C. L. CRAIG.

COLLAPSIBLE FORM FOR CISTERNS.

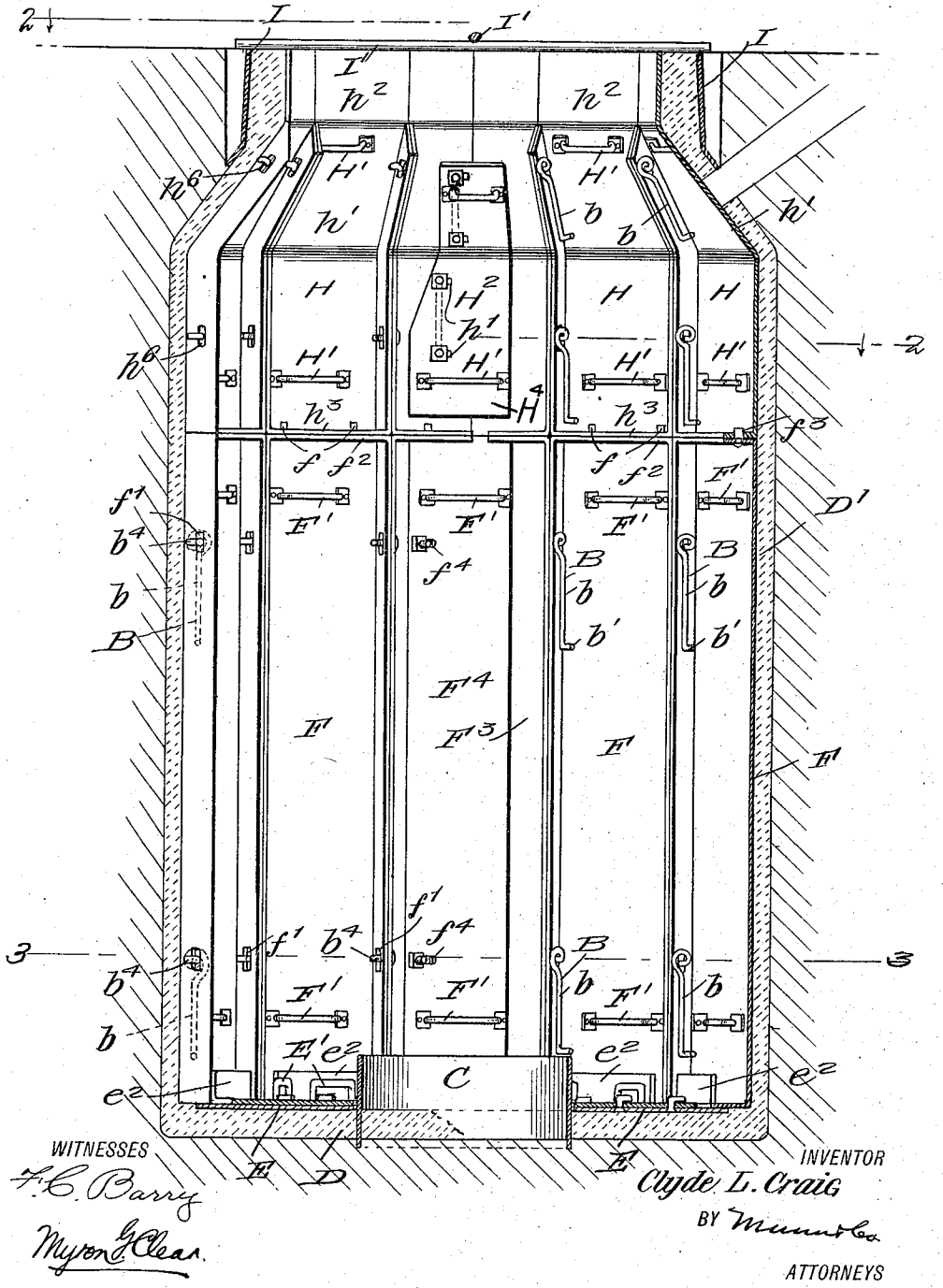
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Patented Feb. 8, 1916.

3 SHEETS—SHEET 1.

Fig. 1



WITNESSES

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3 SHEETS—SHEET 2.

Fig. 2.

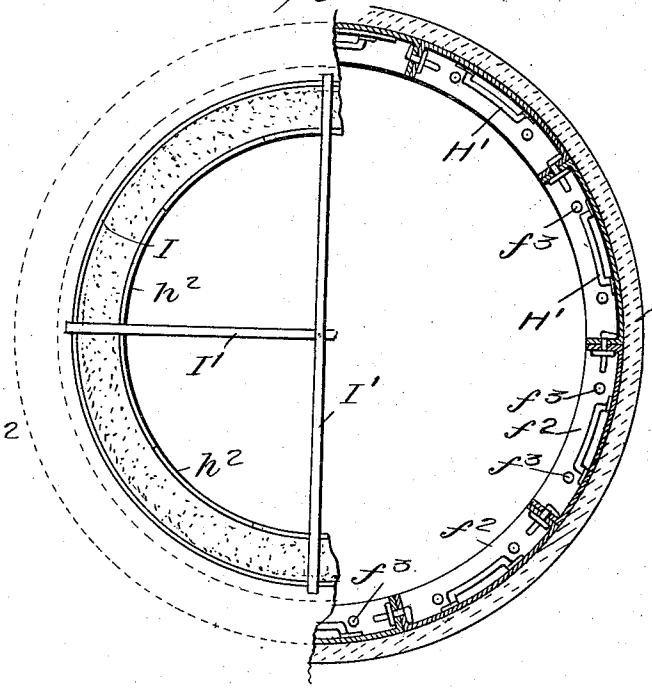


Fig. 12.

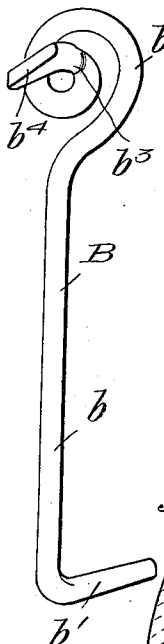


Fig. 13.

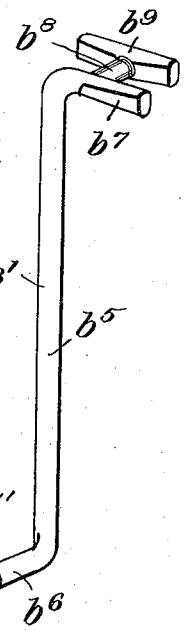
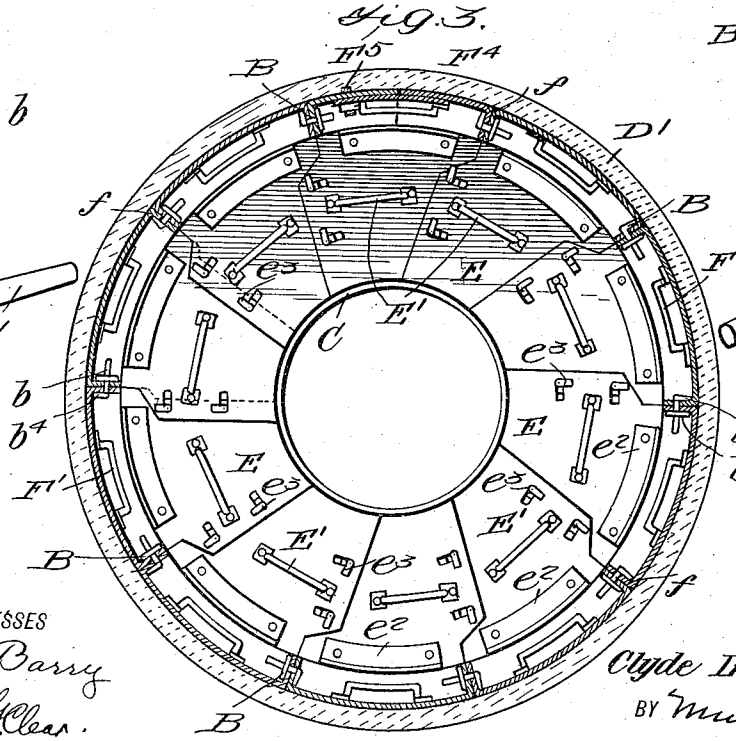


Fig. 3.



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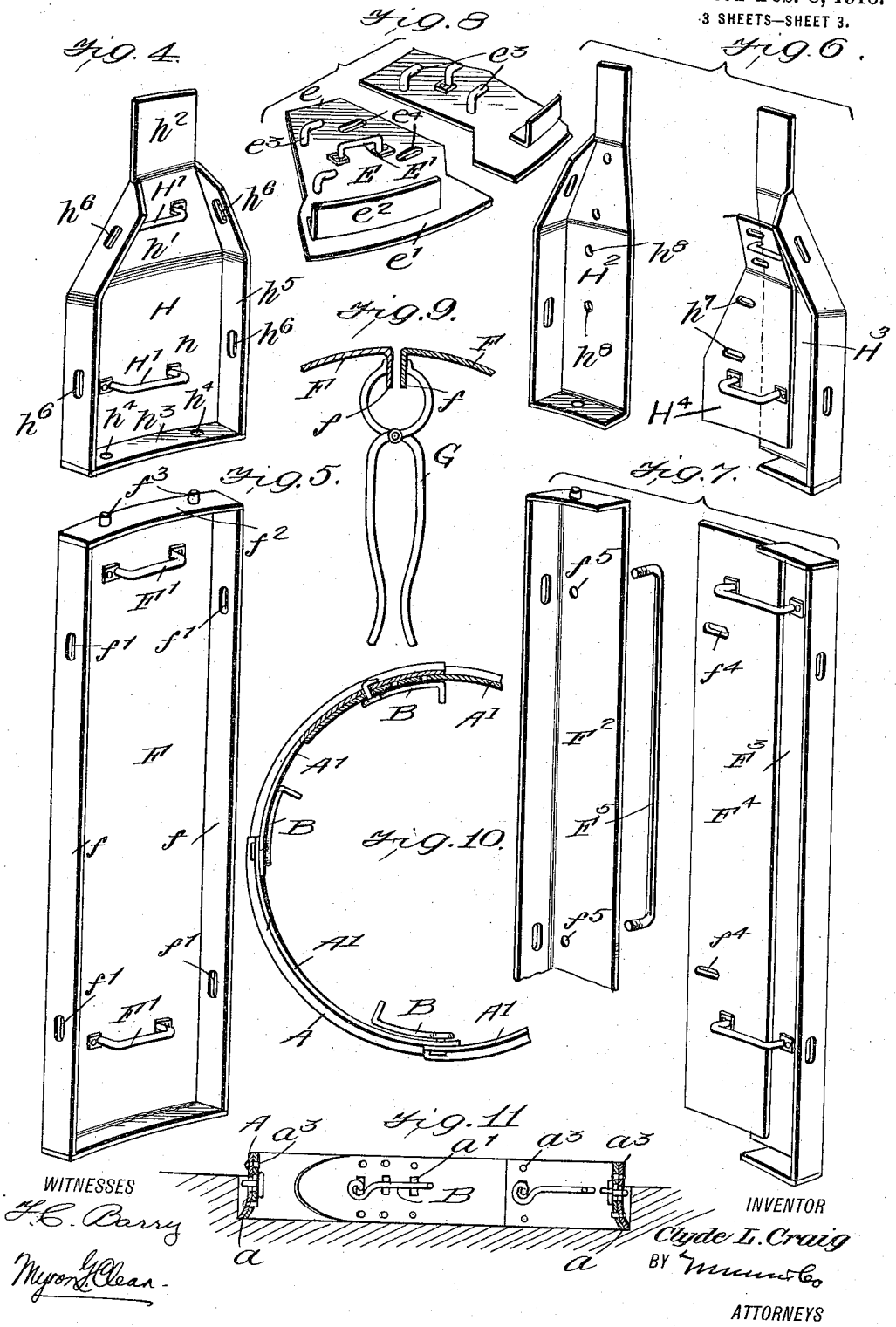
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3 SHEETS—SHEET 3.



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COLLAPSIBLE FORM FOR CISTERNS.

1,171,176. Specification of Letters Patent. Patented Feb. 8, 1916.

Application filed August 28, 1914. Serial No. 859,071.

To all whom it may concern:

Be it known that I, CLYDE L. CRAIG, a citizen of the United States, and a resident of Washington Court-House, in the county of Fayette and State of Ohio, have invented a new and useful Improvement in Collapsible Forms for Cisterns, of which the following is a specification.

My present invention relates particularly to sectional adjustable molds utilized in the formation of water storage cisterns and other structures of this character, and my primary object is to provide an arrangement by which a cistern may be constructed of cementitious material within the ground, in a minimum space of time, without the use of bolts, nuts and special tools, without the use of calculating instruments, and lastly without the necessity of workmen particularly skilled in the erection of structures of this character.

The objects above outlined lead naturally to many others, among which it should be mentioned that this invention aims to provide an arrangement wherein the operation from start to finish is perfectly guided and practically fool-proof.

These and other objects, together with the advantages arising therefrom, will be clearly apparent from the following description in which reference is made to the accompanying drawings, forming a part of this specification, and in which,

Figure 1 is a vertical section through a cistern illustrating the use of my improved molding apparatus and before the latter has been removed, Fig. 2 is a view partly in plan and partly in horizontal section, taken substantially on line 2—2 of Fig. 1, Fig. 3 is a horizontal section taken substantially on line 3—3 of Fig. 1, Fig. 4 is a perspective detail view of one of the single-piece upper wall sections removed, Fig. 5 is a similar view of one of the single-piece lower wall sections, Fig. 6 is a similar view of one of the two-part adjustable upper wall sections, Fig. 7 is a similar view of one of the two-part adjustable lower wall sections, Fig. 8 is a detail perspective view of one of the two-part adjustable base sections, Fig. 9 is a detail horizontal section through adjacent portions of two of the wall sections illustrating the application of an implement designed according to my invention for drawing the contiguous portions of the wall sections together, Fig. 10 is a plan view of a portion of the digging guide ring partly broken away and in section, Fig. 11 is a cross section therethrough illustrating its practical application, Fig. 12 is a detail perspective view of one of the implements designed in accordance with my invention for use as a quick detachable connection between mold sections in lieu of bolts and the like, and Fig. 13 is a similar view of a modified form of implement for the same purpose.

Referring now to the several figures and particularly to Figs. 1, 10, and 11, it will be noted that in digging into the ground preparatory to the erection of the several mold sections for the cistern, I employ a digging guide ring in order to obviate the necessity for the use of the calculating instruments inadapted to the use of practical workmen usually engaged in the erection of structures in connection with which my invention is intended for use. The proper digging of the opening in which the cistern is to be erected is merely essential inasmuch as the wall of such opening thereafter constitutes the outer wall of the mold space, the inner wall of which mold space is constituted by the several mold sections which will be hereinafter described. This digging guide ring, as clearly seen at A in Figs. 10 and 11, includes a plurality of sections A′ having their contiguous ends overlapping in one direction throughout the series, and certain of which are provided with series of apertures whereby the diameter of the ring, and consequently the diameter of the opening to be dug, may be regulated, it being seen from Fig. 11 that the lower edges a of the several sections are flared slightly in an outward direction in order to provide sufficient space between the wall of the dug opening and the upper portions of the ring sections to clear the engaging heads of the connecting implements indicated generally at B. It will also be seen from Figs. 10 and 11, and particularly from the latter figure that, in addition to the apertures a' of the several ring sections A′ for the accommodation of the connecting implements B, these several ring sections are provided with series of apertures a^2 and with pins a^3 engageable within such apertures, the connections thus described serving to effectively unite the several ring sections to form a substantially rigid guide by the use of which the workmen cannot go wrong in the preparatory digging operation.

The several implements B utilized in the

manner above described and also utilized at various points in the mold itself as hereinafter described, may be either of the forms shown in Figs. 12 and 13. In Fig. 12 the implement B consists of a rod b one end of which is bent laterally to form a handle b' and the opposite end of which is bent substantially in the form of a ring b^2, the extremity of such ring being bent laterally to form a shank b^3 engageable through alined apertures in the parts to be connected and having an angularly bent head b^4 adapted to be located upon the relatively opposite side of the connected parts to that against which the ring b^2 is disposed.

As shown in Fig. 13 the implement b' consists of a rod b^5 similarly bent at one end to form a handle b^6, and having a lateral extension b^7 at its opposite end which is connected by a shank b^8 extending laterally therefrom at an intermediate point and forming a connection between the same and a substantially parallel head b^9, the angular extremity b^7, shank b^8 and parallel head b^9 of this form of the implement corresponding in function to the ring b^2, shank b^3 and head b^4 of the form just described in connection with Fig. 12.

When the preparatory digging operation has been completed through the use of the digging guide ring previously described, a circular one-piece guide band C is disposed centrally of the base of the ground opening so formed and partially embedded in the soil, as clearly seen in Figs. 1 and 3, and this band so disposed, thereafter forms an effective guide for the concentric location of the several mold wall sections as will be clearly understood from the following. With the guide band C disposed as just described, cementitious material is disposed upon the base of the prepared opening to form the base D of the finished cistern, the thickness of which may be readily gaged by the height of the band C. As soon as this base D is laid the several base sections E of the mold are placed thereon as clearly shown in Figs. 1 and 3, each of which base sections is generally triangular in form and provided with a curved inner end e to abut the band C and a curved outer end e' adjacent which is disposed a parallel curved angle piece e^2 forming a guide. The several base sections E are also provided along one side edge with upwardly projecting angular lugs e^3 and along the opposite edge with slotted openings e^4, this latter edge being adapted to overlap the contiguous edge of the next adjacent section E in order to engage over the lugs e^3 of the latter and thus connect the several base sections E throughout the series, the lugs e^3 being rotatable to angular positions with respect to the slotted openings e^4, as clearly shown in Fig. 3 in order to effectively lock the several base sections E in operative position. The several base sections E are also provided with handles E′ by means of which they may be more readily manipulated and disposed and removed from operative position as above. The wall of the mold is formed in its lower portion of a plurality of substantially rectangular lower wall plates F, each of which is flanged around its entire edge, the side flanges f having slotted openings f' and the upper end flange f^2 having upwardly projecting studs f^3. Each of these lower wall sections F is also provided with inner handles F′ and one thereof is in two parts F^2 and F^3, as clearly shown in Fig. 7, the part F^3 carrying a supplemental connecting plate F^4 upon its inner surface, adapted to lap the part F^2 and having slotted openings f^4 to register with the apertures f^5 of the part F^2 for the reception of a connecting U-bolt F^5.

In disposing the several lower wall sections F in position it is to be understood that their side flanges f are arranged in contacting relation and locked together by means of the implements B and B′ utilized in the same manner as in connection with the sections of the digging guide ring A before described, the contact between the side flanges of the wall sections being secured at the time of the introduction of the locking implements by means of clamping tongs or a similar implement such as shown at G in Fig. 9. It is also to be seen by reference to Figs. 1 and 3 that the lower flanged ends of the several lower wall sections F are disposed upon the outer portions of the base sections E against the angular guide pieces e^2 so that through the abutments of these base sections E against the guide band C and similar abutments of the lower wall sections F against the guide pieces E^2 of the base sections E, the wall of the mold is assured a position concentric with the guide band C, without loss of time, calculation or trouble.

The several upper wall sections H with their lower rectangular portions h intermediate inclined and tapering portions h' and upper reduced extending neck portions h^2 are disposed upon the lower wall sections F with which they coincide and their lower and intermediate portions just mentioned are provided with flanges of which the base flanges h^3 of the lower sections are provided with apertures h^4 which receive the upwardly projecting studs f^3 of the lower wall sections before described. Likewise the side flanges h^5 of these upper wall sections have slotted openings h^6 in connection with which the implements B and B′ are utilized to lock the upper wall sections together throughout the series.

The upper wall sections H are each provided with handles H′ and one of the sec-

tions as seen clearly in Fig. 6 is in two parts H^2 and H^3 coinciding with the two-part lower wall section shown in Fig. 7, the part H^3 having an inner connecting plate H^4 with slots h^7 adapted to coincide with apertures h^8 of the part H^2 for the reception of connecting U-bolts, (not shown) which are duplicates of the bolt F^5, though smaller in length. The upwardly extending neck portions h^2 of the several upper wall sections H form an inner neck ring and in their operative positions, as shown in Figs. 1 and 2, are opposed by an outer neck ring I in a single piece with connecting rods I′ diametrically above and across the same forming handles for its proper manipulation. Thus with the several mold sections disposed as described, the disposition of the cementitious material to form the wall D′ of the cistern may be readily understood. The several mold sections are of course allowed to remain in operative position until the cementitious material has properly settled and hardened and may then be removed by withdrawing the outer neck ring I and disconnecting the U-bolts uniting the two parts of the two-part upper and lower wall sections and reducing the width of these two-part sections by the relatively sliding movement of their parts after the removal of the connecting implements B and B′ uniting the same with the side portions of the adjacent wall sections. With the two-part sections withdrawn it is then comparatively easy to withdraw the remaining wall sections after detaching the connecting implements B and B′ at the several points at which they are utilized. In the meantime during the erection of the wall sections of the mold, the operator stands within the guide band C upon the ground and afterward steps out upon the base section E in order to properly dispose the cementitious material within said guide band. After the removal of the wall sections, the base sections E may be readily detached and removed likewise the guide band C and after filling in the groove formed by the latter, the body of the cistern is practically completed.

It is to be observed that the quick detachable connections between the several detachable parts of the apparatus do away with the use of bolts and similar connections which from their number would necessarily require the expenditure of considerable time in coupling and uncoupling the parts, and adding this advantage in the saving of time to those already mentioned in avoiding the necessity for particularly skilled workmen and the use of calculating instruments, it will be seen that I provide an arrangement materially improved over those of a similar nature now in use and one which particularly recommends itself to use in the outlying districts where cisterns are most frequently employed.

I claim:

1. In a collapsible cistern mold, upper and lower detachably connected wall sections, means for detachably connecting said wall sections, a centrally located cylindrical ring adapted to be partially embedded in the ground in the base of the cistern, and horizontal radially extending base sections located around said ring and positioned thereby, having means adjacent their outer edges adapted to receive and support the lower ends of the lower wall sections, certain of said wall sections and certain of said base sections embodying adjustably connected portions for the purpose described.

2. In a collapsible cistern mold, a plurality of detachably connected wall sections, means for connecting said sections, a centrally located cylindrical ring adapted to be partially embedded in the ground in the base of the cistern, and horizontally radially extending base sections located around said ring and positioned thereby, having upwardly projecting portions adjacent their outer ends adapted to receive and support the lower ends of the corresponding wall sections.

3. In a collapsible cistern mold, upper and lower detachably connected wall sections each having apertured inwardly projecting flanges around its sides, means for connecting the sections through said apertures, a centrally located cylindrical ring adapted to be partially embedded in the ground in the base of the cistern, and horizontal radially extending base sections located around said ring and positioned thereby, having upwardly extending curved angle pieces adjacent their outer edges adapted to receive the base flanges of the corresponding wall sections.

4. In a collapsible cistern mold, a plurality of detachably connected wall sections, means for detachably connecting the said wall sections, a centrally located cylindrical ring adapted to be partially embedded in the ground in the base of the cistern, and horizontal radially extending base sections located around said ring and positioned thereby, having means adjacent their outer ends adapted to receive and support the lower ends of the corresponding wall sections.

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Witnesses:
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SOLON C. KEMON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."