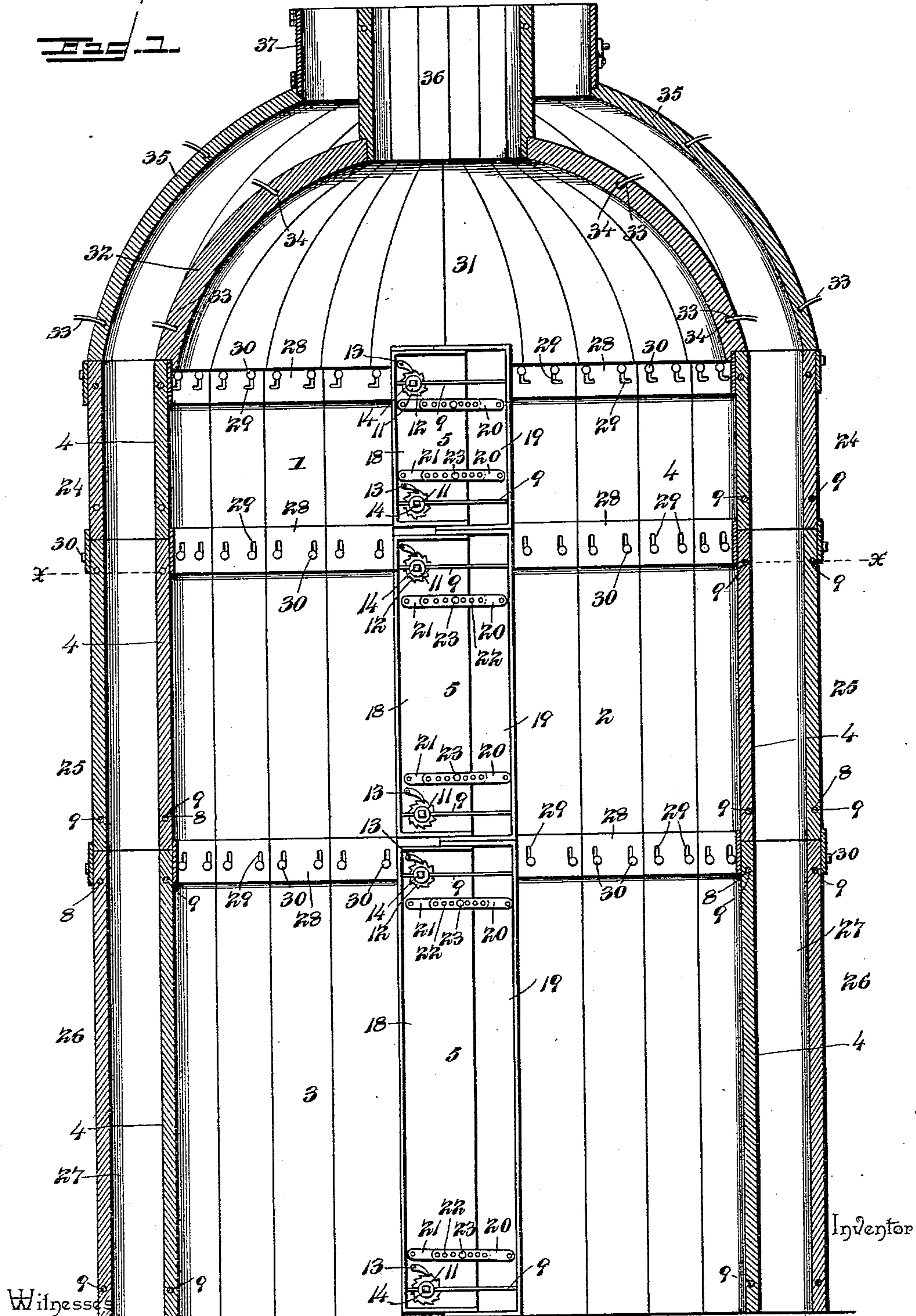


2 Sheets—Sheet 1.

No. 559,931.

Patented May 12, 1896.



By *his* Attorneys, *Rolla W. Campbell*

E. H. Stewart.
V. B. Hillyard.

Chas. Snow Geo.

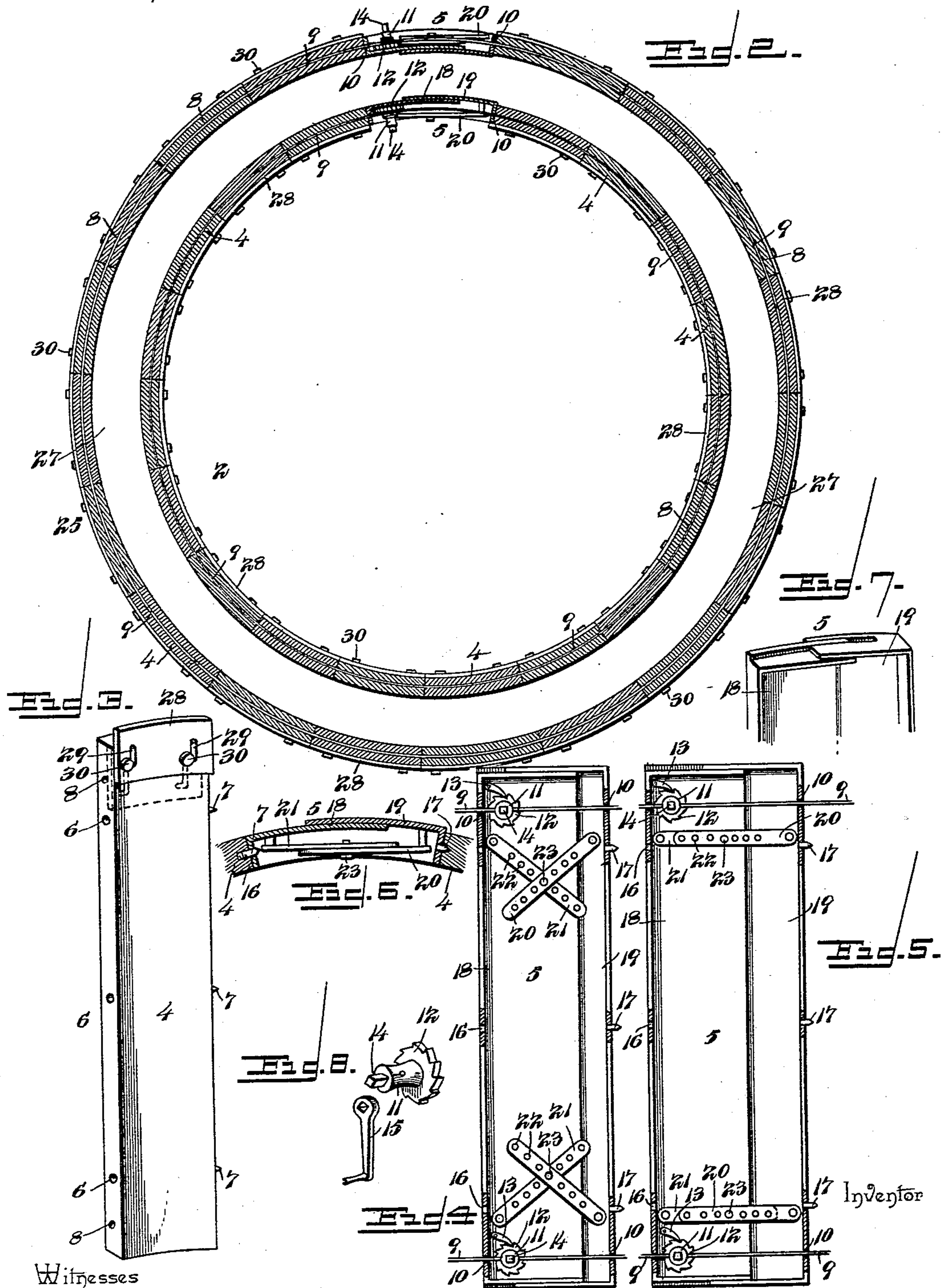
(No Model.)

2 Sheets—Sheet 2.

R. W. CAMPBELL.
MOLD FOR CISTERNS, RESERVOIRS, &c.

No. 559,931.

Patented May 12, 1896.



Witnesses

E. H. Stewart
V. B. Hillyard

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UNITED STATES PATENT OFFICE.

ROLLA W. CAMPBELL, OF FORT RECOVERY, OHIO.

MOLD FOR CISTERNS, RESERVOIRS, &c.

SPECIFICATION forming part of Letters Patent No. 559,931, dated May 12, 1896.

Application filed December 23, 1895. Serial No. 573,103. (No model.)

To all whom it may concern:

Be it known that I, ROLLA W. CAMPBELL, a citizen of the United States, residing at Fort Recovery, in the county of Mercer and State of Ohio, have invented a new and useful Mold for Cisterns, Reservoirs, &c., of which the following is a specification.

This invention relates to the construction of cisterns, reservoirs, &c., of concrete or other artificial-stone composition, and aims to provide a mold which can be used for constructing the cisterns of any required size and above ground or at the place where it is required to locate the same.

A further object of the invention is the provision of a mold made in sections, whereby a cistern or reservoir of any height can be built by combining two or more of the sections; also in forming each section of a number of staves or elementary parts, whereby the diameter of the cistern can be increased or diminished according to the required capacity.

A still further object of the invention is the construction of a mold which can be stored or packed into a small compass and which can be quickly set up for use and again taken apart after the cistern has been erected and set or hardened.

Other objects and advantages are sought to be attained and will appear as the nature of the invention is better understood; and to this end the improvement consists in certain details of construction, novel features, and peculiar combinations of parts, which hereinafter will be more fully described, illustrated, and claimed.

The improvement is susceptible of various changes in the form, proportion, and the minor details of construction without departing from the principle or sacrificing any of the advantages thereof, and to a full disclosure of the invention an adaptation thereof is shown in the accompanying drawings, in which—

Figure 1 is a vertical central section of a mold constructed in accordance with this invention. Fig. 2 is a plan section thereof on the line X X of Fig. 1. Fig. 3 is a detail view of a stave or element of a mold-section. Fig. 4 is a detail view of an expansible stave or element. Fig. 5 is a view similar to Fig. 4, showing the parts of the stave extended. Fig. 6 is a detail section of an adjustable stave.

Fig. 7 is a detail view of an end portion of the adjustable stave. Fig. 8 is a detail view of the means for tightening the wire or flexible connection employed for securing together the elementary parts of a mold-section.

Like numerals of reference denote corresponding and similar parts in all the figures of the drawings.

In its organization the mold is composed of a series of sections 1, 2, and 3, the number varying and being dependent upon the use for which the mold is designed. These mold-sections are similarly constructed, but vary in length, so that one or more of the sections can be used according to the height of the cistern, reservoir, &c., to be constructed. Suppose the section 1 is about two feet in height, the section 2 four feet, and the section 3 six feet. If it be required to construct a cistern six feet high, the section 3 will alone be used, and if the diameter exceeds that of the section 3 any number of the staves of the sections 1 and 2 can be interposed, so as to increase the diameter of the section 3 to correspond to that of the cistern to be built. This will be comprehended when it is remembered that each section is composed of staves which are readily separable, and since the staves of the section 1 are two feet long and those of the section 2 four feet it will be seen that by placing the staves of the sections 1 and 2 end to end their combined length will be six feet, thereby adapting them for use in connection with the staves of the section 3, so as to increase the diameter of the latter when required. To construct a cistern ten feet high, the sections 2 and 3 will be employed, or if it be required to build a cistern only eight feet high the sections 1 and 3 will be combined. Thus it is obvious that the sections can be combined in any desired manner for the erection of a cistern of required height.

The mold-sections are constructed substantially alike. Hence a detailed description of one will suffice to a clear understanding thereof. Each section is composed of a number of wooden staves 4 and an expansible stave 5, and these staves are formed along one edge with a series of openings 6, and are provided at the opposite edge with dowel-pins 7, corresponding in position and number with the openings 6, so that when placing the staves

together the dowel-pins 7 will enter the openings 6, and thereby secure the staves from accidental slipping. Transverse openings 8 extend through the staves near their ends, and through these openings are passed wires or similar connections 9, so as to secure the staves from outward displacement after the fashion of the ordinary hoops for tanks, casks, &c. The expansible stave 5 is provided near its ends with openings 10, through which pass the end portions of the wires 9, and which ends are engaged with drums 11 near the ends of the stave 5, so as to be wound thereon when it is required to tighten the wires 9, so as to draw the staves closely together. Each drum 11 is provided with a circular ratchet portion 12, whose teeth are engaged by a pawl 13, and with an angular portion 14, to which is fitted a crank 15 for rotating the drum 11 to wind the wire thereon when it is required to draw the staves together, the pawl 13 engaging with the teeth of the ratchet portion 12 and holding the drum against backward rotation.

The expansible stave 5 is provided at one edge with openings 16 to receive the dowel-pins 7 and at the opposite edge with dowel-pins 17 to enter the openings 6 of any one of the staves 4, thereby admitting of the stave 5 being placed between any two of the staves 4. The parts 18 and 19 comprising the stave 5 are adapted to slide upon one another and are flanged at their ends and outer edges to approximate the thickness of the staves 4, and these parts are preferably formed of sheet metal of sufficient stoutness to withstand the strain and pressure to which the mold will be subjected when in use. Arms 20 and 21 are pivotally connected to the respective parts 19 and 18 near their outer edges, and are formed with a series of openings 22, through which are passed pins 23 to hold the parts 18 and 19 in the adjusted position. By having the parts 18 and 19 slidably mounted upon each other the width of the stave 5 can be varied, thereby admitting of the diameter of the mold-section being readily adjusted to any degree within certain limits. When a mold-section is set up and ready for use, the arms 20 and 21 are in alinement, as shown in Fig. 5, thereby preventing the collapsing or inward movement of the parts 18 and 19. After the cistern has been constructed the mold-sections are removed, first, by cutting the wires 9 close to the drums 11, then swinging the arms 20 and 21 inward without removing the pins 23, thereby drawing the parts 18 and 19 together, so as to clear the dowel-pins and admit of the removal of the stave 5, after which the remaining staves can be detached, as will be readily understood.

The mold-sections 1, 2, and 3 constitute the core and will be used when an excavation is made in the ground for the construction of the cistern therein, the walls of the excavation forming the outer inclosure to sustain the cement or plaster material filled into the space between the walls of the said excava-

tion and the mold-sections. When it is required to construct a cistern above ground, corresponding mold-sections 24, 25, and 26 will have to be provided, so as to surround the sections 1, 2, and 3 and form therewith an annular space 27, into which the composition or plaster material is filled. These outer mold-sections will be constructed precisely in the same manner as the inner mold-sections and will be supplied with expansible staves the counterpart of those of the inner mold-sections, with the exception that the molding-faces of the expansible staves for the said outer sections will be concave instead of convex, as required for the inner mold-sections.

In order that the superposed sections may be held in proper relation, each stave is provided with a plate 28 at its upper end, and this plate is formed with L-slots 29 near its ends to receive pins 30, let into the staves 4, and which engage with the horizontal portion of the L-slots 29, so as to hold the plate 28 projected when it is required to have the said plate extend over the joint formed between the abutting ends of adjacent staves. By moving the plate 28 so that the pins 30 will register with the vertical portion of the L-slots 29 it can be lowered so that its top edge will come about flush with the upper edge of the stave. This is clearly indicated by the dotted lines in Fig. 3.

In order to finish the crown or upper end of the cistern, reservoir, &c., a dome-section 31 is provided and comprises a series of curved and segmental staves 32, which are adapted to be held together by wires 33, passing through openings 34 near the ends of the staves 32 in a similar manner to the staves 4 of the several mold-sections. The staves comprising the dome-section are rabbeted at their lower ends to receive the upper end of the mold-section 1, so as to prevent slipping. An outer dome-section 35 is placed opposite the dome-section 31 to inclose a space to receive the cement material.

A neck 36, formed of a series of staves, is rabbeted at its lower end and is fitted into the opening of the dome-section 31, and a band 37, of metal, encircles the neck 36 and is composed of two parts, which are hinged together and secured at their free ends by any suitable fastening.

Having thus described the invention, what is claimed as new is—

1. In a mold for constructing cisterns, &c., of cement material, an expansible stave composed of laterally-slidable parts, in combination with arms having pivotal connection with the slidable parts and with each other, and adapted to be brought into alinement to hold the parts extended and to be turned on their pivotal connections to reduce the width of the stave, substantially as and for the purpose set forth.

2. In a mold for constructing cisterns, &c., an expansible stave composed of laterally-slidable parts, in combination with arms hav-

ing pivotal connection with the said parts and provided in their length with a series of openings, and pins passing through registering openings in the arms to secure the latter and the parts of the stave in locked relation, and forming pivots for the said arms to turn upon when it is required to reduce the width of the stave, substantially as set forth for the purpose described.

10 3. In a mold for constructing cisterns, &c., the combination of a series of staves interlocking at their longitudinal edges and formed with transverse alining openings, an expan-
15 sible stave adapted to be interposed between any two of the series of staves and interlocking therewith at its edges, and having openings in register with the said transverse openings, means for securing the parts of the ex-
20 pansible stave in an adjusted position, a drum attached to the expansible stave and supplied with means to hold it against backward rotation, and a wire or like connection passing through the transversely-alining openings of
25 all the staves and having connection with the said drum, substantially in the manner set forth for the purpose described.

4. In a mold for constructing cisterns, &c., the combination with a series of staves adapted to interlock at their longitudinal edges and
30 provided with transverse alining openings, of an expansible stave comprising laterally-slid-

able parts, arms having pivotal connection with the slidable parts and formed in their length with a series of openings, pins passing through registering openings in the arms, 35 drums mounted upon one of the said slidable parts, wires or like connections passing through the transverse openings in the several staves to connect them in series and having connection with the respective drums, and 40 means for rotating the drums to tighten the wires and for securing the said drums against retrograde movement, substantially as set forth.

5. In a mold for constructing cisterns, &c., 45 the combination with superposed mold-sections, of metal plates disposed at the end of one section and adapted to overlap the end of the adjacent section, and having L-slots, and pins passing through the L-slots and 50 adapted to cooperate therewith to secure the plates in working relation and to the end portion of the first-mentioned section, substantially as set forth.

In testimony that I claim the foregoing as 55 my own I have hereto affixed my signature in the presence of two witnesses.

ROLLA W. CAMPBELL.

Witnesses:

JOHN A. HUNTER,

GEO. W. KRENNING.