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PATENTED FEB. 14, 1905.

D. E. MORAN & J. W. DOTY.

COFFER-DAM.

APPLICATION FILED AUG. 12, 1904.

2 SHEETS—SHEET 1.

FIG. 1.

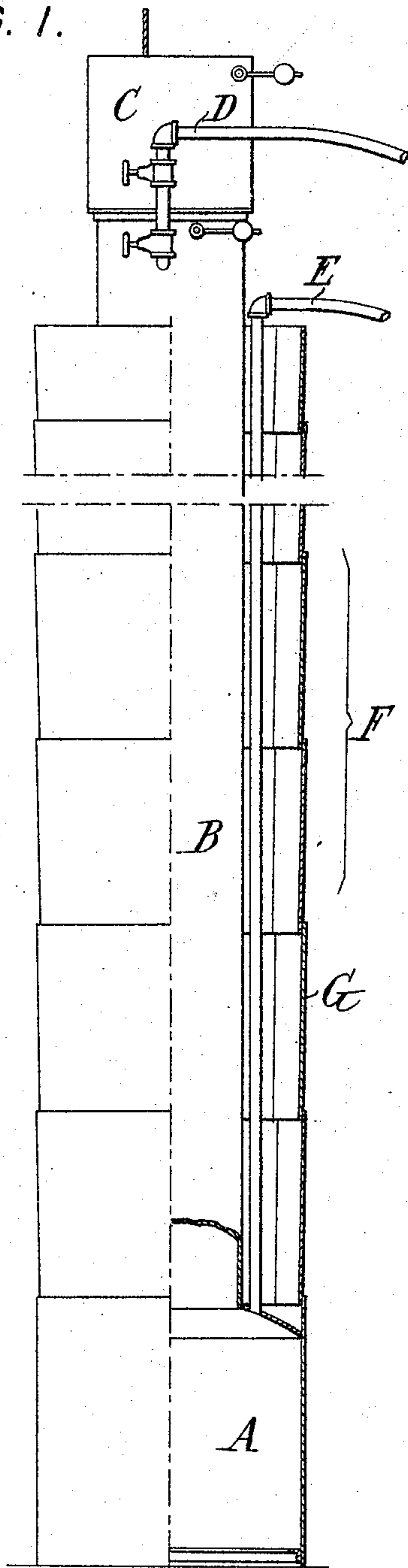
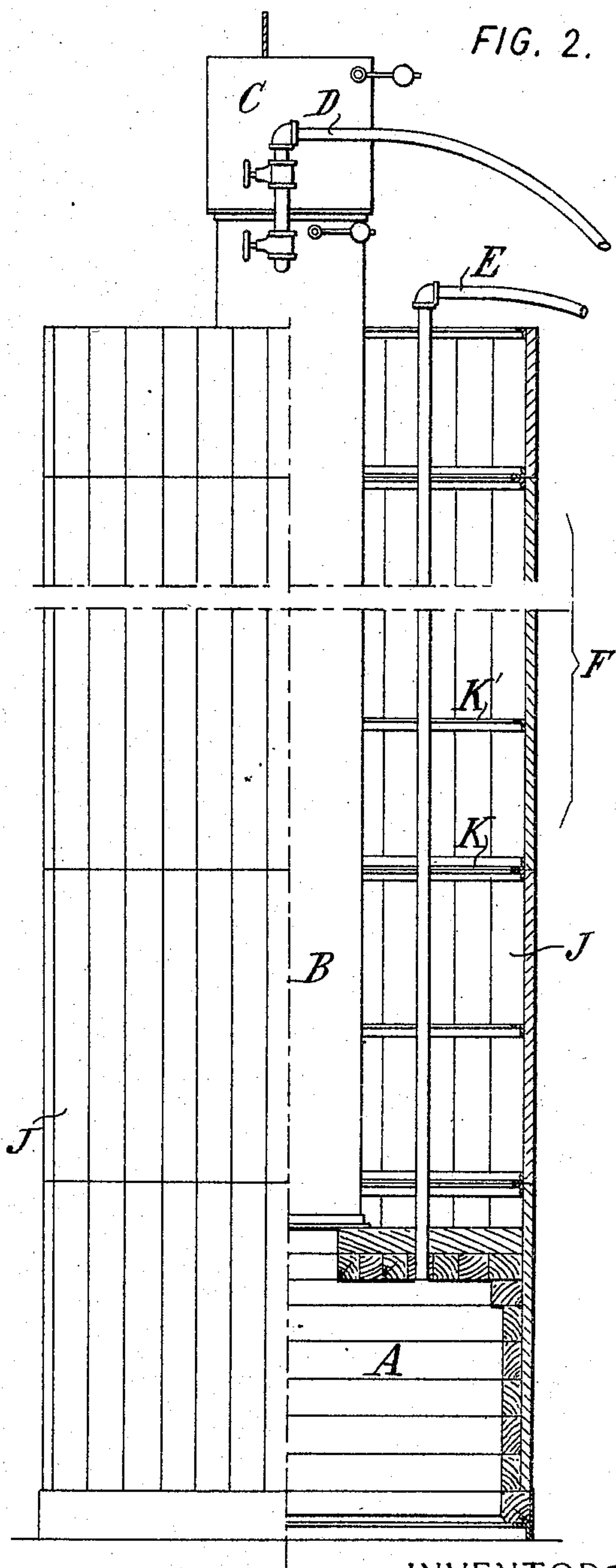


FIG. 2.



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2 SHEETS—SHEET 2.

FIG. 3.

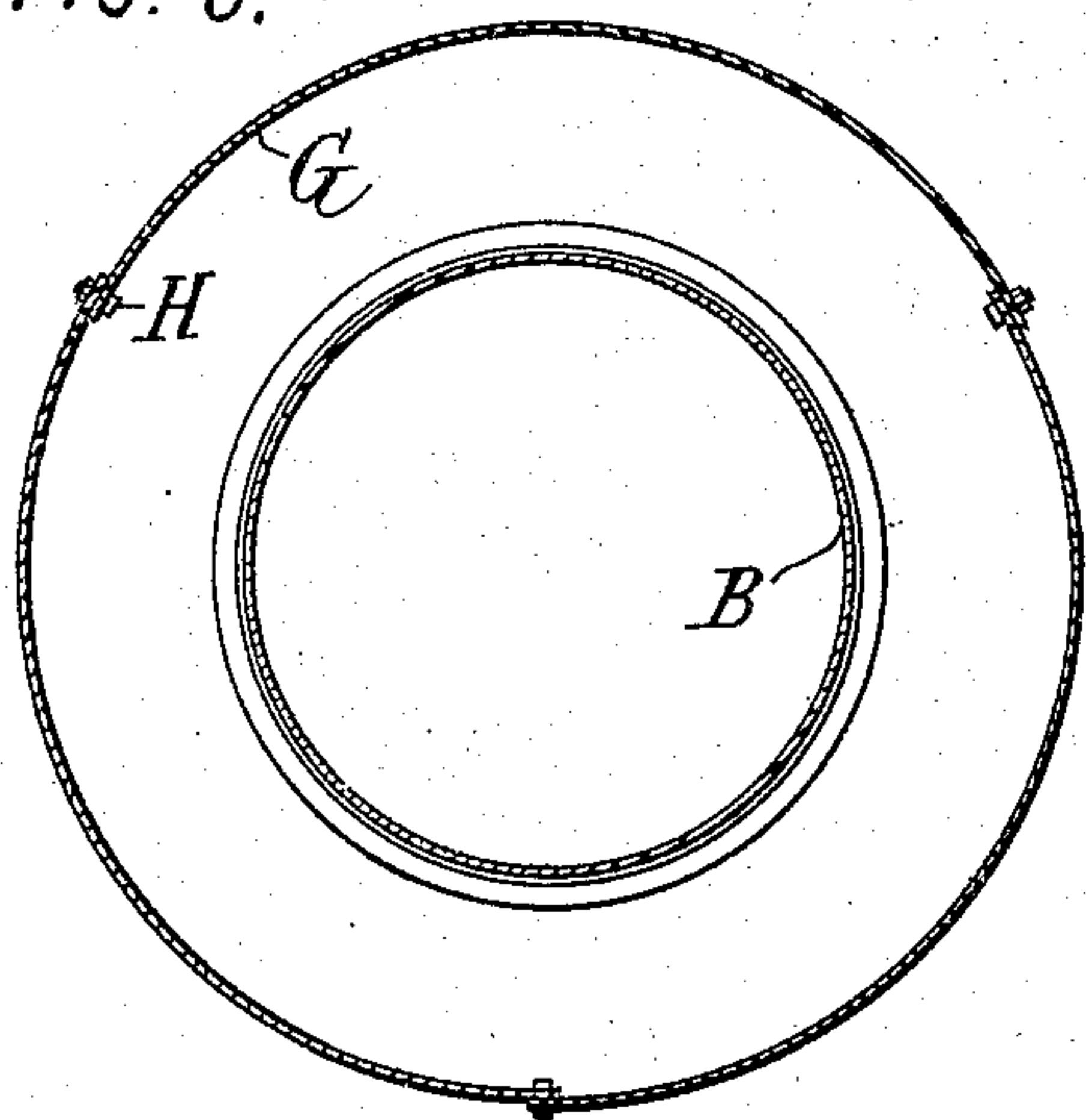


FIG. 4.

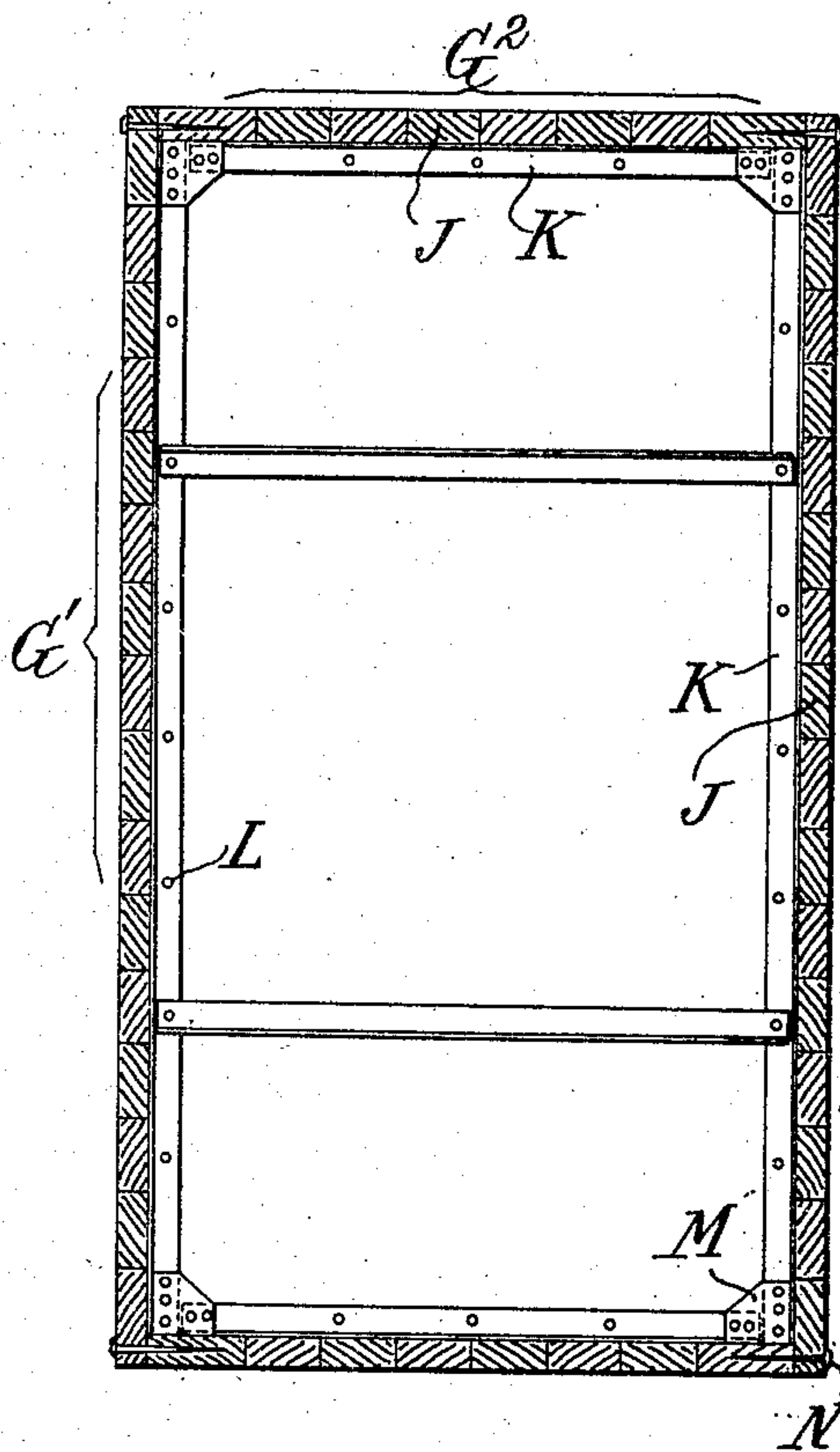


FIG. 5.

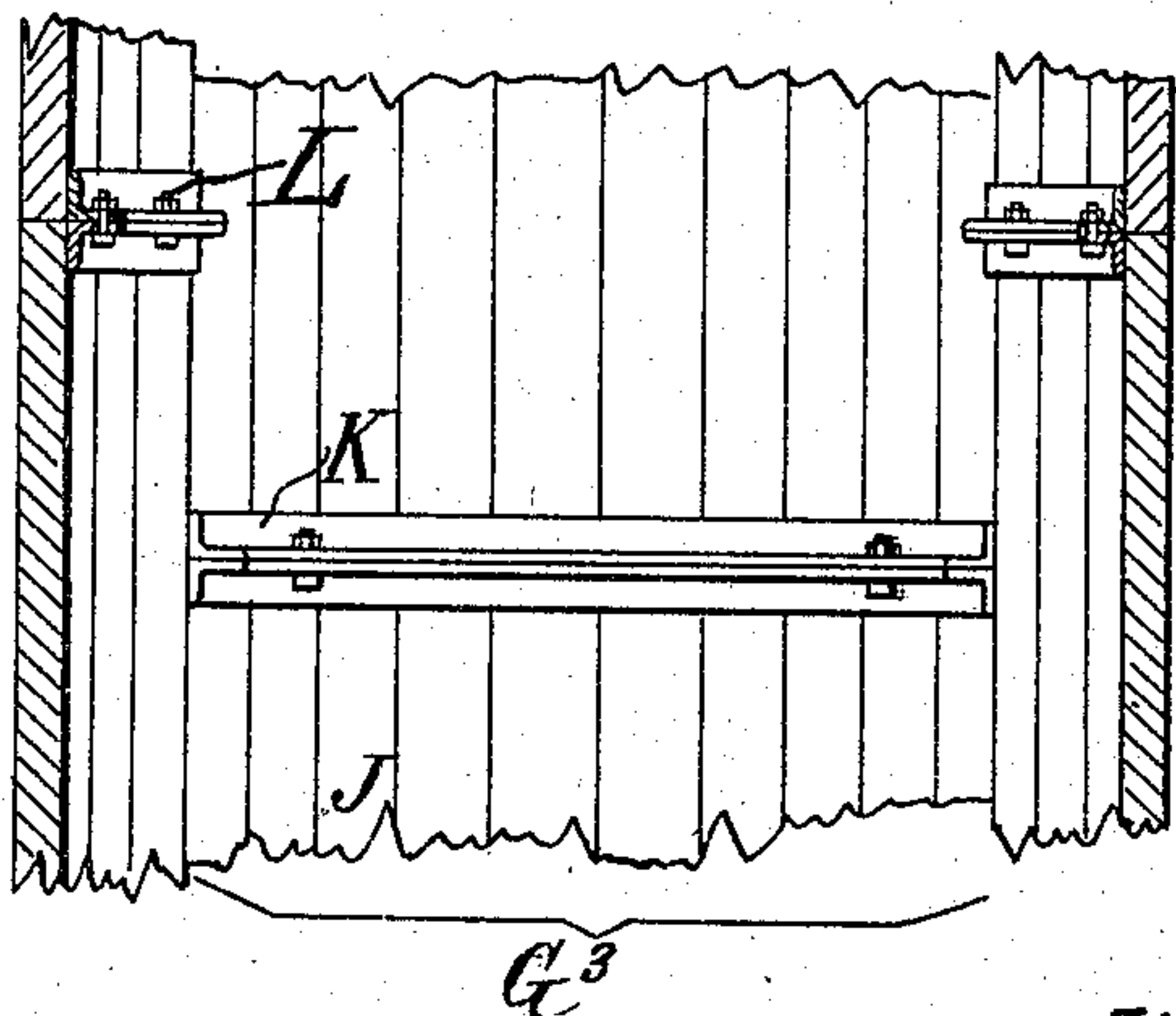
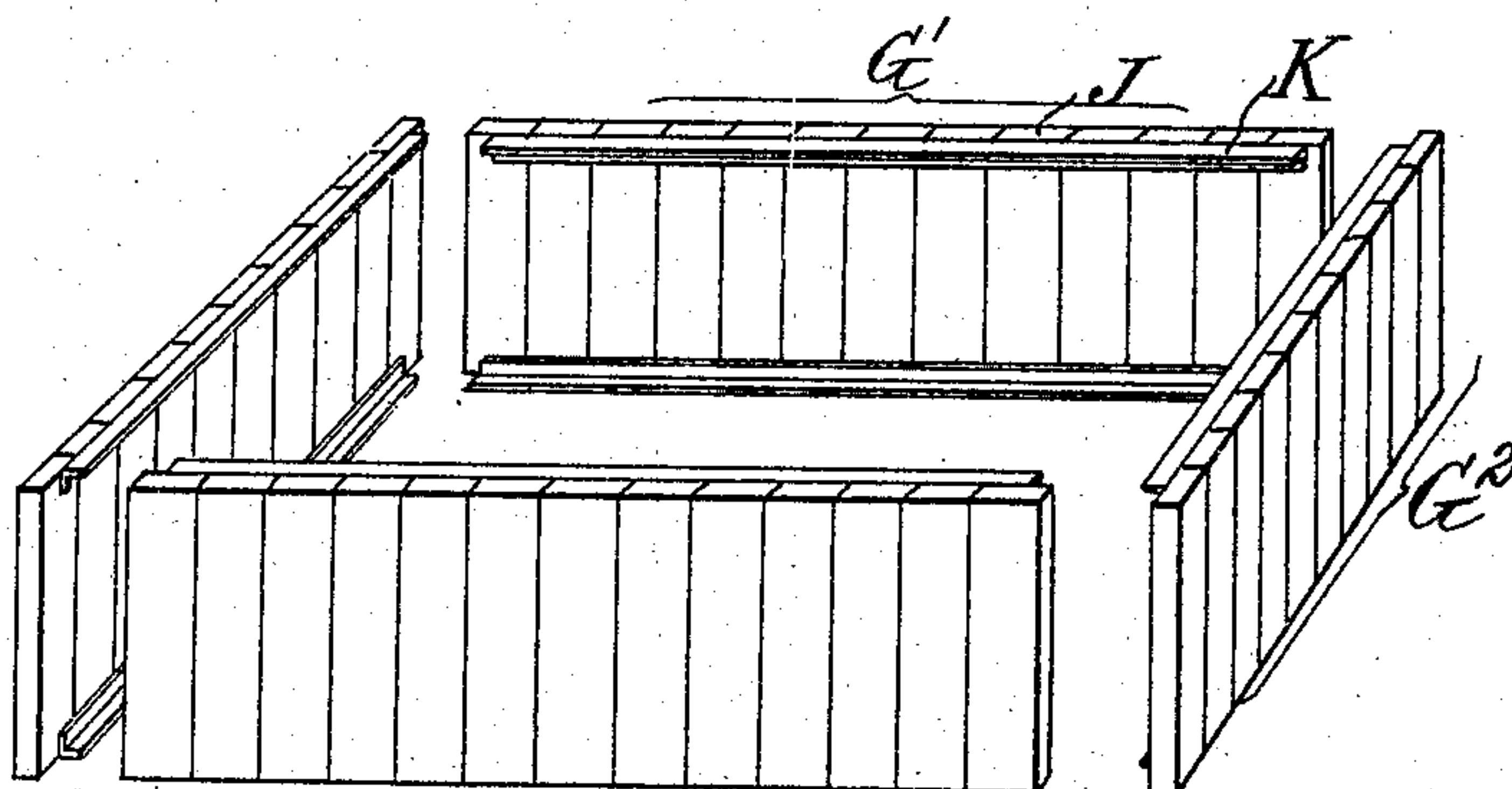


FIG. 6.



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UNITED STATES PATENT OFFICE.

DANIEL E. MORAN, OF MENDHAM, NEW JERSEY, AND JOHN W. DOTY, OF
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COFFER-DAM.

SPECIFICATION forming part of Letters Patent No. 782,410, dated February 14, 1905.

Application filed August 12, 1904. Serial No. 220,555.

To all whom it may concern:

Be it known that we, DANIEL E. MORAN, a citizen of the United States, residing at Mendham, in the county of Morris and State of New Jersey, and JOHN W. DOTY, a subject of the King of Great Britain, residing in the borough of Manhattan, city, county, and State of New York, have jointly invented certain new and useful Improvements in Coffers-Dams, of which
10 the following is a specification.

In the building of pneumatic foundations a caisson is sunk and a pier built, usually of concrete, on the roof of the caisson as the sinking progresses. The pier of concrete or
15 other masonry is carried up inside of a wall which is ordinarily known as the "coffer-dam." Previous to this invention the coffer-dam has either been built up by the successive addition of the single pieces necessary, either iron
20 plates or timbers, or rings (circular or rectangular, according to circumstances) have been first constructed and then lifted into place by powerful derricks and connected one above another. The objection to the first
25 method is that it delays the work and adds to the cost by the necessity of doing all the assembling work on the caisson and pier during the sinking of the same. The objections to the second method are, first, the necessity of
30 lifting the completed ring over the air-lock and the air-pipes leading to the compressors and the difficulty in handling and transporting such rings, especially where they are constructed at a distance from the job.

According to this invention the greater part of the preparing or assembling of the single pieces can be done at a distance from the work—that is to say, in a carpenter-shop or at the steel-works—a feature which is of the
40 greatest importance in working in crowded cities. The assembled or prepared sections are of suitable size and shape to form easily-transportable units, and the sections may be applied to the completed portion of the coffer-dam
45 without any great difficulty in handling and without the necessity of breaking through the air connection. These results are obtained by building the coffer-dam of sections form-

is at least one open vertical joint, and preferably a number of such joints, depending on the size of the coffer-dam. Each of the free vertical edges forming the open joint is previously prepared either by providing suitable
55 connecting-pieces or by punching the necessary holes, or otherwise, to adapt it for ready connection with an adjacent vertical edge of the same or preferably of another section, whereby to form a closed ring substantially
60 in place upon the completed portion of the coffer-dam. Preferably each of the sections referred to is built up of a plurality of smaller pieces, though with the smallest steel coffer-dam each section may be a single plate suitably prepared. Preferably, also, each of said
65 sections, or at least a number of such sections forming the greater part of the coffer-dam, are of the same size and shape, so as to be interchangeable. The method of constructing the coffer-dam of such sections by setting
70 them substantially in place and then connecting the vertical edges greatly facilitates the work and reduces the cost.

The accompanying drawings illustrate caissons embodying the invention.

Figure 1 is a view, partly in section and partly in elevation, of a steel caisson of small size. Fig. 2 is a similar view of a timber caisson of larger size. Fig. 3 is a cross-section of Fig. 1. Fig. 4 is a cross-section of
80 Fig. 2. Fig. 5 is a vertical section of another arrangement of the parts of a timber caisson. Fig. 6 is a perspective view showing a number of sections in juxtaposition.

At the lower end of the caisson there is provided a chamber A, called the "working" chamber, from which a shaft B conducts the men and materials through an air-lock C at the top. Air is admitted to the lock and to the upper end of the shaft by a pipe D, and
90 ordinarily an additional air-pipe E runs direct to the working chamber. The pipes D and E lead to the air-compressor or other source of compressed air. Extending upward from the edges of the working chamber is the coffer-dam, which is designated as a whole by the letter F.

Referring to the embodiment of the inven-

tion illustrated in Figs. 1 and 3, the caisson is built up of individual complete horizontal rings, each composed of three sections G, suitably prepared beforehand with the necessary bolt-holes. Each ring is formed by putting the separate sections directly in place upon the finished portion of the coffer-dam and afterward uniting their vertical edges by bolts H. If desired, two of the plates might be connected together before putting them in place, or even three plates might be connected, leaving one vertical edge open, so that the ring could be lowered over the air-lock and the air-pipes D and E passed through the open joint without breaking the pipes, thus accomplishing what is perhaps the principal advantage of the invention. The sections may be connected to the lower finished portion of the coffer-dam either before or after the uniting of the sections into a complete closed ring. With the former methods in use the ring has been completely formed and then lowered over the pipe D, the latter being broken to permit this, and being then connected again over the upper edge of the ring, after which the same operation was repeated with the pipe E, the ring being all the while suspended from the derrick and the operation requiring the attention of a number of men, as well as the loss of much time.

With timber coffer-dams the method of this invention is substantially similar. The coffer-dam is formed of rings of approximately the same height throughout the principal portion of the coffer-dam, but of less height at the top. For example, each ring may be made of staves about eight feet long, except the top ring, which is similarly constructed, but is only four feet long. Depending upon the length of the sides of the coffer-dam, these will need to be stiffened and braced. Referring to the timber coffer-dam shown in Figs. 2, 4, and 6, it will be seen that the complete structure is composed of horizontal rings, each of which rings in turn is composed of side sections G' and end sections G², which are united at the corners. These sections might be made smaller, as by dividing the long sides G' into two parts, or they might be made greater, as by connecting a side and an end in a single section, or, as explained in connection with a steel coffer-dam, two sides and two ends may be connected together, leaving only one open vertical joint, in order to pass over the air-pipes, though this construction is not practically the best. Each of the sections is made up of vertical staves J, connected together at their opposite ends to form units, which are preferably flat and of moderate size, so as to be easily transportable. For example, the staves may be connected together by means of the angle-irons K, which are to serve as stiffeners and which are also punched to receive the necessary bolts L for forming the horizontal joints. In the high sections it is preferable also to provide

an intermediate angle-iron K', Fig. 2, to stiffen the section. These sections are introduced in place and then connected together in the manner explained for the steel coffer-dam. The vertical joints, for example, may be made by connecting the angle-irons by means of gusset-plates M and by overlapping one section upon the other and driving in spikes N. It is understood the joints may be calked, if necessary, to resist the entry of water into the space within.

It is not essential that the horizontal joints be continuous around the perimeter of the coffer-dam. For example, they may be broken, as in Fig. 5, which represents a vertical section of a round timber coffer-dam built up of quadrant-sections G³, formed of vertical staves J, connected at their ends by angle-irons K.

Though we have described with great particularity of detail certain embodiments of the invention, yet it is not to be understood therefrom that the invention is limited to the embodiments described. Various modifications thereof may be made by those skilled in the art in detail and in the arrangement and combination of the parts without departure from the invention.

What we claim is—

1. In a pneumatic caisson, a coffer-dam composed of sections having free vertical edges, each of which edges is adapted to be connected to an adjacent vertical edge to form a closed joint, and whereby a closed ring may be formed.

2. In a pneumatic caisson, a coffer-dam composed of sections each comprising a plurality of pieces connected together to form a readily-transportable unit having free vertical edges, each of which edges is adapted to be connected to an adjacent vertical edge to form a closed joint, and whereby a closed ring may be formed.

3. A coffer-dam composed of sections having free vertical edges, each of which edges is adapted to be connected to an adjacent vertical edge to form a closed joint, and whereby a closed ring may be formed, each section comprising a plurality of timbers, a connecting member being mounted on at least one horizontal edge of each section whereby it may be connected to the horizontal edge of an adjacent section.

4. A coffer-dam composed of sections having free vertical edges, each of which edges is adapted to be connected to an adjacent vertical edge to form a closed joint, and whereby a closed ring may be formed, each section comprising a plurality of vertical wooden staves, a metal bar having a horizontal extension being mounted on at least one horizontal edge of each section whereby it is stiffened and whereby also it may be connected to the horizontal edge of an adjacent section.

5. A coffer-dam composed of sections each section consisting of a plurality of timbers

fastened together in a readily-transportable flat unit, and forming only a portion of a complete ring adapted to be easily attached to an adjacent section along each vertical edge.

5 6. A coffer-dam composed of a number of sections of the same size and shape so as to be interchangeable, each section having free vertical edges, and each of which edges is adapted to be connected to an adjacent vertical edge to form a closed joint, whereby a closed ring may be formed.

10 7. A complete self-contained article of manufacture comprising a plurality of pieces fastened together to form a readily-transportable section of a coffer-dam having free vertical edges, each of which is adapted to be connected to an adjacent vertical edge to form a closed joint, and whereby a closed ring may be formed.

20 8. A complete self-contained article of man-

ufacture comprising a plurality of timbers fastened together to form an easily-transportable unit-section of a coffer-dam constituting only a portion of a complete ring, and adapted to be easily attached to an adjacent section along each vertical edge. 25

9. A self-contained article of manufacture comprising a plurality of timbers fastened together to form a readily-transportable flat section of a coffer-dam, and adapted to be easily attached to adjacent sections along its vertical edges. 30

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

DANIEL E. MORAN.
JOHN W. DOTY.

Witnesses:

LOUIS L. BROWN,
LAMAR HARDY.