April 2, 1929. T. E. MURRAY ET AL 1,707,446

CONDUIT BUILDING APPARATUS

Filed Aug. 6, 1927 2 Sheets-Sheet 1

Fig. 1.

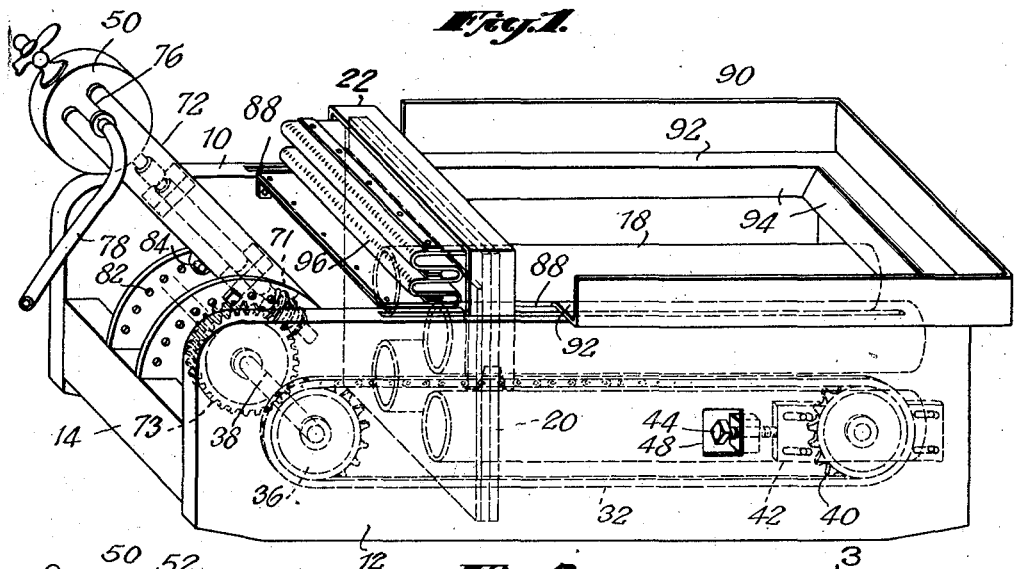


Fig. 2.

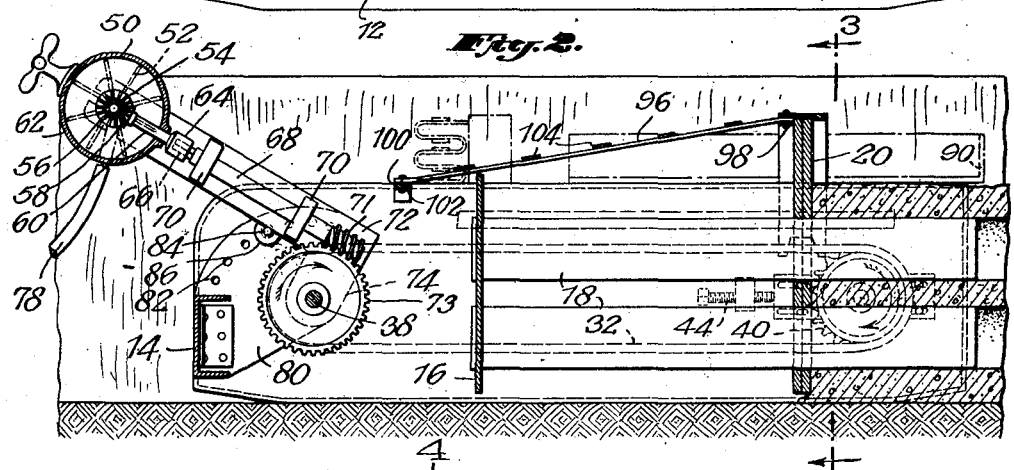


Fig. 3.

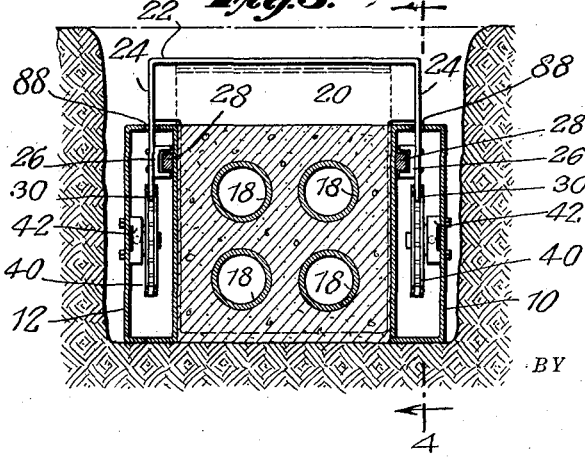
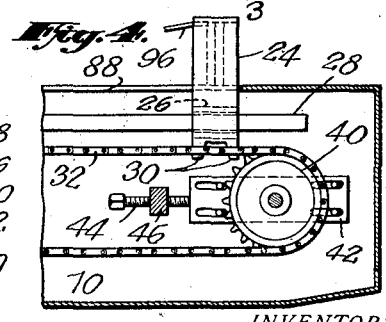


Fig. 4.



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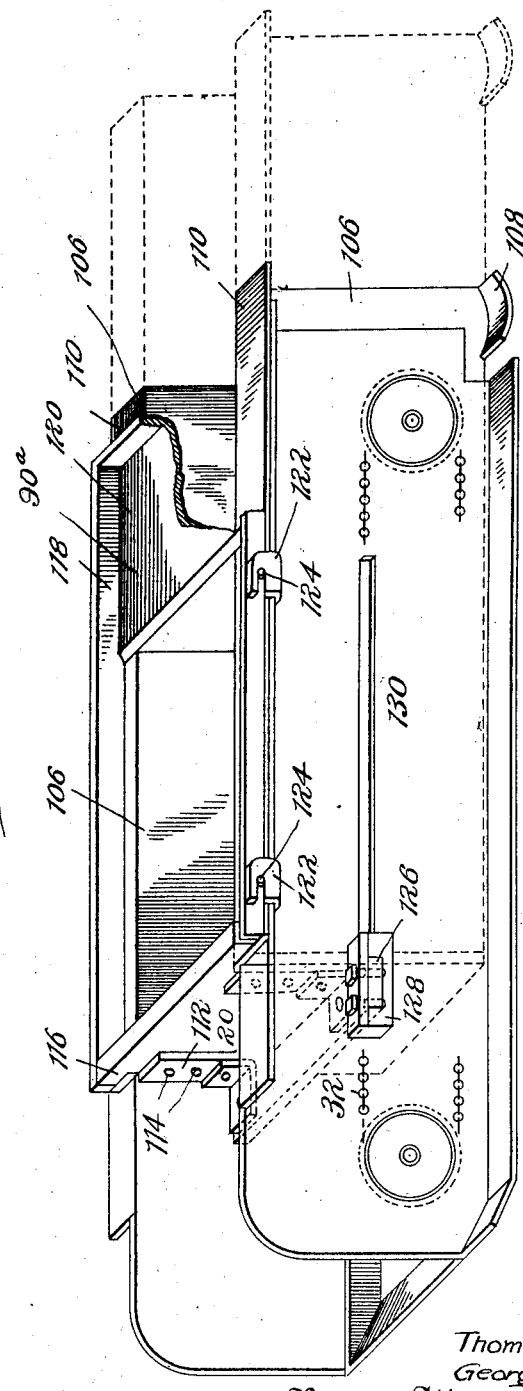

Fig. 5.

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UNITED STATES PATENT OFFICE.

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CONDUIT-BUILDING APPARATUS.

Application filed August 6, 1927. Serial No. 211,082.

This invention relates to conduit building apparatus and aims to provide a portable apparatus of simple construction which is capable of readily casting a body having ducts therein.

The invention will be fully apparent from the following specification when read in connection with the accompanying drawings and the features of novelty will be pointed out with particularity in the appended claims. In the drawings—

Fig. 1 is a perspective view of a preferred embodiment of our invention;

Fig. 2 is a longitudinal section showing the apparatus in operation;

Fig. 3 is a transverse section on line 3—3 of Fig. 2;

Fig. 4 is a detail section on line 4—4 of Fig. 3.

Fig. 5 is a perspective view illustrating certain preferred structural details.

Referring in detail to the drawings, our improved apparatus includes hollow mold sides 10 and 12 held in spaced relationship by a transversely extending channel member 14 at the rear and by a transversely extending plate 16 at an intermediate point. The plate 16 has secured thereto a plurality of forwardly extending substantially cylindrical cores 18.

A packer member 20 is adapted to be moved longitudinally between the mold sides 10 and 12 so as to tamp or compress the concrete or other material used in building the conduits. In the embodiment illustrated, the packer member is formed of a pair of substantially rectangular plates supported from above by U-shaped bale 22, the legs 24 of which carry grooved blocks 26 arranged to slide on guide tracks 28 located on the inner walls of the mold sides 10 and 12. The legs 24 are provided at their lower ends with prong-like extensions 30 which are adapted to enter the spaces between links of the sprocket chain 32 so that as the chain is actuated, the packer will be moved longitudinally. Each chain 32 is driven by a sprocket 36 secured to a cross-shaft 38 suitably journalled in bearings carried by the mold sides 10 and 12. At their forward ends, the chains 32 pass over idle sprockets 40 carried by bearings 42 each of which is adapted to be adjusted by a bolt 44 threaded through a post 46 secured to the mold side. The outer wall of each mold side is apertured as at 48 so as to give access to the adjusting bolt 44.

For driving the sprockets 36, we provide a reversible air motor 50 having a suitable rotor 52 carried by shaft 54 to which is secured a bevel gear 56 which meshes with a pinion 58 carried on a short shaft 60 journalled in the motor housing 62. Outside of the motor housing this shaft is formed with a socketed enlargement 64 for engagement with the square end 66 of a shaft 68 journalled in bearings 70 of a yoke 72 which embraces the shaft 38. At its lower end, the shaft 68 carries a worm 71 which meshes with a worm wheel 73 secured to the shaft 38. The socket connection 64—66 permits the air motor to be detached from the shaft 68 and the yoke 72 is slotted at 76 so as to permit such detachment. Compressed air or other fluid medium is supplied to the motor by means of a suitable flexible tube 78. Of course, it is understood that if desired a portable electric or other suitable motor may be substituted for the air motor shown.

The cross member 14 carries a pair of cheek plates 80 between which the yoke 72 is positioned. Each cheek plate is formed of a plurality of holes 82 located on an arc struck from the center of the shaft 38. The angular position of the yoke 72 can be varied by removing a locking pin 84 which passes through a lug 86 carried by said member and swinging the member about the shaft 38 and then engaging the pin 84 through another of the holes 82.

The legs 24 of the bale 22 travel through slots 88 formed in the tops of the mold sides. To prevent material from falling down through these slots when the mold is being filled, we provide a detachable hopper-like member 90 having a substantially horizontal portion 92 which rests on the upper surfaces of the mold sides 10 and 12, this member also being provided with downwardly extending apron portions 94 which fit between the mold sides. This hopper member is placed in position when the packer 20 is in the retracted position of Fig. 1, and material such as concrete or similar plastic material is dumped in the mold-like space between the sides 10 and 12 and after sufficient material has been charged, the hopper is removed. Air pressure is then supplied to the motor. Through the gearing described,

the shaft 38 is rotated, this forces the packer 20 from the position of Fig. 1 toward the right as indicated in Fig. 2. This action compresses the concrete and at the same time, the packer reacting against the mass of material causes the mold sides and all parts of the apparatus except the packer to travel toward the left in Fig. 2, the undersides of the mold forming a sort of runners which readily slide along the bottom of the trench in which the structure is being molded. After the material has has been compressed and the parts reach the position of Fig. 2, the motor will be reversed so as to return the packer to the position of Fig. 1 against the plate 16 whereupon more material may be charged and the operation repeated until a structure having conduits therein of the desired length has been formed.

For preventing material from falling into the space between the transverse plate 16 and the movable packer 20, we provide a flexible shield 96 one end of which is secured at 98 to the underside of the bale 22 and the other end of which is secured at 100 to a cross-bar 102 extending from side to side of the members 10 and 12. This flexible shield may be formed of heavy canvas or rubberized or other water-proof fabric and in some instances, transverse reinforcing strips 104 will be secured thereto.

Referring to Fig. 5, we have illustrated a preferred construction of our apparatus in which the packer member 20 has secured near each side thereof inside apron members 106. These members are preferably greased or otherwise lubricated on the faces which are next to the side frame members 10 and 12. The forward end of each inside apron is provided with a skid or shoe 108 so that the same will easily ride over the trench or other support for the machine. Each apron member 106 is flanged outwardly as at 110. At the rear each apron member is provided with inwardly extending flanges 112 which are bolted or otherwise secured to the packer 22 as indicated at 114. The packer in the embodiment illustrated in Fig. 5 is provided at the top with outward extensions 116 which overlap the flanges 110 and abut an upright flange 118 formed on the band or hopper member 90^a. This hopper is in most respects a duplicate of the hopper shown in Fig. 1, the chief difference being that it is provided with an elongated bottom portion 120. The hopper is adapted to be held in place by brackets 122 which are secured to the side frame, these brackets being slotted as shown for engagement with studs 124 carried by the flange of the hopper. The packer 20 illustrated in this form of the device, has secured thereto a transversely extending bar 126 which in turn is connected with a sprocket chain 32, the latter having secured thereto a suitable clamping member 128. Each end of this bar travels through a slot 130 formed in the inner wall of each side frame. In operation of this form of the device, it will be understood that when the plastic material is poured it will be retained between the inside aprons 106 which will, in effect, form the mold sides. One end of the mold will be formed by the packer plate 20. When the air motor is put into operation, the top run of the sprocket chains will tend to move to the right. This will compress the concrete or other plastic material to a certain degree. After the material has been compacted, the chain reacting through the packer will cause the side frame members to be retracted. That is to say, the side frame members 10 and 12 will slide with respect to the apron members 106. Thus, it is clear that there will be no rubbing of the side frames against the sides of the plastic concrete body. The dotted lines in Fig. 5 illustrate the position of the inside aprons at the end of the stroke of the packer member 20. After the concrete has hardened sufficiently, the air motor will be reversed and the packer plate and also the inside aprons will be returned to the full line position shown. It is clear that the inside aprons will aid the concrete in standing up as the side members 10 and 12 are propelled away from the mold structure. These aprons also reduce the frictional resistance in extracting the cores 18.

Various modifications may be made by those skilled in the art without departing from the invention as defined in the following claims.

What we claim is:—

1. In an apparatus for building ducts comprising spaced hollow mold sides having a packer movable between them, actuating mechanism for said packer encased within said hollow mold sides and means for driving said actuating mechanism.

2. In an apparatus for building ducts comprising spaced hollow mold sides having a packer movable between them, actuating mechanism for said packer enclosed within said hollow mold sides, a core supported at one end by a member secured to at least one of said mold sides and means for driving said actuating mechanism.

3. In an apparatus for building ducts comprising mold sides, a packer movable therebetween, chains mounted on sprockets carried by said mold sides and operatively connected with said packer, means for driving said sprockets, and a fixed core arranged to slidably engage said packer.

4. In an apparatus for building ducts comprising a pair of elongated hollow mold side frames, a flexible transmission member mounted for movement lengthwise within each hollow frame, means for driving said flexible members in unison, a packer movable

between said mold side frames and guided thereby, and a core passing freely through said packer.

5. In an apparatus for building ducts, a pair of mold side frames having a packer movable therebetween, a core which passes freely through said packer, and a shield for said core.

6. In an apparatus for building ducts, a pair of mold side frames having a packer movable therebetween, a core which passes freely through said packer, and a flexible shield for said core having one end secured to said packer and the opposite end secured to said side frames.

7. In an apparatus for building ducts, a pair of hollow mold side frames, a core supported thereby, a packer movable between said frames adapted to compact material about said core, drivers for said packer enclosed in said hollow frames, members secured to said packer extending through slots formed in said frames and engaging said drivers and a means for transmitting power to said drivers.

8. In an apparatus for building ducts, a pair of mold side frames, a core supported thereby, a packer movable between said frames adapted to compact material about said core, flexible drivers for said packer enclosed in said frames, members secured to said packer extending through slots formed in said frames and engaging said flexible drivers and a detachable charging hopper having portions adapted to cover said slots.

9. In an apparatus for building ducts, a pair of mold side frames, a core supported thereby, a packer movable between said frames adapted to compact material about said core, flexible drivers for said packer enclosed in said frames, a shaft supported by said frames for transmitting power to said drivers, a yoke journalled on said shaft, a motor carried by said yoke and power transmission means connecting said motor and said shaft.

10. In an apparatus for building ducts, a pair of mold side frames, a core supported thereby, a packer movable between said frames adapted to compact material about said core, flexible drivers for said packer enclosed in said frames, a shaft supported by said frames for transmitting power to said drivers, a yoke journalled on said shaft, a motor detachably engaging said yoke, a worm wheel carried by said shaft, a worm carried by said yoke meshing with said worm wheel and means for detachably connecting said worm with said motor.

11. An apparatus for building ducts comprising spaced side frames, a packer movable between said side frames, inner aprons secured to said packer adapted to form mold sides and means for moving said packer relatively to said side frames.

12. An apparatus for building ducts comprising side frames, a packer movable therebetween, inner upright aprons secured to said packer, a core supported at one end to a transverse member secured to said side frames, and means for moving the packer relatively to said side frames.

13. An apparatus for building ducts comprising a pair of spaced upright side frames, a core supported thereby, a packer movable between said frames adapted to compact material about said core, upright side aprons secured to said packer in juxtaposition to said side frames and flexible drivers operatively connected with said packer.

14. An apparatus for building ducts comprising a pair of side frames, a core supported thereby, a packer movable between said frames, side aprons secured to said packer, flexible drivers for said packer enclosed in said side frames and a member secured to said packer and operatively connected with said flexible drivers.

15. An apparatus for building ducts comprising a pair of side frames, a core supported thereby, a packer movable between said frames, side aprons secured to said packer, flexible drivers for said packer enclosed in said side frames and a member secured to said packer and operatively connected with said flexible drivers, a motor for transmitting power to said flexible drivers.

In witness whereof, we have hereunto signed our names.

THOMAS E. MURRAY.
GEORGE K. JESSUP.