C. F. DRAPER.

COLLAPSIBLE CORE.

APPLICATION FILED JUNE 25, 1913.

1,103,664. Patented July 14, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

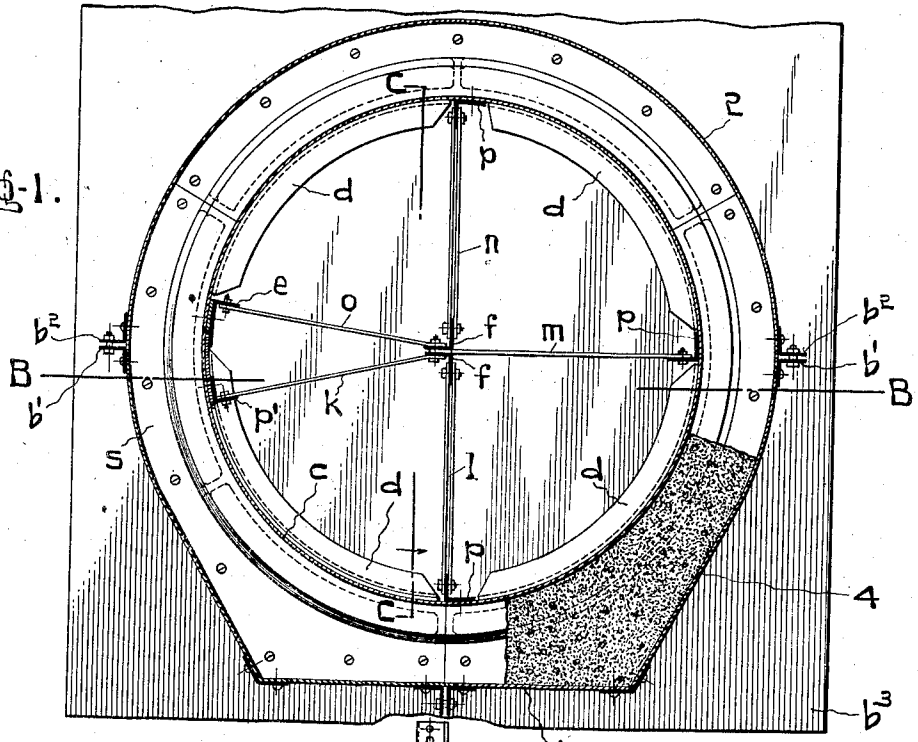
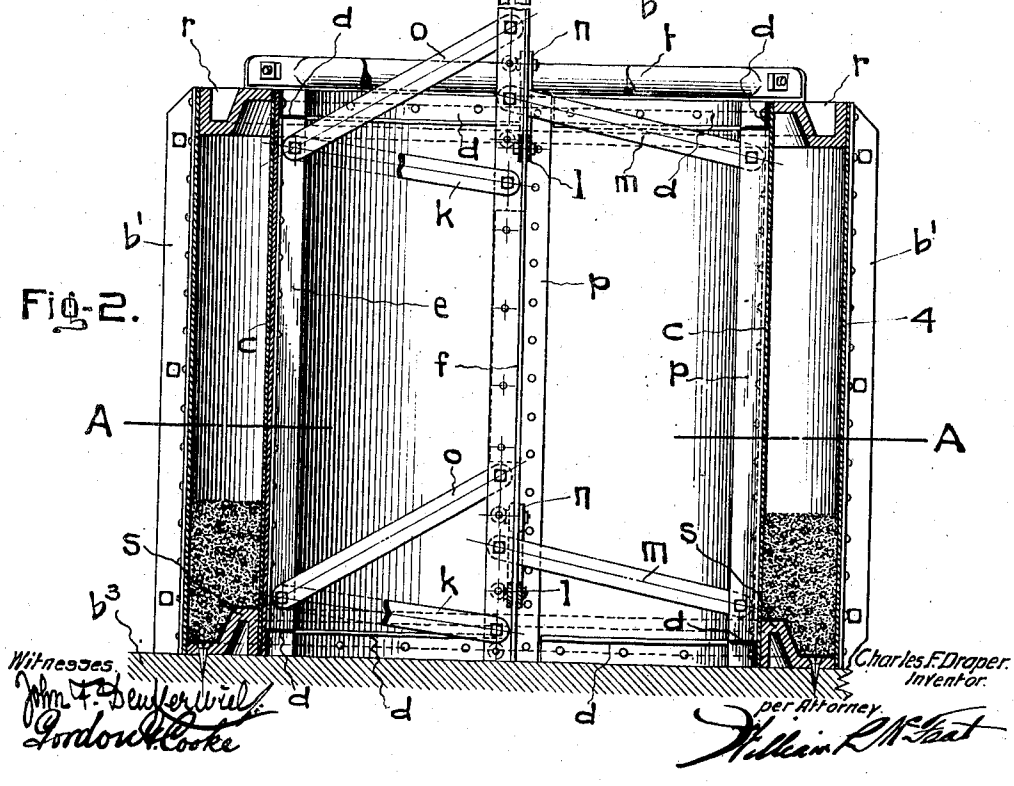


Fig. 2.



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2 SHEETS—SHEET 2.

Fig-3.

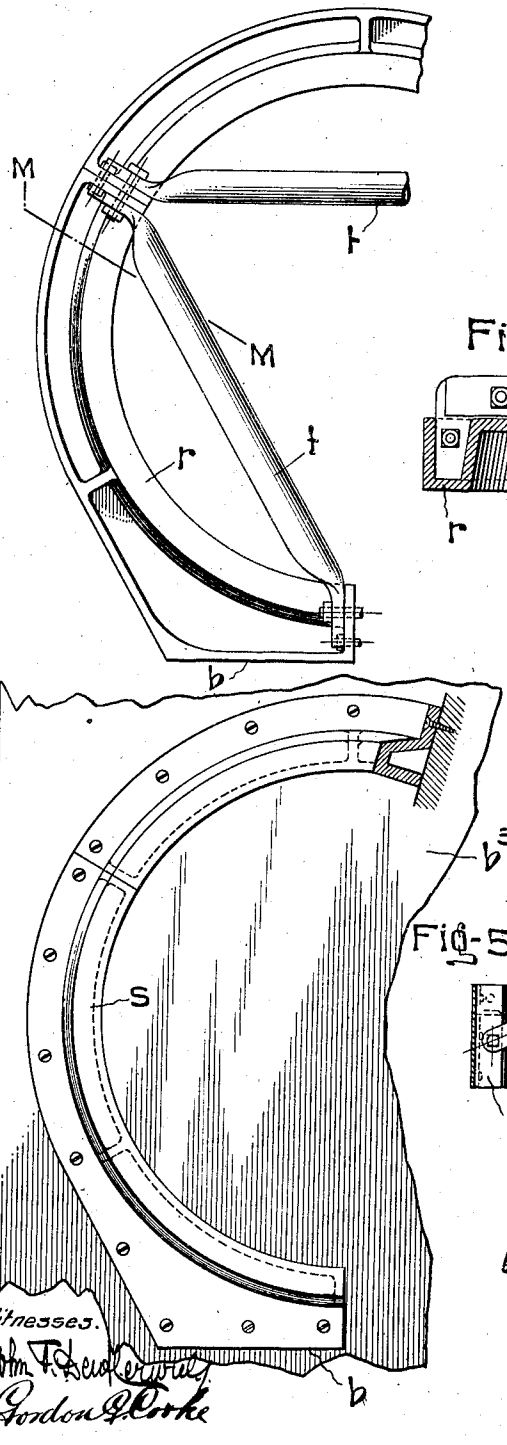


Fig-6.

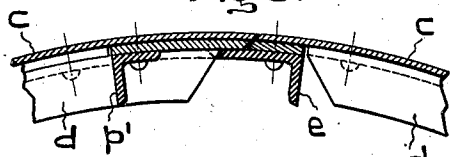


Fig-7.

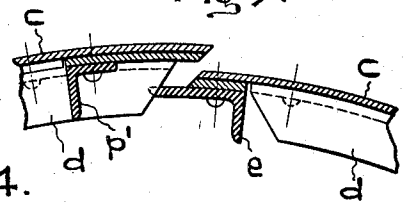


Fig-4.

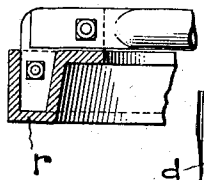


Fig-8.

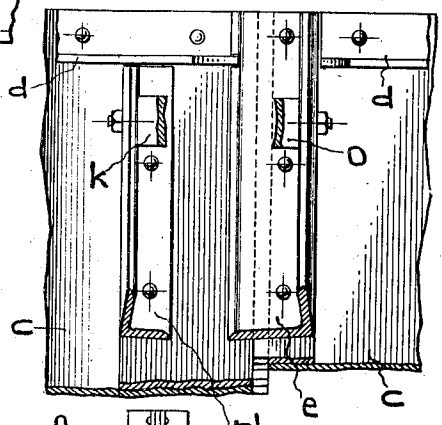


Fig-5.

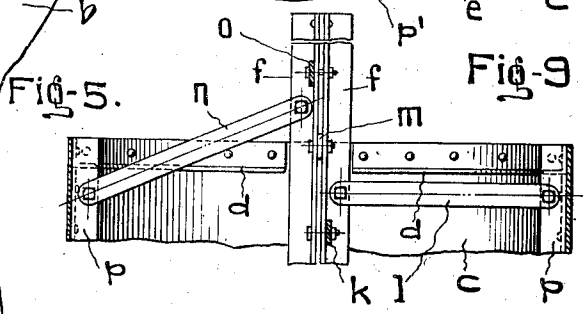
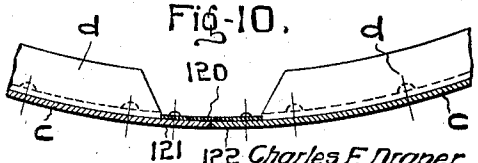


Fig-9

Fig-10.



Witnesses.

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UNITED STATES PATENT OFFICE.

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COLLAPSIBLE CORE.

1,103,664. Specification of Letters Patent. Patented July 14, 1914.

Application filed June 25, 1913. Serial No. 775,726.

To all whom it may concern:

Be it known that I, CHARLES FREDERICK DRAPER, residing in the city of Montreal, Province of Quebec, and Dominion of Canada, have invented certain new and useful Improvements in Collapsible Cores; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates particularly to cores of the type used in the casting of culverts, beams, pipes, piles and other articles from concrete, cement and the like although it may be applied with advantage to the casting of articles from clay or other material to be subsequently baked.

The invention may be said briefly to consist of a sheet metal form divided along one or more sides, the divided edges abutting and being operatively connected to means for releasing the same from the cast member in a manner to relatively displace the said edges. An improved feature of this form is that when in use its straight edge portions abut and thereby present an unbroken and uniformly substantially smooth molding surface. For full comprehension, however, of my invention reference must be had to the accompanying drawing forming a part of this specification in which similar reference characters indicate the same parts, and wherein:

Figure 1 is a longitudinal vertical sectional view of a mold containing my improved form the section being taken on line A A Fig. 2; Fig. 2 is a horizontal sectional view taken on line B B Fig. 1; Fig. 3 is a detail plan view of one half of the form for the spigot of the mold; Fig. 4 is a detail vertical sectional view of the spigot form taken on line M M Fig. 3; Fig. 5 is a similar view to Fig. 3 of the form of the spigot; Fig. 6 is an enlarged detail horizontal sectional view illustrating the contact edges of the form in position for use; Fig. 7 is a similar view to Fig. 6 illustrating the edges as they appear when the form is collapsed; and Fig. 8 is an inside elevation of these edges in position for use. Fig. 9 is a vertical sectional view taken on line C C Fig. 1; Fig. 10 is a sectional view of a modification of my device.

I have illustrated and will herein describe my invention applied to a culvert or drain pipe section although the essentials may be applied with advantage to other forms. This mold consists of an inner form in an outer shell the latter comprising a flat side *b*.

The collapsible form consists of a resilient sheet-metal shell *c* reinforced by two series of substantially quadrantal spaced angle irons *d*, one series being located at the top and the other at the bottom of the shell. An angle iron *e* is secured along one of the straight edge portions of the shell and its attached flange extends out beyond such edge and overlaps the other straight edge of the shell, this angle iron serving principally as a means of attachment for the collapsing mechanism of the form as will be presently shown.

In order to cause my form to collapse effectively without buckling I cause it to assume a substantially spiral shape when being collapsed, and it is to be noted that the initial action is a direct inward or radial movement of one edge of sufficient extent to free it from the other edge just before the spiral shape is assumed. To this end I employ a longitudinal movable bar *f* connected to the shell *c* by two series of radial levers located near the top and bottom of the form. Each of these series may comprise any required number of levers, for purpose of illustration however I have shown five levers for each series. They are indicated at *k*, *l*, *m*, *n*, and *o* and are connected to the angle iron *e* and angle-irons *p* and *p'* secured to and reinforcing the shell, the angle iron *p'* being mounted adjacent to the other straight edge of the shell, the levers *o* being connected to angle iron *e* and levers *k* to angle iron *p'* last mentioned. These levers are arranged in particular vertical and horizontal angular positions as follows; the vertical angular position being first considered and the form being assumed to be with its axis vertical. The arm *k* is pivoted to the bar *f* below the horizontal plane of its pivotal connection to the shell, the arm *l* being connected to the bar at a point on the same horizontal plane, and the angles of the remaining levers increasing progressively to the lever *o* which has the greatest inclination to the horizontal. The horizontal angles between these levers, viewed in plan, are such that the vertical movement of the bar will cause the form to be displaced inward by substantially regular increment between all adjoining levers excepting *k* and *o* which as above mentioned

are connected adjacent to the edges to be displaced of the form, such edges abutting when the form is expanded.

In order to secure the effective separation of these abutting edges when the core is to be collapsed the angle of the lever *m* to the bar *f* is made not less than that of the lever *k* to the bar. As these levers are on opposite sides of the bar, the initial longitudinal movement of the latter will tend to cause an outward displacement of the angle iron *p* and the portion of the shell to which it is connected, while the lever *m* tends to draw its portion of the shell inwardly. The result is that the edge to which the lever *k* is connected is momentarily held stationary while the bar is displaced laterally in a diametrical direction away from this edge. Simultaneously the lever *o* owing to the component of the two forces due to its greater inclination and the displacement of the bar, draws the edge to which the lever *o* is connected sharply away from the held edge. Following this action, as the bar continues to be moved, the decreasing angles of the several levers relatively to the bar causes the shell to be displaced inward with substantially uniform increment as above mentioned.

The spigot and socket forms *r* and *s* respectively are preferably castings of the cross section shown in Figs. 1, 3, 4 and 5. The spigot form is furnished with handles *t* consisting preferably of pieces of pipe with flattened ends for attachment to the form.

The outer member of the mold is preferably made of sheet metal and in two parts 2 and 4 the latter being formed with the flat side *b*, before mentioned, and flanges *b' b'*; while the part 2 is of semicylindrical form and has flanges b^2 to engage and be bolted to the flanges *b'*.

To use my improved mold for casting culvert or drain pipe sections and the like, the socket member is bolted to a base b^3 upon which the core and shell 2—4 stand. The core is placed within the socket form *s* and the shell inclosing it, the parts 2 and 4 of the latter being bolted together and the core expanded. The space between the core and shell is then filled with concrete or other suitable material and the spigot member is set in place. After the material has set the spigot member is removed, the core collapsed and withdrawn vertically, the parts of the shell unbolted and removed. The cast article is then ready for use.

What I claim is as follows:—

1. The combination with a form whereby hollow members are cast such form having abutting straight edge portions and such form presenting when in use an unbroken molding surface, of means for releasing the same from the cast member comprising devices for relatively displacing the said edges in both radial and tangential directions, and for converting the shell into substantially spiral form.

2. In combination with a form whereby the hollow members are cast such form having abutting straight edges and adapted for relative lateral displacement and means for effecting the said displacement comprising a member movable in the approximate axial line of the form and devices having different scope of movement operatively connecting the said member to the respective edges and other portions of the form for the purpose set forth.

3. In combination with a form whereby hollow members are cast such form consisting of sheet metal having abutting straight edges and adapted for relative lateral displacement and means for effecting such displacement comprising a bar disposed in the approximate axial line of the form, levers pivotally connected to the interior of the form adjacent to one of such edges and pivotally connected at their opposite ends to the bar at a point inclined from the pivotal connection to the form and other levers pivotally connected contiguously to the other edge of the form and at their opposite ends to the bar such last mentioned levers being inclined relatively to the first mentioned levers.

4. In combination with a form whereby hollow members are cast such form consisting of sheet metal having abutting straight edges and adapted for relative lateral displacement and means for effecting such displacement comprising a rod disposed in the approximate axial line of the form, levers pivotally connected to the interior of the form adjacent to one of such edges and pivotally connected at their opposite ends to the bar at a point inclined from the pivotal connection to the form, and other levers pivotally connected contiguously to the other edge of the form and at their opposite ends to the bar such last mentioned levers being inclined relatively to the first mentioned levers, and additional levers pivotally connected to the interior of the form in different positions and pivotally connected at their opposite ends to the bar, these last mentioned levers having regularly approximately increasing inclination for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two witnesses.

CHARLES F. DRAPER.

Witnesses:
GORDON G. COOKE,
E. R. PITTS.