D. M. DULLER.

FORM FOR BUILDING CONCRETE STRUCTURES.

APPLICATION FILED OCT. 7, 1909.

970,998.

Patented Sept. 20, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

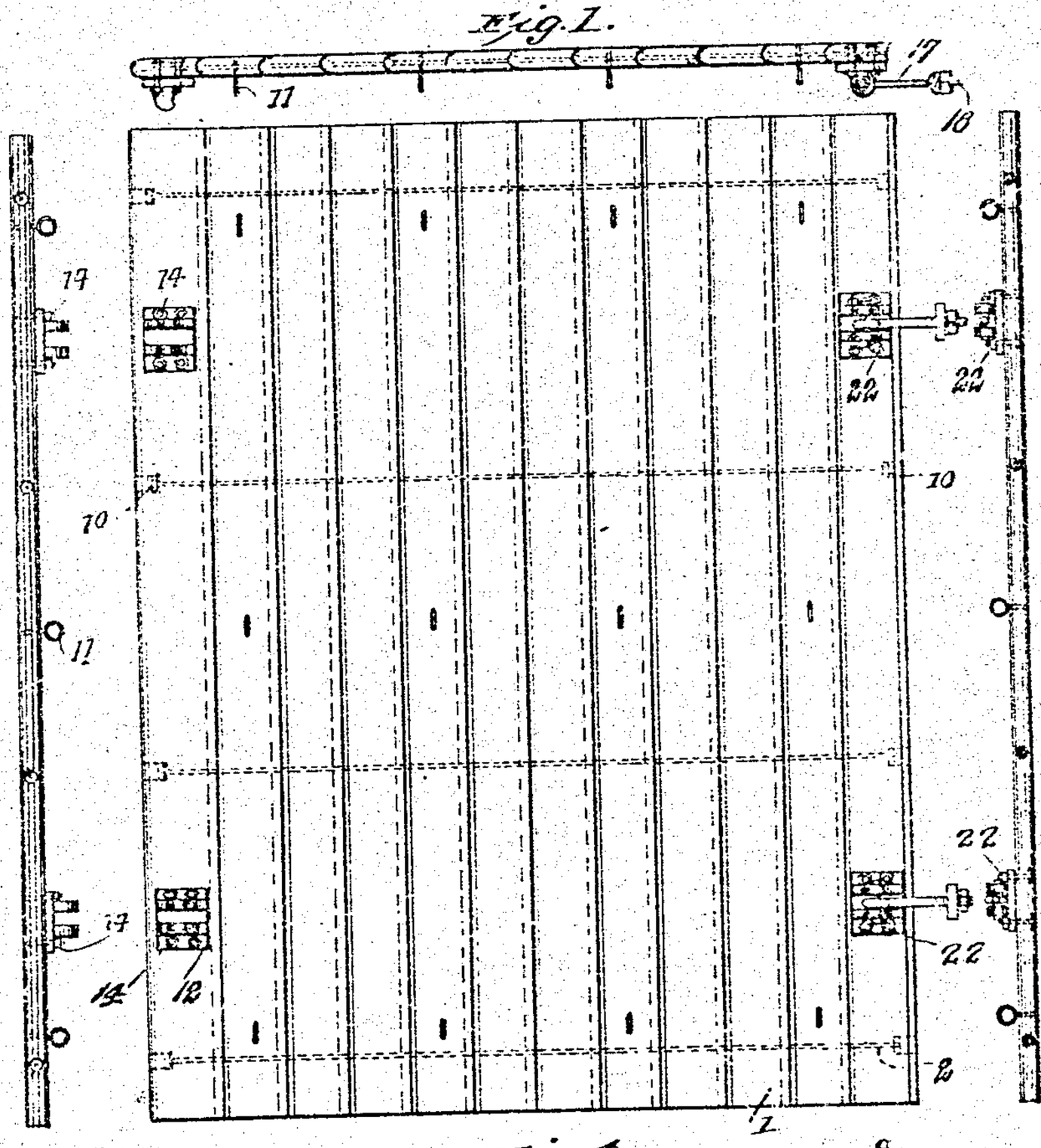


Fig. 4.

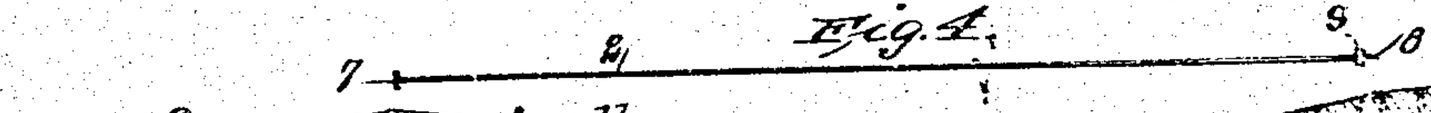


Fig. 2.

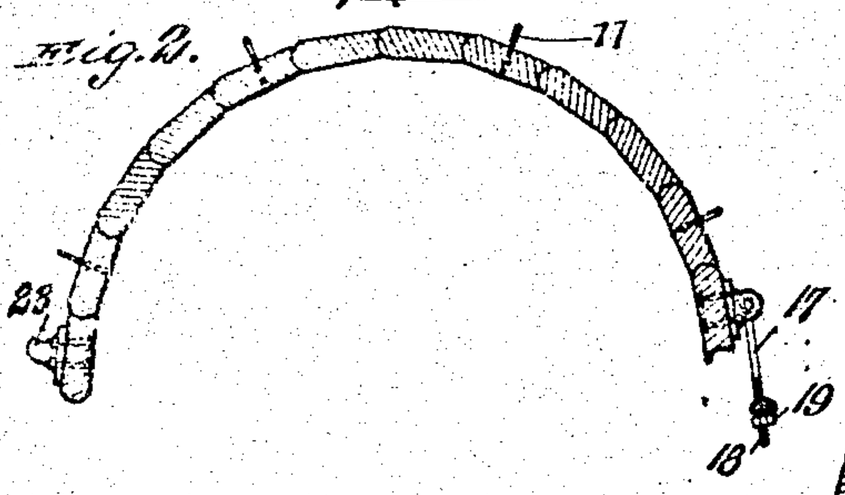
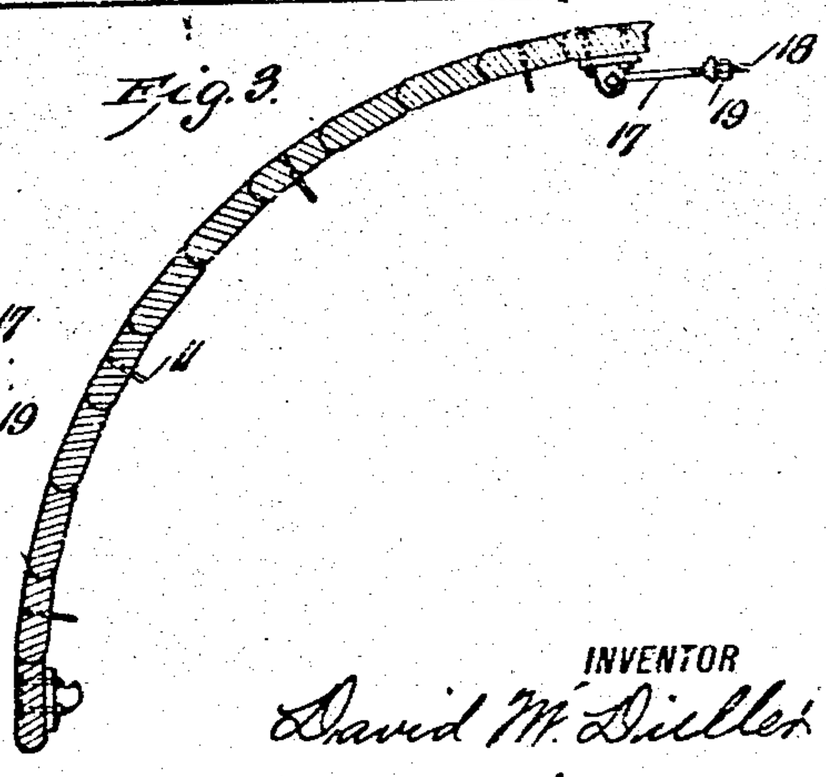


Fig. 3.



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3 SHEETS—SHEET 2.

Fig. 5.

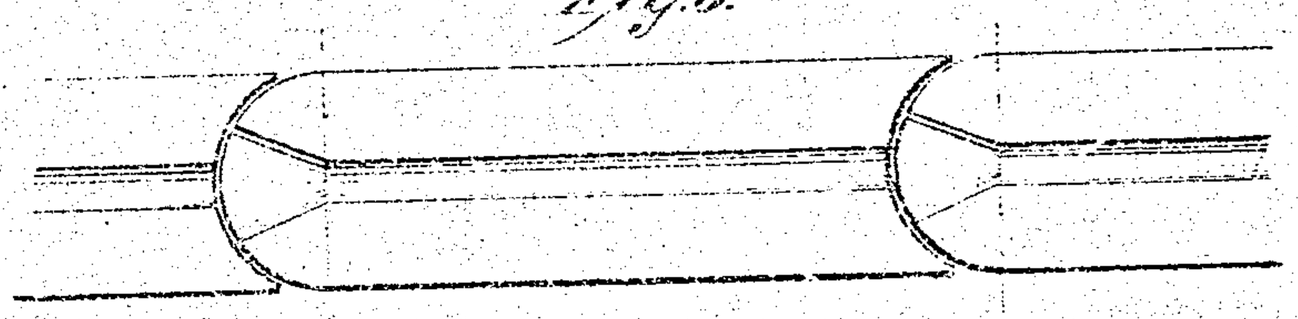


Fig. 6.

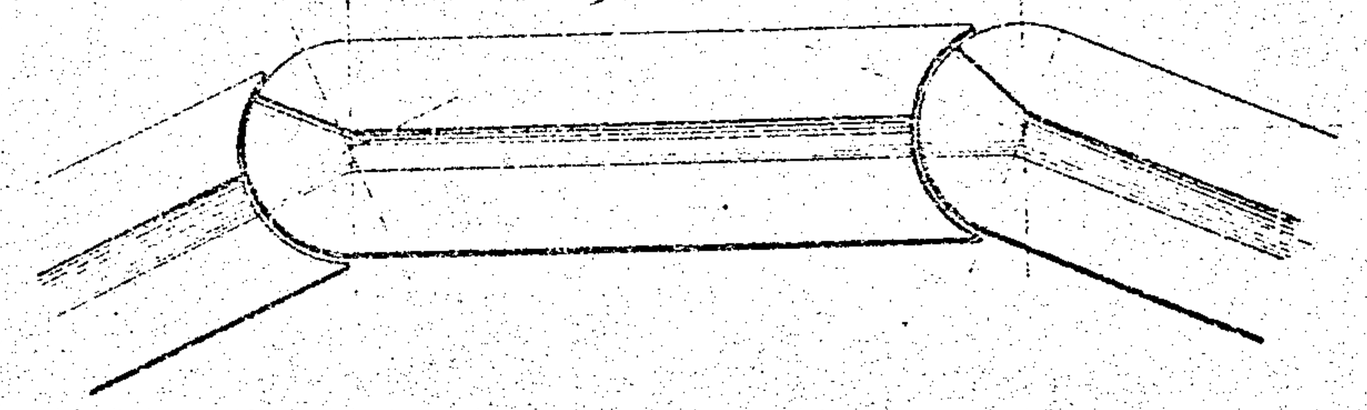


Fig. 7.

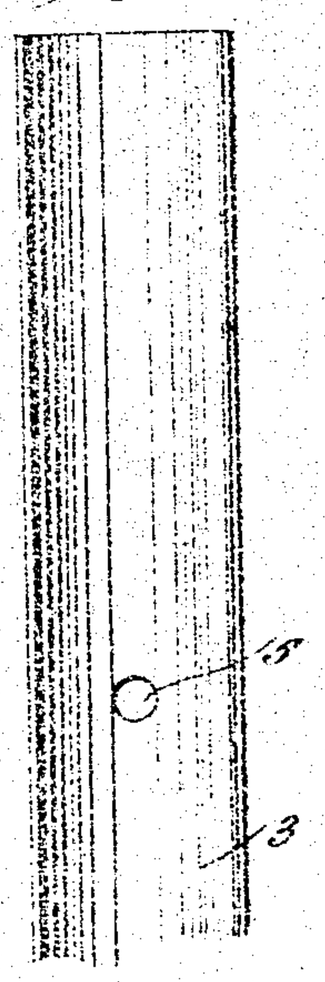
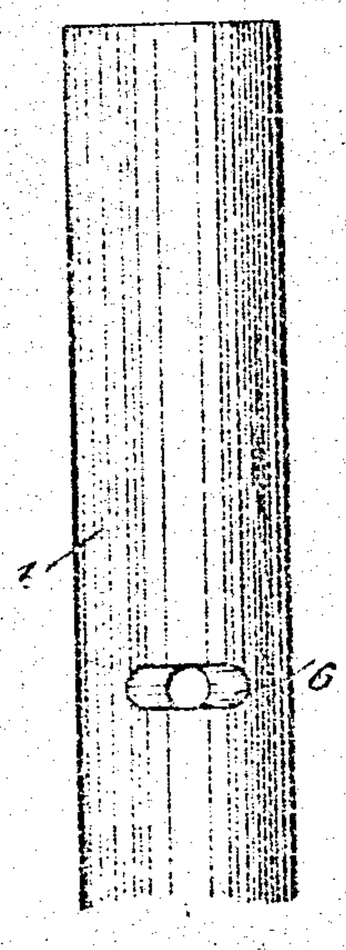


Fig. 8.



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3 SHEETS—SHEET 3.

Fig. 9.

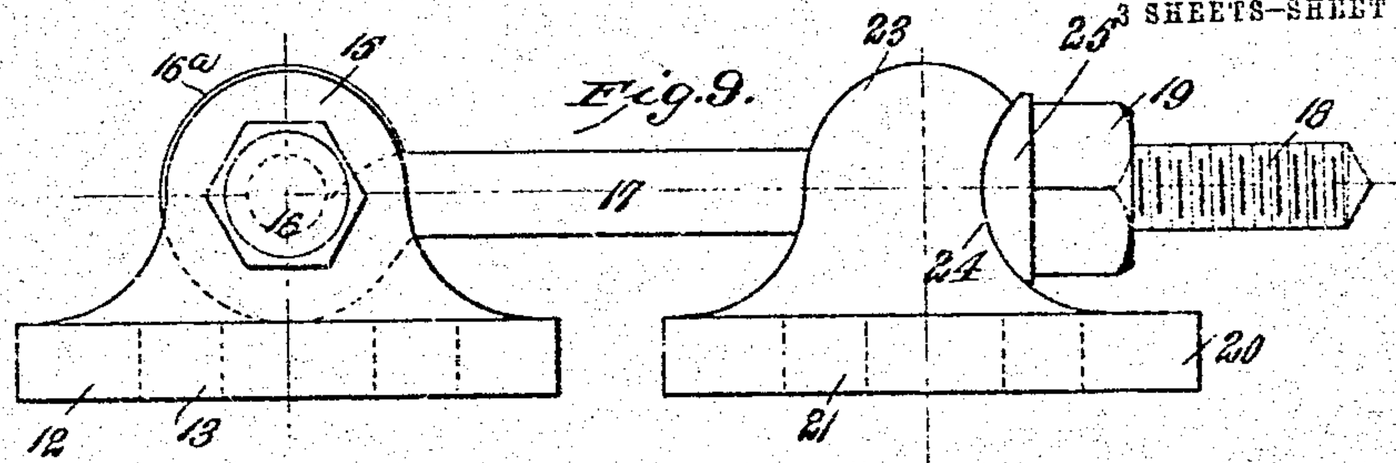


Fig. 10.

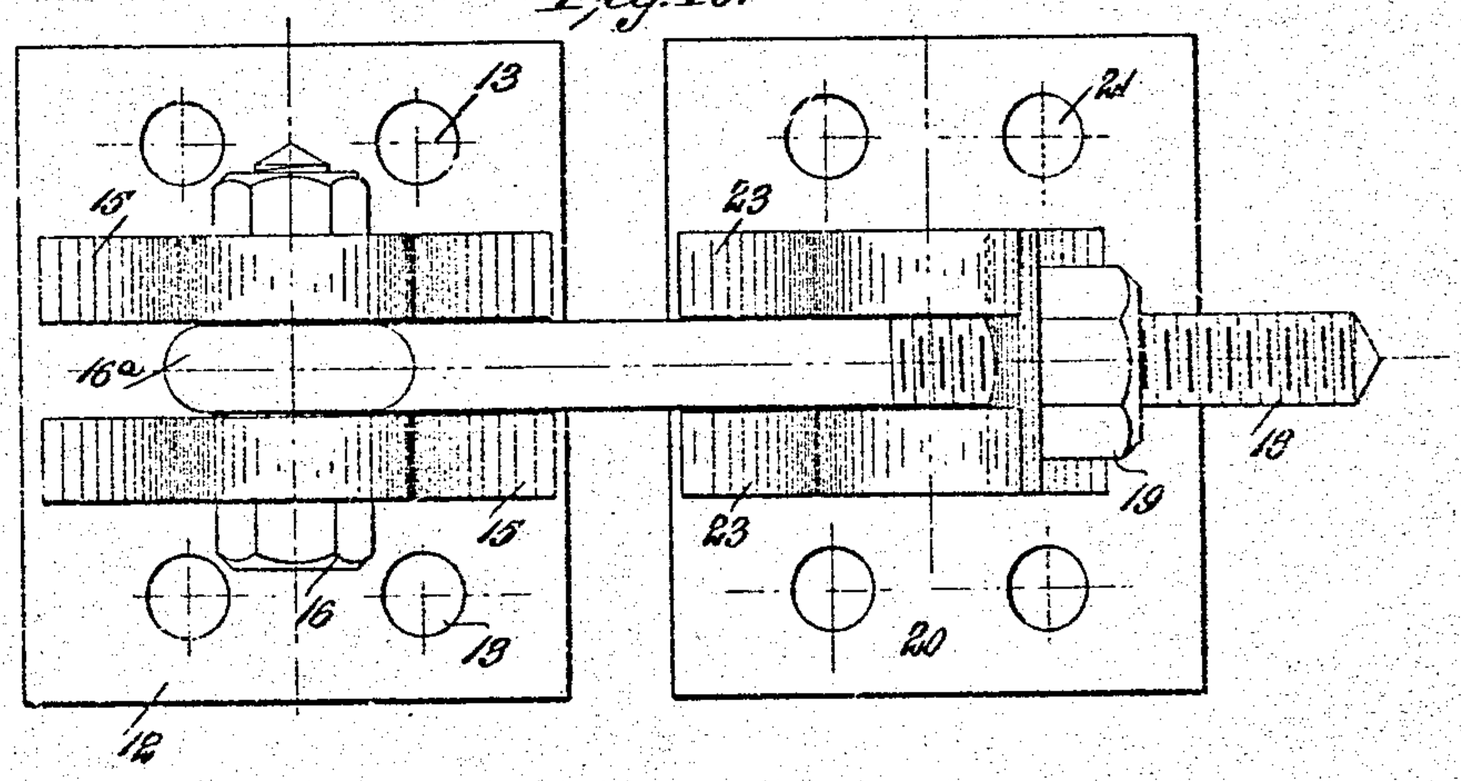


Fig. 11.

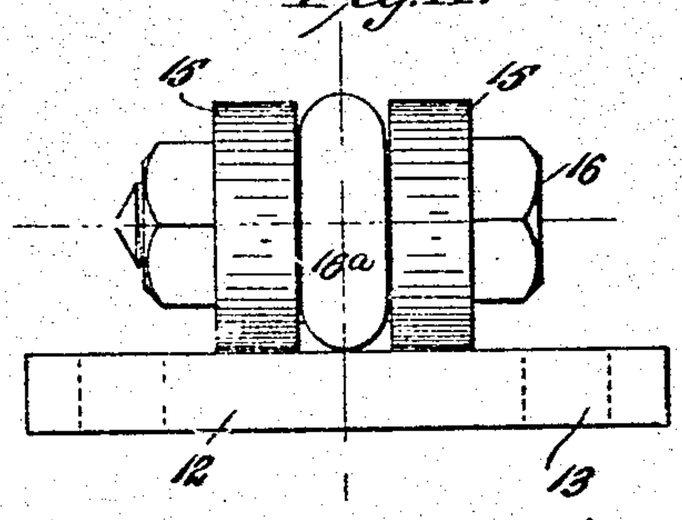
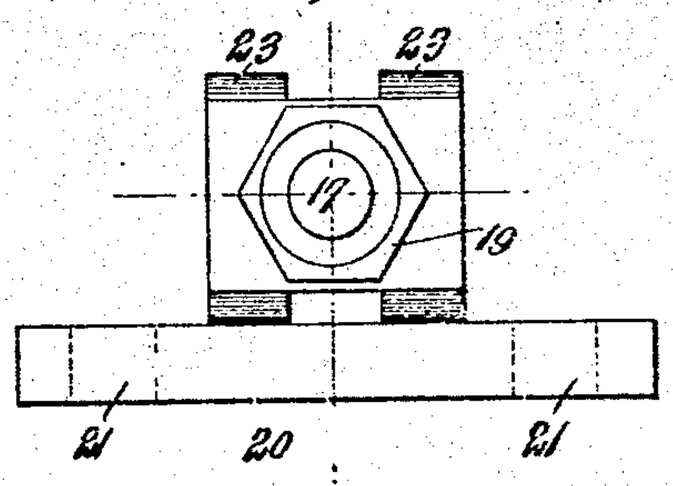


Fig. 12.



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UNITED STATES PATENT OFFICE.

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FORM FOR BUILDING CONCRETE STRUCTURES.

970,998. Specification of Letters Patent. Patented Sept. 20, 1910.

Application filed October 7, 1909. Serial No. 521,605.

To all whom it may concern:

Be it known that I, DAVID M. DULLER, a citizen of the United States, and a resident of Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Forms for Building Concrete Structures, of which the following is a specification.

My invention is an improvement in forms for building concrete structures, and consists in certain novel constructions, and combinations of parts, hereinafter described and claimed.

The object of the invention is to provide a form of the character specified more especially adapted for figures circular in cross section, and composed of a plurality of strips hinged edge to edge, wherein the width of the individual strips bears a constant ratio to the unit of measure.

Referring to the drawings forming a part hereof Figure 1 is a front view of a form with the walls detached. Fig. 2 is a transverse section of a semi-circular form. Fig. 3 is a similar view of a quarter circle. Fig. 4 is a front view of the flexible rod for hinging the strips together. Fig. 5 is an end view of a portion of a form, with the strips in the same plane. Fig. 6 is a similar view with the strips flexed on each other. Fig. 7 is a partial edge view of a strip. Fig. 8 is a similar view of the adjoining strip. Fig. 9 is a side view of the means for connecting the sections of the form together. Fig. 10 is a plan view of the same. Fig. 11 is an end view looking at one end and Fig. 12 is a similar view looking at the other end.

The embodiment of the invention shown in the drawings, consists of a plurality of form sections, each of which is composed of a plurality of strips 1 arranged side by side, and secured together by flexible rods 2.

Each of the strips is concave on one edge as shown at 3, and convex on the other as shown at 4, and they are arranged with the convex edge of the one fitting into the concave edge of the other as shown more especially in Figs. 5 and 6.

Each of the strips is provided with a plurality of transverse openings 5, arranged at spaced intervals with respect to each other, and the corresponding openings of the strips register when the said strips are arranged as shown in Fig. 1. On the convex edge of the strips, each of the openings is widened from side to side, as indicated at 6 in Figs. 5, 6 and 8, and the flexible rod 2 is passed through each set of the registering openings. Each rod is provided at one end with a head 7, and at the other with a threaded portion 8, which is engaged by a nut 9 to secure the strips together. The outermost strips are recessed as shown at 10 in Fig. 1, to receive the head and the nut respectively, and the nuts are turned tight enough to hold the strips together, while permitting them to bend laterally with respect to each other, as shown in Figs. 2, 3, 5 and 6.

Upon one face, each of the sections is provided with a plurality of eyes 11, and with a plurality of hinge sections, by means of which the form sections may be secured to the other sections, or one edge of a form section may be secured to the other.

The hinge section upon one edge of the form section comprises a plate or base 12, having openings 13, whereby it may be secured to a strip by bolts 14, and provided with a pair of spaced transversely perforated lugs 15. A stem 17 is provided with an eye 16^a, which is received between the lugs, and a bolt 16 passes through the lugs and the eye. The opposite end of the bolt is threaded as at 18, and is engaged by a nut 19, which engages the opposite hinge section in a manner to be described. The other hinge section comprises a plate 20, having openings 21 for receiving bolts 22 whereby it may be secured to a strip, and provided with spaced lugs 23. The lugs are recessed as at 24, on their outer faces, the bottoms of the recesses being concave from above downward, and a washer 25, having one face shaped to fit the recesses, is arranged on the stem 17 between the nut and the lugs.

Each of the form sections is provided upon one side edge with a plurality of the hinge sections shown in Fig. 11, and upon the other edge with a corresponding number of the sections shown in Fig. 12, and the form sections may be secured to each other, or the edges of one section may be secured together.

To secure the hinge sections together the stem 17 is turned into the position shown in Fig. 9, with the outer end between the lugs 23, and the nut 19 is tightened until the washer 25 engages the recesses as shown. To disengage the sections the nut is loosened until the washer will pass the lugs, and the

stem is turned upwardly out of engagement with the lugs.

The width of each strip bears a constant ratio to the unit of measure. That is, whatever unit is made use of to express the size of the diameter, whether inches, feet or yards, each strip is made 3.1416 times such unit of measure. By this arrangement when the forms are used for articles circular or approximately circular in cross section and of known diameter, no calculation is necessary. For every unit of measure of the diameter of the article to be formed, one strip is used. For instance, to make a column 12 inches in diameter, using a form material 1 inch in thickness, a form having a width of 13 strips each 3.1416 inches wide will be used, one inch being for thickness of strip. For columns polygonal in cross section, the strips may be used in the same manner, and the greater the number of sides, the more nearly will the dimensions be correct.

While more especially adapted for objects circular, or approximately circular in cross section, the improved forms may be used in any other kind of work, since they are easily connected and disconnected, and require no especial skill in their manipulation.

The strips may be made of any suitable material, and of any desired proportions as to length, and thickness, and also as to width, when the special function above described is not intended to be made use of.

The form sections may be bent into the shapes shown in Figs. 2 and 3, the movement of the strips with respect to each other being permitted by the flexibility of the rod, and by the widening of the ends of the openings, and may be retained in shape in any suitable manner.

I claim:

1. A form section comprising a series of strips, each having one edge convex and the other concave from face to face, the strips being arranged side by side with the convex edge of one fitting the concave edge of the succeeding strip, said series having a plurality of transverse registering openings, the ends of the openings on the convex sides of the strips being widened from face to face, flexible rods traversing the openings, for securing the strips together, pairs of spaced lugs arranged longitudinally of the outermost strip on each side of the form, a threaded stem pivoted between each pair on one side and secured between the corresponding pair on the other side, said pair having recessed outer faces, a washer on the stem having a convex face fitting the recesses, and a nut for forcing the washer toward the lugs.

2. A form section comprising a series of strips, each having one edge convex and the other concave from face to face, the strips being arranged side by side with the convex edge of one fitting the concave edge of the succeeding strip, said series having a plurality of transverse registering openings, the ends of the openings on the convex sides of the strips being widened from face to face, flexible rods traversing the openings, for securing the strips together, and means on the outermost strips at each side of the form sections, for securing said strips together.

3. A form section comprising a series of strips, each having one edge convex, and the other concave from side to side, the strips being arranged side by side with the convex edge of one fitting the concave edge of the succeeding strip, said strips having registering transverse openings, the openings on the convex edge being enlarged from face to face of the strip, flexible rods traversing the openings, and means in connection with the rods for securing the strips together.

4. A form section comprising a series of strips arranged side by side with the edge of one abutting the edge of the other, said strips having registering transverse openings, the openings on one edge being enlarged from face to face of the strip, flexible rods traversing the openings, and means in connection with the rods for securing the strips together.

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