July 6, 1926. 1,591,060

F. H. SHERRERD

FORM FOR CASTING PLASTIC MATERIAL

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Fig. 1

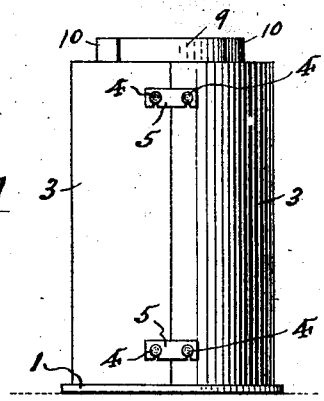


Fig. 2

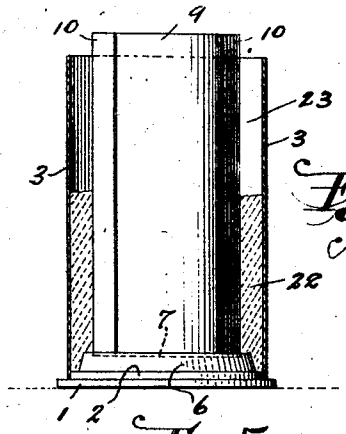


Fig. 6

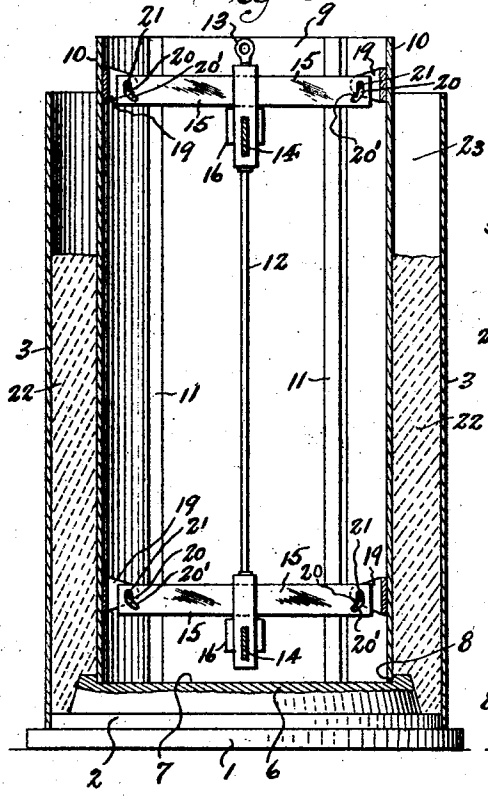
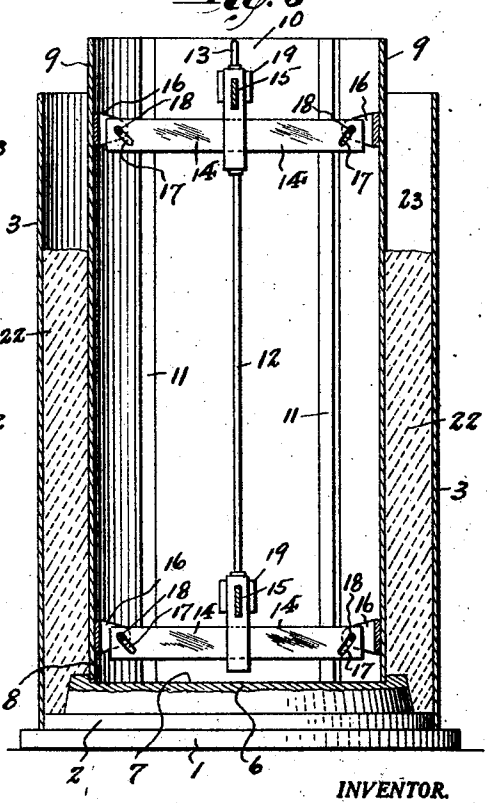


Fig. 5



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FORM FOR CASTING PLASTIC MATERIAL

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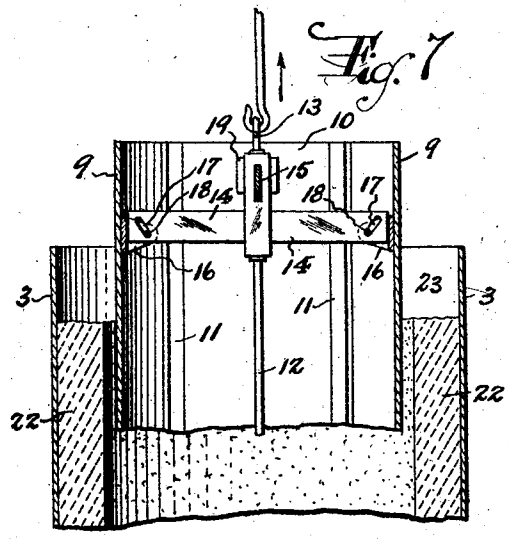


Fig. 7

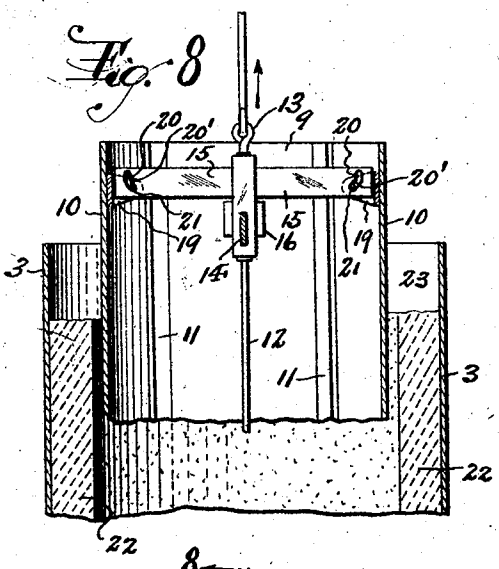


Fig. 8

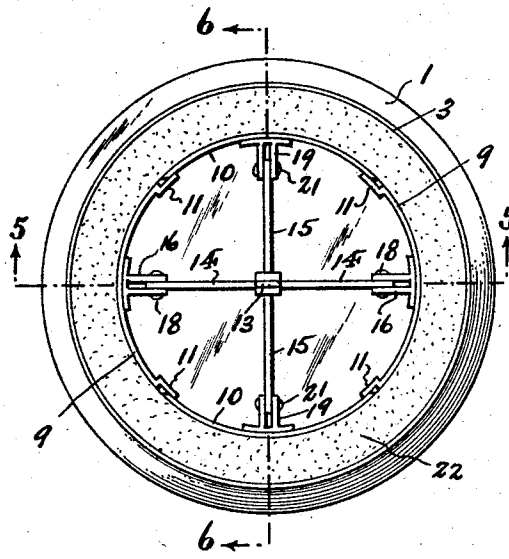


Fig. 3

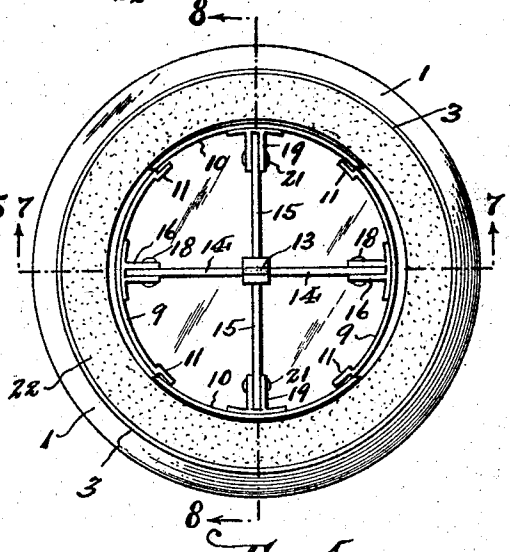


Fig. 4

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FORM FOR CASTING PLASTIC MATERIAL

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Fig. 10

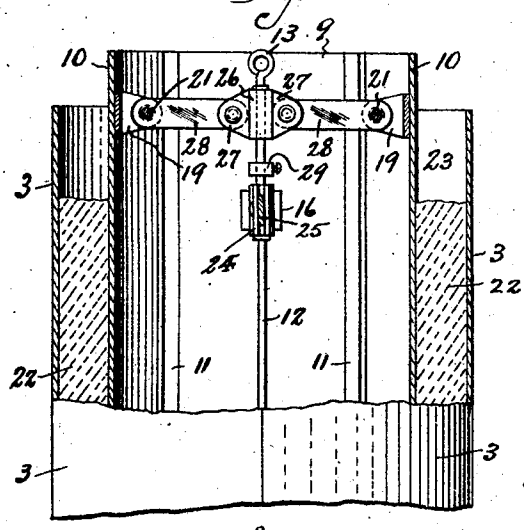


Fig. 9

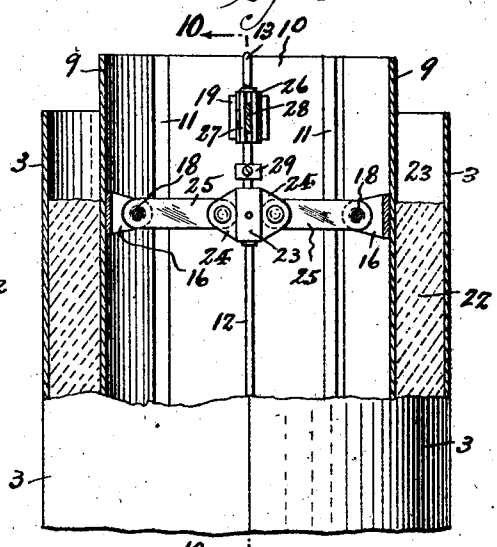


Fig. 11

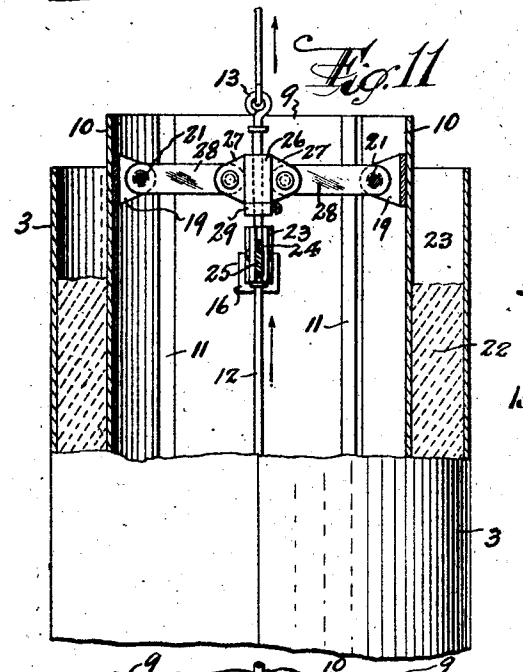


Fig. 12

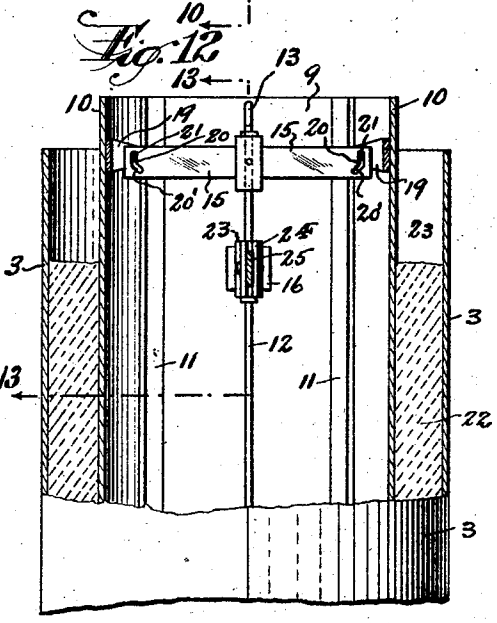
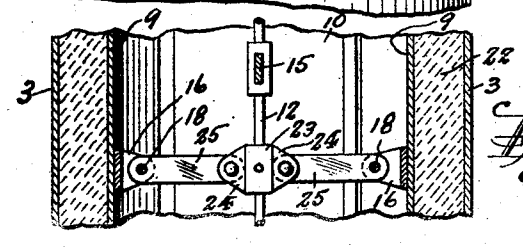


Fig. 13



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Patented July 6, 1926. 1,591,060

UNITED STATES PATENT OFFICE.

FRANCIS H. SHERRERD, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO NEWARK CONCRETE PIPE CO., OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

FORM FOR CASTING PLASTIC MATERIAL.

Application filed March 28, 1925. Serial No. 18,976.

This invention has reference to an improved construction of form or mold for casting concrete pipe and the like, and the invention relates, more particularly, to a novel construction and combination of inner and outer forms made of separable sections, the inner being provided with a novel means for contracting the same preparatory to withdrawing the same from the finished casting.

The invention has for its principal object to provide a novel construction of form or mold comprising a hollow cylindrical outer form mounted on a suitable base, and a contractible inner form consisting of a plurality of radially movable sections having means whereby the same may be withdrawn from a finished casting, and whereby the initiation of the withdrawing movement will successively contract diametrically opposed sections to remove the same from engagement with the internal surfaces of the finished casting.

Other objects of this invention, not at this time more particularly enumerated, will be clearly understood from the following detailed description of the same.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation of my improved form or mold; Figure 2 is a part side elevation with the outer form in section; Figure 3 is a top end view, showing the inner form expanded to operative relation to the outer form, said view being drawn on an enlarged scale; Figure 4 is a view similar to Figure 3 but showing the inner form contracted preparatory to withdrawal of the same from the finished casting; Figure 5 is a vertical longitudinal section taken on line 5—5 in Figure 3; Figure 6 is a vertical longitudinal section taken on line 6—6 in Figure 3; Figure 7 is a fragmentary vertical longitudinal section taken on line 7—7 in Figure 4; and Figure 8 is a fragmentary vertical longitudinal section taken on line 8—8 in Figure 4.

Figure 9 is a fragmentary part side elevation and part longitudinal section, showing a modified arrangement and construction of means for contracting the inner form; Figure 10 is a part sectional view taken on line 10—10 in Figure 9; and Figure 11 is a view similar to that shown in Figure 10, but illustrating the partial operation of the modified means for contracting and withdrawing the inner form.

Figure 12 is a fragmentary part side elevation and part longitudinal section, showing another modified arrangement and construction of means for contracting the inner form; and Figure 13 is a part sectional view taken on line 13—13 in Figure 12.

Similar characters of reference are employed in all of the hereinabove described views, to indicate corresponding parts.

Referring now to Figures 1 to 8 of said drawings, I have illustrated therein one embodiment of my novel construction of form or mold for casting concrete pipe and the like. In said drawings, the reference character 1 indicates a base member having a raised boss 2 providing a shoulder for seating the lower end of the outer form. Said outer form comprises two or more sections 3 which, when assembled together, provide a cylindrical outer casing or form wall. Said sections 3 are preferably made of sheet metal, and the respective sections 3 thereof are provided, adjacent to adjoining edges, with headed studs 4, adapted to receive slotted coupling links 5, whereby the said sections are retained together in operative assembled relation. It will be understood that any other form of coupling means, found convenient or desirable, may be substituted for said studs 4 and links 5.

If desired the base 1 may be provided with a suitably shaped center boss or core 6, if it is desired to produce a bell-mouthed end in connection with the pipe casting, but if simple straight pipe sections are desired to be produced, said center boss or core 6 may be omitted from the base 1.

The upper surface of said base 1 is provided with a countersunk seat 7, corresponding in diameter to the outside diameter of the inner form, and thus providing an annular shoulder 8 against which said inner form, when expanded, is engaged, and by which the same is concentrically spaced in proper relation to the outer form.

Said inner form comprises a series of interfitting sections, preferably arranged in pairs, the members of which are in diametrically opposed relation, which, for convenience of identification, I shall denominate, by reference to their relative movements when contracting the form preparatory to withdrawing the same from a finished cast-

ing; first moving members or sections 9 and last moving members or sections 10. Said first moving members or sections 9 are provided, at their respective longitudinal edge portions, with inwardly off-set lapping strips 11, which overlap the internal sides of the longitudinal marginal edge portions of said last moving members or sections 10, when the several sections or members are expanded to occupy circumferentially alined positions whereby the operative cylindrical contour of the inner form is produced.

The means for controlling the operative and relative movements of the first moving members or sections 9 and last moving members or sections 10, when contracting the inner form from operative relation to a finished casting, so that the same may be withdrawn from the interior of said casting, comprises an axially disposed or central longitudinal pull rod 12, which is provided at its upper extremity with an eye 13, to which may be attached any suitable form of hoisting tackle (not shown). Said pull rod 12 is provided with means for both supporting said members or sections 9 and 10 in assembled relation and for producing the desired operative movements thereof. Said means may consist of one or more groups of supporting and actuating devices, but preferably consists of a plurality of such groups in longitudinally spaced connected relation to the members or sections 9 and 10. Each group of said supporting and actuating devices comprises a pair of oppositely extending arms 14 rigidly connected with said pull rod 12, and a similar pair of oppositely extending arms 15, also rigidly connected with said pull rod 12. Said arms 14 respectively project toward the respective first moving members or sections 9, the latter having rigidly secured to their inner surfaces, in suitable location, bifurcated lugs 16, in the forks of which are respectively entered the free ends of said arms 14. Provided in the free end of each arm 14 is a downardly and inwardly inclined or oblique cam-slot 17, and supported by said bifurcated lugs 16 are cross pins 18 which extend through said cam-slots 17 of the arms 14. Said arms 15 respectively project toward the respective last moving members or sections 10, the latter having rigidly secured to their inner surfaces, in suitable location, bifurcated lugs 19, in the forks of which are respectively entered the free ends of said arms 15. Provided in the free end of each arm 15 is a cam slot consisting at its upper end of a perpendicular neutral portion 20 and at its lower end in a downwardly and inwardly inclined or oblique portion 20′. Supported by said bifurcated lugs 19 are cross-pins 21 which extend through said cam slots of the arms 15.

In Figures 3, 5 and 6 the inner form, construction as above described, is shown expanded into operative position, with its respective members or sections 9 and 10 in circumferentially alined relation, and operatively positioned and spaced relative to the outer form and base of the apparatus, ready to receive the pouring of the concrete or other material out of which the casting 22 is to be made. When the form is in this position, the pull rod 12 is dropped to normal lowered position, whereby the arms 14 are lowered so that the cross-pins 18 are seated in the upper outer ends of the cam-slots 17, and the arms 15 are likewise lowered so that the cross-pins 21 are seated in the upper ends of the neutral perpendicular portions 20 of their cam-slots.

After the concrete or other material has been cast in the space 23 intermediate the outer and inner forms to thus produce the desired pipe casting 22, and the latter has set, the forms may be removed to liberate the completed pipe casting 22. The inner form is actuated, preparatory to withdrawal from the interior of the pipe casting 22, in the following manner; viz, a suitable hoisting tackle is coupled to the pull rod 12 by attaching the same thereto through the medium of the eye 13. An initial upward longitudinal movement is then imparted to said pull rod 12. This initial upward movement of the pull rod raises the respective sets of arms 14 and 15. Since the cam-slots of the arms 15 possess perpendicular neutral portions 20 the initial movement of said arms 15 produces no retracting effect upon the members or sections 10, but as the cam-slots 17 of the arms 14 are completely oblique throughout their lengths, they are, upon the initial upward movement of said arms 14, immediately effective to exert at once an inwardly pulling movement upon the cross-pins 18, so that while the members or sections 10 remain stationary, the members or sections 9 are first subjected to a retractive movement which is transmitted thereto through said cross-pins 18 and bifurcated lugs 16, thus first inwardly moving or retracting said members or sections 9 to withdraw their longitudinal edges away from normally abutting relation to the longitudinal edges of the members or sections 15. Clearance having been thus provided for the inward movement of said members or sections 10, such inward movement is effected by the continued upward pull on the pull rod, whereby the cam-slots 17 of the arms 14 continue the inward movement of the members or sections 9, and whereby the oblique or inclined portions 20′ of the cam slots of the arms 15 are moved into operative engagement with the cross-pins 21 of the lugs 19, so that said members or sections 10 are also retracted; the respective members or sections 9 and 10 thereupon assuming the

retracted positions shown in Figures 4, 7 and 8, whereby the same are withdrawn or separated from engagement with the internal surfaces of the casting 22. The inner form being thus contracted the same may be readily hoisted and withdrawn endwise from the interior of said casting 22.

The outer form, comprised of the sections 3 may now be uncoupled and taken apart, thus entirely freeing the casting 22 for removal; after which the forms may be reassembled for repeated use.

Referring now to Figures 9, 10 and 11, I have shown therein a modified form of connections between the members or sections 9 and 10 of the inner form and the central pull rod 12, which are adapted, however, to effect the initial or first movement of the members or sections 9, and the delayed movement of the members or sections 10 in the same timed relation as already above described. Said modifications comprise one or more groups of connections to actuate the first moving members or sections 9, each group consisting of a sleeve 23, which is fixed on said pull rod 12. Said sleeve 23 is is provided with oppositely projecting fulcrum lugs 24 with which are respectively pivoted normally horizontal links or toggles 25, the outer ends of the latter being respectively pivotally engaged by the cross-pins 18 with the lugs 16 of the respective first moving members or sections 9. One or more groups of connections are provided to actuate the last moving members or sections 10, each group consisting of a sleeve 26 longitudinally slidable on said pull-rod 12. Said sleeve 26 is provided with oppositely projecting fulcrum lugs 27 with which are respectively pivoted normally horizontal links or toggles 28, the outer ends of which are respectively pivotally engaged by the cross-pins 21 with the lugs 19 of the respective last moving members or sections 10. Fixed on said pull rod 12, suitably spaced below said sleeve 26, is a lift collar 29.

In operating said modified groups of connections to retract the members or sections 9 and 10 to thereby contract the inner form for removal from the interior of a completed casting 22, an upward pull is exerted on the pull rod 12 which moves upwardly therewith the sleeve 23 fixed thereon. The upward movement of the sleeve 23 by pulling upwardly the inner ends of the links or toggles 25 exerts a laterally and inwardly drawing effect upon the first moving members or sections 9, to thus retract the same from circumferentially alined relation to the members or sections. While the first moving members or sections 9 are thus being actuated, the last moving members or sections 10 remain stationary, by reason of the fact that the pull rod 12 is free to slide upwardly through the sleeve 26 until the lift collar 29 is brought into engagement with the lower end of said sleeve 26. By the time the advance movement of the members or sections 9 is completed, the lift collar 29, abuts the lower end of the sleeve 26, so that on continued upward movement of the pull-rod 12 said sleeve 26 is in turn lifted to pull upward the inner ends of the links or toggles 28, thereby exerting a laterally and inwardly drawing effect upon the last moving members or sections 10, to in turn retract the same from the internal sides of the completed casting 22. On completion of the contraction of the inner form, as thus produced, the same may be hoisted and withdrawn from the interior of the completed casting.

Referring now to Figures 12 and 13 I have shown a further modification of the means for contracting the inner form. This modification comprises a combination of the link or toggle arrangement for actuating the first moving members or sections 9, as above described and as indicated by corresponding reference characters applied to said Figures 12 and 13, with the delayed cam means for actuating the last moving members or sections 10, as also above described and as indicated by corresponding reference characters applied to said Figures 12 and 13. The operation of this arrangement will be understood from the above description without necessity for repetition.

From the foregoing description, it will be apparent, that my invention provides a very simple and easily manipulated set of forms for casting pipe from plastic materials.

I am aware that some changes may be made in the general arrangements and combinations of the various devices and parts, as well as in the details of the construction of the same, without departing from the scope of my present invention as described in the foregoing specification, and as defined in the appended claims. Hence, I do not limit my invention to the exact arrangements and combinations of the devices and parts as set forth in the foregoing specification, nor do I confine myself to the exact details of the construction of said parts as illustrated in the accompanying drawings.

I claim:—

1. A form for casting pipe from plastic material, comprising a base, an outer cylindrical form consisting of separable circumferentially alined sections, means on said base for positioning said outer form sections, an inner cylindrical form, means on said base for positioning said inner form in concentrically spaced relation to said outer form, said inner form comprising a plurality of circumferentially alined sections arranged in independently movable pairs, a longitudinal central pull rod within said inner form, upper and lower knuckle blocks

fixedly secured to said pull rod, toggle links connected between said knuckle blocks and one pair of said inner form sections, additional upper and lower knuckle blocks slidably related to said pull rod, toggle links connected between said latter knuckle blocks and the remaining pair of inner form sections, and collars fixed on said pull rod in normal spaced relation to and beneath said slidable knuckle blocks, all whereby longitudinal movement of said pull rod will retract the first mentioned pair of inner form sections in advance of said remaining pair thereof.

2. In a form for casting hollow structures from plastic material, an inner form comprising a plurality of circumferentially alined sections arranged in independently movable pairs, a longitudinal central pull rod within said inner form, upper and lower knuckle blocks fixedly secured to said pull rod, toggle links connected between said knuckle blocks and one pair of said inner form sections, additional upper and lower knuckle blocks slidably related to said pull rod, toggle links connected between said latter knuckle blocks and the remaining pair of inner form sections, and collars fixed on said pull rod in normal spaced relation to and beneath said slidable knuckle blocks, all whereby longitudinal movement of said pull rod will retract the first mentioned pair of inner form sections in advance of said remaining pair thereof.

In testimony that I claim the invention set forth above I have hereunto set my hand this 26th day of March 1925.

FRANCIS H. SHERRERD.