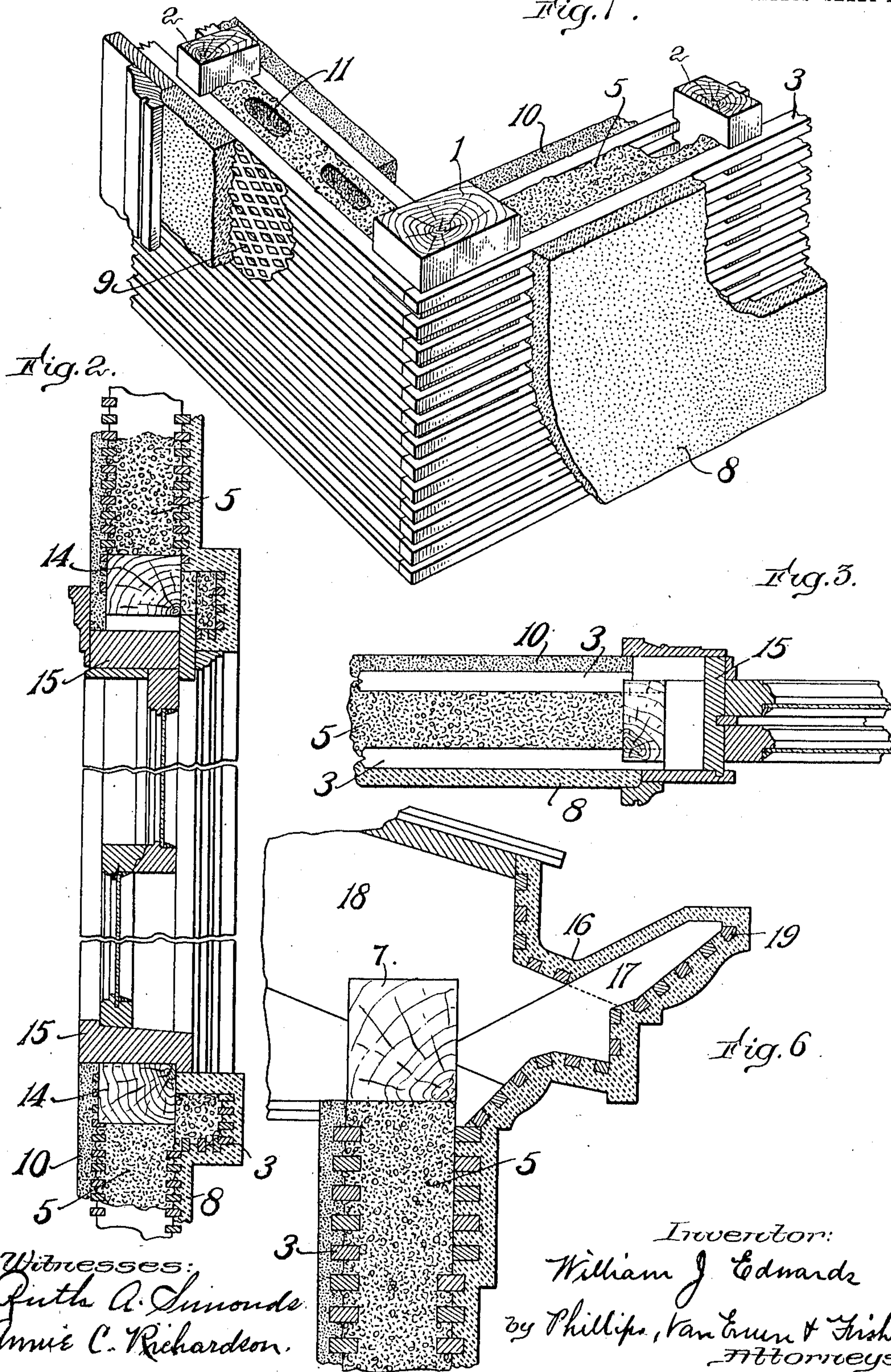


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CONCRETE CONSTRUCTION.
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947,492.

Patented Jan. 25, 1910.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 4.

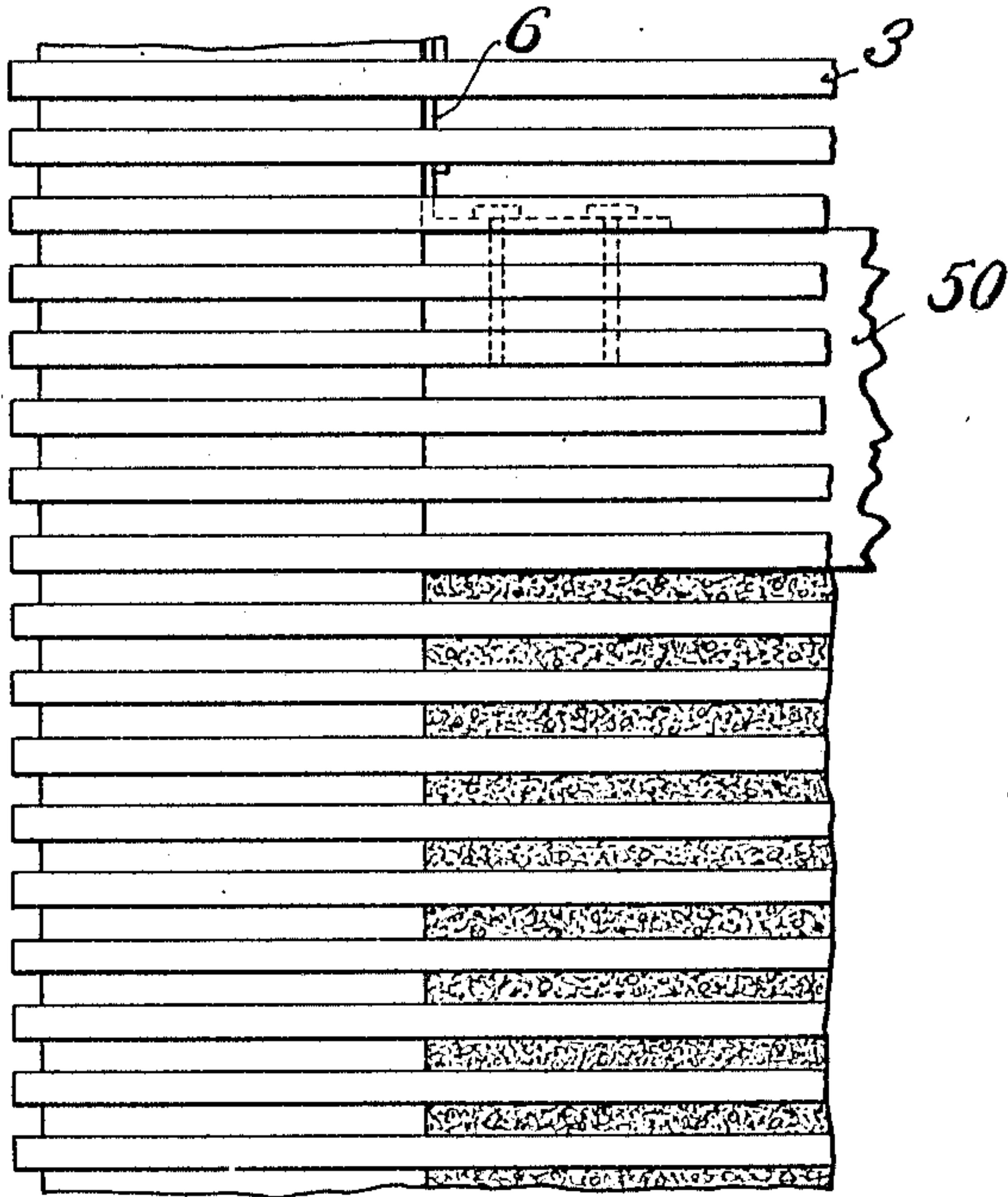


Fig. 5.

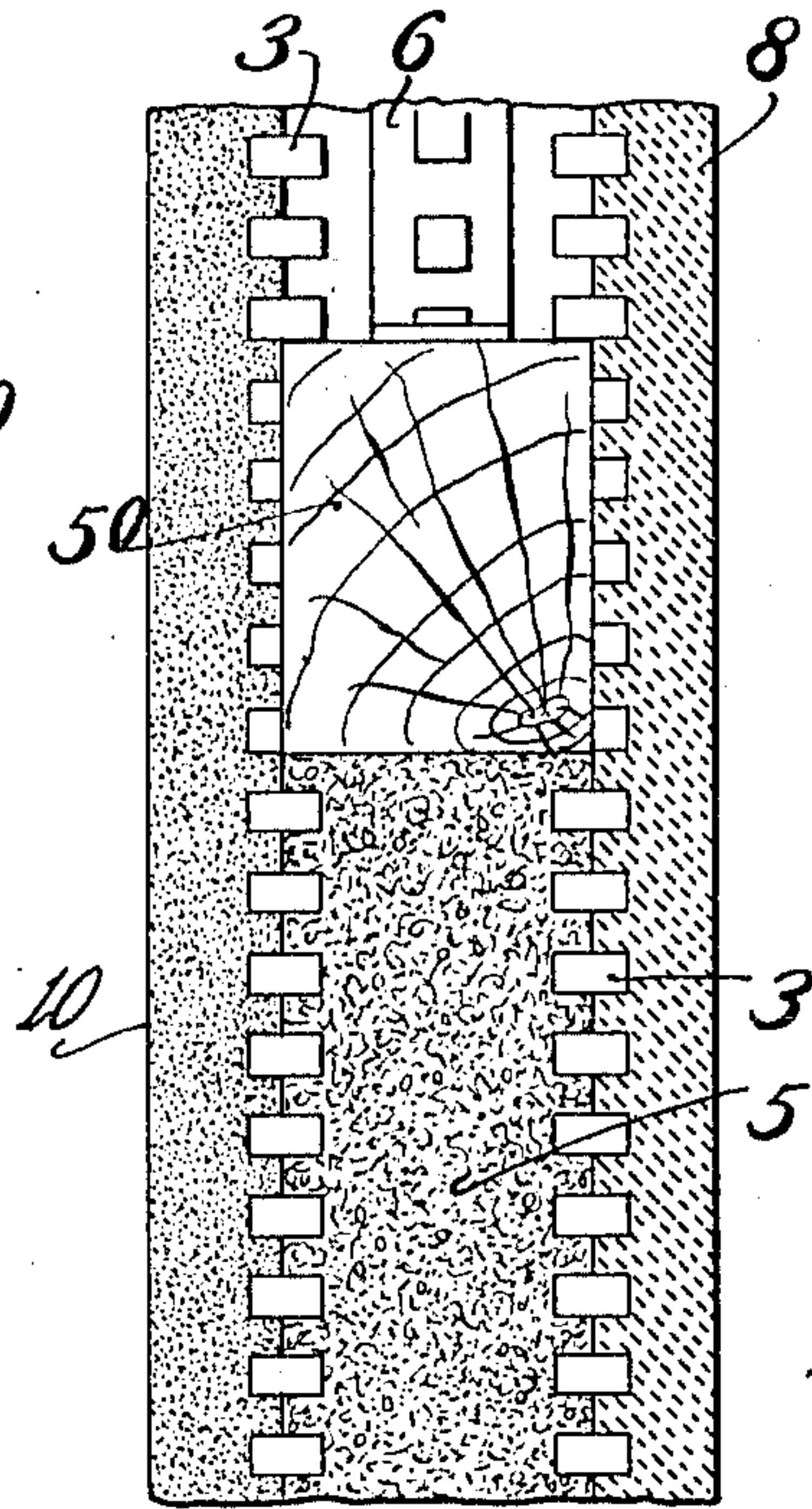


Fig. 7.

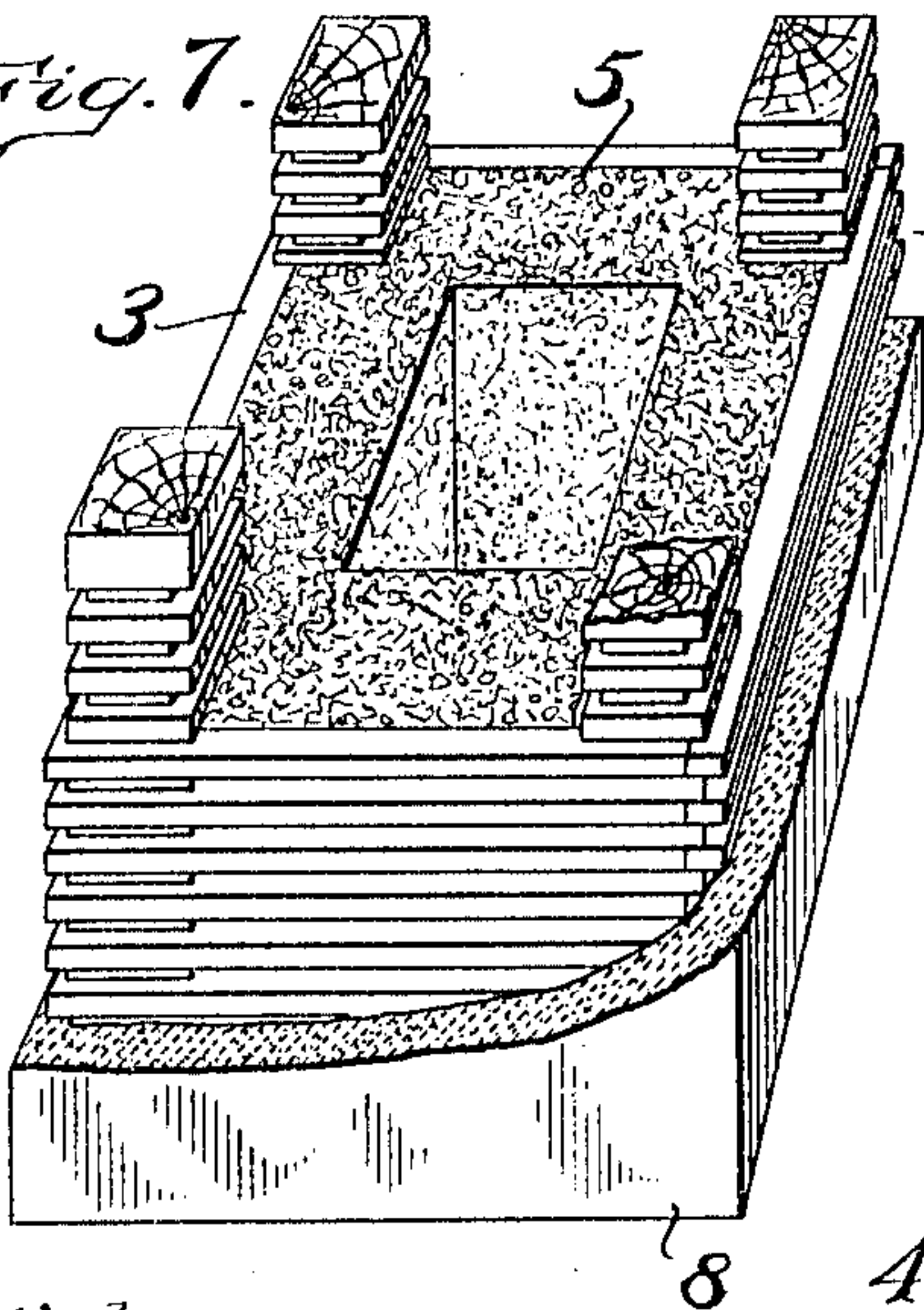


Fig. 9.

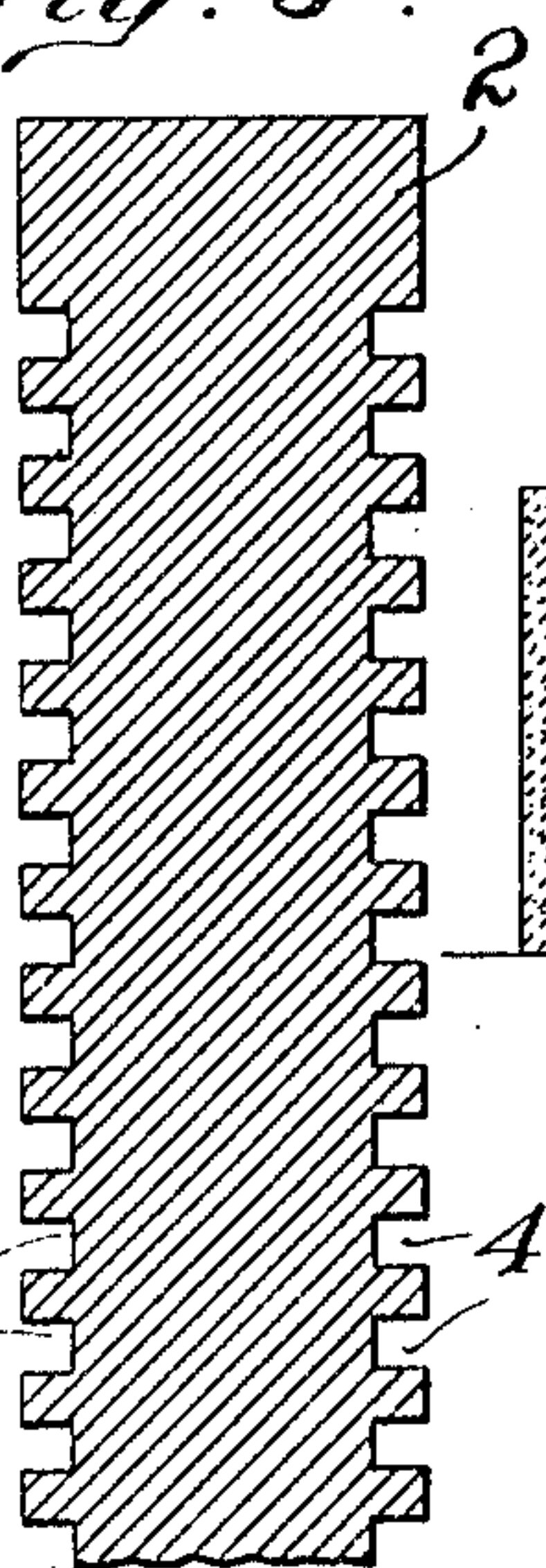
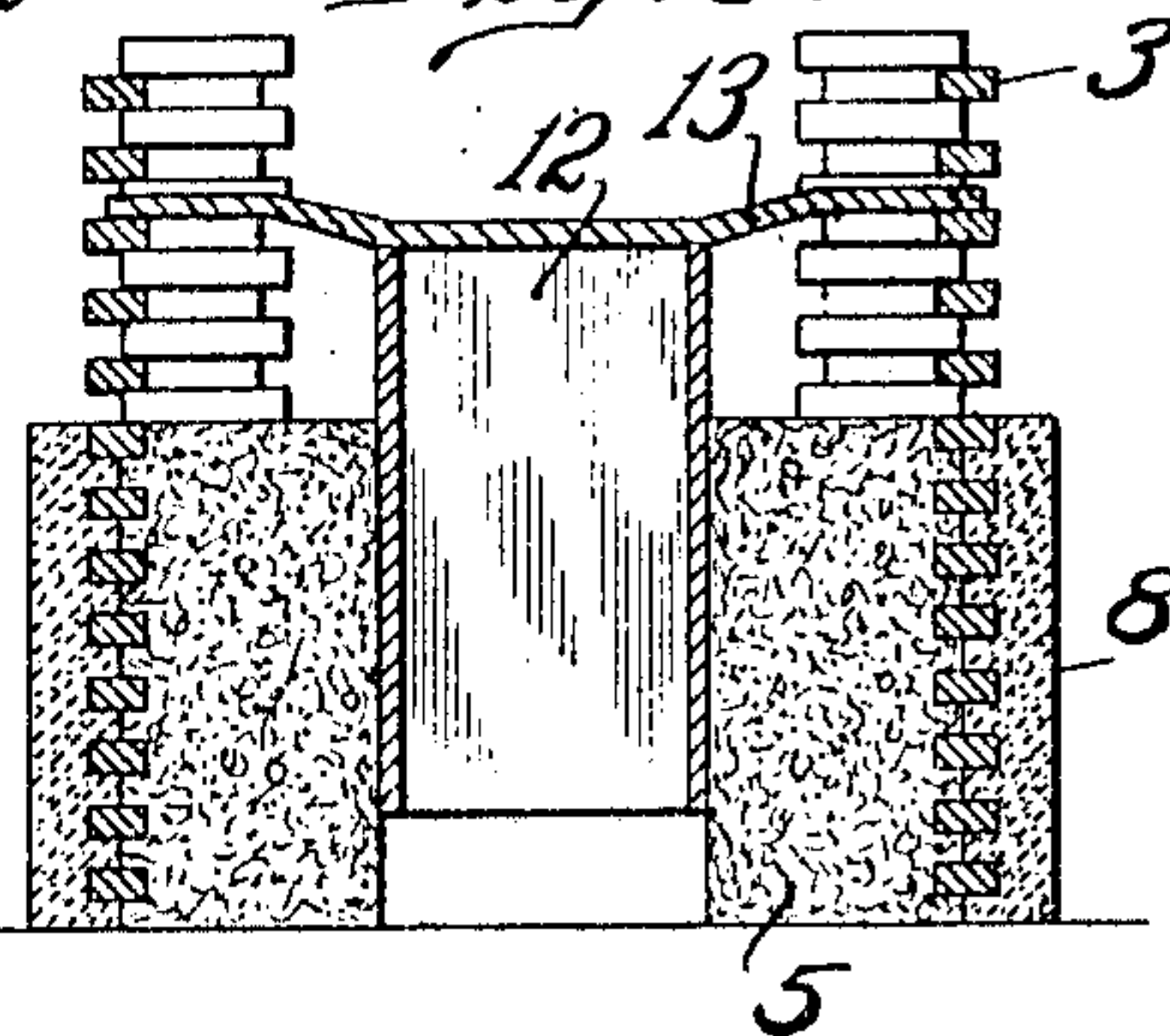


Fig. 8.



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UNITED STATES PATENT OFFICE.

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CONCRETE CONSTRUCTION.

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To all whom it may concern:

Be it known that I, WILLIAM J. EDWARDS, a citizen of the United States, residing at Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Concrete Construction; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to a concrete construction which may be employed for the erection of dwelling houses, stables, garages and other buildings and structures where a cheap, durable and fire-proof construction is desired.

It has heretofore been the common practice, where a building or structure of concrete was to be erected, to first construct a substantially tight or closed mold or form for a greater or less portion of the structure to be erected, which form or mold was filled with concrete. This was allowed to set or harden after which the mold would be built up for another section or portion of the structure, and which in turn would be filled with concrete. In order to reinforce the concrete and give additional strength, metal rods or bars were often embedded in the concrete. After the concrete had hardened sufficiently, the mold or form would be torn away and when made of wood, as was usually the case, such portions as were in proper condition were used again in building another form or mold. This method of construction is objectionable for many reasons. In the first place a great deal of lumber is required in the building of the forms and this is generally damaged to such an extent when the form is taken down that much of it cannot be used a second time. Another objection is that since the outside surfaces of the structure assume with remarkable distinctness all the details of the side of the mold, either first-class material and workmanship are required for the building of the molds or the surfaces of the concrete must be dressed or finished to remove the objectionable marks of the mold. Still another objection to the above described method is that, being so essentially different from the methods of construction commonly employed for erecting wooden

frame structures, it is not adapted for use by the ordinary builder whose experience has been wholly with such wooden structures.

The object of the present invention is to provide a concrete construction which shall be cheap to erect since no lumber is temporarily employed which is more or less damaged or destroyed by its temporary use, all lumber which is used being embodied in the finished structure and reinforcing and strengthening the same, and since the expense of the making of molds and redressing the outer surface of the concrete is avoided.

Another object of the present invention is to provide a concrete construction which may be used by any builder familiar with and capable of the erection of ordinary wooden buildings and without requiring especially skilled labor.

With these objects in view, the present invention consists, generally speaking, of a wooden frame having open work retaining walls which hold or retain the concrete filling, coatings or layers of cement, mortar, plaster or any similar material being applied to the outside of these retaining walls, thus providing an integral structure of concrete and cement or similar material, within which is embedded and buried the wooden framework.

In the accompanying drawings, which illustrate portions of a dwelling house constructed in accordance with the present invention, Figure 1 shows in perspective and with portions broken away, the construction of the vertical walls of a house at a corner; Fig. 2 is a vertical section, and Fig. 3 a horizontal section, through a wall and window; Fig. 4 shows in side elevation, and Fig. 5 in cross section, the wall and the method of securing the horizontal girts; Fig. 6 is a vertical section through the eaves portion of the house, showing a gutter constructed in accordance with the present invention; Fig. 7 is a perspective, and Fig. 8 a vertical section of a chimney showing the method of construction; and Fig. 9 is an enlarged longitudinal section of a stud or post to be used in erecting a building in accordance with the present invention.

In Fig. 1 of the drawings, 1 represents the vertical posts and 2 the studs which are secured by mortise and tenon in the usual

manner in the horizontal sills, which preferably will be laid in well troweled cement on the top of the cellar walls or other foundation. The upper ends of the studs will be provided with tenons to enter mortises in the girts, as usual in frame buildings, the girts, however, being secured to the posts by angle irons instead of by mortise and tenon. After the posts and studs are placed on the sills and while temporarily held in vertical position in any suitable manner and before the girts are placed upon the studs, the horizontal strips 3 will be attached at proper intervals to the inside and outside of the posts and studs, in recesses or grooves 4 formed in the inner and outer faces thereof, as shown in Fig. 9. The horizontal strips may be of any suitable dimensions, those in the drawings being $\frac{1}{2}$ " thick and $\frac{3}{8}$ " wide, and conveniently being formed by sawing up $\frac{3}{8}$ " boards, such as are ordinarily used for boarding-in purposes, into $\frac{1}{2}$ " strips. In the drawings, these strips are shown spaced apart about $\frac{1}{2}$ ", this depending upon the width of the strips and the character of the concrete which is to be used. The recesses or grooves 4 may be formed in any suitable manner, a cheap and convenient way being by gang saws at a mill. These strips form an open framework as it were, or retaining walls, and after they have been secured to the vertical posts and studs to a proper height, concrete will be introduced into the space between them and allowed to harden. The broken stone or coarse gravel used for the concrete, and the distance the horizontal strips are placed apart, will be such that while some of the concrete may be forced through the spaces between the horizontal strips, the major portion will be held in place by these open retaining walls until the concrete has hardened. While this process is going on, another portion of the wall will be built up to the proper height and filled with concrete, and the work will thus progress around the entire building so that by the time the workmen have reached the first section the concrete will have set or hardened sufficiently so that another section of retaining walls may be built up and more concrete filled in. This will be continued until the walls reach the proper height, when the horizontal girt shown at 5 will be placed upon the tops of the studs and upon the solid wall of concrete, the ends of the girt being secured to the posts by the angle irons 6. The second story will then be constructed in the same manner as the first, and so on until the walls are completed, the plate 7 (see Fig. 6) being placed upon the top of the upper set of studs and the solid concrete and secured by angle irons or in other suitable manner to the posts. The sills and girts and other horizontal portions of the

frame may be grooved longitudinally to receive the horizontal strips, or strips of reduced width may be applied directly thereto, as shown in Fig. 5.

A finishing coating of cement 8 will be applied by trowel or in any other convenient way to the exterior surface of the walls, all wooden and concrete surfaces with which the cement would come in contact being first well wet with water to cause the cement to more firmly attach itself thereto. Ordinarily the cement will attach itself to the concrete and wood sufficiently to secure the cement in position. If desired, however, metal lathing 9 or some similar means may be employed which shall be secured to the outside of the retaining walls, to which in turn the outer coating of cement shall be applied. Owing to the substantial character of the horizontal strips, this metal lathing may be attached thereto at frequent intervals so that all danger of its sagging or pulling away will be avoided. With stables, garages, and similar structures, the interior surface of the walls may be finished with cement in a like manner, but with dwelling houses it may be desired to apply a coating of plaster 10 instead of cement. This may be applied directly to the inner retaining wall or to lathing secured thereto or in any other suitable manner.

If it is desired to provide air spaces, such as are shown at 11, in the walls, these may be formed by the use of a suitably shaped core or form held between the retaining walls and around which the concrete is filled and allowed to set, after which the form can be partially withdrawn and another section of concrete built. The chimneys of the house may very conveniently be constructed in this manner, Fig. 7 showing in perspective a chimney partially completed, while Fig. 8 shows in vertical section the chimney with the core or form 12 in position, being supported by the arms 13 which rest upon the horizontal strips on opposite sides of the chimney structure.

If it is desired to construct a window cap or ledge in accordance with the present invention, wooden blocks or pieces may be secured to the horizontal members 14 (see Fig. 2) above and below the window casing 15, horizontal strips being attached to the side and bottom of these blocks forming a sort of trough to be filled with concrete. If necessary a coarser concrete may be employed for such purposes and the strips may be spaced less distance apart. A finishing layer of cement will be applied to the outside of these longitudinal strips, if necessary a strip of board being placed under the over-hanging portion to temporarily support the coating of cement while it was hardening. In a similar manner a gutter 16

may be formed as shown in Fig. 6, a properly shaped supporting piece 17 being secured to the rafter 18, the horizontal strips 19 being attached to the outer and lower edges of the supporting pieces 17. By the use of a properly shaped mold, any desired configuration of cornice may be obtained.

From the above description it is evident that a building or structure embodying the present invention will be comparatively cheap to erect, absolutely fire-proof since the entire wooden framework is buried or embedded in the concrete or similar fire-proof material, and of great strength and durability. By the use of horizontal strips of substantial width and thickness, not only is all likelihood of their bending or bulging under the pressure of the concrete avoided, but the concrete is strongly reinforced particularly since the retaining strips are secured in grooves or recesses in the supporting members. Furthermore, by inserting the horizontal strips in recesses or grooves in the vertical studs, practically any width of strip may be employed without materially increasing the thickness of the wall. Such an arrangement also insures an exceedingly rigid framework which will not be distorted or thrown out of alinement during the process of erection.

Where in the claims a coating of cement is referred to, this is to be understood as in-

cluding mortar, plaster or other similar material.

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

1. A concrete construction consisting of a wooden frame comprising vertical supporting members provided with transverse recesses on their opposite faces, wide, thin, horizontal retaining members spaced apart from one another and fitting tightly edge-wise in the recesses forming two retaining walls, a filling of concrete between the walls, and a coating of cement applied to the outside of the walls, substantially as described.

2. A concrete construction consisting of a wooden frame comprising vertical supporting members provided with recesses on their opposite faces, horizontal retaining members spaced apart from one another and fitting tightly in the recesses forming two retaining walls, a filling of concrete between the walls, metal lathing secured to the outside of the walls, and a coating of cement applied to the lathing, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

WILLIAM J. EDWARDS.

Witnesses:

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