

UNITED STATES PATENT OFFICE

2,114,785

EXTENSIBLE AND COLLAPSIBLE MANDREL

William Alfred Porter, Brisbane, Australia

Application August 12, 1935, Serial No. 35,863
In Australia August 14, 1934

5 Claims. (Cl. 25—128)

This invention relates to the construction of pipes, cylinders, and the like of cementitious or other suitable material, the object being to provide an improved core or mandrel which will permit of the ready construction of a continuous pipe line of desired diameter in position, the core or mandrel being such that it can be readily placed in position and as readily removed, moved forward, and again fixed ready for casting. The arrangement of core or mandrel is such that the cost of forming pipes is greatly reduced.

Pipes constructed according to this invention may be of circular, oviform, rectangular, or other formation, and the invention will now be described in relation to circular, oviform, or the like pipes.

For this purpose a shell is formed of sheet metal or other material, the outer diameter being approximately that of the internal diameter of the pipe to be made. This shell, which is suitably strengthened, is divided into an invert section, two sections hinged thereto, one at each side, and a locking section forming the roof of the shell. Means are provided for lowering the side and roof sections and raising the invert section free of the cast pipe when it is desired to move the mandrel and to again move the sections into position for again casting.

Modifications may be devised without departing from the essence of the invention.

In order that the invention may be better understood it will now be more fully described with the aid of the accompanying drawing, in which Fig. 1 is a side sectional elevation.

Fig. 2 is an end sectional elevation.

Figs. 3 and 4 are enlarged views of details.

Fig. 5 is an end sectional elevation of a modified arrangement.

Fig. 6 is a detail showing a modification of certain parts.

The description which follows relates to the formation of circular pipes. It will be readily understood that oviform pipes may be made by means of a similar construction and arrangement of mandrel, the shape and dimensions of the parts being varied to suit.

The shell of the mandrel is made of sheet metal or other material, the outer diameter being that of the internal diameter of the pipe to be made. This shell is divided into an invert section A, which is less than half of the circumference of the pipe, two side sections B connected respectively as by the hinges B¹ to each side of the upper edges of the invert section A, and a locking section C, which supports, when in position, the upper edges of the side sections B. The various

sections are stiffened by angle, T bar, or otherwise sectioned segmental and longitudinal stiffeners D, D¹. One edge of each longitudinal stiffener D¹, where it meets that on the adjacent section, is preferably chamfered. The edges of the sections of the shell are similarly formed.

Brackets E, which support a frame or plate E¹, are secured on the inside of the invert A. The frames or plates E¹ carry, in bearings E² secured thereto, a shaft F rotatable by a crank and handle secured at the end. Formed or secured on the shaft F is a number of worms G. To facilitate and cheapen construction it is preferred that shaft F be made in sections, that is a number of worm sections connected by simple joints to connecting section. Worm wheels H gearing with the respective worms G are formed with internal threads and a vertical rod J suitably threaded is passed through it. This rod J is attached at the top to locking section C and is further supported by the plate E¹. A roller K or shoe, provided at the lower end, when forced down projects through an opening K¹ in the invert A. Cross pins L in the rod J engage in slots L¹ in links L² articulated to the respective sections B.

To construct drains with the mandrel described the invert of the drain is first formed. Any desired length longer than the mandrel can be laid to commence. The mandrel, collapsed, is then moved into position. The worms G are then rotated causing the worm wheels H to rotate and force the rods J, by reason of the thread thereon, up, withdrawing the rollers K from the openings K¹ and pushing the side sections B outward and the locking plate C upward to lock them.

The drain pipe is then cast thereon, a mould being provided to ensure the desired thickness.

After allowing the cementitious or other mastic material to set the mandrel is collapsed and raised on its rollers K so that it can be readily moved forward to cast another length of pipe.

The mandrel may be of any desired length and a number may be used end to end and connected by means of bolts and nuts or any suitable means. For this purpose hand holes K³, with covers K², are provided to permit of the hands being inserted for joining the parts including the connection of the ends of the shaft F. Longer lengths of pipe may thereby be cast at one time.

According to an alternative arrangement, as shown in Fig. 5, the vertical rod M has threads M¹ cut at the top and bottom. Near the top of the rod M is threaded the nut N connected to the locking section C by the links N¹, and the pins N² on the nut N are engaged by the slots P in

the links P¹, which are articulated to the side sections B. The lower end of the threaded rod M screws into the boss of the fork carrying the roller K (Figs. 1, 2, 6), shoe, or skids.

5 To form square pipes a square mandrel, as shown in Fig. 6, would be used. In this case the flat bottom plate Q would have a side plate R hinged to the respective edges. These side plates R would be bent to form portions of the upper
10 portion of the mandrel and would be locked in position for casting by the locking plate S. Means for forming the mandrel for casting, collapsing it for withdrawal, and moving it into a new position would be as already described, no further description being necessary.

In carrying out the invention metals most suitable for the respective purposes would be used, the shape and dimensions of the various parts would be as found most serviceable, and the constructional details could be varied without departing from the essential features of the invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I
25 declare that what I claim is:—

1. In improvements in the construction of pipes, cylinders and the like of cementitious or other material, an extensible and collapsible mandrel comprising an invert section provided with an aperture, side sections operatively connected to the side edges of the invert section and movable with respect thereto and a movable locking section arranged above the invert section and positioned between the side sections when the mandrel is extended, means contained within the mandrel for extending and collapsing the sections of the mandrel and for movably supporting the mandrel when collapsed, said means including a
40 support on the invert section, at least one rod vertically adjustable in the support and attached at one end to the locking section and operatively connected to the side sections, a supporting member mounted on the opposite end of the rod for projection through the aperture in the invert section to support the mandrel when the sections

are in a collapsed position, and means on the support for adjusting the rod.

2. Improvements as claimed in claim 1, in which a nut is screw-threaded on the upper part of the rod and is connected to the locking sections, links articulated to the said side sections and operatively connected to the nut.

3. Improvements as claimed in claim 1, in which there is provided a fork having a box screw-threaded on the lower end of the rod for carrying the supporting member which movably supports the mandrel when collapsed.

4. Improvements as claimed in claim 1, in which the rod is screw-threaded, an internally threaded bearing rotatably mounted on the support and through which the rod operates, a worm wheel carried by the bearing, a driving shaft rotatably mounted on the support, and a worm carried by the shaft and engaging the worm wheel.

5. In improvements in the construction of pipes, cylinders and the like of cementitious or other material, an extensible and collapsible mandrel comprising an invert section having a series of apertures therein, side sections operatively connected to the side edges of the invert section and movable relatively thereto and a movable locking section arranged above the invert section and positioned between the side sections when the mandrel is extended, said sections being arranged to form a shell with the edges of each section being formed so that a tight joint can be made therebetween, means for operating the side and locking sections so as to move the same to an extended and collapsed position including a support mounted on the invert section, a plurality of rods mounted for vertical adjustable movement in the support and each having their upper ends operatively connected to the locking section and each being in operative connection with the side sections, supporting members mounted on the other ends of the rods and projected through the apertures when the sections are in a collapsed position so as to support the mandrel when collapsed, and means on the support for adjusting the rods.

WILLIAM ALFRED PORTER.