

2. A concrete pipe manufacturing machine comprising a central shaft vertically movable and rotatably mounted within a mold, carrying a packer head and a center block with packing wings secured thereon, said shaft being hollow and in communication with a source of water supply, said shaft also having an orifice in communication with its hollow portion, said center block having passages communicating with said orifice, piping connecting with said passages and carried by said head, and a nozzle directed and carried on the operating face of each packing wing so as to impinge obliquely on that portion of the concrete mix about to be formed into the inner periphery of the pipe wall and part adjacent thereto.

3. A concrete pipe manufacturing machine machine comprising a central hollow shaft in communication with a source of water supply and vertically movable and rotatably mounted within a mold, carrying a packer head and a center block with packing wings secured thereon, said shaft having an orifice, a nozzle carried by said head, connections between said orifice and said nozzle, said nozzle carried on the leading face of a packing wing and positioned and arranged relatively to said wing and the internal surface of the pipe being formed in a manner causing the water issuing from the nozzle to impinge obliquely on that portion of the concrete mix about to be formed into the inner periphery of the pipe wall and part adjacent thereto.

4. A concrete pipe manufacturing machine as claimed in claim 1 characterised in that a cylindrical troweling member is supported on the central vertical shaft below the long bottom so that the said troweling member does not revolve with the central vertical shaft, and smooths off the interior surface of the pipe wall.

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