May 29, 1923. 1,456,539

T. DE LA MARE

CONCRETE MOLD OR FORM

Filed Feb. 23, 1921 2 Sheets-Sheet 1

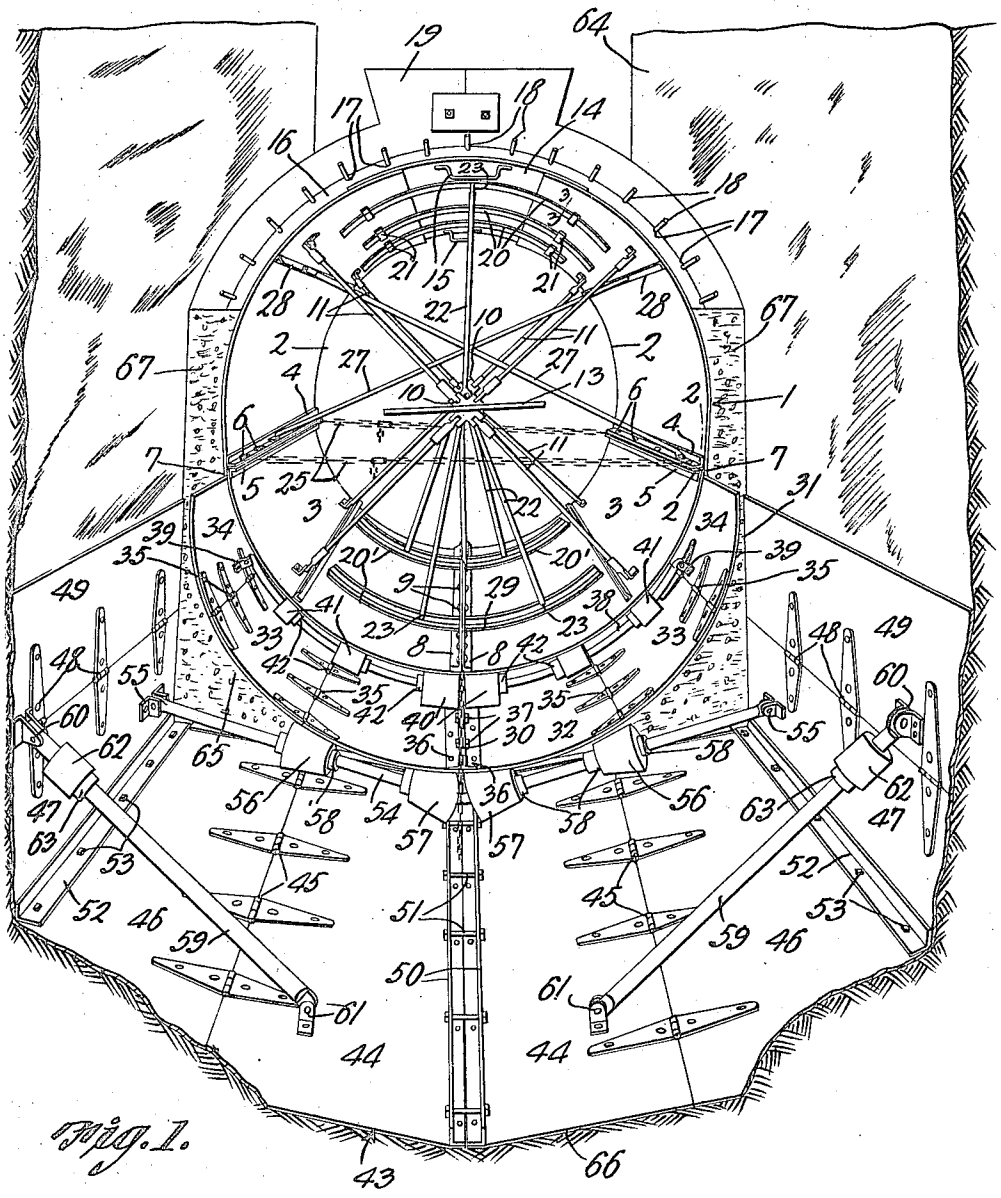


Fig. 1.

Witnesses

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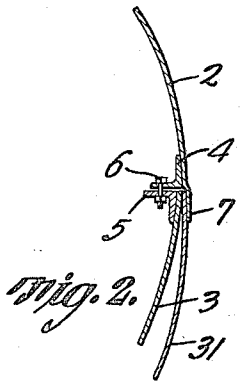


Fig. 2.

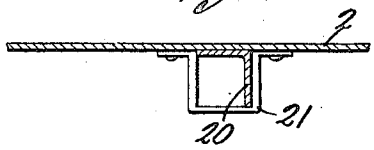


Fig. 3.

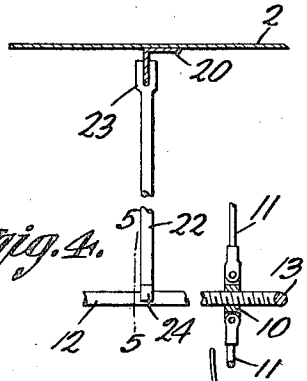


Fig. 4.

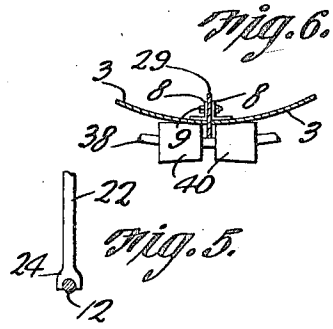


Fig. 6.

Fig. 5.

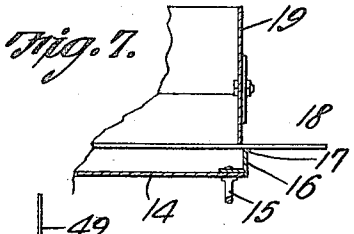


Fig. 7.

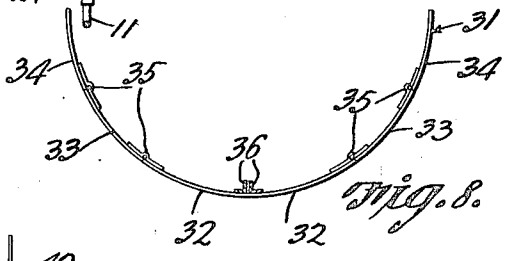


Fig. 8.

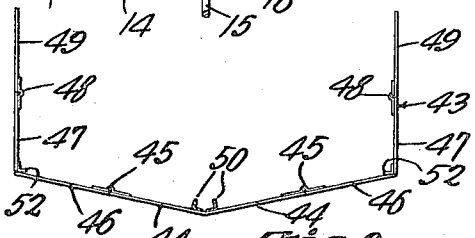


Fig. 9.

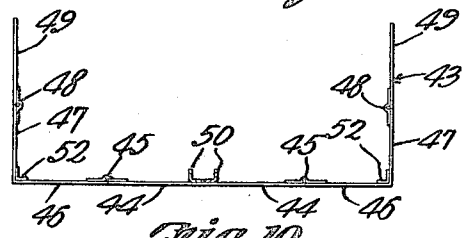


Fig. 10.

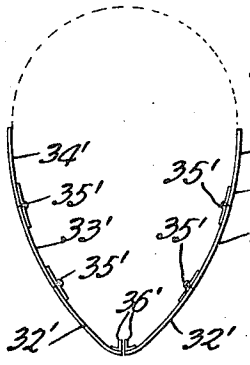


Fig. 11.

Witnesses

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Patented May 29, 1923. 1,456,539

UNITED STATES PATENT OFFICE.

THOMAS DE LA MARE, OF TOOELE, UTAH.

CONCRETE MOLD OR FORM.

Application filed February 23, 1921. Serial No. 447,203.

To all whom it may concern:

Be it known that I, THOMAS DE LA MARE, a citizen of the United States, residing at Tooele, in the county of Tooele and State of Utah, have invented a new and useful Concrete Mold or Form, of which the following is a specification.

The present invention appertains to concrete molds, or forms, and is particularly an improvement over the conduit mold disclosed in my Patent No. 1,118,558, issued November 24, 1914.

One of the objects of the present invention is the provision of a mold or form of novel construction, which enables different shapes of conduits or culverts to be molded with comparative ease and dispatch, the contrivance embodying a core, and novel means for movably supporting it within the trench or ditch, whereby the core can be readily moved step by step over the completed bottom of the conduit or culvert, to enable the sides and top of the conduit or culvert to be completed in sections, similar to that disclosed in the said patent supra.

Another object of the invention is the provision of an appliance for molding conduits and culverts of different contours, and having bottoms properly shaped according to the angle of inclination of the conduit or culvert.

The invention also includes improved details of construction, to enhance the utility and efficiency of the structure.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a perspective view of the invention as in use, portions being broken away, and this view illustrating how a change from a round or concaved bottom is made to an angular or V-shaped bottom.

Figure 2 is an enlarged sectional detail taken on the line 2—2 of Figure 1.

Figure 3 is an enlarged sectional detail taken on the line 3—3 of Figure 1.

Figure 4 is an enlarged fragmental detail, portions being broken away, illustrating one of the stays and one of the hubs of the toggle links.

Figure 5 is a sectional detail taken on the line 5—5 of Figure 4.

Figure 6 is a sectional detail of the lower portion of the core showing the guide or keel plate and a pair of rollers between which it is movable.

Figure 7 is an enlarged sectional detail of the cap or top plate of the core and the cope.

Figure 8 is an end view of the bottom part over which the core is movable, this part being used for forming a rounded or concaved bottom.

Figure 9 is an end view of the bottom part used for making an angular or V-shaped bottom.

Figure 10 is a view similar to Figure 9, illustrating the bottom part in position for a flat bottom.

Figure 11 is an end view of a modified form of bottom part used in constructing an egg-shaped conduit or culvert.

The chief part of the structure is the core 1 which is of the same general construction and function as the core disclosed in the above mentioned patent, although the present core has improved details of construction thereover. The present core is contractible, and is split longitudinally with the split or open portion at the top. The core embodies a pair of opposite sheet metal side sections 2 of arcuate cross section which have their upper edges projecting toward one another, and their lower edges projecting downwardly. The core 1 also embodies a pair of opposite sheet metal bottom sections or plates 3 of arcuate cross section having their lower edges projecting toward one another, and their upper longitudinal edges projecting upwardly adjacent the lower longitudinal edges of the sections or plates 2. The meeting or adjacent edges of the respective sections 2—3 at the opposite sides of the core are attached together, and to this end longitudinal angle irons 4 are riveted, bolted or otherwise secured to the inner sides of the sections 2 slightly above the lower longitudinal edges thereof, and longitudinal angle irons 5 are riveted, bolted or otherwise secured to the inner sides of the sections 3 flush with the upper edges thereof. The inwardly projecting flanges of the angle irons 4 and 5 are bolted or otherwise de-

tachably secured together, as at 6. The lower edge portions of the sections or plates 2 project downwardly below the angle irons 4 and provide depending flanges 7 upon the outer sides of the upper edge portions of the sections 3, for the purpose which will hereinafter more fully appear. The adjacent or lower edges of the sections or plates 3 are secured together by means of longitudinal angle irons 8 riveted, bolted or otherwise secured upon the adjacent edge portions of the sections 3, and having their upstanding flanges secured together by means of bolts 9 or the like. The sections 2 and 3 are thus securely fastened together, the upper edges of the sections 2 being spaced apart and detached whereby the core is split at the top, to enable the core to expand and contract, the sections thereof being flexible or resilient.

The core is expanded and contracted in approximately the same manner as is the core disclosed in the said patent. Thus, hubs 10 within the ends of the core are connected by toggle links 11 with the sections 2 and 3 of the core, and means is provided for moving the hubs 10 toward and away from one another whereby the toggle links will expand and contract the core as desired. This means may be of the nature illustrated in said patent, and as illustrated in the present case is like that illustrated in Figure 4 of said patent. A rod 12 is threaded through the hubs 10 and is provided at one end with a handle 13 whereby when the rod 12 is rotated, the hubs 10 are moved toward or away from one another to accomplish the expansion or contraction of the core.

A cap or top plate 14 of arcuate cross section has its longitudinal edge portions overlapping the upper edge portions of the sections 2, to close the opening therebetween, and the cap or top plate 14 is provided adjacent its ends with depending handles 15, whereby the cap plate can be readily handled. An arcuate angle iron 16 has one flange riveted or otherwise secured upon one end of the cap 14, and has its other flange projecting upwardly and provided with a longitudinal series of notches 17, the terminals of the angle iron 16 projecting downwardly so as to overlap the sections 2, as clearly illustrated in Figure 1. The notches 17 are for the reception of longitudinal reinforcing rods 18 disposed above the core.

The cope 19 is of practically the same construction as the cope illustrated in said patent, and need not be considered in detail. The closed or flanged end of the cope 19 is seated upon the reinforcing rods 18 against the upstanding flange of the angle iron 16, and the other end of the cope is seated upon the last completed section of the conduit or culvert, as described in said patent. The cope 19, however, as illustrated is composed of two sections.

In order to support the upper portion of the core, arcuate angle irons or ribs 20 are placed upwardly against the upper portions of the sections 2 and cap plate 14, and the terminals of the angle irons 20 are passed through U-shaped keepers 21 secured to the inner sides of the sections 2 adjacent the upper edges thereof, whereby the angle irons or ribs 20 are maintained in the proper position. Radial stays 22 are disposed between the ribs 20 and rod 12 which is disposed axially of the core, the outer ends of the stays 22 having forks 23 straddling the ribs 20, and the inner ends of the stays 22 having forks 24 straddling the rod 12, whereby the ribs 20 are supported properly above the rod 12.

The rod 12 is supported above the bottom of the core in a somewhat similar manner that the top of the core is supported above the rod 12, and to this end pairs of arcuate angle irons or ribs 20′ are seated upon the sections 3 of the core at the opposite sides of the angle irons 8 and radial stays 22 are disposed between the ribs 20′ and rod 12, the same as between the said rod and ribs 20. The stays 22 below and above the rod 12 thus properly support the top of the core.

In order to prevent the spreading or separation of the sides of the core, transverse chains 25 are terminally engaged with suitable bolts 6 of the angle irons 4—5, and are provided with suitable take up devices 26 or the like, so that the chains 25 will normally be taut to prevent the separation or spreading of the sides of the core.

The core is also reinforced by chordal stays 27 arranged in an inclined position above the rod 12, the lower ends of the stays 27 being attached to suitable bolts 6 of the angle irons 4—5, and the upper ends of the stays 27 being bolted or otherwise attached to the longitudinal angle irons 28 secured to the inner sides of the sections 2 between the upper and lower edges thereof.

By the provision of the foregoing devices within the core, the core is rendered thoroughly substantial in construction, even though the core be of comparatively large diameter for molding a large conduit or culvert.

A longitudinal vertical plate 29 is clamped between the angle irons 8, and projects below the bottom of the core, said plate providing a guide or keel plate which is useful for the purpose hereinafter pointed out. A chain or flexible element 30 is attached to one end of the plate 29, and this chain can be pulled manually or by the assistance of a winch or other device, when the core is moved longitudinally from one position to the next.

The core may be used by itself when a con-

duit or culvert of circular cross section is made, as disclosed in the above mentioned patent. When a conduit or culvert of elliptical cross section is desired, there is used in conjunction with the core 1, the bottom part 31.

This bottom part 31 embodies longitudinal sections or plates 32, 33 and 34, the intermediate plates 33 at the opposite sides of the part 31 having its longitudinal edges hinged to the adjacent longitudinal edges of the sections 32—34 by means of hinges 35. The sections or plates 32, 33 and 34 are of arcuate cross section, and the part 31 is of arcuate or concaved shape. The lower or adjacent edges of the sections 32 are secured rigidly together by means of longitudinal angle irons 36 secured in any suitable manner upon the adjacent edge portions of the sections 32, and having their upstanding flanges bolted or otherwise secured together, as at 37. The upper edges of the upper or remote sections 34 rest against the sides of the core, and the lower or adjacent sections 32 are spaced below the bottom of the core, whereby the bottom part 31 will form with the core 1, an elliptical mold. The depending flanges 7 overlap the outer sides of the sections 34, whereby the part 31 and core 1 will be properly assembled, the core 1 being movable upon the part 31. Thus, a series of the parts 31 may be disposed upon the bottom of the conduit or culvert, and the core 1 can be slid longitudinally from one part 31 to the other as the sides and top portions of the conduit or culvert are completed step by step, as indicated in the above mentioned patent.

In order to enable the core 1 to be moved easily upon the bottom part 31, one or more arcuate rods 38 are disposed within the part 31, and have their ends attached, as at 39, to the sections 34, whereby the rod 38 is supported above the sections 32 and 33. A pair of rollers 40 is mounted for rotation upon the intermediate portion of the rod 38, and other rollers 41 are mounted for rotation upon the said rod between the intermediate and end portions thereof. The rollers 40 and 41 are held in place by means of collars 42 secured upon the rod. The core 1 is adapted to rest upon the rollers 40 and 41, whereby the rollers enable the core to be moved easily over the part 31. The rollers may be supported in various manners within the part 31 so as to properly contact with the bottom portion of the core.

When an angular or V-shaped bottom is required, a bottom part 43 is employed, the same embodying adjacent longitudinal bottom sections or plates 44 and having their remote edges hinged, as at 45, to the adjacent edges of longitudinal bottom sections or plates 46. The bottom part 43 also embodies lower side sections or plates 47 above the remote edges of the sections 46, and which have their upper edges hinged, as at 48, to the lower edges of upper side sections or plates 49. Angle irons 50 are riveted or otherwise secured upon the adjacent end portions of the sections 44, and are connected by bolts 51 to securely fasten the sections 44 together, and angle irons 52 are riveted, bolted or othewise secured to the lower edge portions of the sections 47 and have flanges overhanging the remote edges of the sections 46. The said flanges of the angle irons 52 are connected by bolts 53 with the remote edge portions of the sections 46, whereby the sections 46 and 47 are attached together. The core 1 is adapted to move within the part 43, the same as within the part 31, and the depending flanges 7 of the core are adapted to pass over the upper edges of the part 43 or sections 49 thereof.

Rollers are also mounted within the bottom part 43 for supporting the core movably, and to this end, a V-shaped rod 54 has its terminals attached, as at 55, to the sections 47, and rollers 56 and 57 are mounted for rotation upon the rod 54, said rollers being held in place by means of collars 58 secured upon said rods. The rollers 57 are arranged in a pair adjacent one another, whereby the guide plate 29 of the core will pass between the rollers 57 to assist in guiding the core, and to prevent the accidental rotation thereof. The plate 29 also passes between the rollers 40 for the same reasons when the core is within the bottom part 31. A pair of inclined rods 59 have their upper or remote ends connected, as at 60, to the sections 49, and the lower or adjacent ends of the rods 59 are attached, as at 61, upon the sections 44, rollers 62 being mounted upon the rods 59 for movably supporting the core, said rollers 62 being held in place by means of collars 63 upon the rods 59. It will therefore be apparent that the rollers may be supported in various manners within the bottom parts.

Figure 1 illustrates the apparatus in use, and shows both of the bottom parts 31 and 43 in use for making a change in the contour of the conduit or culvert. The apparatus is used within a ditch or trench 64 which has been dug, and sufficient concrete is placed in the bottom of the trench to form the bottom of the conduit. As illustrated, the bottom of the conduit is rounded or concaved, as at 65, and is of angular or V-shaped form at 66. The bottom part 31 is fitted upon the portion 65 and the bottom part 43 is fitted upon the portion 66, with the upper edges of the parts 31 and 43 in alignment to enable the core 1 to pass from the part 31 onto the part 43 without interference. When the core is in one position, the sides and top of the conduit may

be completed, the sides being formed by pouring the concrete between the core and sides of the trench, and the top of the conduit being formed by the assistance of the cope 19 as indicated in the above patent. The reinforcing rods 18 will be embedded in the top of the conduit, and their protruding ends may be used for attaching the next set of reinforcing rods which will be embedded in the succeeding section of the conduit. After the completed section of the conduit has hardened or set, the core 1 is contracted, the stays having first been removed, so that the core can be drawn longitudinally to a new position, so that the next succeeding section of the conduit can be completed. It will be noted that the rods 38, 54 and 59 not only support the rollers, but also act as braces for strengthening the bottom parts of the structure.

By using the bottom part 31 with the core 1, an elliptical conduit or culvert can be molded, and by using the bottom part 43 with the sections 44—46 arranged at an obtuse angle relative to one another, a bottom of angular or V-shaped section can be produced. As suggested in Figure 7, if the sections 44—46 of the part 43 are in the same plane, a flat bottom can be formed, when it is desired.

Figure 11 illustrates how the bottom part 31′ comprising the sections 32′, 33′ and 34′ hinged together, as at 35′, can be positioned to form with the core, an egg-shaped conduit or culvert. This bottom part 31′ is similar to the bottom part 31 but the sections thereof are positioned slightly different.

From the foregoing, taken in connection with the drawings, it will be evident that various contours of conduits or culverts can be readily molded with the present apparatus, and the conduits may be given various shapes of bottoms according to the angle of inclination of the conduit or other circumstances.

Having thus described the invention, what is claimed as new is:

1. In a concrete mold, a core having an upper split portion, a cap plate seated upon the core over the split portion, an arcuate member attached to one end of the cap plate and having upstanding flange provided with notches for receiving reinforcing rods, and a cope seatable upon the said rods adjacent said flange.

2. In a concrete mold, a core, a bottom part in which the core is movable, a pair of rollers carried by the bottom part for supporting the core, and a depending plate carried by the bottom portion of the core and adapted to pass between said rollers.

3. In a concrete mold, a core embodying lower sections having their adjacent edges secured together, a bottom part in which the core is movable and having upstanding sides, the core having means engageable with the upper edges of the bottom part, a pair of rollers carried by the bottom part for supporting the core, and a plate secured between the adjacent edges of said sections of the core, and depending from the core to move between said rollers.

4. In a concrete mold, a core, a bottom part in which the core is movable and having upstanding sides, the core having means engaging the upper edges of the bottom part.

5. In a concrete mold, a core, and a bottom part having upstanding sides whose upper edges engage the sides of the core, the core having depending flanges to overlap the upper edge portions of the bottom part.

6. In a concrete mold, a core embodying side and lower sections having their adjacent edges secured together, and a bottom part having upstanding sides engaging the core, the lower edge portions of the side sections of the core depending to provide flanges overlapping the upper edge portions of the bottom part.

7. In a concrete mold, a core embodying side and lower sections, angle irons secured to the side sections slightly above the lower edges thereof, angle irons secured to the lower sections flush with the upper edges thereof and attached to the aforesaid angle irons, and a bottom part having upstanding sides engaging the core, the lower edge portions of the side sections of the core providing depending flanges overlapping the upper edges of the bottom part.

8. In a concrete mold, a core and a bottom part comprising hinged sections having upstanding sides engageable with the core.

9. In a concrete mold, a core and a bottom part comprising hinged sections having upstanding sides engageable with the core, the core having depending flanges to overlap the upper edges of the bottom part.

10. In a concrete mold, a core, a bottom part having upstanding sides to engage the core, and rollers mounted within the bottom part for supporting the core.

11. In a concrete mold, a core, a bottom part comprising hinged sections and having upstanding sides to engage the core, a rod terminally secured to the bottom part to brace the same, and rollers upon said rod for supporting the core.

In tesimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

THOMAS DE LA MARE.

Witnesses:
IVY E. SIMPSON,
AGNES ROCKELLI.