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PATENTED JULY 24, 1906.

G. H. PEGRAM.
FORM FOR THE CONSTRUCTION OF PLASTER AND CONCRETE STRUCTURES.

APPLICATION FILED MAR. 1, 1905.

2 SHEETS—SHEET 1.

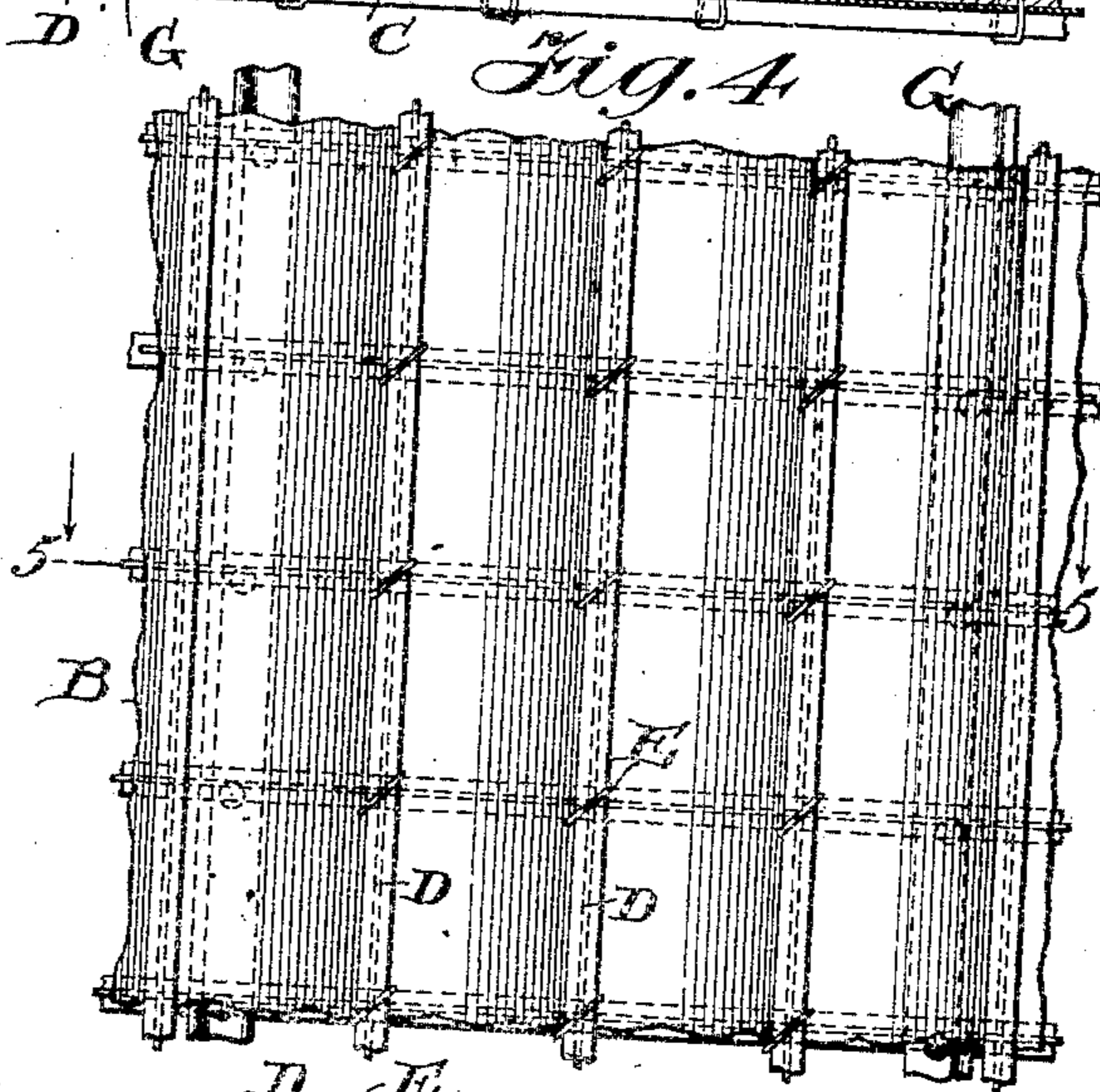
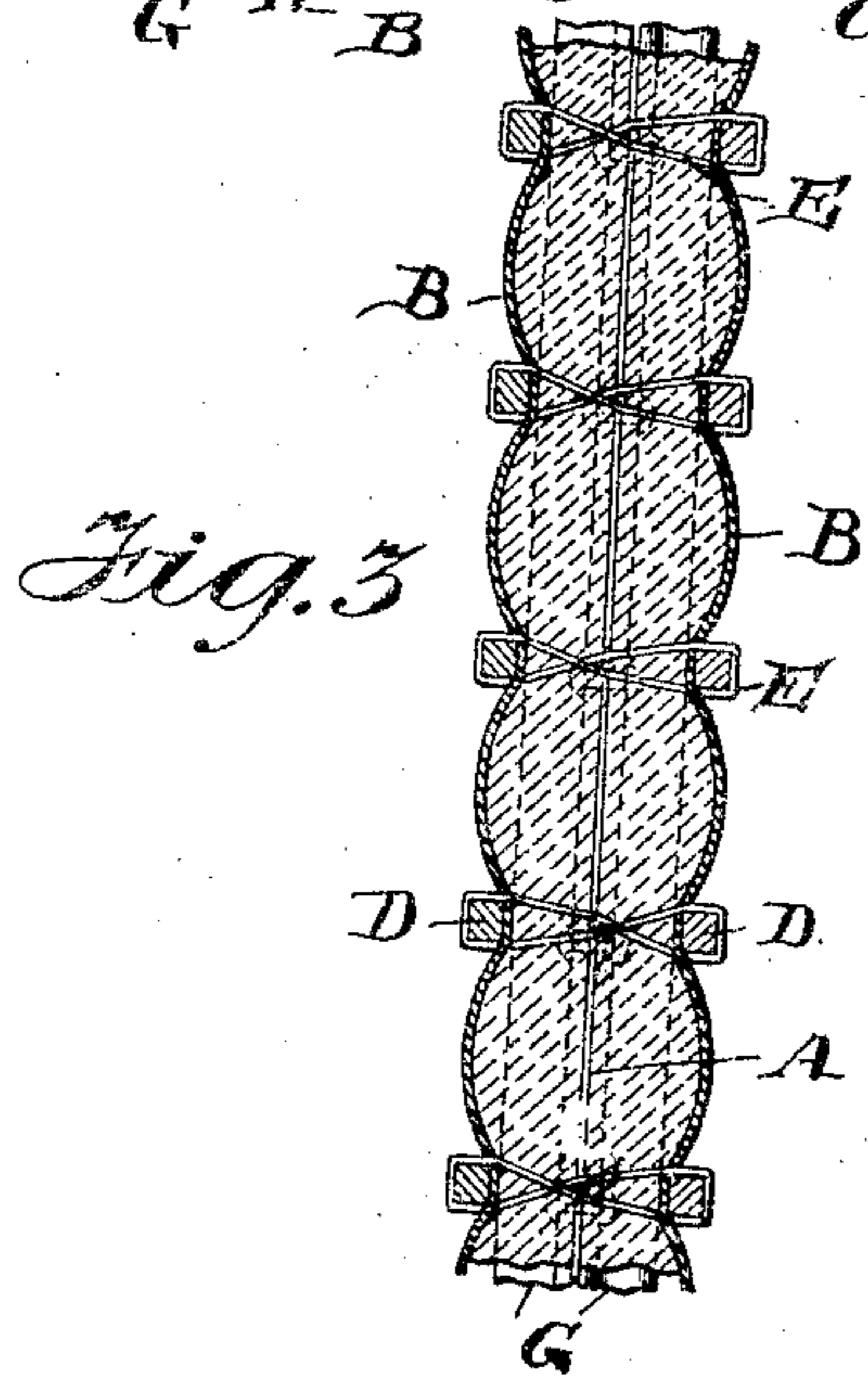
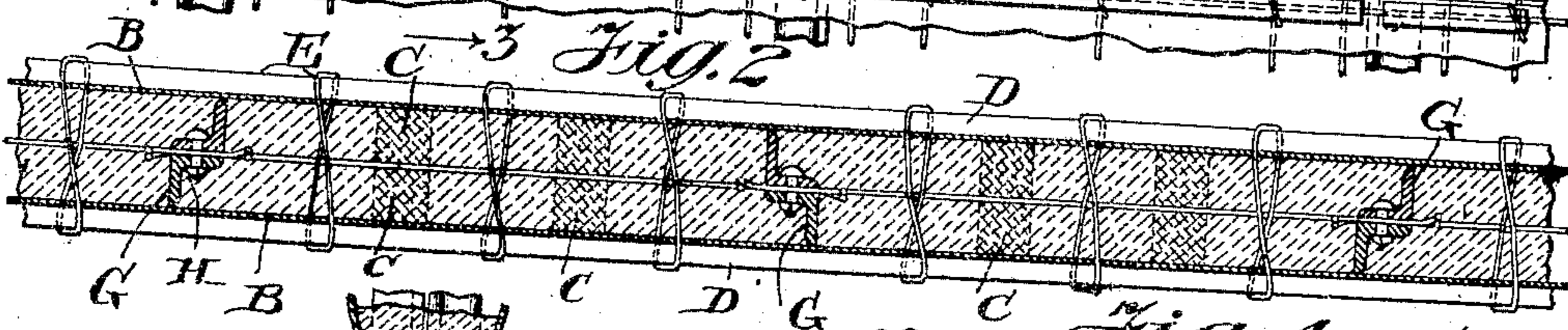
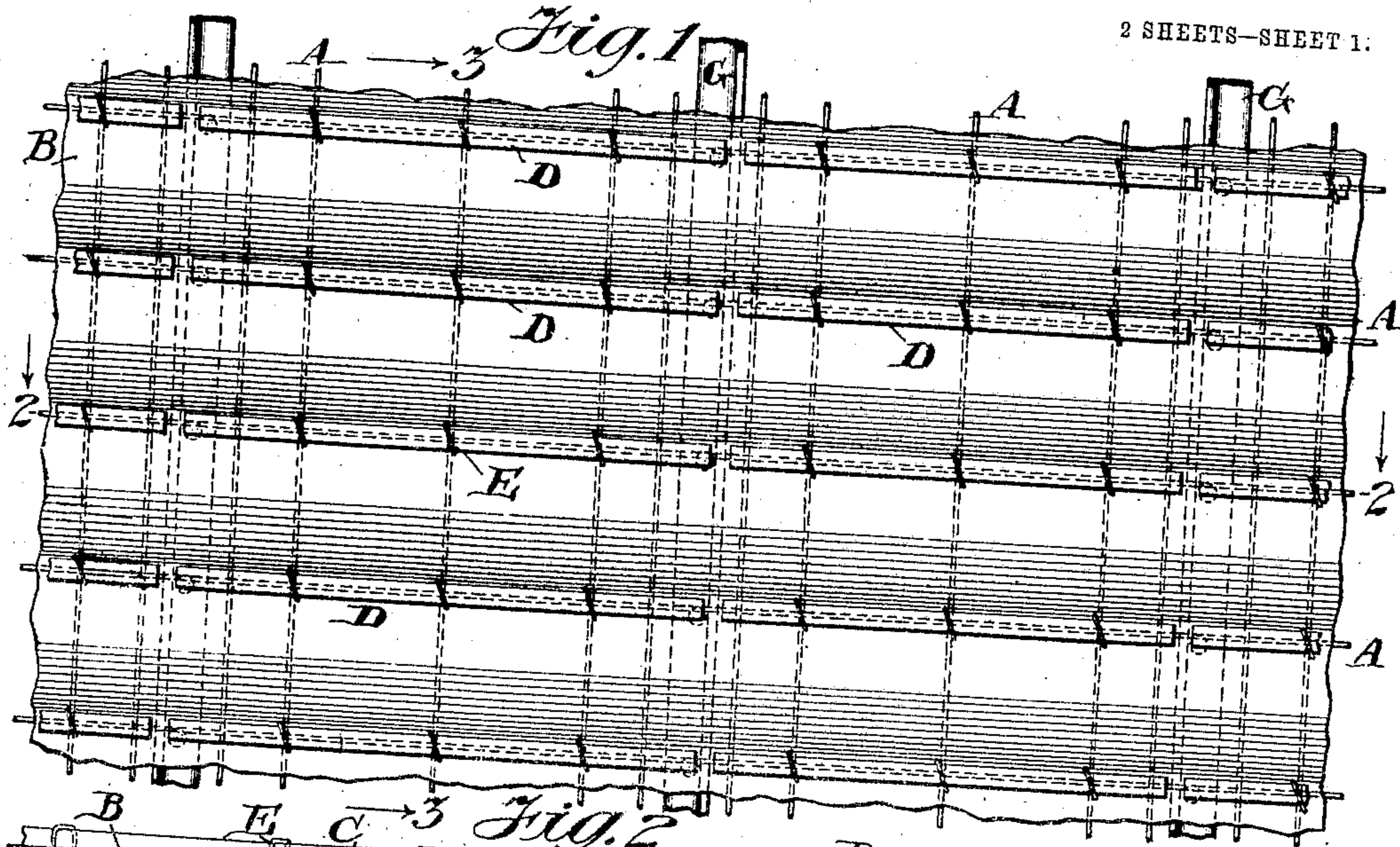
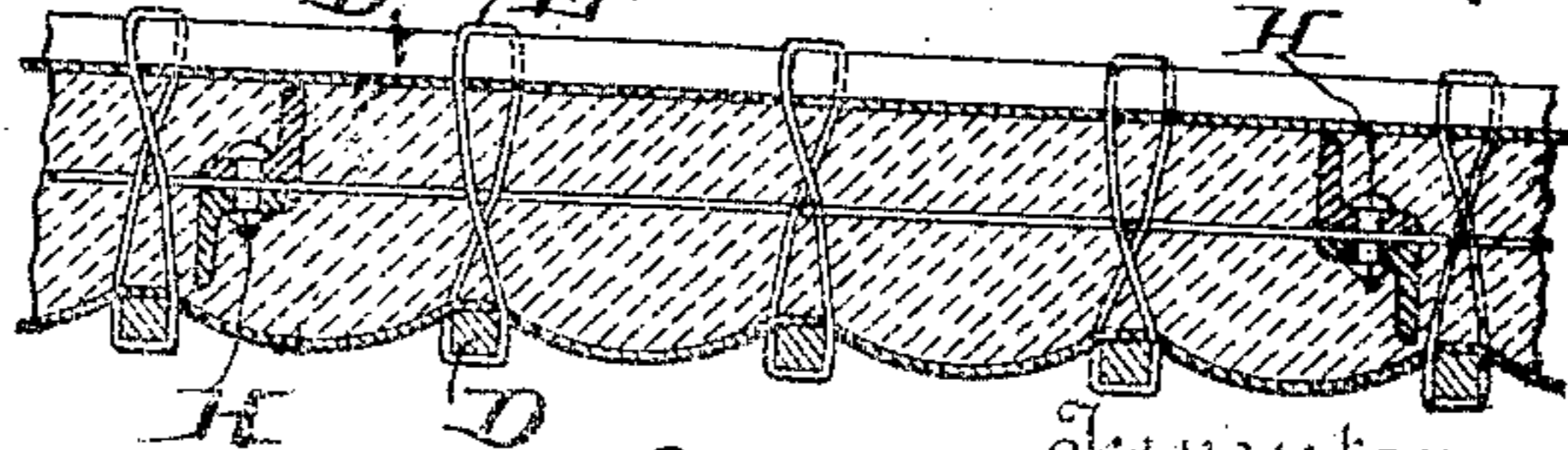


Fig. 5



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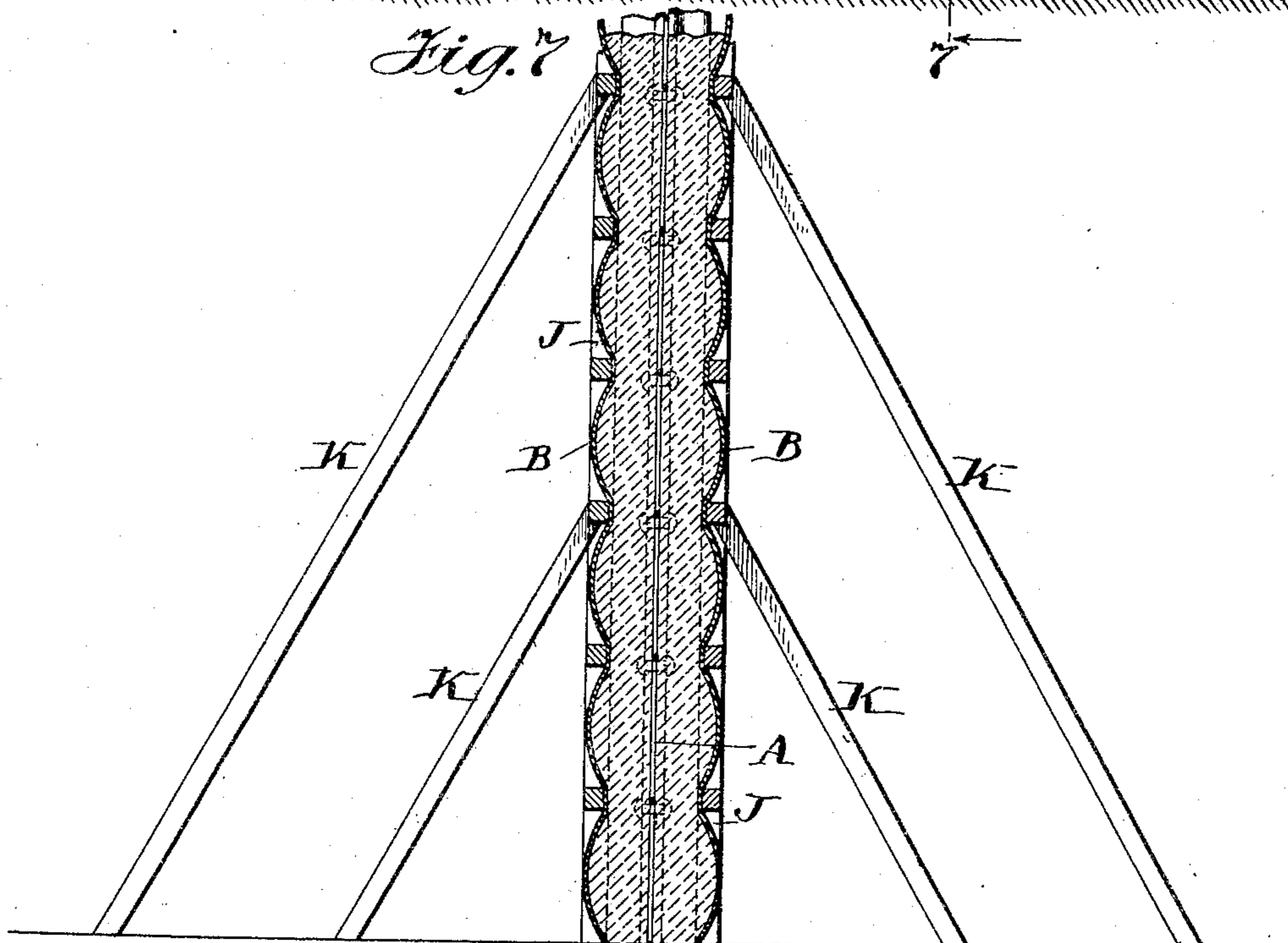
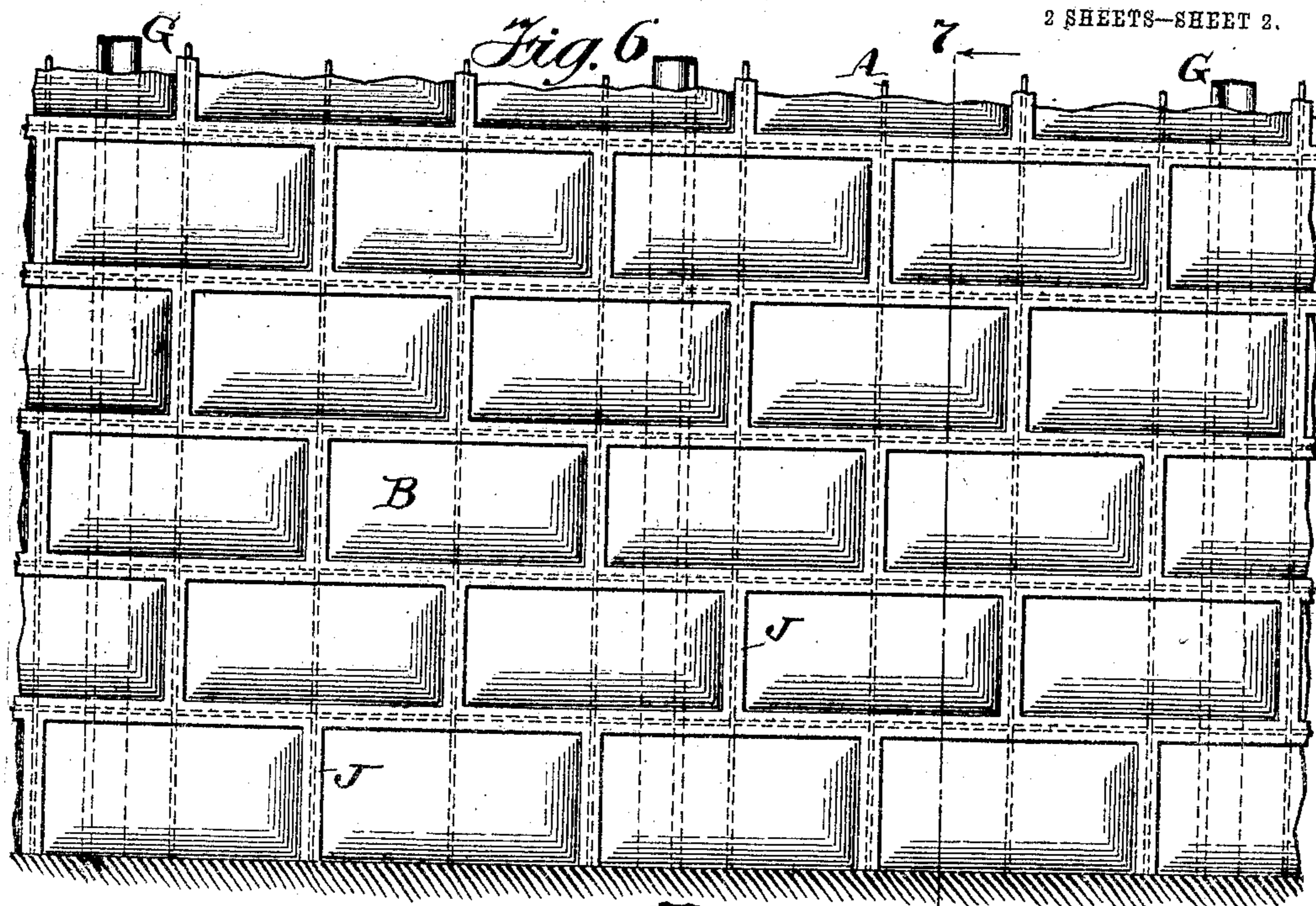
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2 SHEETS—SHEET 2.



Witnesses
C. M. Kelly,
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George H. Pegram, Inventor
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UNITED STATES PATENT OFFICE.

GEORGE H. PEGRAM, OF NEW YORK, N. Y.

FORM FOR THE CONSTRUCTION OF PLASTER AND CONCRETE STRUCTURES.

No. 826,878.

Specification of Letters Patent.

Patented July 24, 1906.

Application filed March 1, 1905. Serial No. 247,944.

To all whom it may concern:

Be it known that I, GEORGE H. PEGRAM, of the city, county, and State of New York, have invented an Improvement in Forms for the Construction of Plaster and Concrete Structures, of which the following is a specification.

My invention has reference to forms for the construction of plaster and concrete structures; and it consists of certain improvements, which are fully set out in the following specification and shown in the drawings which form a part thereof.

The retaining surfaces or forms for the construction of concrete and plaster structures which confine the material in its plastic state until it has hardened or "set" are commonly called "forms." In the present practice these forms are made of wood, which retain the plastic material by the transverse strength and stiffness of the boards, and in such case the thickness of the boards and frequency of the supports must be so formed and proportioned that they will insure a practically uniform surface by their strength and stiffness. It has further been difficult to produce a smooth finish to the surface, because the surplus water of the concrete or plastic mixture escapes through the cracks, intensifying the lines of division between the boards, which show in any case, and this water when not permitted to escape, owing to the non-permeability of the boards, collects during the setting of the concrete or plaster and often leaves worm-marks and pits in the surfaces. To give configuration of surface similar to the joints of masonry, for instance, wooden forms are so costly that they are seldom, if ever, used. In some places wooden forms are unduly costly through the high price of lumber or cost of transportation and the small value of the lumber after being so used.

The object of my invention is to overcome the above objections and produce a greatly-improved concrete or plaster structure.

My invention consists of forms in which the retaining material is a pliable and preferably permeable fabric, like cotton cloth, adapted to retain the plastic material and permit bulging between supporting strips or grillages superimposed to support the fabric and with which it is combined, the strength of which fabric is exerted in tension rather

than cross-bending, as in wooden boards. By my improved means any desired configuration of surface is obtained, depending upon the openings between the retaining strips or grillages. The strips or grillages may be held in place by flexible ties of wire or string, which I usually sew through the fabric to and around similar opposing strips facing upon what will be opposing surfaces of the concrete structure when formed. In the reinforcement of an old wall or where the opposite surface is made by a wooden or other fixed forming-surface the ties for holding the pliable fabric and strips or grillages are attached to it in any well-known manner.

More specifically my invention may be described as follows: In making a wall or partition I commonly employ a metal core of wire-cloth of about No. 10 wire, with mesh about a foot square, which is held in place by angle-irons or wooden studs. The angle-iron studs are composed of two angle-irons, one on each side of the core and bolted together under the horizontal wires of the core for its better support. The angle-irons serve to determine the uniform thickness of the wall as well as to stiffen it. Where, however, the angle-irons are crooked or too light or too far apart, I may employ removable spacing-strips to secure the desired uniformity of thickness, said strips being withdrawn before the plastic material or concrete sets and these places filled with the plaster or cement. The pliable fabric is stretched on the outside of the studs, and strips of wood about an inch square are laid against it at distances of about a foot apart. These are secured in place by wire or twine, which is sewed through the fabric, passing around the outside strips and usually supported vertically by the wires of the metal core. The water of the plaster or concrete mixture oozes through the pliable fabric, thus taking the particles of cement to the surface, where they are retained by the fabric as the water escapes, resulting in a fine smooth surface. After the concrete has hardened and sufficiently set the ties of string or wire are cut and the strips and fabric removed and used again in forming other portions of the wall. The metallic core may be dispensed with, if desired, as may also the spacing-strips; but I prefer to use either or both of them in the practical application of my invention.

My invention also comprehends details of construction which, together with the features above specified, will be better understood by reference to the drawings, in which—

Figure 1 shows a front elevation of such apparatus. Fig. 2 is a horizontal section on the line 2 2 of Fig. 1. Fig. 3 is a vertical section on the line 3 3 of Fig. 1. Fig. 4 is a front elevation of another form, showing the retaining-strips horizontal on one side and vertical on the other. Fig. 5 is a horizontal section on the line 5 5 of Fig. 4. Fig. 6 is a front elevation showing the method of producing any desired surface conformation by the use of a grillage, and Fig. 7 is a vertical section on the line 7 7 of Fig. 6 and shows one way in which the patterned grillage can be retained in position.

A represents the internal strengthening metallic core, which may be a stout wire mesh (of wire, say, one-eighth-inch diameter and having meshes a foot square) or a frame of expanded metal or any suitable material.

B is the pliable material, preferably permeable to liquids, which may be either cotton cloth, canvas, or other suitable woven material, whether of metal or combined metal and fiber or fiber alone. To keep the pliable fabric at proper distance from the internal mesh and angle-irons of the core when desired, there are inserted at suitable intervals removable spacing-strips C.

D represents removably-attached strips for retaining the pliable material in proper relation to the core A and for producing the surface configuration desired. These retaining-strips can evidently be retained in position by any well-known means—as, for instance, strings or wires E, sewed through the pliable material and passing around the oppositely-located retaining-strips D. (See Figs. 3 and 4.) Any other suitable means, such as bolts, for holding the retaining-strips D or grillages may be employed in lieu of the strings or wire. The parts being thus spaced and retained, I pour into the space between the pliable external limiting-walls the plastic material desired, which may be mortar, cement, concrete, plaster-of-paris, &c. This fills the space within the pliable walls and causes the pliable material to take on the desired configuration. The spacing-strips C are then preferably removed and the holes left by the spacing-strips filled with the plastic material, and in this condition the material and structure are left until the said plastic material has set and hardened. The strings or wires E (or the equivalent fastening devices) can then be cut and removed, and the pliable material stripped off and used over again in further construction.

For holding the internal core in position I have employed angle-irons G and find the bolts H a convenient and satisfactory method of supporting the horizontal-wires of the in-

ternal mesh A and holding the angle-irons together. However, the core may be dispensed with, if so desired, and the supporting-strips D may be sustained and positioned in any suitable manner so long as they support the pliable fabric.

It is at times desirable to have the waves or ridges formed by the bulging of the pliable partition-walls horizontal on one side of the structure and vertical on the other, in which case the strips retaining the pliable fabric are correspondingly arranged, as shown in Figs. 4 and 5. By using a grillage J for retaining the pliable walls I am enabled to imitate any configuration I desire, the pliable material bulging out into the open spaces of the grillage and producing the desired effect—masonry blocks, for example, as shown in Fig. 6. The grillage can be sewed through the pliable material or bolted or buttoned, like the retaining-strips, or it can be supported by removable props K, as shown in Fig. 7. The fabric in many cases may be used over and over again, or, because of its cheapness, it can be left in place on the concrete.

The method of operation with my invention is as follows: The apparatus, provided with walls of pliable material permeable to liquids, being prepared in any of the manners above described or in any equivalent manner, the cement or mortar mixed with water to the proper consistency is introduced in the spaces left between the fabric surfaces. The pliable walls B bulge out or assume the desired shapes dictated by the manner in which they are supported by the said retaining-strips D and wires or cords. The surplus liquid drains off through the permeable walls and carries the finer material to the surfaces, thus giving a fine hard finish to the wall and accelerating and drying of the structure. After setting and drying, the grillage or retaining strips and cloth are removed, leaving a solid wall without joints or seams on its faces. The spacing-strips may be left in place or be withdrawn before the material has set or after one section of wall is set partly, so as to be self-sustaining, the spacing-strips may be removed, and the next section joined to the first directly.

The core of wire mesh may be dispensed with where other means of supporting the pliable walls are employed, such as grillages. Where angle-irons or similar upright supports extending from one side of the structure to the other are employed, the additional spacing-strips C may be omitted, as said angle-irons perform the spacing function themselves.

It is obvious that in cases where one side of the wall is confined by boarding or an old wall of which the new wall is to form a face or reinforcement the ties may be attached thereto in any well-known manner and but one wall of flexible material employed.

Having therefore described and illustrated my invention, what I claim is—

1. In a form for constructing walls of plastic material, the combination of two walls of pliable material permeable to liquids arranged to provide a continuous space between them, and means for retaining the walls in position during the introduction and setting of the plastic material consisting of frames upon the outer surfaces of the pliable material for supporting it at intervals only and removable spacing-strips C C between the walls of the pliable material for supporting them upon their inner surfaces said spacing-strips being removable when the plastic material is sufficiently set whereby the spaces left thereby may be filled with additional plastic material.

2. In a form for constructing walls of plastic material, the combination of two walls of pliable material permeable to liquids forming a continuous space between them, and means consisting of binding strands extending through and between the flexible walls at numerous intervals in their area for retaining the same in position during the introduction and setting of the plastic material.

3. Means for constructing walls of plastic material consisting of the combination of two walls of pliable material permeable to liquids separated throughout their entire length, retaining-strips exterior to the walls for retaining the walls acting upon said walls at intervals only in position during the introduction and setting of the plastic material, and means for temporarily holding the retaining-strips in position.

4. In a form for constructing walls of plastic material, the combination of a wall of pliable material permeable to liquids, and means for retaining same in position during the introduction and setting of the plastic material comprising one or more sets of grillage forming a substantially flat structure arranged exteriorly of said wall and temporarily supporting it at intervals in its surface.

5. Means for constructing partitions or walls of plastic material, consisting of a flat sheet of pliable material, combined with non-pliable retaining parts resting against portions only of the pliable material and the areas between the retaining parts in contact with the pliable material being materially less than the area of the corresponding pliable material so as to permit the free portions of the said pliable material to bulge between the retaining parts.

6. Means for constructing partitions or walls of plastic material, consisting of a sheet of pliable material, combined with non-pliable retaining parts resting against portions only and covering an area less than the actual surface of the pliable material so as to permit other portions thereof to bulge between the retaining parts, and means passing through

the pliable material and space occupied by the plastic material for holding the retaining parts in place against the outer face of the pliable material.

7. A form for constructing partitions or walls of plastic material, consisting of a thin pliable sheet permeable to fluids, combined with retaining parts for firmly holding the pliable material against outward pressure at intervals in its surface and in which the remaining portion of the pliable material is bulged between the retaining parts to form projecting or bulging portions in the wall and allow the surplus water to escape.

8. A form for constructing partitions or walls of plastic material, consisting of a thin pliable sheet permeable to fluids, combined with retaining parts arranged substantially in the same plane for firmly holding the pliable material against outward pressure at intervals in its surface and the pliable material between the retaining parts being sufficiently loose to bulge between the retaining parts and allow the surplus water to escape, and means acting at intervals over the retaining parts for holding them firmly in position upon the pliable sheet and against the outward thrust of the plastic material.

9. A form for constructing rectilinear partitions or walls of plastic material consisting of a sheet of pliable material permeable to fluids, combined with substantially parallel retaining-strips forming a grille structure with vertical and horizontal bars for supporting the pliable material at intervals in its surface and in substantially one plane; and means extending into the space to be occupied by the plastic material for connecting the retaining-strips to the pliable material and holding them in position.

10. A form for constructing partitions or walls of plastic materials consisting of two opposed sheets of pliable material forming a space between them open throughout their length combined with retaining-strips resting against their outer surfaces at intervals only, and flexible ties passing through the two sheets of pliable material and around retaining-strips at numerous points of the surfaces of the pliable material.

11. A form for constructing walls or partitions of plastic materials consisting of the combination of two walls of pliable material, retaining-strips exterior to the walls of pliable material and resting against their outer surfaces at intervals only, ties passing through the walls and space between them for holding the retaining-strips in position and against the pliable material, and the metal core between the pliable walls to support the ties.

12. In a form for constructing walls of plastic material, the combination of two walls of pliable material permeable to liquids and arranged to provide a continuous space between them, a frame acting upon one of the

walls at intervals in its area to hold it in position, and a second frame comprising a series of vertical and a series of horizontal bars connected together and in substantially the same plane for supporting the other pliable wall at crossing intervals in its area.

13. In a form for constructing walls of plastic material, the combination of two walls of pliable material permeable to liquids and arranged to provide a continuous space between them, a frame acting upon one of the walls at intervals in its area to hold it in position, a second frame comprising a series of vertical and a series of horizontal bars connected together and in substantially the

same plane for supporting the other pliable wall at crossing intervals in its area, and means consisting of binding flexible strands between the two frames pliable walls and the space between them for holding the frames and pliable material in relatively fixed position during the introduction and setting of the plastic material.

In testimony of which invention I have hereunto set my hand.

GEORGE H. PEGRAM.

Witnesses:

WM. F. LOCKWOOD.

Q. D. HOLMAN.