M. H. MOONEY.

MOLD FOR CONCRETE CONSTRUCTION.

APPLICATION FILED SEPT. 5, 1911.

1,122,977.

Patented Dec. 29, 1914.

4 SHEETS—SHEET 1.

Fig. 1

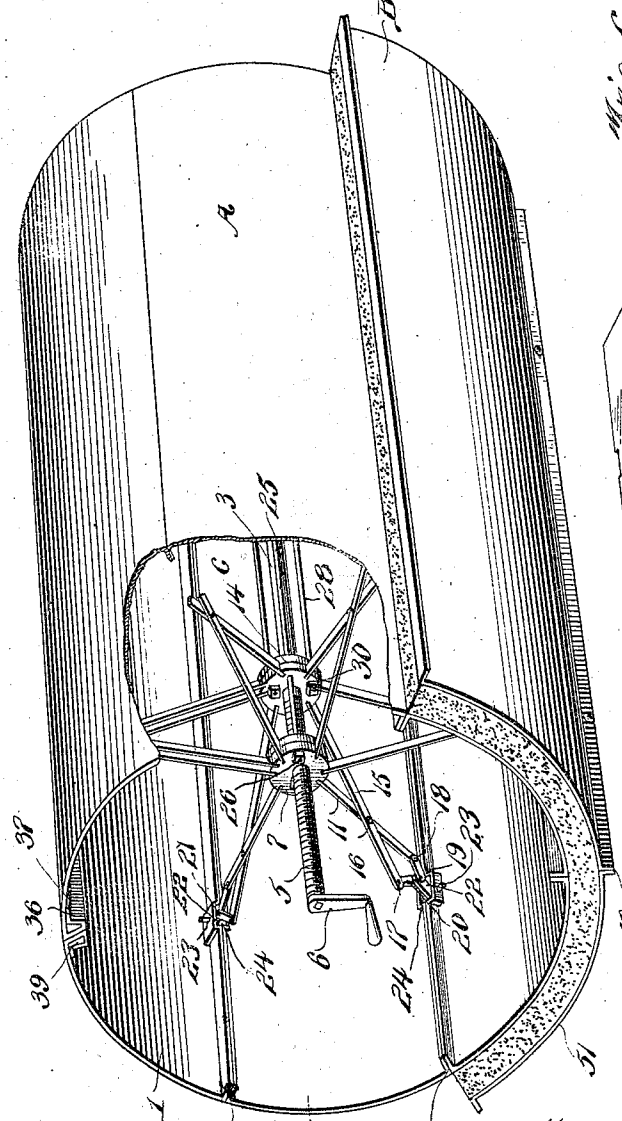
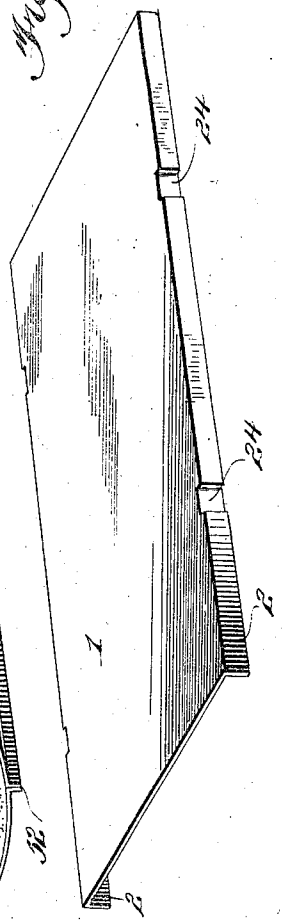


Fig. 6



Witnesses

W. S. McDowell

R. B. Cavanagh.

Inventor

Marvin H. Mooney

By Victor J. Evans

Attorney

M. H. MOONEY.

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4 SHEETS—SHEET 2.

Fig. 2

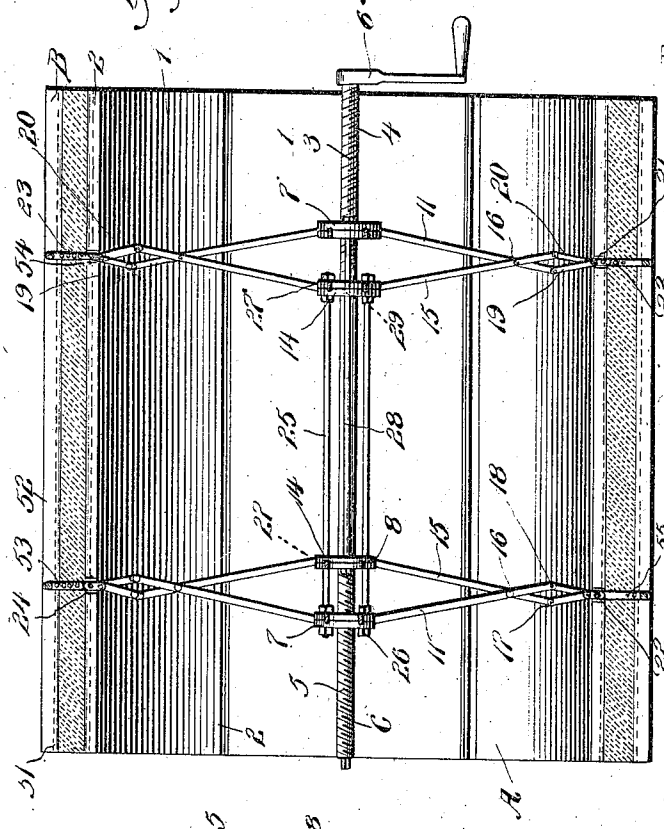


Fig. 3

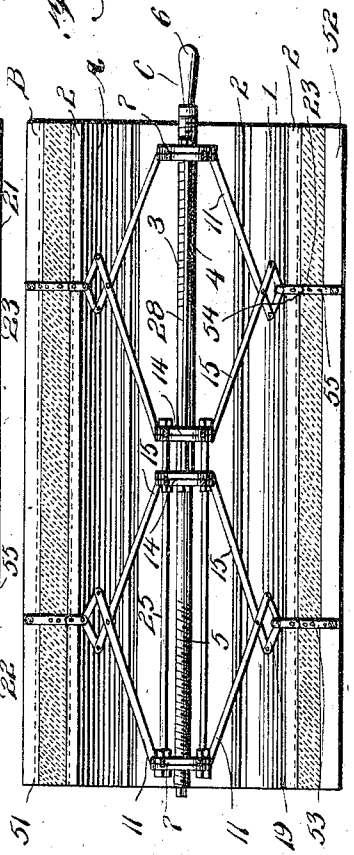
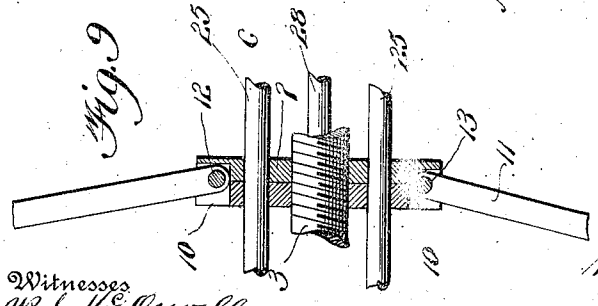


Fig. 9



Witnesses
W. S. McElwell.
R. B. Cranagh.

Inventor
Marvin H. Mooney
By Victor J. Evans
Attorney

M. H. MOONEY.

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4 SHEETS—SHEET 3.

Fig. 4

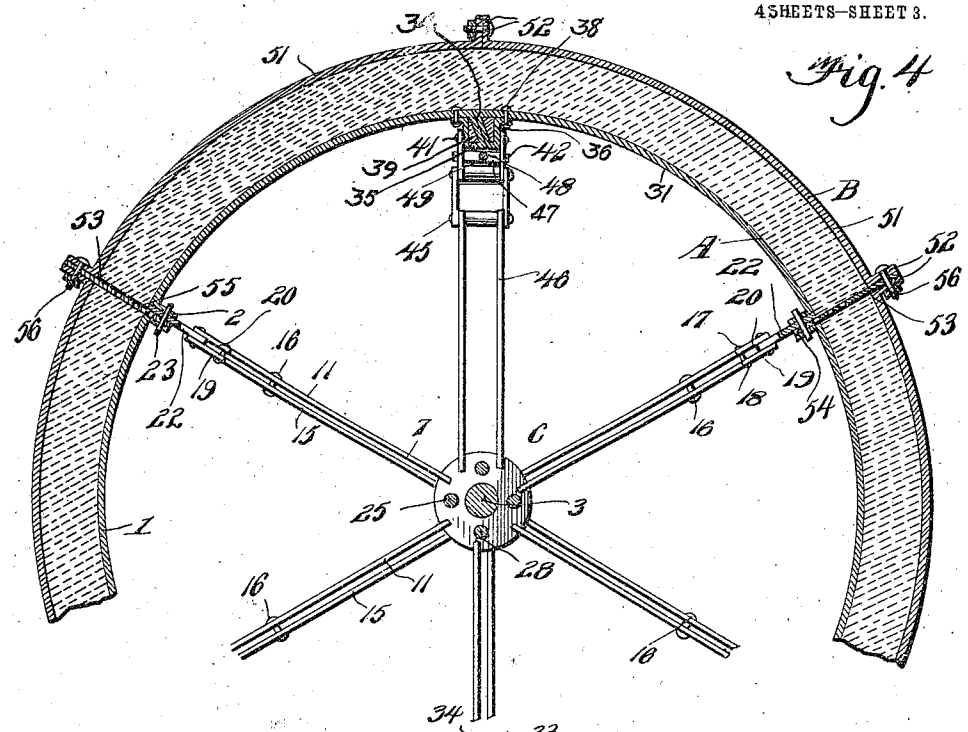
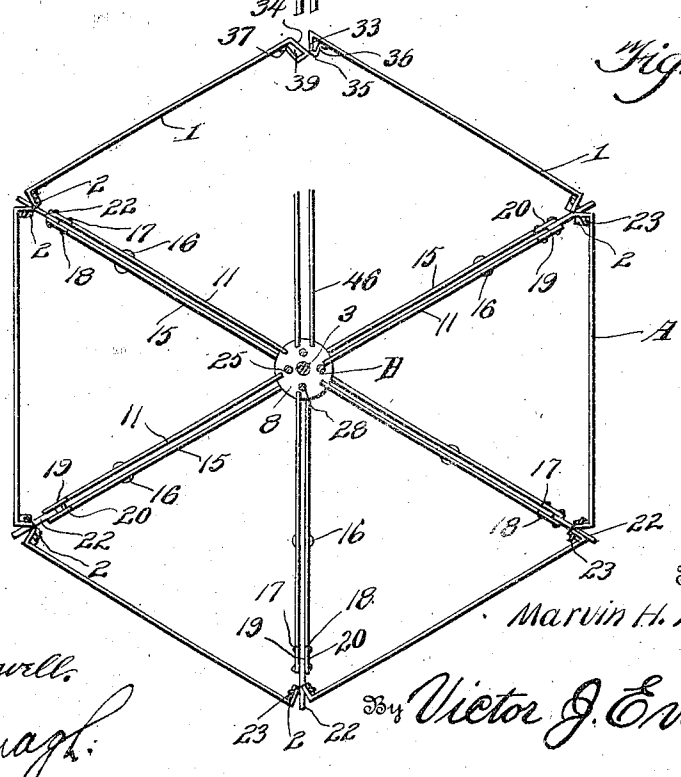


Fig. 5



Witnesses

W. S. McDowell.

A. Kavanagh.

Inventor

Marvin H. Mooney

By Victor J. Evans

Attorney

M. H. MOONEY.

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4 SHEETS—SHEET 4.

Fig. 7

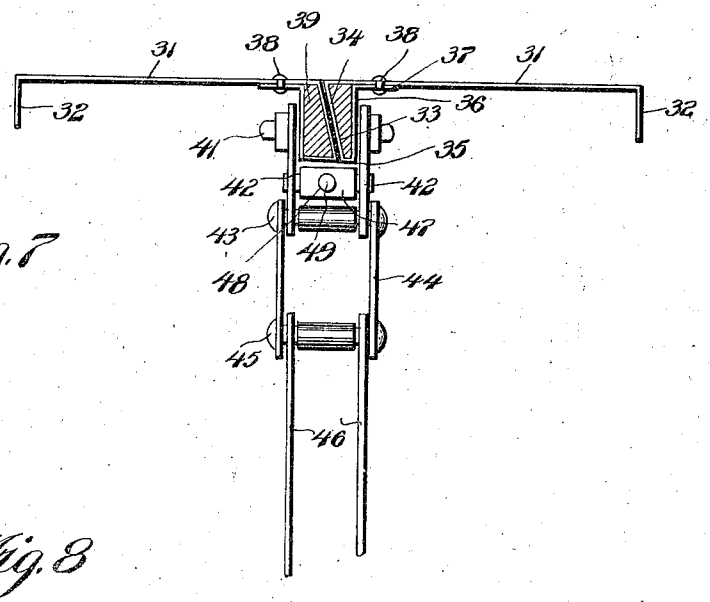
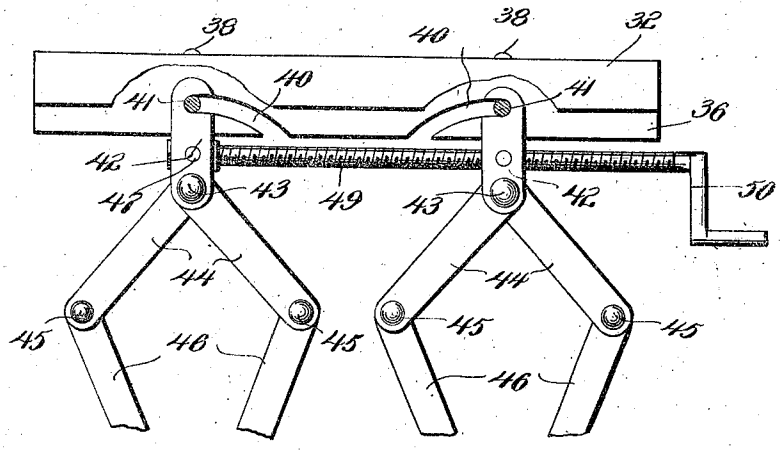


Fig. 8



Witnesses

W. S. McDowell,

R. B. Cavanagh.

Inventor

Marvin H. Mooney

By Victor J. Evans

Attorney

UNITED STATES PATENT OFFICE.

MARVIN H. MOONEY, OF TRENTON, MISSOURI.

MOLD FOR CONCRETE CONSTRUCTION.

1,122,977. Specification of Letters Patent. Patented Dec. 29, 1914.

Application filed September 5, 1911. Serial No. 647,498.

To all whom it may concern:

Be it known that I, MARVIN H. MOONEY, a citizen of the United States, residing at Trenton, in the county of Grundy and State of Missouri, have invented new and useful Improvements in Molds for Concrete Construction, of which the following is a specification.

This invention relates to certain novel and useful improvements in molds for making culverts, sewers, and other similar constructions, which are formed of concrete or cement, or like material.

In carrying out my invention, it is my purpose to provide an improved former or mold, which is composed of a series of independent sections or walls, capable of being adjusted to form a culvert or conduit of the desired dimensions, means being provided whereby said walls may be readily, quickly and positively adjusted in assembling or dismantling the former.

Still a further object of my invention is to provide a mold or former of the type referred to, which will embody the desired features of strength and durability, coupled with economy of cost of production, and installation.

Furthermore, I aim to provide a former whereby the sections composing the walls may be uncoupled or separated and the operating mechanism also separated from the sections forming the mold body, so that the labor of handling the apparatus in transportation, and in assembling and dismantling the same is reduced.

I also aim to provide a structure which will contain but relatively few rivets to be exposed to the elements, or to the concrete or cement, and thereby I avoid the objection incident to those types of molds, which contain numerous rivets or similar fastenings that are continuously becoming loose or pulling out.

With the above-recited objects and others of a similar nature in view, the invention consists of the construction, combination and arrangement of parts, set forth in and falling within the scope of the appended claims.

In the accompanying drawings:—Figure 1 is a perspective of a portion of a mold embodying my invention, and showing a culvert or conduit in the course of construction. Fig. 2 is a longitudinal sectional view taken through a section of the mold, and showing the expanding mechanism in extended position. Fig. 3 is a similar view, showing the mechanism in collapsed position. Fig. 4 is a cross sectional view. Fig. 5 is an end view, showing the sheets or sections forming the core or inner shell, prior to bending the same into circular formation. Fig. 6 is a perspective view of one of the sections or inner sheets of the core. Fig. 7 is an end view of the releaser sheets. Fig. 8 is a side view of one of the same. Fig. 9 is an enlarged sectional view through the ring showing the connections of the pull and push rods.

In the present instance, in carrying out the invention, I employ an inner shell or core formed of a series of sheets or sections each having side flanges bent downwardly at an angle to the main body of the sheet, said side flanges being attached to devices adapted to be actuated to bend or bow the individual sheets into sector-like form. Surrounding this inner shell or core, but spaced apart therefrom, the desired distance is an outer casing also formed of a series of metallic sheets which are assembled, and bent to form a cylinder or to otherwise conform to the shape of the inner core. This outer casing is also formed with side flanges, and I further provide spacing levers or rods connected to the devices for expanding the core. The core or inner shell is furthermore formed with two sections connected to releasing mechanism, whereby these releasing sections may be moved to permit the contraction or collapsing of the core.

Referring now to the accompanying drawings in detail, the letter A designates the core or inner casing as an entirety, the letter B indicating the outer casing, while the letter C indicates the expanding or operating mechanism, as a whole. The inner casing is composed of a series of metallic sheets or sections 1 having downwardly turned flanges 2—2, the contiguous flanges of each sheet extending toward each other when the sections are assembled, as shown in Fig. 5.

The numeral 3 indicates a main shaft having one end thereof formed with a right hand thread as at 4, while the opposite end is provided with a left hand screw thread 5, the shaft being rotatable through means of a crank handle 6. Threaded upon the shaft are the hubs 7—7, each hub comprising two sections, a casting 8 and a ring section 9. The casting 8 is formed with a series of

slots or recesses 10, into which is designed to rest the ends of the levers 11, the said lever ends being secured through the medium of a welded ring 12, which passes through bores in the ends of the lever and rests within the rabbet 13 formed within the hub. As will be seen by the drawings, these levers 11 extend radially from the hubs and form parts of the lazy tong construction. Loosely mounted upon the shaft are the companion hubs 14—14 each of similar construction to the hubs 7, so that the shaft 3 carries four hubs all of like construction.

Extending from the hubs 14 and secured in the manner of the levers 11, are the levers 15 pivoted as at 16 to the levers 11, the ends of said levers 11 and 15 having pivoted thereto as at 17 and 18 the short links 19 and 20, which in turn are pivoted as at 21 to the short links 22 which are adapted to be turned down when not in use, but which when employed carry short cross studs 23 at the ends thereof which studs are disposed upon the outer sides of the sheets 1, the flanges 2 of the sheets being slotted as at 24 to permit the passage of the links 22 therethrough and receive the studs 23 as shown in Fig. 4.

The numerals 25—25 indicate pull or push rods extending longitudinally of the main shaft, said rods being fastened as at 26 to the hub 7 at the left hand side of the shaft, the said rods then extending through bores or openings 27 in the adjacent loose hub 14 and are secured at their opposite ends to the loose hub 14 at the right hand side of the shaft, as shown at 27. Similarly the pull or push rods 28 are coupled or fastened to the hub 7 at the right hand side of the main shaft, passed through bores 29 in the adjacent loose hub 14 and are rigidly secured or connected to the left hand loose hub 14, as at 30.

From the description thus far given and by reference to the drawings, it will be seen that the inner casings is primarily composed of a series of sections normally in the form of flat sheets with downturned angular flanges or edges. When the sheets are to be assembled in the form of a cylindrical core, the ends of the links 22 carrying the studs are placed in position, heretofore described, with each cross stud overlying the adjacent angular edges of the sections. The handle 6 is then turned to pull the ends of the sheets toward each other, thereby bending or curving the sheets, until a cylinder is formed, with the contiguous angular flanges in face-to-face contact, these flanges forming strengthening ribs running longitudinally on the inside of the cylinder. By reference to the drawings, it will be seen that one of the sections of the inner core forms what I term the releasing section which is arranged at the top of the core and is constructed and operated as follows: The releasing section comprises two sheet members 31—31 having at their outer edges the downturned angular flanges 32, similar to the flanges 2, while at their adjacent edges, the sheets 31 are formed with longitudinally extending hollow webs 33 formed by bending the ends of the sheets, said webs being inclined downwardly as at 34, thence horizontally as at 35, thence upwardly as at 36 and terminating in the horizontal portion 37, where said web is secured to its sheet by the bolts or rivets 38. Each horizontal web is provided with a wedge-shaped body 39 in the form of a wooden block which strengthens and reinforces the same. Formed in this central web of the releasing section are the oppositely expanding curved slots 40—40 in each of which rise a connecting bolt 41, connecting the links 42, said links being in turn pivotally connected as at 43 to the short links 44 which in turn are pivoted as at 45 to the long levers 46 which are operable from the main shaft 3, the structure of levers just described forming a double lazy tong arrangement. Between the links 42 is supported a block 47 having a bore 48 therein for the passage of the threaded rod or pull bolt 49, the latter being actuated by a crank handle 50. When the pull bolt or rod 49 is turned until the bolts 41 are drawn down, the edges of the wedge-shaped sheets are released so that one flanged side may pass the adjacent side whereby the sheets may be removed from the studs to permit the form to be contracted and all of the sheets removed.

The outer shell or casing B of the mold is also formed of a series of metallic plates or sections 51 having the outwardly extending side flanges 52. The outer casing is adapted to be built up around the inner casing, sheet by sheet, as the work of filling and tamping in the concrete between the two shells progresses.

The numerals 53 designate spacer bars each having a lower hooked end portion 54 designed to be connected to one of the studs 23 carried by the short link 22, said spacer bars being further provided with a series of vertically arranged apertures 55 by means of which the distance between the two shells may be adjusted. The spacer bars extend radially between the two shells, and are connected to the flanges of the outer shell through means of bolts or studs 56 extending through the flanges and through the openings in the spacer bars or rods.

From the above description, taken in connection with the accompanying drawings, the construction and manner of employing my improved mold or former will be readily apparent to those skilled in the art. The inner core is first assembled, as is shown in

the drawings, and the sheets or sections form hexagon in cross section. The desired number of tie rods for the sections of the outer shell are then hooked to the studs at the ends of the links connected with the long levers and the sections of the inner core are pulled together by revolving the crank handle 6 so that the sheets of the inner core are bowed or drawn into circular or cylindrical form. The building of the concrete structure then begins from the bottom, the sheets of the outer core being hooked or connected to the studs through the medium of the tie bar, as the work progresses, the tie bars passing between the adjacent edges of the outer sheets, the concrete then being tamped in the space formed by the built-up sections of the outer shell, and the inner core, the outer sheets being forced into circular form by the tamping action. Thus any sheet is forced to all the direct curves of culverts or sewers of different diameters. The process is then continued, the outer sheets being added as the work progresses, until the complete culvert is formed, said culvert or sewer being finished at the top thereof directly over the releasing sheets. When it is desired to remove the former, the releaser sheets are loosened by swinging the locking bolts carried by the links out of the curved slots and thereby permitting the sheets to pass each other edge-to-edge. The core may then be contracted and removed, and the outside casing taken off sheet-by-sheet. In some instances, it may be necessary in forming culverts, for instance, sixteen to twenty foot long or longer to use two or more forms, and in this case the forms are set end to end, and overlap so that they form practically one mold or former.

It will be noted that I have provided an exceedingly simple, strong and positive former or mold, whereby the sewer, culvert or conduit may be built up, and, furthermore, it will be seen that the device may be easily and readily assembled in use and dismantled when desired.

While I have herein shown and described one particular embodiment of my invention, I wish it to be understood that I do not limit myself to all the precise details of construction, herein set forth, as modification and variation may be made without departing from the spirit of the invention or exceeding the scope of the appended claims.

Having thus described the invention, I claim:—

1. A former comprising a series of flat sheets having flanged edges, means for connecting the adjacent edges of the sheets, and means for bending or bowing said sheets into circular form with the flanges drawn together to form trusses.

2. A former comprising a plurality of metallic sheets, means connecting said sheets at adjacent edges, and means for pulling upon said connections to draw the sheets into cylindrical form.

3. A former comprising a plurality of flat sheets having angular flanges, means extending between the flanges and forming part of mechanism for drawing the sheets together, and members carried by said means for engaging with the flanged edges of the sheets to bow the latter in the operation of said means.

4. A former comprising a plurality of flat sheets having flanges at the side edges thereof, a power shaft, and means connected to the power shaft, and to the sheets designed when said shaft is actuated to pull the edges of the sheets inward, thus bowing or bending said sheets to form a cylindrical shell.

5. A former comprising a plurality of flat sheets assembled edge to edge, a power shaft, levers radiating from said shaft, and connections between the levers and the sheets whereby the latter are bent into the form of a cylinder when the power shaft is actuated to pull upon said levers.

6. A former comprising a plurality of flat sheets, a power shaft, hubs upon said power shaft, levers connected to said hubs and connections between said levers and the ends of the sheets whereby said sheets are bent to form a cylinder when the levers are drawn inward by the actuation of the power shaft.

7. A former comprising a plurality of flat sheets assembled edge to edge, flanges formed at the edges of the sheets, said sheets having offsets or recesses in the edges for the passage of links therethrough, levers extending through said recesses, and having connections with said sheets power levers connected to said links, and means for actuating the levers.

8. A former comprising a plurality of flat sheets having inwardly turned flanges at the edges thereof, a power shaft, hubs mounted upon said power shaft, lazy tong levers carried by the hubs, and connections between said levers and the edges of the sheets whereby the latter may be bent or bowed, when the levers are contracted, to form a cylindrical shell.

9. A former comprising a core composed of a series of flat sheet sections having inturned flanges, an outer casing surrounding said core and also formed of a series of flange sheets, mechanism for bending the sheets of the core to form a cylinder, the outer casing being bent to the form of the core by the material tamped between the core and casing, and tie rods extending from the bending mechanism to the outer casing.

10. A former comprising a plurality of flat sections forming a portion of a core, a release section coöperating with the other

sections formed of two sheets having flanges at the edges thereof, the adjacent flanges of said release sheets being formed to pass each other, an operating lever, a power shaft for said lever, a short lever connected to the operating lever, a link pivoted to said short lever, a bolt carried by said link and working in segmental slots formed in the adjacent flanges of the sheets the construction and arrangement being such that said bolt may be withdrawn from the slots to permit the removal of the release sheets and the contraction of the core.

11. A former comprising a core formed of a plurality of flat sheets and a release section formed of two flat sheets having the abutting edges formed to pass each other in overlapping engagement, mechanism for bending all of said sheets individually to form a cylindrical core, and means holding the sheets of said release section normally against relative movement.

12. A former comprising a core formed of a plurality of flat sheets and a release section formed of two flat sheets having the abutting edges formed to pass each other in overlapping engagement, mechanism for bending all of said sheets individually to form a cylindrical core, means holding the sheets of said release section normally against relative movement, and means for releasing said last-named means.

In testimony whereof I affix my signature in presence of two witnesses.

MARVIN H. MOONEY.

Witnesses:
W. M. MORRIS,
H. R. MORRIS.