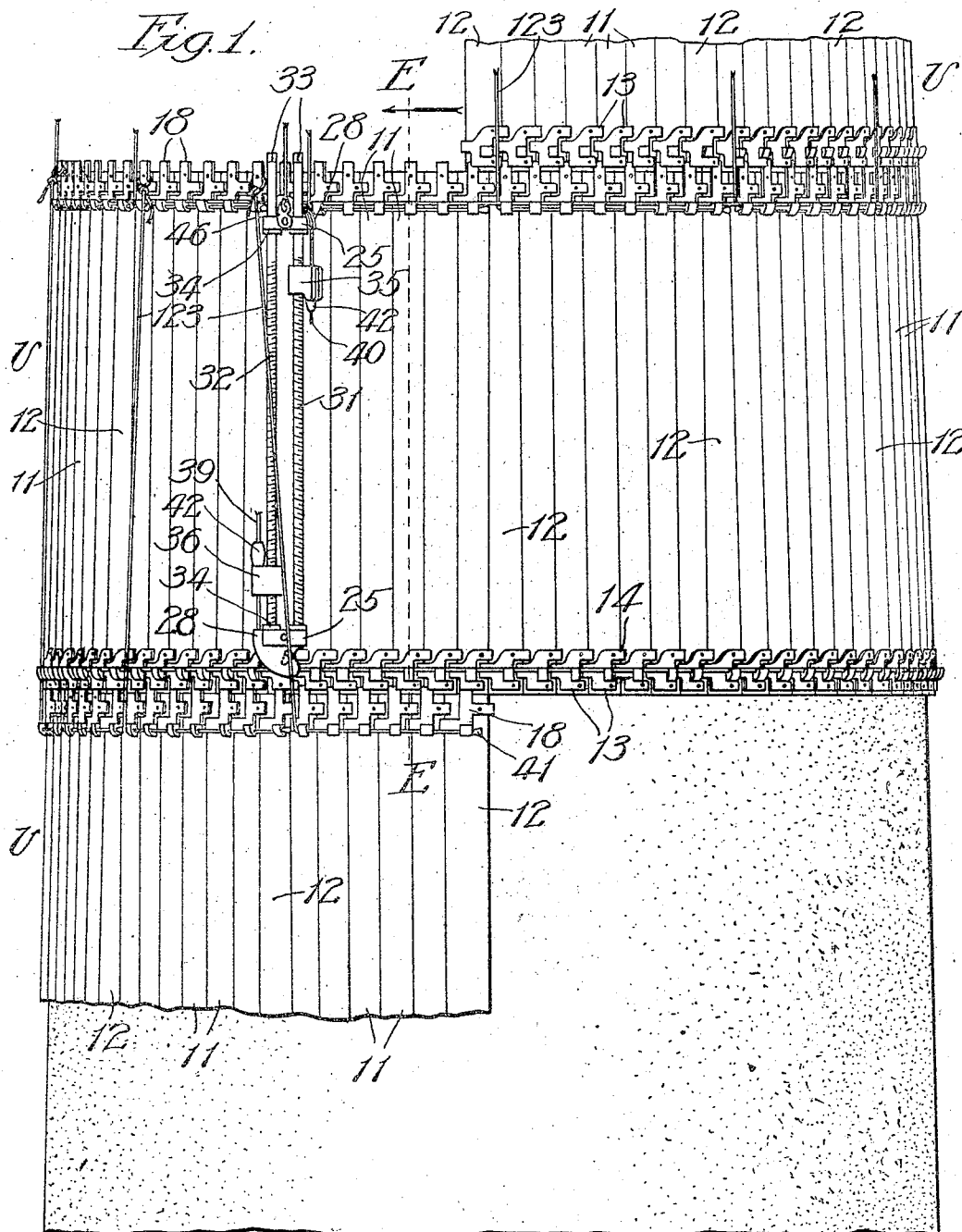


C. WEBER.
ERECTING MOLD FOR CONCRETE STRUCTURES.
APPLICATION FILED OCT. 12, 1909.

968,905.

Patented Aug. 30, 1910.

6 SHEETS—SHEET 1.



Witnesses:

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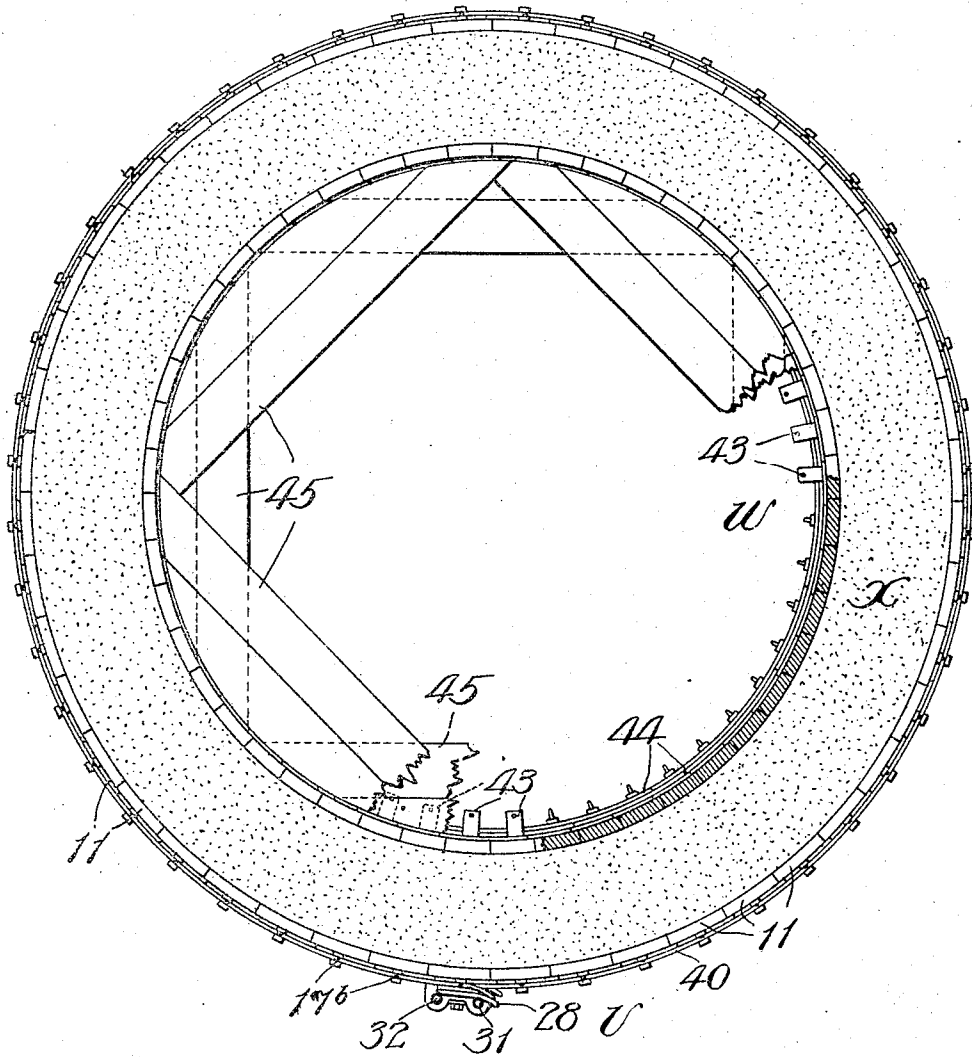
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Fig. 2.



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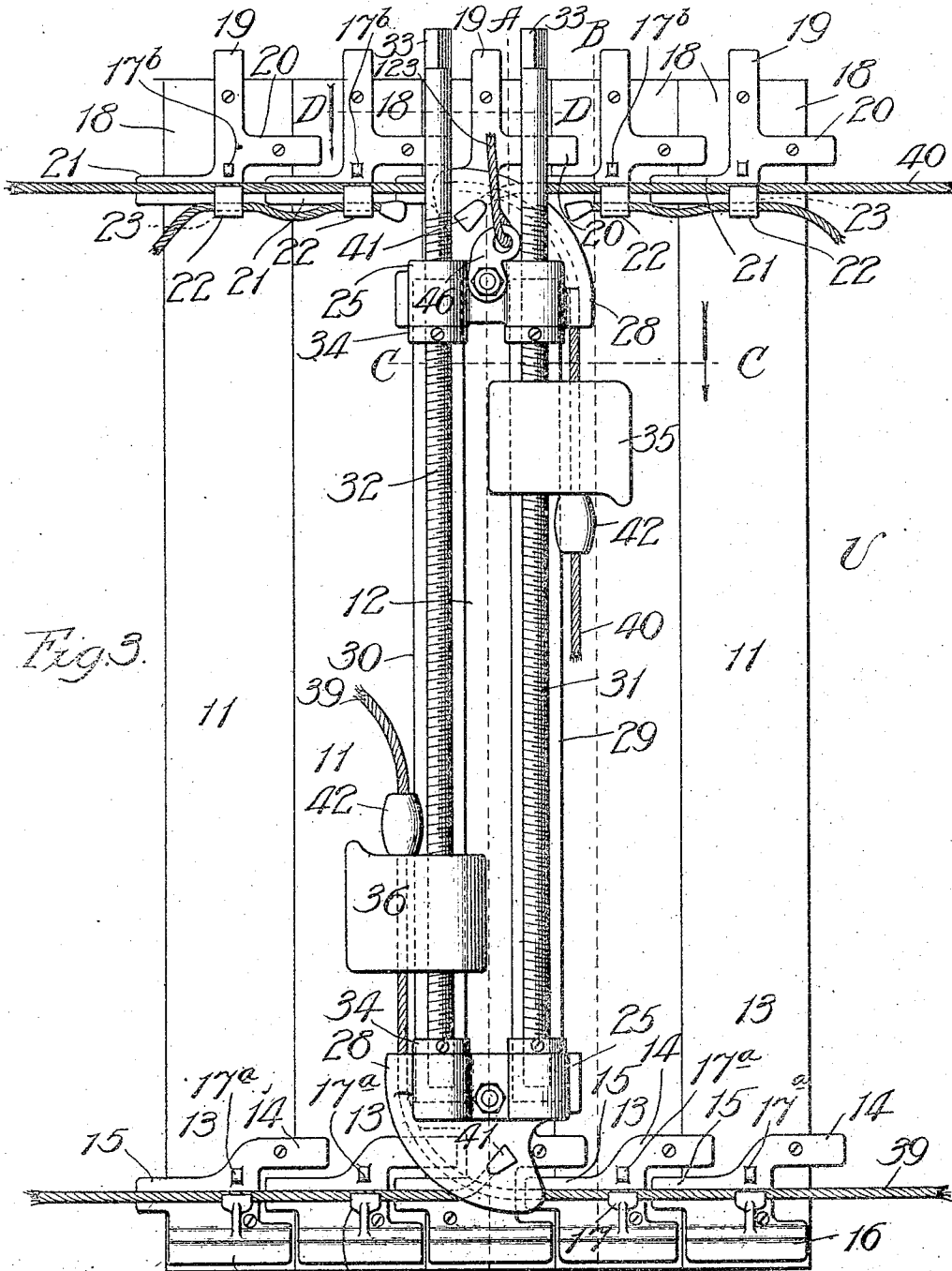
By Syrenforth, Lee, Chritton & Wiles
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6 SHEETS—SHEET 3.



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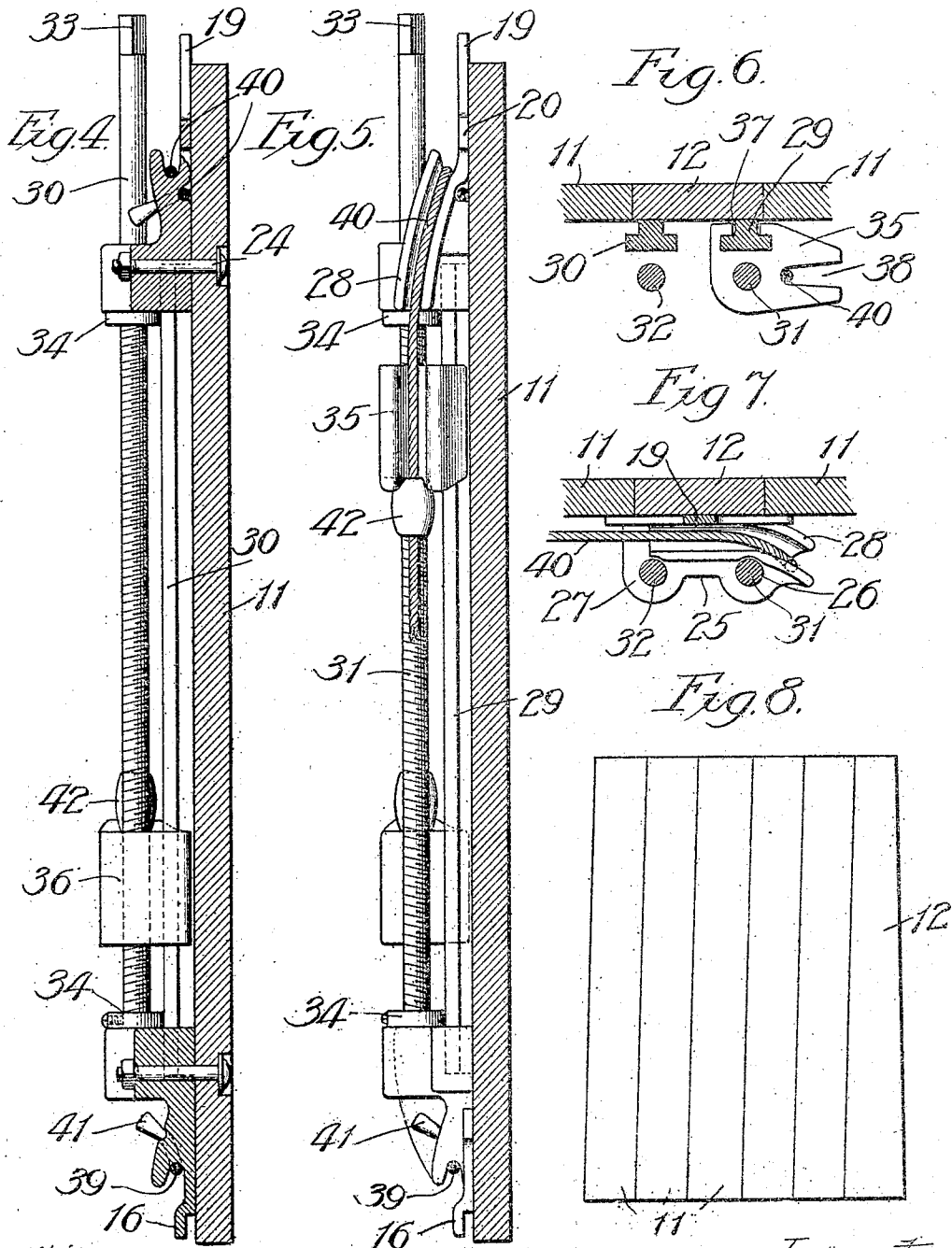
By Sydenhorth, Lee, Chritton & Miles.
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6 SHEETS—SHEET 4.



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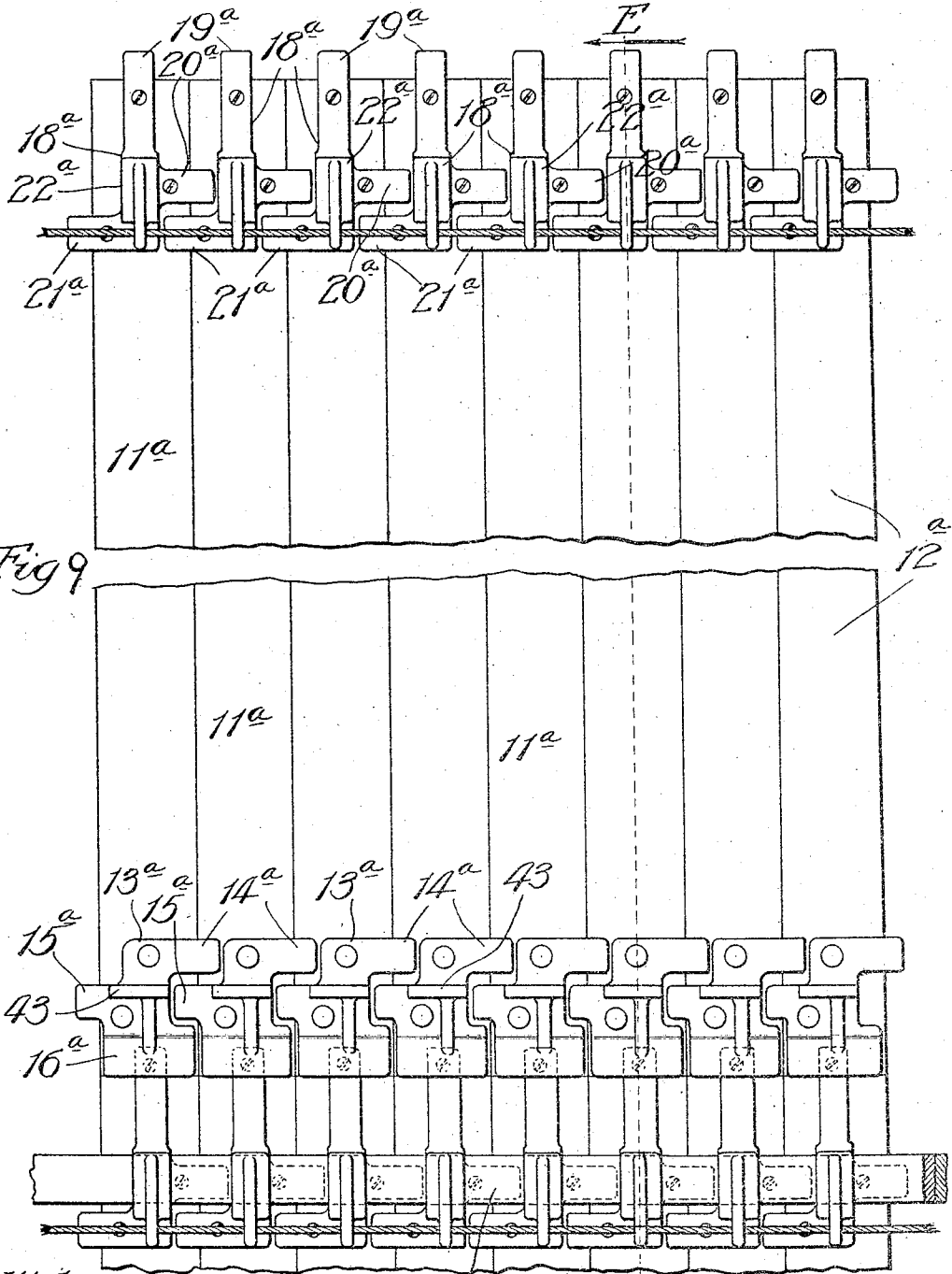
Dy. Dyrenforth, Lee, Christman & Miller
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6 SHEETS—SHEET 5.



Witnesses:
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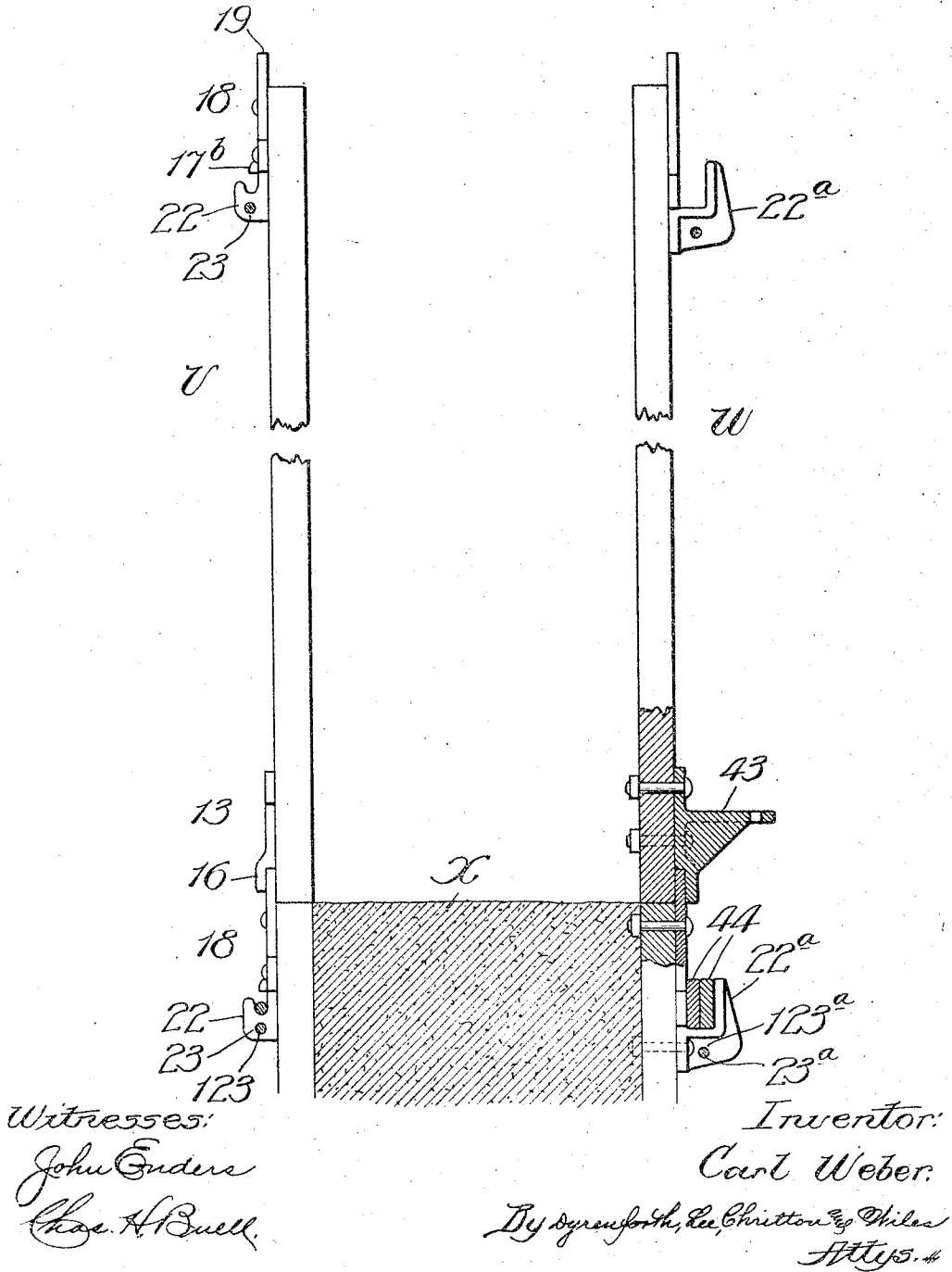
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Patented Aug. 30, 1910.

6 SHEETS—SHEET 6.

Fig. 10.



UNITED STATES PATENT OFFICE.

CARL WEBER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WEBER CHIMNEY COMPANY,
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ERECTING-MOLD FOR CONCRETE STRUCTURES.

68,905.

Specification of Letters Patent. Patented Aug. 30, 1910.

Application filed October 12, 1909. Serial No. 522,268.

To all whom it may concern:

Be it known that I, CARL WEBER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Erecting-Molds for Concrete Structures, of which the following is a specification.

In building circular concrete structures with the use of molds of the desired form and into which the green concrete is filled and tamped and left to set, section after section being thus built one upon the other to the height to be attained, it is common practice to employ molds of different diameters to correspond with the diameters of different structures or parts of structures to be erected by their use. Each mold is necessarily of unvariable diameter even though it be, as is frequently the case, composed of arc-shaped sections for convenience in handling it, since they are rigidly united. This condition of the art makes it necessary for a builder of such structures to keep on hand or provide many sizes of molds to enable him to be equipped for erecting different diameters of structures he may be called upon to undertake. This requirement is objectionable for various reasons, principal among which are the expense incurred in constructing and maintaining a large number of molds, of which a considerable number may remain out of use for long periods and deteriorate with non-use, besides representing more or less dead capital; the inconvenience and expense of shipping them from place to place of use and handling them, due to their bulkiness, and their liability to be damaged and practically ruined in shipment.

The primary object of my invention is to provide a construction of mold for the purpose herein referred to, whereby it shall be readily adaptable for use in erecting any cross-sectional dimensions of structure.

My invention is particularly useful and I have more especially devised it for the erection of upwardly-tapering circular structures of molded concrete, reinforced concrete, or similar material, in connection with which its advantages are most pronounced, though it may be used to advantage in the erection of polygonal and other forms of such structures; and I have primarily devised it and practically employed it in the

construction of chimneys or stacks involving the tapering shape referred to, in which application it is, therefore, illustrated in the accompanying drawings, in which—

Figure 1 is a broken view in elevation of a concrete chimney undergoing erection with the use of molds of my improved construction; Fig. 2 is a cross-sectional view of the same showing a somewhat modified construction of the mold as used for the interior of the structure; Fig. 3 is a view in elevation, on a scale enlarged over that of the preceding figures, showing a portion of the outer mold equipped with means which I have devised for readily tightening and loosening it and for holding its parts together; Figs. 4 and 5 are sections taken, respectively, on lines A—A and B—B, Fig. 3; Figs. 6 and 7 are sections taken, respectively, on the lines C—C and D—D, Fig. 3; Fig. 8 is a view, showing by way of a diagram, a bunch or bundle of the staves composing the body of the mold in their assembled relation but without any attachment-details; Fig. 9 is a broken view, but otherwise like that presented in Fig. 3, of the mold as used for the inside of the structure to cooperate with the outside mold, and Fig. 10 is an enlarged broken section on line E—E, Fig. 1.

When, as is more usually the case, the outside and inside molds are used together, they, of course, cooperate to form the mold proper; but throughout the present description I designate each of the two members by the term "mold", for the reason that each, and particularly the outer one, may be used in instances, as for solid structures, separately and is thus an independent article.

It is an essentially characteristic feature of my improved mold that it shall comprise, as to its body-portion, flexibly-united sections that are independently removable and insertible. It is also essential, to obtain all the advantages of my invention, when used for erecting a structure of circular and tapering shape, requiring the mold to be of corresponding shape, that each of these sections, at least to the number thereof requiring to be removed in the progress of the work, as hereinafter described, constitute a unit and be in width π , or 3.1416, times the difference between the bottom and top of the mold. These

structures, as chimneys or stacks, are commonly erected in successive sections built one upon the other, each, say, three and one-half feet in height and formed by molding the concrete to that height, which is also that of the mold and therefore of each mold-section, so that when, in the progress of the work, a mold which has been used in forming a lower section is transferred to a higher position for using it to form another section, withdrawal of one or more units from the mold shall adapt it to form a circle reduced in circumference at its base and top to conform to the taper of the new section to be molded in it. The tapering shape of the mold is produced by wedge-shaped sections, of proper dimensions assembled with the other sections, each of which latter is of uniform width throughout its length; and it is preferred to have the aforesaid wedge-like sections or "reducers" each tapered along both edges and to divide or distribute the difference between the circumference of the lower end of the mold and that of its upper end among a plurality of the reducers, twelve of which are preferably used in any mold of ordinary size for my particular purpose. If, therefore, the taper desired in a chimney be that of one inch difference between the lower and upper ends of each molded section thereof, the width of each "unit" of the mold that may be required to be removed therefrom is 3.14 inches; if the standard be one and one-fourth inches, the width of the unit is 3.93, and if the standard be one and one-half inches, then 4.71 inches is the width of the unit, and so on.

V denotes the outer mold, W the inner mold and X a concrete upwardly-tapering chimney undergoing erection by their use. The mold V is composed of a plurality of staves or sections 11, of metal or wood, each of a width throughout its length of pi times the difference between the lower and upper ends of the complete mold to constitute it a unit, and a plurality (preferably twelve) of somewhat wider and similar staves or sections 12, each tapered upwardly along both edges to an extent to distribute among them all the degree of taper required to produce the desired difference in circumference between the lower and upper ends of the complete mold. All the sections should be of uniform length and thickness. Each section 11 is provided rigidly on its lower end with a metal clip 13 having a tongue 14 extending from one end, a tongue 15 extending from its opposite end and an offset-clip 16 extending from its lower end, with a hook 17 and a stop 17^a projecting from its face. These clips are shown to be fastened in place by screws through perforations in them, and the lips 16 form sockets for the purpose hereinafter explained. Another

clip 18 is provided, and shown to be fastened like the clips 13, on the upper end of each stave or section and is formed with two arms 19 and 20 extending at right-angles to each other, a third arm 21 extending opposite to and parallel with the arm 20, and a hook 22 on the lower end having a transverse opening 23 through its base-portion for the passage of a wire suspension-rope 123.

For releasably fastening the sections together to form the outer mold means are shown to be provided of which the following is a description: One of the sections 12 has rigidly secured to it near each end of its outer face by a bolt 24 (Fig. 4) a metal head 25 containing at opposite sides of its vertical center apertures or passages 26, 27 (Fig. 7) and having formed with it a segment 28 provided with a rope-receiving groove in its edge. Along this same stave extend, parallel with each other, two similar bars 29 and 30, of T-shape in cross-section, with their ends confined in alining sockets in the opposite heads 25 and performing the guiding purpose hereinafter explained. Threaded rods or screw-shafts 31 and 32, each having an angular upper end at 33 for the application of a suitable wrench by which to turn it, pass through the apertures at 26, 27, in the upper head 25 into those of the lower head, and they are confined against longitudinal movement through the medium of collars 34 secured upon them and bearing against the respective heads, as shown. Nuts 35 and 36 work on the rods 31 and 32, respectively, these nuts being alike and each having a rear socket 37 (Fig. 6), to loosely fit one of the guiding T-bars, and being formed with a laterally and outwardly extending fork or notch 38.

To form a mold V, the sections are assembled by stringing a rope 123 through the opening 23 of each of a number (as seven) of the sections 11 to form a bunch of sections for readily handling and abutting said bunches edgewise together in proper succession, this being done at the place of erection; and the tongues 14 and 15 on each lower clip 13 overlap and form guides in alining with the section carrying such clip the sections flanking it, while the tongues 20 and 21 of the clips 18 on the upper ends of the sections serve the same purpose. With the sections thus assembled to form a ring of desired diameter, ropes or cables 39 and 40, each provided on one end with a stop-head 41 whence it passes through a suitable opening in the segment-member 28 of a head 25, are wound, respectively, about the clips 13, at which the cable 39 is laid in the hooks 17 to be confined against jumping out by the lugs 17^a, and about the clips 18, the cable 40 being laid in the hooks 22 adjacent to which lugs 17^b are provided for the purpose stated

of the lugs 17^a. The free end of the cable 39 is passed about the grooved segment on the lower head 25, for guiding it, and is introduced into the notch or fork 38 of the nut 36, beyond which it carries rigidly a stop-button 42; and the free end of the rope 40 is similarly passed about the grooved segment on the upper head 25 and into the notch 38 of the nut 35, beyond which it also carries a stop-button 42. Thus, turning the screw 32 at its end 33 in one direction works the nut 36 upwardly to strain the cable 39 about the mold and tighten the sections in their assembled relation, while similarly turning the screw 31 forces the nut 35 downwardly to exert a similar effect on the rope 40; and to loosen the mold-sections the rods are turned in the opposite direction, such loosening permitting the ropes to be readily pulled out of the notches 38 to permit the mold to be taken apart.

The construction of the inner mold W does not differ greatly from that of the outer mold. Like the latter, its body-portion is formed of sections 11^a and 12^a, respectively, similar to and for the same purposes as the sections 11 and 12, though no such tightening-means are provided as on the outer mold. The clips 13^a on the lower inner faces of the section-ends are, substantially, like the clips 13 in being formed with tongues 14^a and 15^a to overlap adjacent sections, and with offset lips 16^a on their lower ends; but each is furthermore provided between its upper and lower ends with an inwardly-projecting ledge or shelf 43. The clips 18^a on the upper ends of these last-named sections are very much like the clips 18, being formed with tongues 19^a, 20^a and 21^a, and with hooks 22^a like but larger than the hooks 22 and containing in their base-ports transverse openings 23^a for the passage of a suspension-rope 123^a used for stringing a number of the sections together into a bunch.

To form the mold W the sections are assembled in bunches in the manner described of the outer mold and they are rendered stable in their ring-forming relation by a metal hoop 44 seated edgewise in the hooks 22^a. This hoop is shown to be provided, as preferred, in arc-shape sections resting at their ends in adjacent hooks with the ends of successive hoop-sections overlapping each other and requiring to be driven into their seating-hooks to tighten them in place by friction. The ledges 43 form supports for platform-boards 45 (Fig. 2) provided for the workmen inside the structure in the progress of its erection.

After the first or base section of a chimney X has been formed by filling and tamping concrete between the molds V and W, two other molds, respectively similar to them but each with a unit 11, 11^a less in its

body-portion to properly reduce its circumference, are placed on the base-section, being secured as described of the first set of molds. The tongues 19 on the clips 18 of the first mold V enter the lips 16 of the clips 13 of the second outer mold to interlock the two molds, and in the same way and for the same purpose the tongues 19^a on the lower inner mold W engage the lips 16^a of the second inner mold. The free ends of the ropes 123 of section-bunches in the lowermost outer mold V are looped, each, about a projecting tongue 19 of a clip 18, the rope of the section 12 carrying the tightening mechanism extending from an eye 46 fastened by the bolt 24 to the upper head 25, and the ropes 123^a are similarly looped about the tongues 19^a of the clips 18^a on the second inner mold. This disposition of the rope-ends serves to suspend the bunches of sections connected by them when the tightening means of the lowermost outer mold and the hoop of the corresponding inner mold are released to free the sections, and thus to facilitate the operation by the workmen of raising the lower molds for use in forming upper sections of the chimney. When the second chimney-section has been molded and the concrete thereof has set, the members of the first or lowermost set of molds heave their sections (in bunches) freed in the manner described, whereupon the workmen lift them by the suspension-rope to the top of that section and adjust them in place for molding the third section, upon removing from each mold two of its contained units to cause the newly-placed molds to conform to the dimensions and shape of the chimney-section next to be molded, after completion and setting of which the molds used for forming the second chimney-section are similarly used to form the fourth section; and this procedure is carried on until the desired height of the chimney has been attained, the work being greatly facilitated not only by the construction of the molds but by the ease with which they are adapted to be elevated to the different positions of their use.

What I claim as new, and desire to secure by Letters Patent, is—

1. An erecting-mold for structures of the character described, comprising a body-portion forming a tapering ring composed of a plurality of withdrawable sections constituting units, the width of each unit being pi times the dimensional difference between the opposite ends of the mold, and a suitable number of longitudinally-tapering sections.

2. An erecting-mold for structures of the character described, comprising a body-portion forming a tapering ring composed of a plurality of withdrawable sections constituting units, the width of each unit being pi times the dimensional difference between

the opposite ends of the mold, and a plurality of sections tapered longitudinally to distribute their combined width of taper throughout said body-portion.

5 3. An erecting-mold for structures of the character described, comprising a body-portion composed of flexibly-connected sections, each of a plurality of the sections being withdrawable from the body-portion to reduce its size, ropes surrounding said body-portion near its opposite ends and each secured at one end, and means for releasably tightening each rope, comprising heads near opposite ends of said body-portion and provided with rope-guides, guide-bars extending between said heads, screw-shafts working in said heads and confined against longitudinal movement, and nuts on said screw-bars in which the rope-ends are releasably fastened, said nuts engaging said bars to be guided thereby.

4. An erecting-mold for structures of the character described, comprising a body-portion composed of flexibly-connected sections, each of a plurality of the sections being withdrawable from the body-portion to reduce its size, ropes surrounding said body-portion near its opposite ends and each secured at one end, and means for releasably

tightening each rope, comprising heads near opposite ends of said body-portion and provided with segmental rope-guides, guide-bars extending between said heads, screw-shafts working in said heads and confined against longitudinal movement, and nuts having sockets engaging said bars to be guided thereby and provided with notches in which the free ends of said ropes are releasably confined.

5. An erecting-mold for structures of the character described, comprising a body-portion forming a tapering ring composed of a plurality of withdrawable sections constituting units, the width of each unit being times the dimensional difference between the opposite ends of the mold, and a plurality of longitudinally tapering sections, clips on opposite ends of said sections having hooks, ropes fastened at one end and surrounding the body-portion under confinement in said hooks, and tightening means for each rope on the body-portion operative at the upper end of the mold.

CARL WEBER.

In presence of—

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RALPH A. SCHAEFER.