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2,878,544

CONCRETE PIPE MAKING AND LAYING MACHINE

Filed March 30, 1953

3 Sheets-Sheet 1

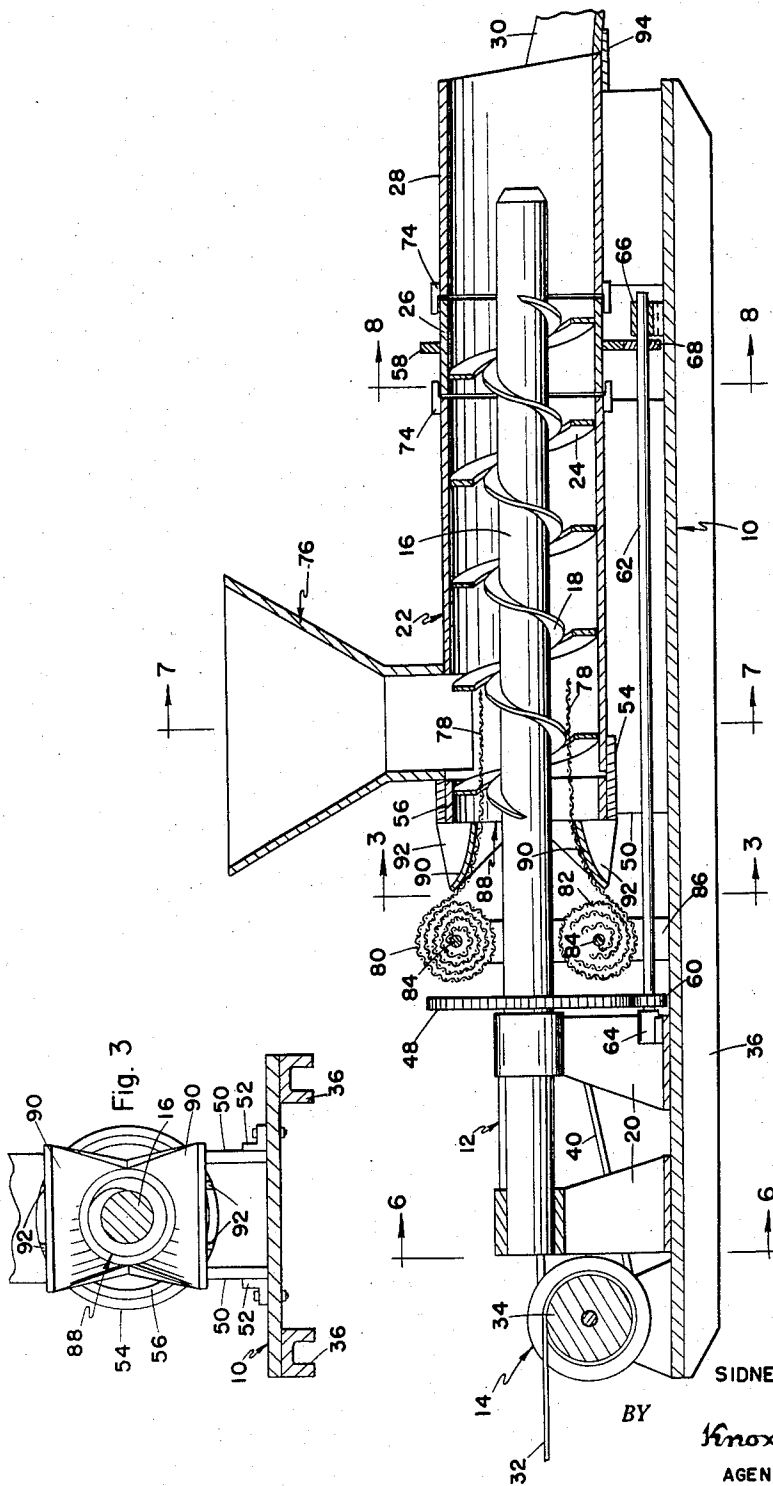


Fig. 1

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3 Sheets-Sheet 2

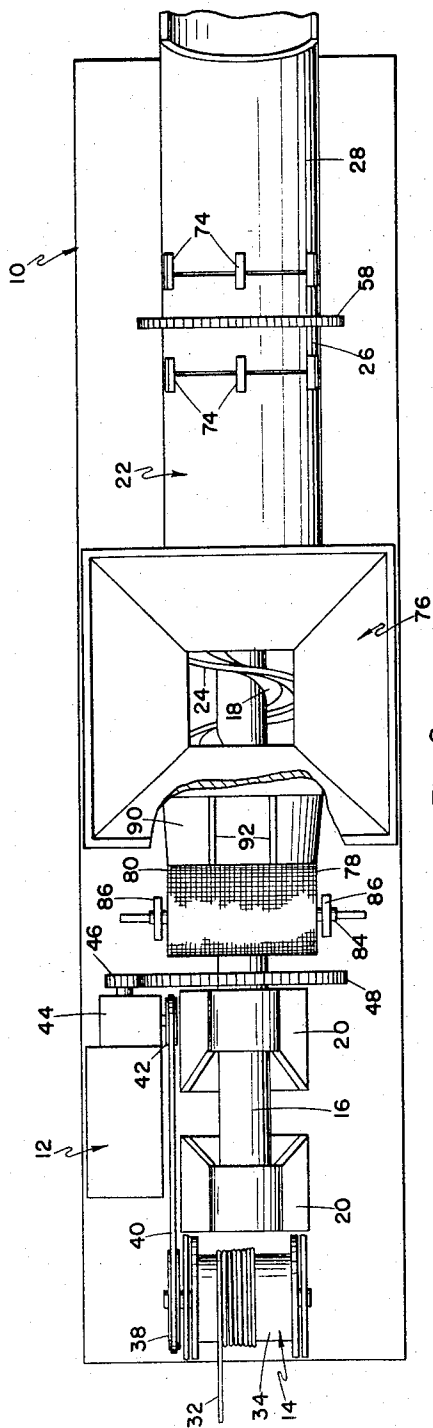


Fig. 2

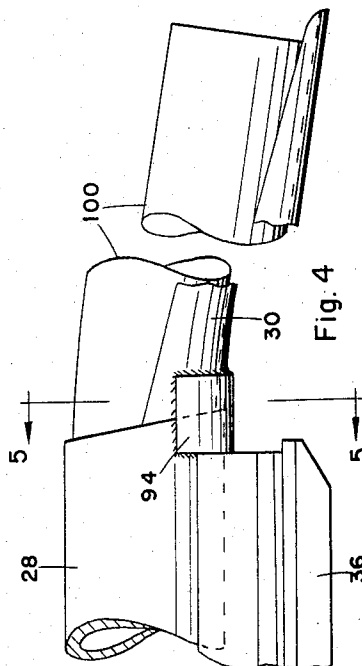


Fig. 4

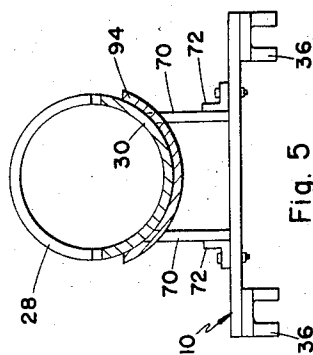


Fig. 5

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3 Sheets-Sheet 3

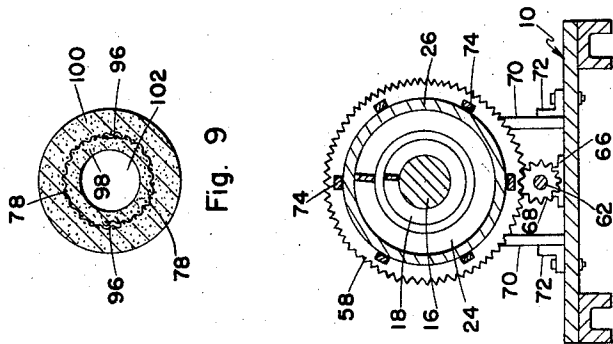


Fig. 9

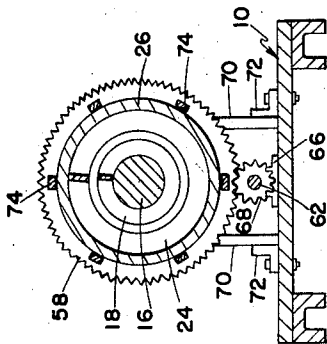


Fig. 8

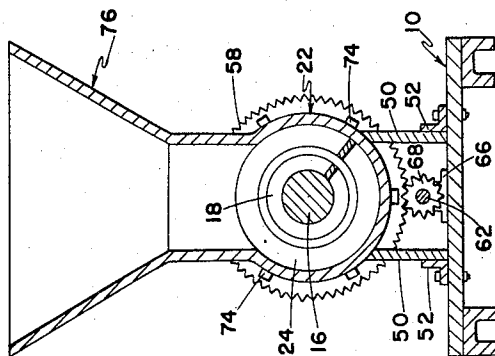


Fig. 7

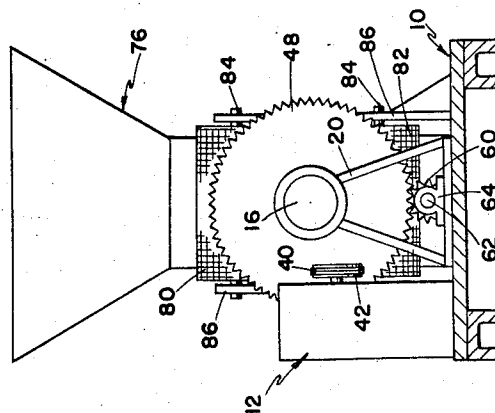


Fig. 6

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CONCRETE PIPE MAKING AND LAYING MACHINE

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3 Claims. (Cl. 25—32)

The present invention relates generally to concrete pipes and more particularly to a machine for making and laying concrete pipes.

The primary object of this invention is to provide a concrete pipe making machine which will produce continuous lengths of reinforced concrete pipe.

Another object of this invention is to provide a pipe making machine which will lay the finished concrete pipe in a ditch or similar excavation as the pipe is extruded.

Another object of this invention is to provide a pipe making machine in which both the inside and outside of the pipe are compacted by means of screw mechanisms, the reinforcing used being positioned between the screw mechanism.

Another object of this invention is to provide a pipe making machine in which the reinforcing in the form of wire mesh is fed automatically into the machine.

Another object of this invention is to provide a pipe making machine which has a self contained power supply and which can be operated by a small crew.

Still another object is to provide a pipe making and laying machine which lays a pipe in such manner and of such character that the trench can be immediately filled in without waiting for the pipe to dry and cure, the slow drying in the filled-in trench being conducive to better curing of the concrete in the pipe.

Another object of this invention is to provide a concrete pipe making machine which is adapted for fabrication from many different materials, so that the choice of material can be according to the dictates of availability and price considerations, the exact sizes and proportions being matters easily determined to suit particular conditions and needs.

Another object of this invention is to provide a concrete pipe making machine which is inexpensive and practicable to manufacture.

Finally, it is an object to provide a concrete pipe making machine of the aforementioned character which is simple, safe and convenient to operate, and which will give generally efficient and durable service.

With these and other objects definitely in view, this invention consists in the novel construction, combination and arrangement of elements and portions, as will be hereinafter fully described in the specification, particularly pointed out in the claims, and illustrated in the drawings which form a material part of this disclosure and wherein similar characters of reference indicate similar or identical elements and portions throughout the specification and throughout the views of the drawings, and in which:

Fig. 1 is a longitudinal sectional view of the pipe making machine.

Fig. 2 is a plan view of the machine.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary side elevation view of the nozzle portion of the machine.

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Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4.

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 1.

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 1.

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 1.

Fig. 9 is a sectional view showing the construction of the completed concrete pipe.

Referring now to the drawing, the machine, briefly stated, includes a base 10 on which is mounted a motor 12 and a winch 14. The core shaft 16, on which the inner screw impactor 18 is mounted, is carried in bearings 20 and is axially aligned within the casing 22. The outer screw impactor 24 is fastened to a driving sleeve 26. The screw impactors 18 and 24 are of generally spiral form and rectangular in cross-section and present radially extending working faces. The sleeve 26 is indirectly driven from the motor 12 and is installed between the principal or forward portion of the casing 22 and the outlet or rear portion of the casing constituting an extrusion or mold nozzle 28, said extrusion or mold nozzle terminating in a chute 30. The principal or forward portion of the casing constitutes a bearing for the outer screw impactor 24.

The winch 14 is secured at one end of the base 10 and is provided with a cable 32, the end of which is attached to a suitable anchorage so that rotation of the winch drum 34 will pull the machine towards the anchorage, said base having skids 36 to allow the machine to slide easily along a trench or ditch in which the pipe is to be laid. The winch 14 is also provided with a pulley 38, which is driven by means of a belt 40 from the drive pulley 42 on the motor gear box 44.

The core shaft 16 is rotated by means of a drive gear 46 on the gear box 44, said drive gear engaging with the reduction gear 48 secured to said core shaft.

The casing 22 is fastened to the base 10 by means of support plates 50 and reinforcing angles 52, the forward end of said casing adjacent the motor 12 having a bearing portion 54 in which rotates the outer screw support ring 56. The outer screw 24 is secured to the driving sleeve 26 which is provided with a ring gear 58. The driving sleeve 26 is rotated by a gear mechanism comprising a pinion 60 engaged with the reduction gear 48, said pinion being secured to a shaft 62 carried in a bearing 64. The other end of the shaft 62 is carried in a bearing 66 and is fitted with a transfer gear 68 which engages with the ring gear 58. It should be noted that the pitches of the inner screw impactor 18 and the outer screw impactor 24 are similar, the ratio of the gear mechanism being such that both screws are rotated at a similar speed, so that the concrete is advanced at a constant rate throughout its thickness.

The nozzle 28 is attached to the base 10 by means of support plates 70 and reinforcing angles 72, said nozzle being positioned adjacent to and in alignment with the driving sleeve 26. The inside diameter of the casing 22, the driving sleeve 26 and the extrusion nozzle 28 is constant so that the concrete is provided with a smooth passage through the machine. The driving sleeve 26 rotates between the casing 22 and the nozzle 28 and is supported by means of bearing guides 74 secured to said casing and nozzle.

Concrete is fed into the machine by means of a hopper 76 on the forward end of the casing 22 and may be loaded into said hopper manually or automatically as desired.

The reinforcing for the concrete pipe comprises a layer of wire mesh 78 which is stored on the machine in the form of rolls 80 and 82 carried above and below the core

shaft 16 respectively as shown in Fig. 1. The rolls 80 and 82 are rotatably mounted on rods 84 which are attached to supports 86, the wire mesh being fed into the machine through the mouth 88.

The mouth 88 is fitted with folding guides 90 which are attached to the casing 22 and reinforced by means of gussets 92, said folding guides being shaped to form the wire mesh to a substantially semi-circular shape as it enters the mouth, so that said wire mesh fits between the inner and outer screws.

The nozzle 28 is provided with a chute 30, attached thereto by means of a joint plate 94, said chute being gradually inclined downwardly so that the concrete pipe is guided smoothly to ground level.

The operation of the machine is commenced by placing the machine in the position where the pipe is to be laid, and attaching the winch cable 32 to a fixed anchor. The wire mesh 78 is then started into the machine as shown in Fig. 1 and concrete is loaded into the hopper 76. As soon as the motor 12 is started, the concrete will be forced along the casing 22 by the inner screw impactor 18 and the outer screw impactor 24, which tamp or compact the concrete tightly and cause the wire mesh to be embedded firmly therein. Continued advancement of the concrete will cause the wire mesh 78 to be pulled into the machine as required, the mesh being sufficiently open to allow concrete from the hopper to pass through said mesh and reach the inner screw impactor 18.

The completed pipe is finally shaped as it emerges from the nozzle 28 and is guided down the chute 30 to the ground surface, the softness of the concrete at this stage being sufficient to allow for the very slight distortion caused by the transition from the extrusion or mold nozzle to the inclined chute.

While the pipe making mechanism is in operation, the machine is being pulled along on its skids 36 by the winch 14, the forward speed being correlated to the rate at which the pipe is produced, so that the finished pipe is laid correctly without distortion or damage.

A section of the completed pipe is shown in Fig. 9 in which the wire mesh 78 is overlapped as indicated at 96 and binds together the inner layer 98 and the outer layer 100 of the concrete pipe which has a central bore 102 formed by the core shaft 16.

The machine may be built to produce concrete pipe of any desired dimensions and the pipe may be laid in irregularly shaped trenches or ditches, the shape being limited only by the ability of the machine to negotiate the turns in the trenches.

The operation of this invention will be clearly comprehended from a consideration of the foregoing description of the mechanical details thereof, taken in connection with the drawing and the above recited objects. It will be obvious that all said objects are amply achieved by this invention.

Further description would appear to be unnecessary.

It is understood that minor variation from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawings are to be considered as merely illustrative rather than limiting.

I claim:

1. A pipe making machine comprising a base, a fixed casing on said base, and a hopper communicating with one end of said casing, a driving sleeve comprising an intermediate portion of said casing and mounted thereon for rotation, a further fixed portion of said casing constituting a mold nozzle, an outer screw impactor secured to said driving sleeve and rotatable within said casing and nozzle, the portion of said casing adjacent said hopper constituting a bearing for the outer screw impactor, a core shaft having thereon an inner screw impactor and being axially aligned within and spaced from said outer screw, said screw impactors each comprising a spiral plate or rectangular cross sectional shape with a radially extending working face, and a motor operatively connected with said driving sleeve and said core shaft.

2. A pipe making machine according to claim 1, and having a winch attached to said base, means to feed wire mesh into the space between said impactors, and said base having skids thereon, said winch being operatively connected to said motor whereby the machine is made to advance while the machine is in operation, so that the finished pipe extruded from said casing is automatically laid down as the machine advances, said motor and winch being mounted on said base, whereby perfect coordination is achieved as between the advancing movement of the machine and said means to feed.

3. A pipe making machine according to claim 1 wherein said casing adjacent said hopper defines an open mouth having a pair of vertically opposed folding guides secured thereto, means for mounting two separate rolls of wire mesh, for free rotation, above and below said core shaft adjacent said open mouth, said folding guides being shaped to fold wire mesh to conform to general cross-sectional shape of the annular space between said outer and inner screw impactors, each roll of wire mesh having a width slightly in excess of one-half the circumference of said annular space, whereby the edges of wire mesh used overlap to form a substantially cylindrical reinforcing, whereby concrete fed into said casing is compacted outside and inside said reinforcing by said outer and inner screw impactors respectively.

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