May 6, 1930. E. L. SOULÉ 1,757,487

CONCRETE FORM

Filed Feb. 14, 1927 2 Sheets-Sheet 1

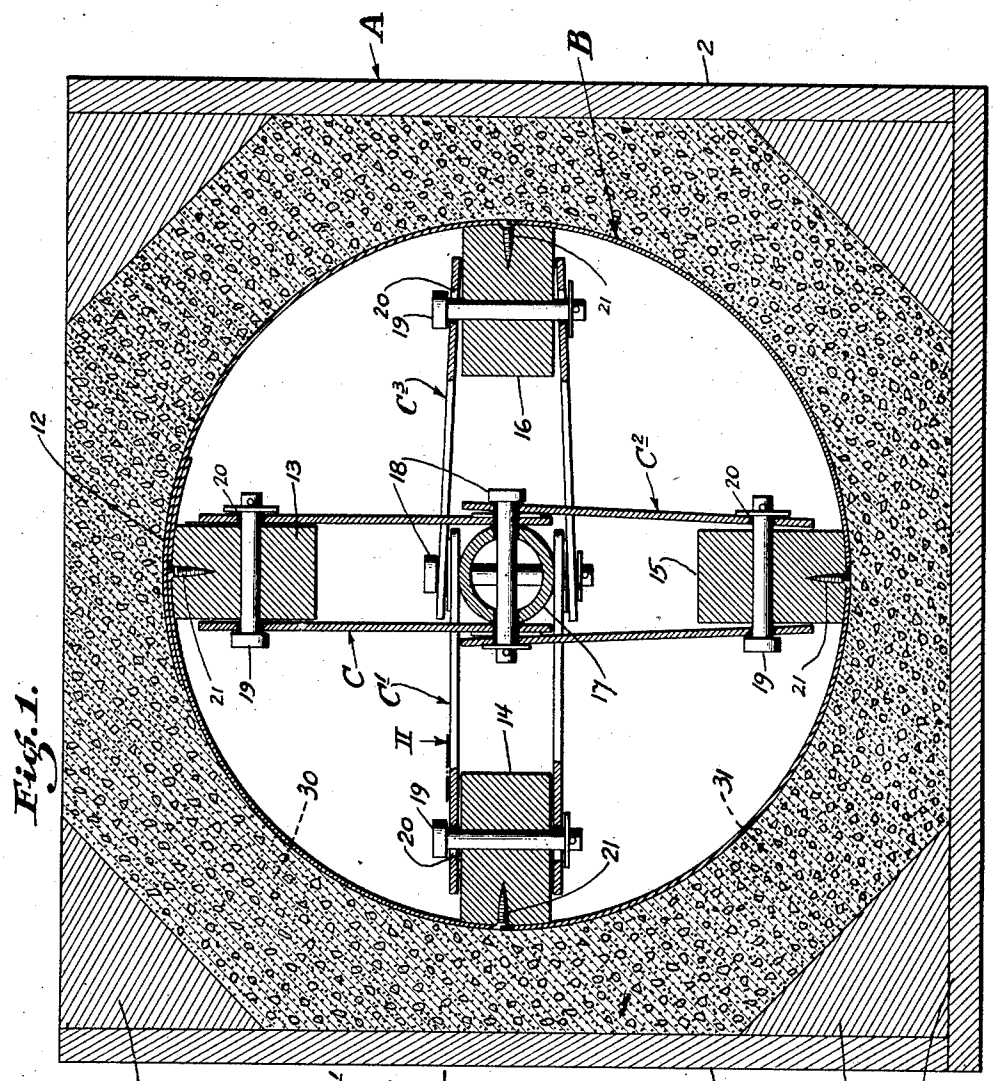


Fig. 1.

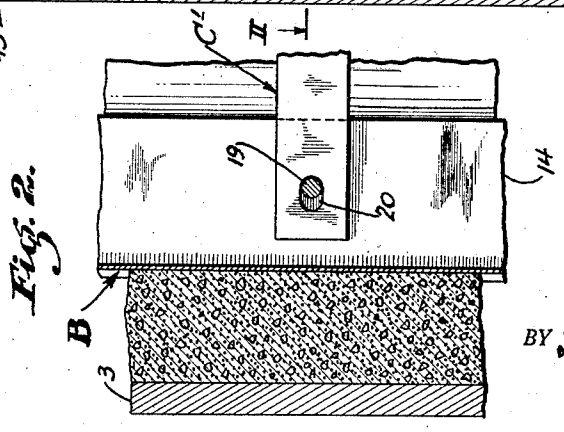


Fig. 2.

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CONCRETE FORM

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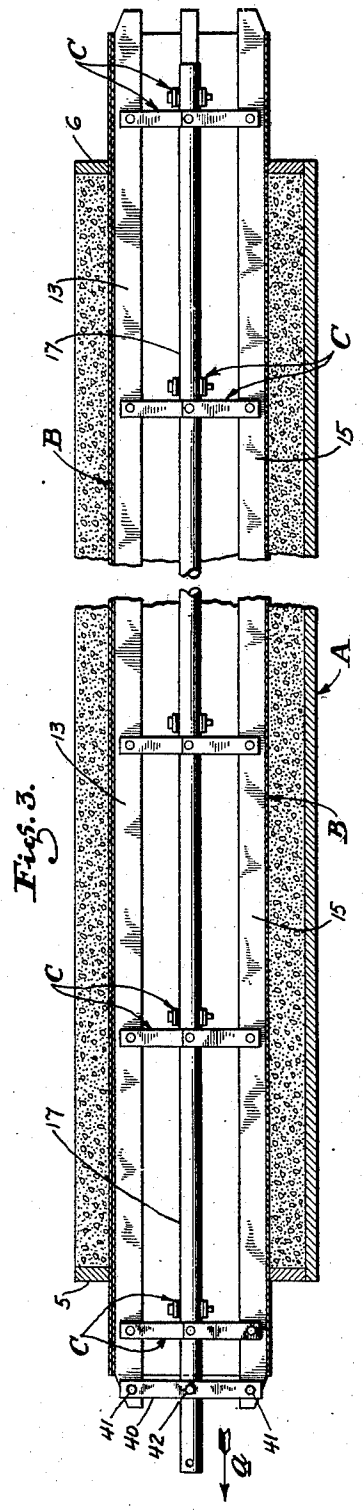


Fig. 3.

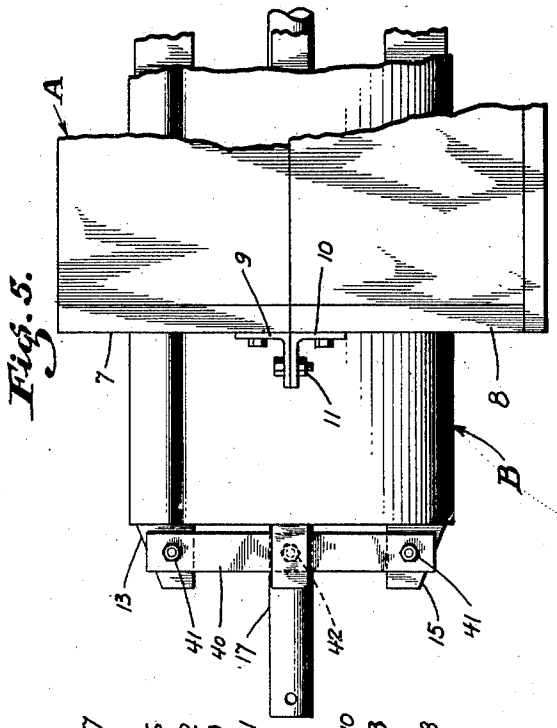


Fig. 5.

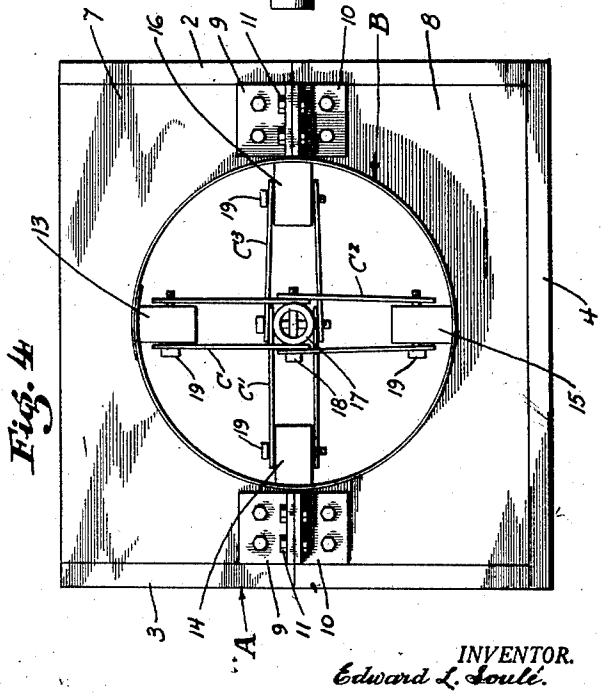


Fig. 4

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Patented May 6, 1930

1,757,487

UNITED STATES PATENT OFFICE

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CONCRETE FORM

Application filed February 14, 1927. Serial No. 167,926.

This invention relates to a concrete form or mold and especially to an inner collapsible mold for making concrete pipe, concrete jackets for piles in wharf construction and the like.

The manufacture of concrete jackets for wharf piling and the like presents a difficult problem, due to the length of the jackets which often reach lengths of fifty to eighty feet. The main difficulty presented is the construction mounting of the inner form or mold and especially the provision of means for releasing or freeing the inner mold after the concrete has set so as to permit endwise removal of the mold.

The object of the present invention is to generally improve and simplify the construction and operation of inner forms or molds of the character described and particularly to provide a collapsible or contractible form or mold which may be readily and quickly released with relation to the concrete jacket after the concrete has set and which may then be removed endwise from the concrete jacket and further to provide an inner form or mold which is readily re-expanded and placed in position for re-use. One form which the invention may assume is shown by way of illustration in the accompanying drawings, in which:

Fig. 1 is an enlarged cross-section of an inner and outer mold whereby the concrete jackets and the like may be cast,

Fig. 2 is an enlarged detail section taken on the line II—II of Fig. 1,

Fig. 3 is a longitudinal section through the inner and outer mold,

Fig. 4 is an end view of the inner and outer mold,

Fig. 5 is an enlarged side elevation of one end of the inner and outer mold.

Referring to the drawings, in detail, and particularly Figs. 1, 3 and 4, A indicates in general the outer mold and B the inner mold forming the subject matter of the present application. The molds illustrated are particularly intended for casting the concrete jackets for wharf piling and the like but it is obvious that they may be used for casting pipe and similar articles. The description submitted will, however, be confined to the casting of concrete jackets.

The outer mold consists of two side members such as indicated at 2 and 3, a bottom section 4 and a pair of end sections 5 and 6. Both end sections are identical in construction and the description of one will accordingly suffice. The end sections are constructed in two halves vertically disposed with relation to each other (see Figs. 4 and 5). These end sections being indicated at 7 and 8, respectively. The sides and bottom sections of the end member 8 are cut to fit the interior surface of the outer mold consisting of the members 2, 3 and 4 and the lower half is otherwise provided with a semi-circular opening to receive and support the mold B. The upper half of the end section indicated at 7 is similarly cut to fit the inner contour of the outer mold and it is provided with a semi-circular opening to receive and support the mold B. The two semi-circular openings in the end sections 7 and 8 form a circular opening which completely surrounds and encloses the mold B. The end sections 7 and 8 are also provided with angle iron sections 9 and 10 and bolts 11 are passed therethrough to secure the end sections with relation to each other. The end sections serve two functions: first that of supporting and securing the inner mold B and secondly that of preventing endwise escape of the concrete when poured into the outer mold.

The inner mold which really forms the main feature of the present invention is constructed of a long section of sheet steel of suitable gauge. This is best illustrated in Fig. 1 and 3. The sheet iron is bent to form a circular elongated tube which extends through the opposite end sections 5 and 6 of the mold. One edge of the sheet iron cylinder or tube overlaps the other, as indicated at 12. This is an important feature as it permits contraction or expansion of the mold or tube as will hereinafter be described. The tube is supported from end to end by means of bars such as indicated at 13, 14, 15 and 16. Four bars are illustrated in the present instance, but the number may be increased or decreased depending upon the diameter of the mold or sheet steel tube B. The bars 13 may be con-

structed of wood or any other suitable material and they extend from end to end of the mold B as shown in Fig. 3 and they are supported throughout their length by a central tube 17 and pairs of interspaced radially disposed arms generally indicated at C. These arms are best illustrated in Fig. 1. They are pivotally secured at their inner ends as indicated at 18 to a pin or bolt extending through the tube 17 and they are similarly pivotally secured to the bars 13, 14, 15 or 16, as the case may be, by means of bolts 19. Certain of the arms C are slotted at their outer ends where they engage the outer pivot pins 19 as shown at 20 (see Figs. 1 and 2) and these slots are of the same length. This is an important feature and the function of the slotted arms will be hereinafter described. The contractible sheet steel tube or mold B is secured to the bars 13, 14, 15 and 16 by nails or screws as indicated at 21 with the exception of the overlapping edge of the tube which is indicated at 12. This section requires freedom of movement in order to insure contraction or expansion of the mold. Contracting movement is transmitted to the mold by pulling the inner tube 17 in the direction of arrow *a* (see Fig. 3). Such movement of the tube 17 imparts an angular movement to the supporting arms C and as such causes the same to exert a radial or inward pull on the longitudinal extending bars 13, 14, 15 and 16 and as the sheet steel tube or mold B is secured to the bars, an inward pull will be exerted thereon and the mold will be contracted. Reverse movement of the tube 17 causes the supporting arms C to swing from an anguiar position to the right angular position shown in Fig. 3 and movement is thus transmitted which forces the bars outwardly and similarly the mold B thus causing expansion of the same.

An inner mold of the character described and illustrated in the present application presents a comparatively large surface to the concrete jacket or similar article to be cast. The concrete, when poured, has a tendency to slightly contract during the setting operation and the mold B is, accordingly, tightly gripped and secured when the concrete becomes set. Endwise removal of the mold B from the jacket without contracting the same would, accordingly, be impossible as the frictional surface presented would be too great and it is for this reason that contraction of the inner mold is resorted to. The adhesion of the concrete to the exterior surface of the mold B is also considerable and the contracting operation of the mold also requires considerable effort or power. To reduce the power required to a minimum, means are provided whereby the contracting movement is progressively exerted around the periphery of the mold. This obviously reduces the amount of power required and it is accomplished as follows:

By exerting a pull on the end of the tube 17 in the direction of arrow *a*, a pull is first exerted on the arms indicated at C and C^2 (see Fig. 1), and the supporting bars 13 and 15. No pull is exerted on the bars 14 and 16, as the outer ends of the arms C^1 and C^3 are slotted as previously described, and as pull is merely exerted on the bars 13 and 15, the parts or surface of the mold secured thereto is pulled inwardly with relation to the concrete jacket. The movement or pull on the tube 17 in the direction of arrow *a* is continued. The next set of arms indicated at C^1 and C^3 will next exert inward pull on the bars 14 and 16 as the length of the slots 20 is such that an inward pull will be exerted on the bars 14 and 16 a moment after the bars 13 and 15 and the parts of the mold supported thereby is freed and as sections of the mold is secured to the bars 14 and 16, these sections will be pulled inwardly and the mold will be freed. The mold is, in this manner, gradually contracted around its periphery and as such is completely released when the arms C^1 and C^3 have exerted their inward pull. The mold is, at the same time, considerably reduced in diameter and as such is sufficiently free and contracted to permit the mold in its entirety to be removed endwise with relation to the concrete jacket. After the mold has been removed, it is only necessary to re-insert it in an empty exterior mold and then expanded it by reverse movement of tube 17. This returns the supporting arms C to their right angular position shown in Fig. 3 and the mold is thus expanded to its full diameter and as such is ready for re-use. The tube 17 and the supporting arms C are secured in the position shown in Fig. 3 by applying a cross bar such as shown at 40 to one or both ends of the mold. This cross bar being bolted as at 41 to the outer ends of the supporting bars and also to the tube as indicated at 42. The bar 40 secures the tube 17 with relation to the bars 13, 14, 15 and 16 and the mold as a whole is thus locked against accidental collapse or contracting movement while concrete is being poured.

It might also be stated that the inner and outer ends of the supporting arms C, C′, C^2 and C^3 have a comparatively loose fit with relation to the pins 18 and 19. This is also of importance as it permits the arms to tilt on the pins 18 and 19 while the mold is being contracted, such tilting movement being more or less essential during the contracting movement so as to permit the overlapping section 12 to move with relation to the underlying section supported and secured to the bar 13.

In order to remove the concrete jacket from the outer mold when the concrete is

thoroughly set, it is not only necessary to remove the end sections 5 and 6, but also the side sections 2 and 3. Such removal leaves the concrete jacket free for removal and the mold sections may thus again be set up for re-use. The most expensive mold is, of course, the inner member B. This may be contracted and removed with relation to the jackets just as soon as an initial set has taken place and a few inner molds such as shown at B may thus be used in conjunction with a great number of exterior molds. The exterior molds may have any shape desired, for instance, they may be provided with corner fillers such as shown at 45 (see Fig. 1) to produce a concrete jacket with a hexagonal exterior shape. The outer molds may be semi-circular, if desired, and it is thus obvious that numerous shapes may be obtained. This is also true of the inner mold which is, in this instance, shown as cylindrical in cross-section but it is obvious that hexagonal, octagonal shapes and other interior surfaces may be formed without departing from the spirit of the present invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. A collapsible mold core comprising a flexible tubular shell having overlapping edges; a centrally disposed supporting member extending through the mold core; a plurality of arms pivoted to the supporting member and to the shell; and additional arms pivoted to the supporting member and having a pin and slot connection with the shell.

2. A collapsible core for molds comprising a flexible tubular shell having overlapping edges; a centrally disposed supporting member extending through the core; a plurality of radially disposed, diametrically opposed arms pivoted to the supporting member; said arms having their ends pivoted to the shell at the overlapping portion and at a point opposed diametrically to the overlapping portion; additional arms pivoted to the supporting member, said last mentioned arms being connected to the shell by pin and slot connections at opposed points on the same.

EDWARD L. SOULÉ.