

No. 881,912.

PATENTED MAR. 17, 1908.

F. C. EMRICK.
DIE AND METHOD OF MAKING SAME.

APPLICATION FILED APR. 15, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

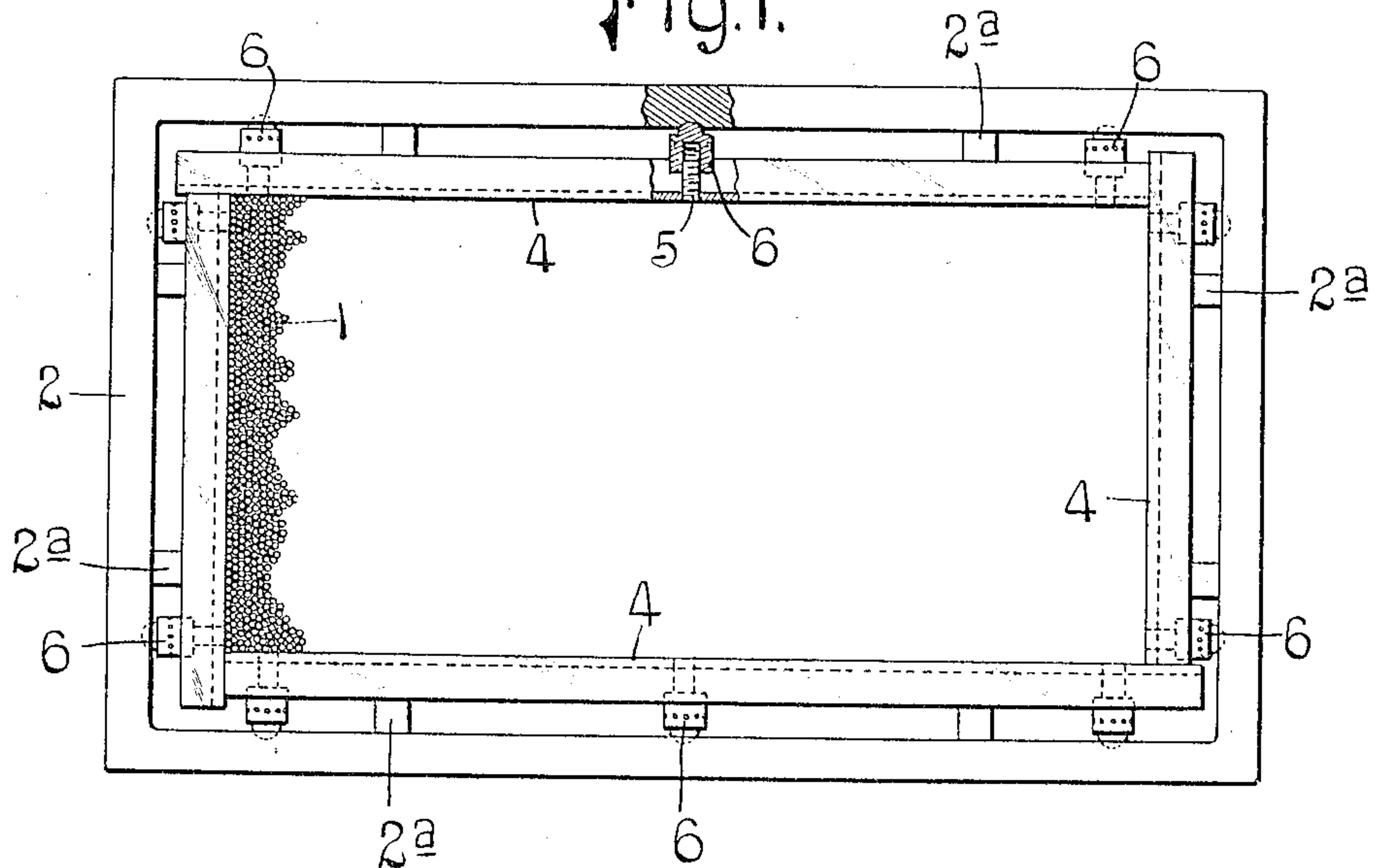


Fig. 2.

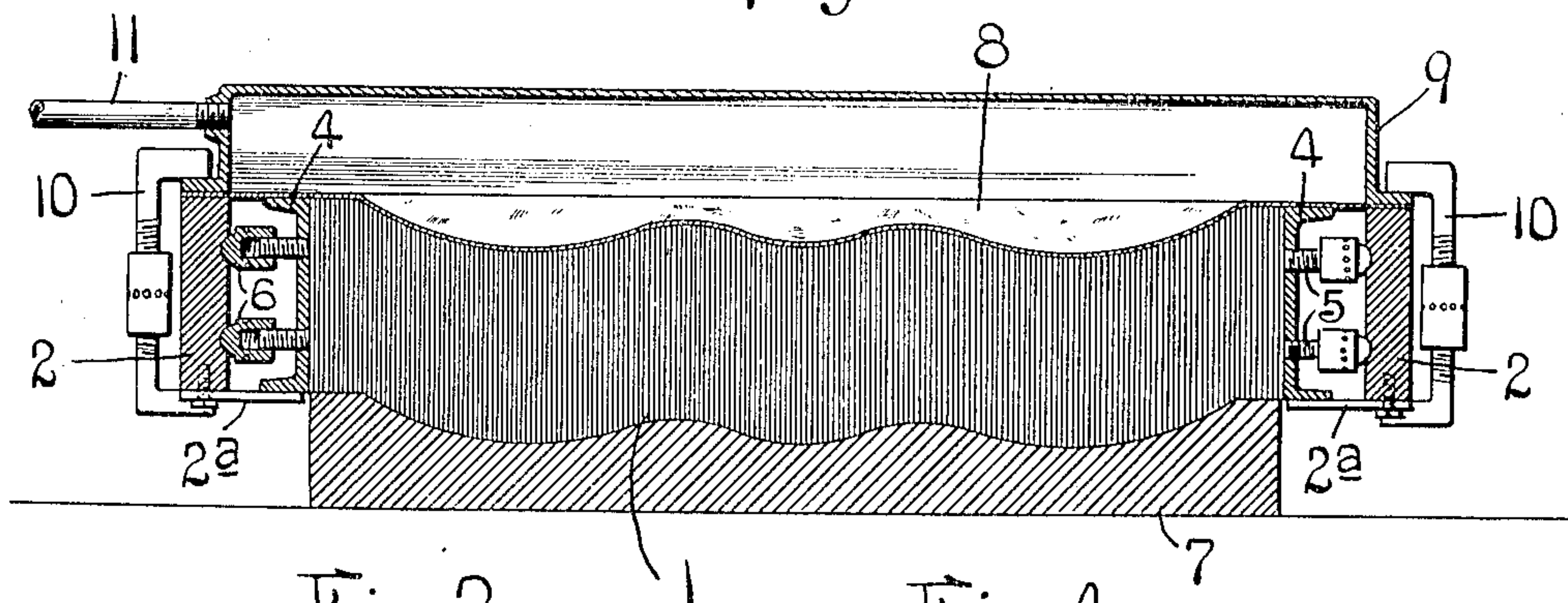


Fig. 3.

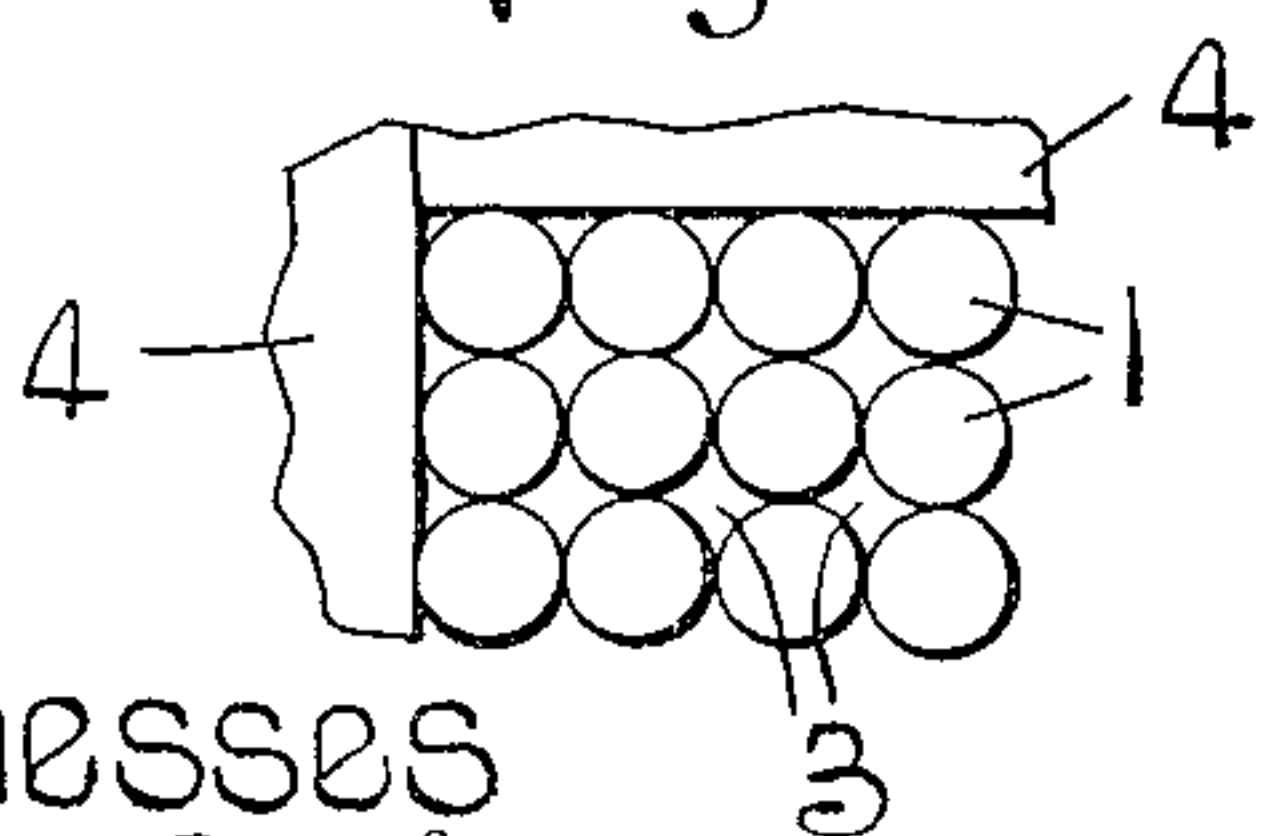
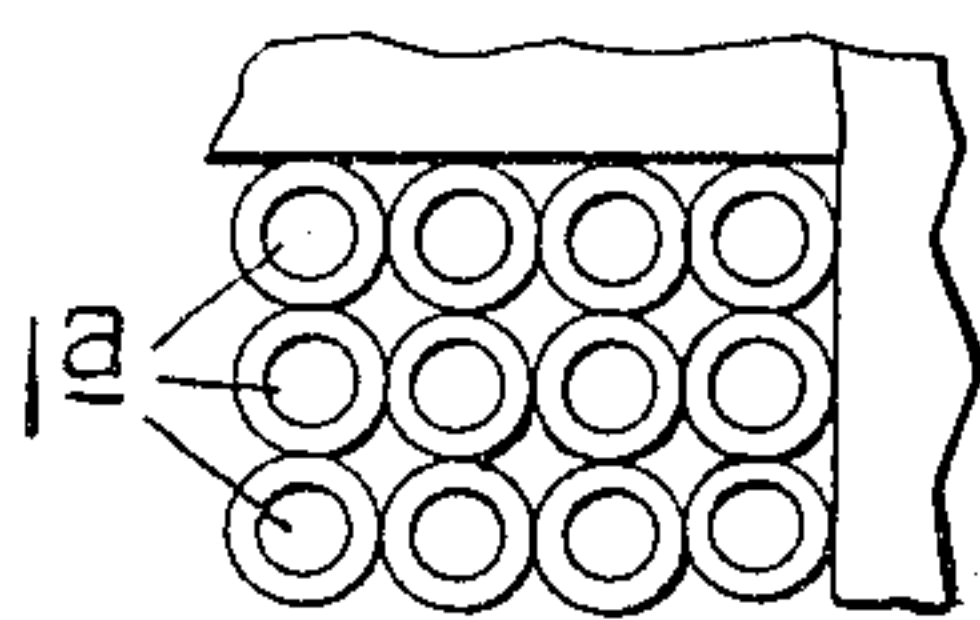


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 5.

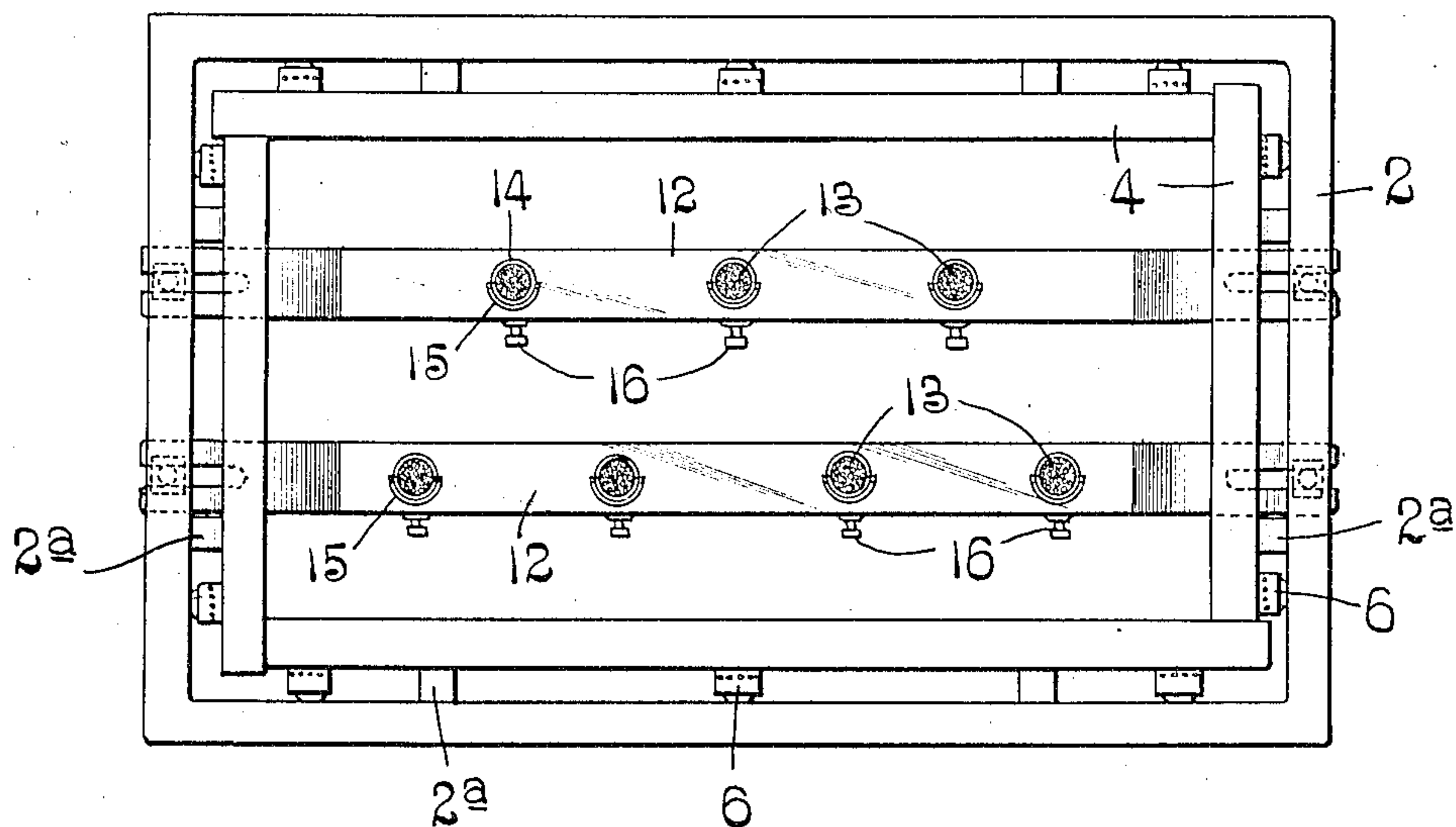


Fig. 6.

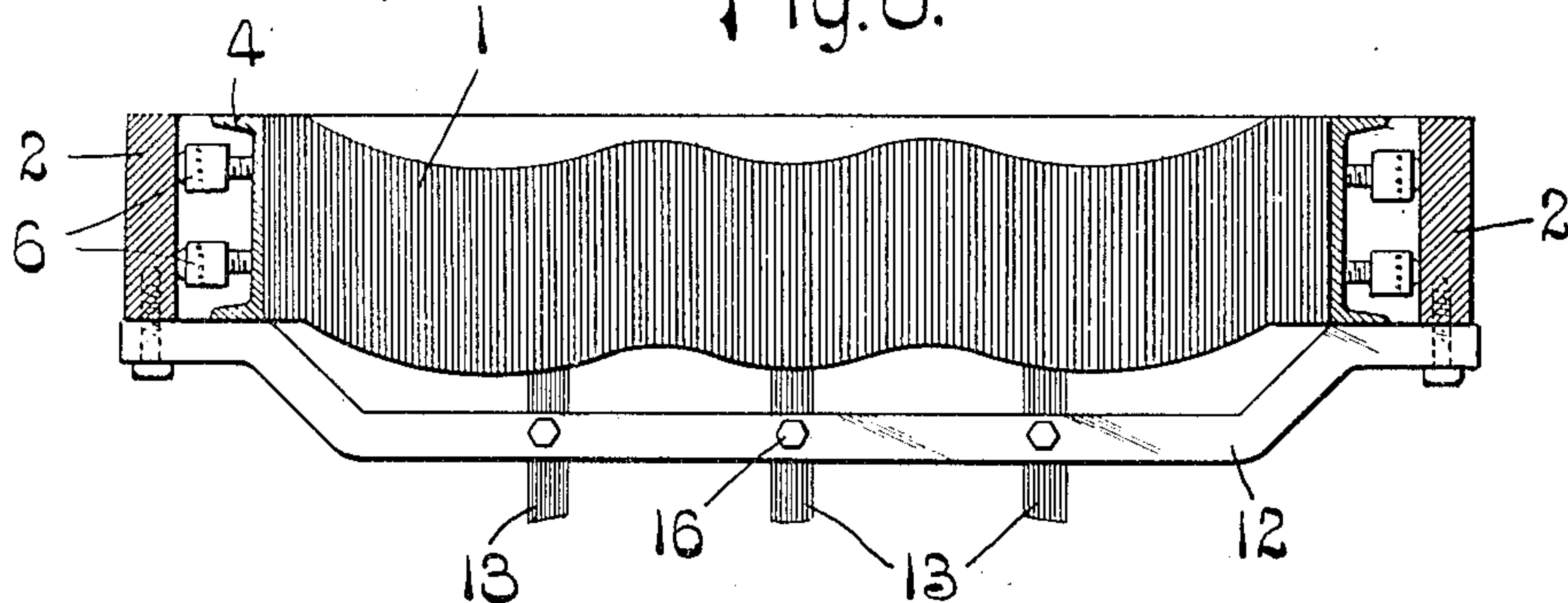
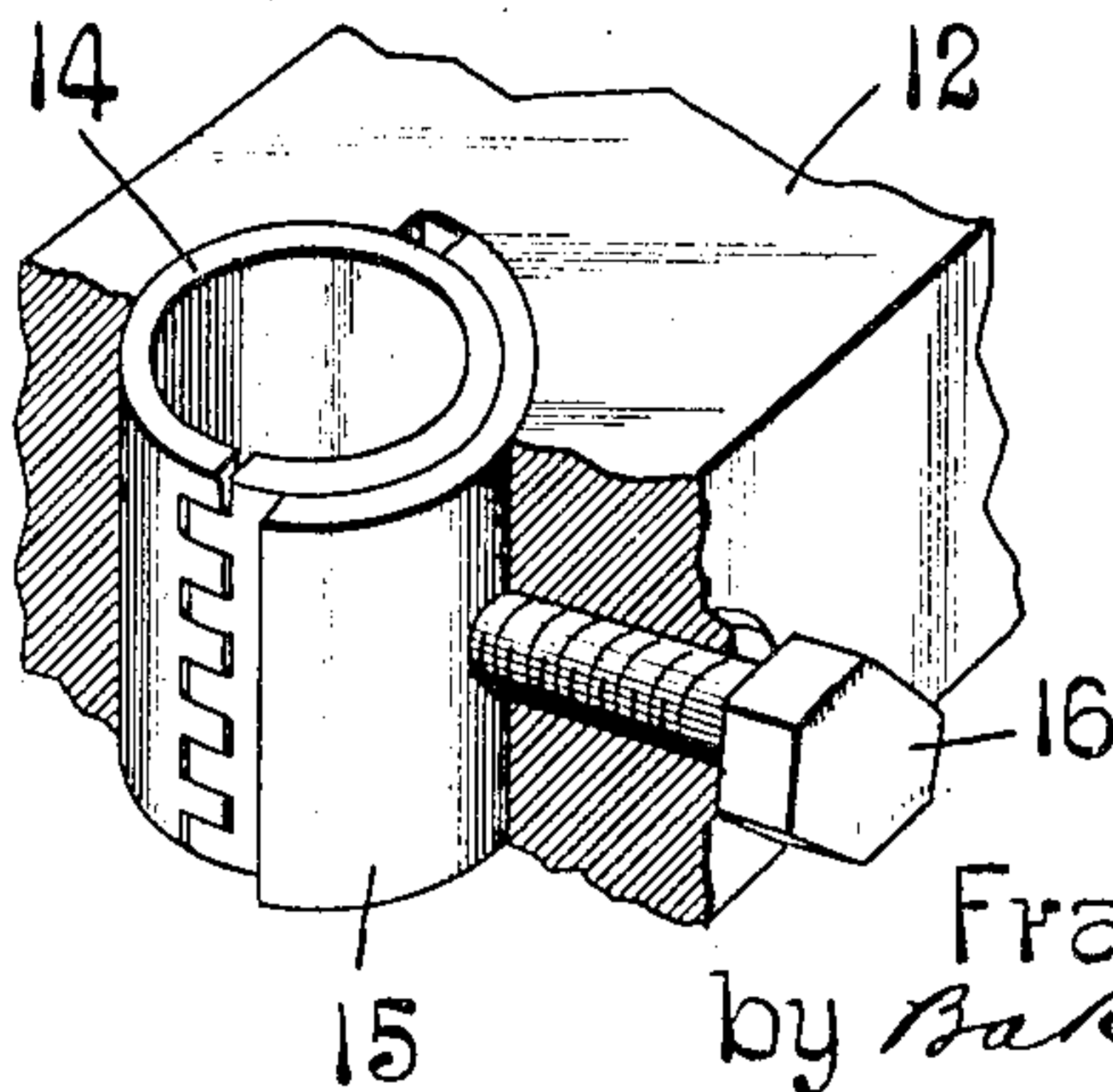


Fig. 7.



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UNITED STATES PATENT OFFICE.

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DIE AND METHOD OF MAKING SAME.

No. 881,912.

Specification of Letters Patent.

Patented March 17, 1908.

Application filed April 15, 1907. Serial No. 368,398.

To all whom it may concern:

Be it known that I, FRANK C. EMRICK, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Dies and Methods of Making Same, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view of a die constructed in accordance with my invention only a few of the pins or rods being shown; Fig. 2 is a vertical sectional view of the die shown in Fig. 1, this figure also showing the member that is arranged over the upper ends of the pins to form an air chamber; Fig. 3 is an enlarged detail view showing the arrangement of the pins or rods which form the pressing face of the die; Fig. 4 is a similar view showing tubular members used in place of the pins shown in Fig. 3; Fig. 5 is a top plan view showing the auxiliary pin supporting member connected to the frame, the pins which form the pressing face of the die being removed; Fig. 6 is a vertical sectional view showing the auxiliary supporting member in operative position for supporting the pins which form the pressing face of the die; and Fig. 7 is a detail perspective view of one of the pin clamps of the auxiliary supporting member.

This invention relates to dies, and particularly to shaping dies that are used in machines for forming articles out of liquid pulp fiber.

The main object of my invention is to provide a die for the purpose described which is so constructed that it can be used to form articles of different shape and configuration.

Another object of my invention is to provide a die for the purpose described which is of simple construction and inexpensive to manufacture. And still another object of my invention is to provide a novel method of making a die for a liquid pulp fiber machine.

Prior to my invention the shaping dies that were generally used in machines for forming articles from pulp water; namely, a mixture composed of water and grains of

pulp, were of two types. One type was a built-up structure consisting of an outer facing of wire mesh or perforated sheet metal with a skeleton backing for reinforcing the outer facing, and the other type consisted of a solid cast member having numerous perforations formed therein through which the water was forced or drawn in the operation of compacting the pulp fibers together to form the article.

Dies of the character above described are expensive to manufacture owing to the number of operations and different steps that have to be performed in their construction and moreover, said dies could only be used for forming articles of the shape for which the dies were originally designed so that when it was desired to form an article of a different shape or configuration from that which the die was designed to form it was necessary to make a new die. Both of these objectionable features added greatly to the cost of making articles out of pulp water and the objects of my invention were to provide a die that combined two features; namely, adjustability and simplicity of construction.

Referring to the drawings which represent the preferred form of my invention, 1 designates the members from which the shaping face of the die is formed, said members being clamped together in a frame 2, as shown in Fig. 1, only a few of said members being shown in the figure, however. These members 1 preferably consist of rods or pins arranged in contact with each other, as shown in Fig. 3, so that openings 3 will be formed between said members to permit the water to pass through the die although, of course, tubes 1^a could be used for this purpose, as shown in Fig. 4. When solid rods or pins are used they may be of any shape in cross section so long as they are of such shape that openings will be formed between them when they are assembled together. When tubes are used, however, the tubes can be of rectangular shape in cross section as the openings through the tubes will permit the water to pass through the die. I prefer, however, to form the members 1 from round wire, as shown in the drawings, in view of the fact that I can obtain such material in the open market at a low cost. The members 1 are held in position in the frame 2 by means of

clamping bars 4 which preferably consist of pieces of channel iron, as shown in Fig. 2, it being immaterial, however, so far as my broad idea is concerned, how the members 1 are clamped together. In my preferred construction these clamping bars 4 are so arranged that one end of each bar butts against the inside face of the bar adjacent thereto, as shown in Fig. 1, the bars being supported on inwardly extending portions 2^a of the frame 2. Means are provided for forcing the clamping bars toward each other to securely clamp the members 1 together, and one form of means which I have found very well adapted for accomplishing this purpose consists of a stationary screw 5 rigidly mounted in the clamping bar 4 and a rotatable nut 6 mounted on said screw and engaging a socket or slot formed in the portion of the frame 2 that is arranged parallel to said clamping bar, a number of these devices being provided for each clamping bar. It will, of course, be obvious that various devices could be used for this purpose without departing from the spirit of my invention.

In constructing the die it is desirable to first form a pattern 7 of the shape and configuration desired for the article which the die is to form. The frame carrying the members 1 is then arranged over this pattern 7 and the members 1 are unclamped so that they can move downwardly until their lower ends rest on the upper face of the pattern, as shown in Fig. 2. Said members are then securely clamped together by turning the nuts 6 to force the clamping bars toward each other and the die will then be adjusted to form an article of the same shape and configuration as the top face of the pattern 7. The pins or members 1 are of uniform length so that both the upper and lower faces of the die will be of the same contour and configuration.

In adjusting the die I prefer to positively force the members 1 downwardly upon the top face of the pattern 7 by means of air pressure instead of relying upon gravity or manual power to move the members 1 into their adjusted position. This I accomplish by arranging a flexible pad 8, preferably of rubber, over the upper ends of the members 1 and also a closed hood 9 over the frame 2 to form an air chamber, said hood being secured to the frame by means of clamps 10. A pipe 11 leading from a supply of compressed air, enters the hood and when compressed air enters the interior of the hood through said pipe all of the members 1 will be positively forced downwardly so that their lower ends rest upon the top face of the pattern 7. It is not absolutely necessary that a pattern 7 be used for determining the positions of the members 1 as said members can be adjusted manually without the aid of a pattern or

other object placed upon one side of said members. Accordingly, a person with any artistic ability can adjust the members 1 into position to form a face, or any other object in practically the same manner that clay or other plastic materials are molded, the members 1 being clamped together with a slight degree of pressure so that they can be moved relatively to each other and will remain in their adjusted position, said members being securely clamped together after they have been adjusted into the desired position. The simplicity of such a construction enables unskilled labor to be employed for adjusting the members 1 as the operation is substantially the same as that performed by children in kindergartens in molding objects from clay.

When the members 1 are adjusted manually and without the aid of a pattern 7 I prefer to use a bed of yielding material, such, for example, as sand, underneath the lower ends of the members 1 so that said members need not be clamped together when they are being adjusted the yielding material permitting the members 1 to be moved downwardly but still offering sufficient resistance to their downward movement to retain them in their adjusted position until they are clamped securely together.

I prefer to use the die herein shown in a machine which deposits the liquid pulp fiber upon the top face of the die; namely, the face formed by the upper ends of the members 1 and for preventing said members from being displaced by the pressure that is used in compacting the pulp fibers together I have provided the die with an auxiliary pin supporting member that is arranged underneath the bottom face of the die when it is in operative position in the machine. This auxiliary pin supporting member is shown in Figs. 5, 6 and 7 and consists of one or more bars 12 secured to the underneath side of the frame 2 and extending across the bottom face of the die. These bars 12 carry a number of bundles of pins or rods 13 that are clamped together by tubes 14 which are so constructed that they can expand and contract. The tubes 14 extend through openings in the bars 12 and are clamped in position by means of semi-circular clamps 15 and set screws 16, as shown in Fig. 7. After the members 1 of the die have been securely clamped together the bars 12 are connected to the frame 2 and the pins 13 are then pushed upwardly into engagement with the lower ends of the members 1 which aline therewith, the set screws 16 being then screwed up so as to clamp the pins 13 firmly together and also secure the tubes 14 to the bars 12. An auxiliary supporting member of this construction will not interfere with the passage of the water through the open-

ings of the die and as the members 1 of the die are supported at several points between the clamping bars 4 there will be no liability of said members 1 being displaced when the pressure is applied to the upper ends thereof in the operation of compacting the pulp fibers together.

Instead of clamping the members 1 together by means of clamping bars, as previously described, said members may be soldered together. In constructing the die in this manner I preferably use tinned brass wire to form the members 1. Said brass members are coated with a flux and are then arranged together preferably over a pattern. A sheet of solder is then placed over the upper ends of said members and heat is applied thereto to melt the solder and thus cause it to flow downwardly between the members 1 to solder them together. The mass of members 1 is then subjected to a blast of cold air which blows out the superfluous solder and leaves openings between the members 1, said members being soldered together at the points where they contact with each other. A solid die is thus formed which has openings extending therethrough to permit the escape of the water that is forced out of the pulp fiber. A die constructed in this manner can also be changed to form articles of different shape and configuration by simply heating the solder and forcing the members 1 down upon a different shaped pattern 7 and allowing the solder to cool so as to hold the members 1 in their adjusted position. This operation can be repeated indefinitely by occasionally applying a little more solder so that the same die can be used for forming articles of different shapes and configurations.

From the foregoing description it will be seen that I have devised a die to be used for forming articles from liquid pulp fiber which can be adjusted to make an article of any shape and configuration and which is of such a simple construction that it can be manufactured at a small cost.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A die for forming articles out of liquid pulp fiber, comprising a plurality of rods arranged parallel to each other and being of such shape in cross section that openings are formed between them to provide passageways for the liquid that is forced out of the pulp fiber, independently movable clamping bars surrounding said rods for binding them together, one end of each of said bars butting against the inner face of an adjacent bar, a closed rigid frame surrounding said bars, and adjustable means arranged between said frame and the clamping bars for forcing said bars toward each other to cause

them to clamp said rods; substantially as described.

2. A die for the purpose described, comprising a frame, a plurality of pins or rods clamped together and arranged inside of said frame, and an auxiliary supporting member extending across said frame and engaging the ends of some of said pins; substantially as described.

3. A die for the purpose described, comprising a frame, a plurality of pins or rods clamped together and arranged inside of said frame, and an auxiliary supporting member extending across said frame and comprising a bundle of rods clamped together and engaging the lower ends of the pins which are arranged inside of said frame; substantially as described.

4. A die for the purpose described, comprising a frame, a plurality of pins or rods clamped together and arranged inside of said frame, and an auxiliary supporting member consisting of a bar which extends across said frame and is secured thereto, and adjustable devices carried by said bar for engaging the lower ends of said pins; substantially as described.

5. A die for the purpose described, comprising a frame, a plurality of pins or rods clamped together and arranged inside of said frame, an auxiliary supporting member consisting of a bar which extends across said frame and is secured thereto, and bundles of adjustable rods clamped to said bar and engaging the lower ends of the pins arranged in said frame; substantially as described.

6. A die for the purpose described, comprising a frame having a plurality of independently movable pins or rods clamped therein, a bar connected to said frame and extending across the lower ends of said pins, expansible tubes carried by said bar, and independently adjustable rods clamped in said tubes and engaging the lower ends of the pins in the frame to act as supports for same; substantially as described.

7. A method of forming a die which consists in arranging a plurality of pins or rods parallel to each other over a pattern, placing a flexible member over the upper ends of said pins, applying fluid pressure to said member so that every portion thereof will exert downward pressure on the pins to force the lower ends of the pins into engagement with said pattern, and then securely clamping said pins together; substantially as described.

8. A die for forming articles out of liquid pulp fiber, comprising a plurality of pins held together by metallic solder and having openings between them to provide passageways for the water that is forced out of the fiber during the operation of forming the article; substantially as described.

9. The method of forming a die which consists in arranging a plurality of pins together, applying metallic solder to said pins to fasten them together and then blowing the surplus
5 solder from between said pins; substantially as described.

In testimony whereof I hereunto affix my

signature in the presence of two witnesses,
this thirteenth day of April 1907.

FRANK C. EMRICK.

Witnesses:

WELLS L. CHURCH,
GEORGE BAKEWELL.