

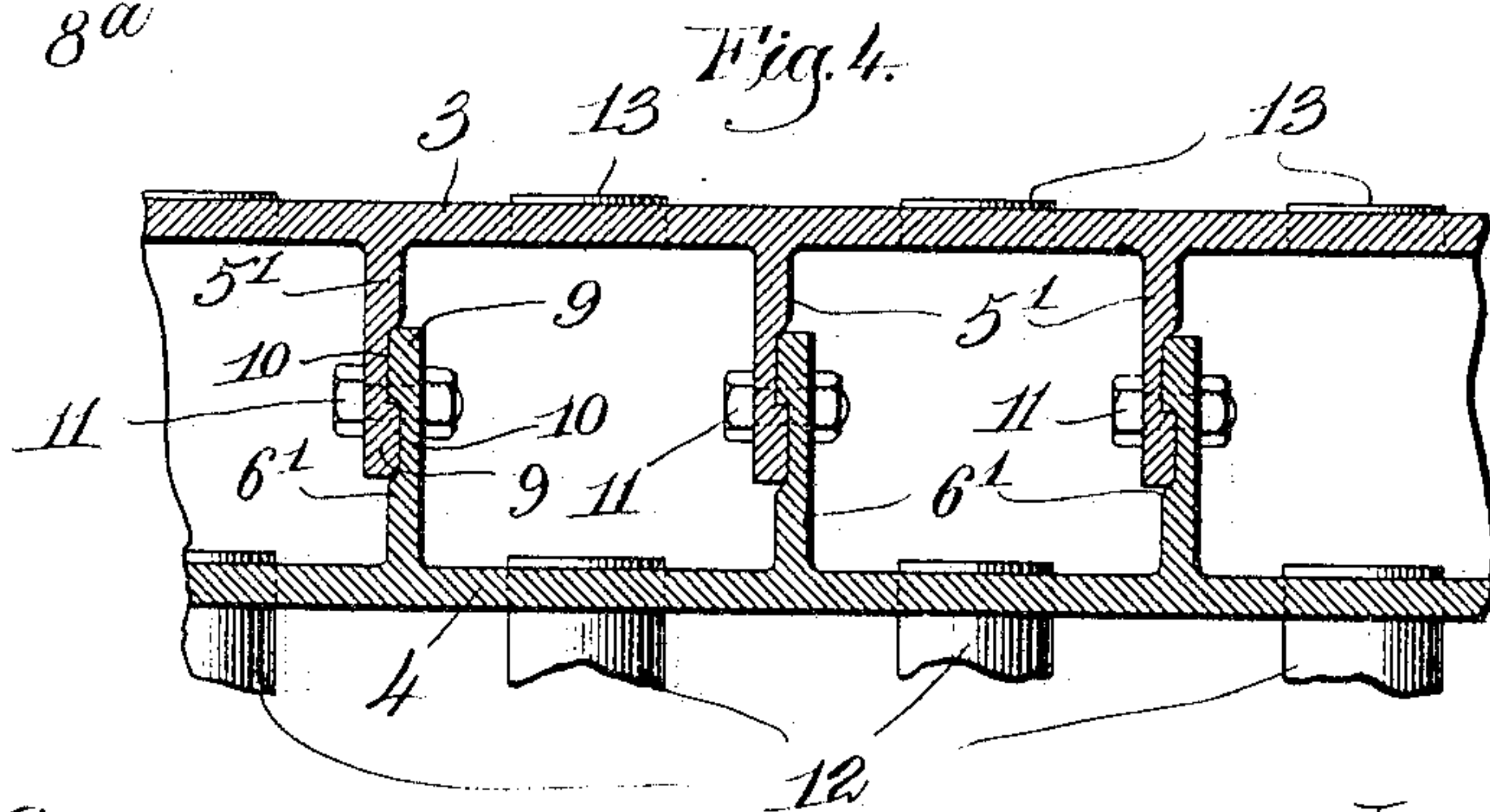
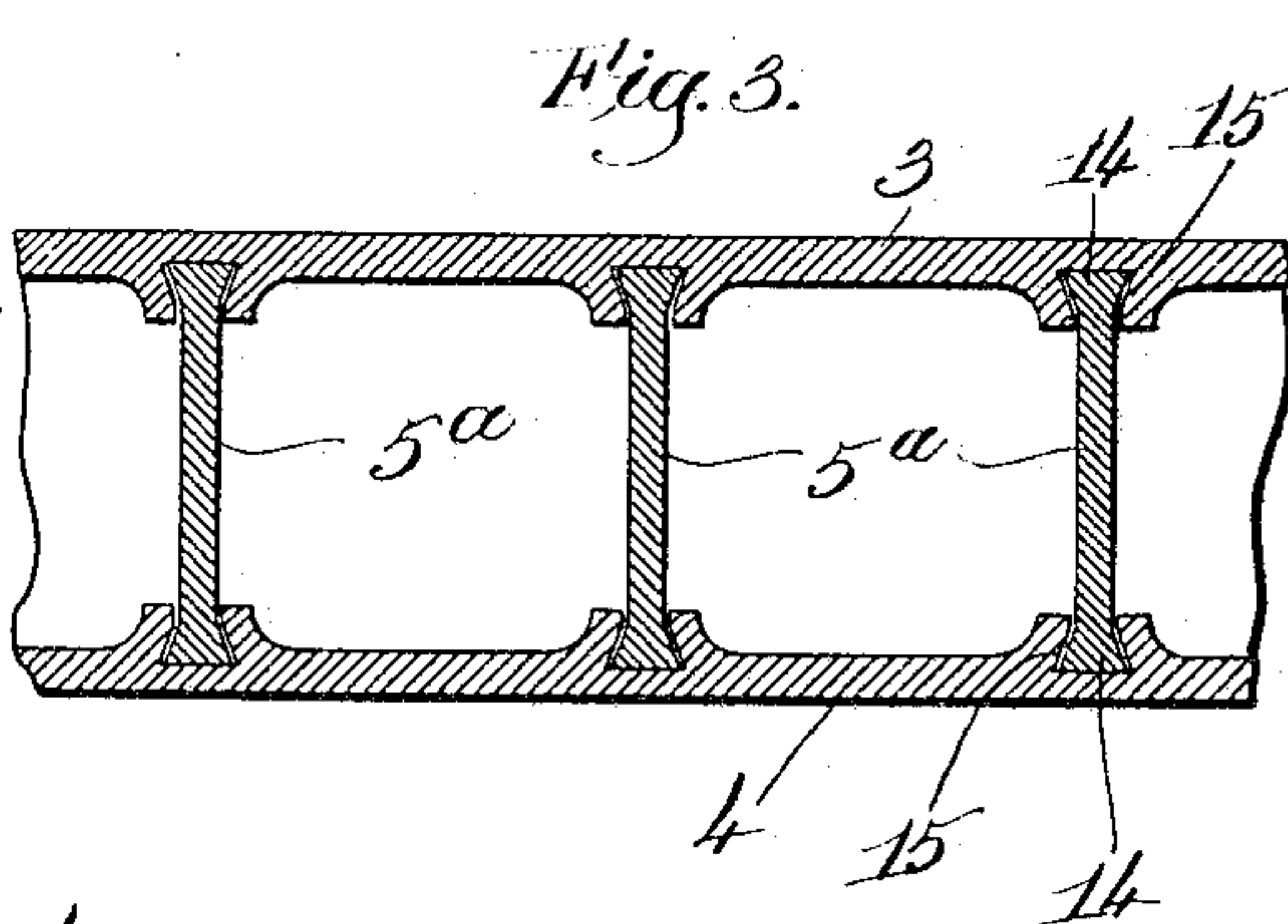
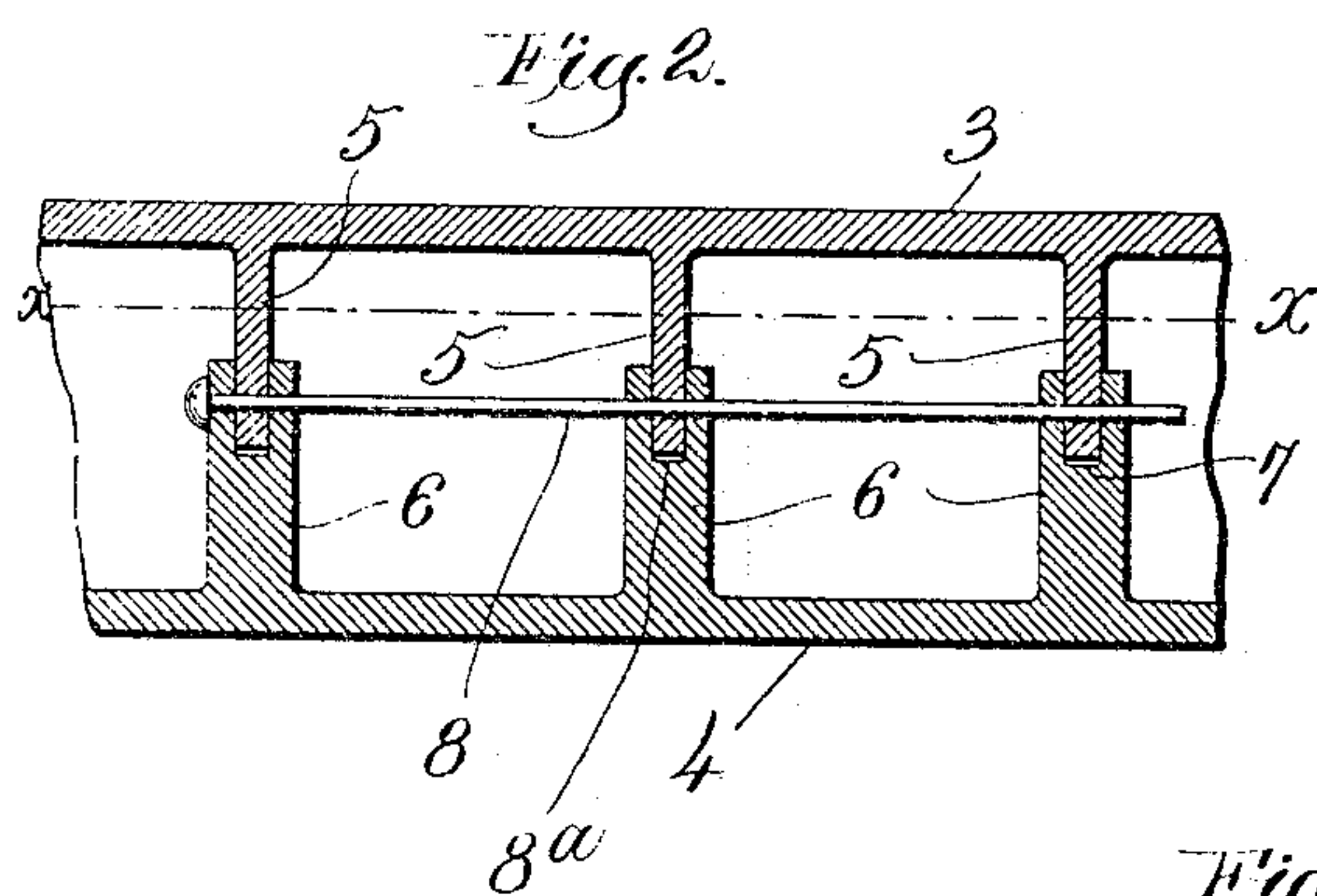
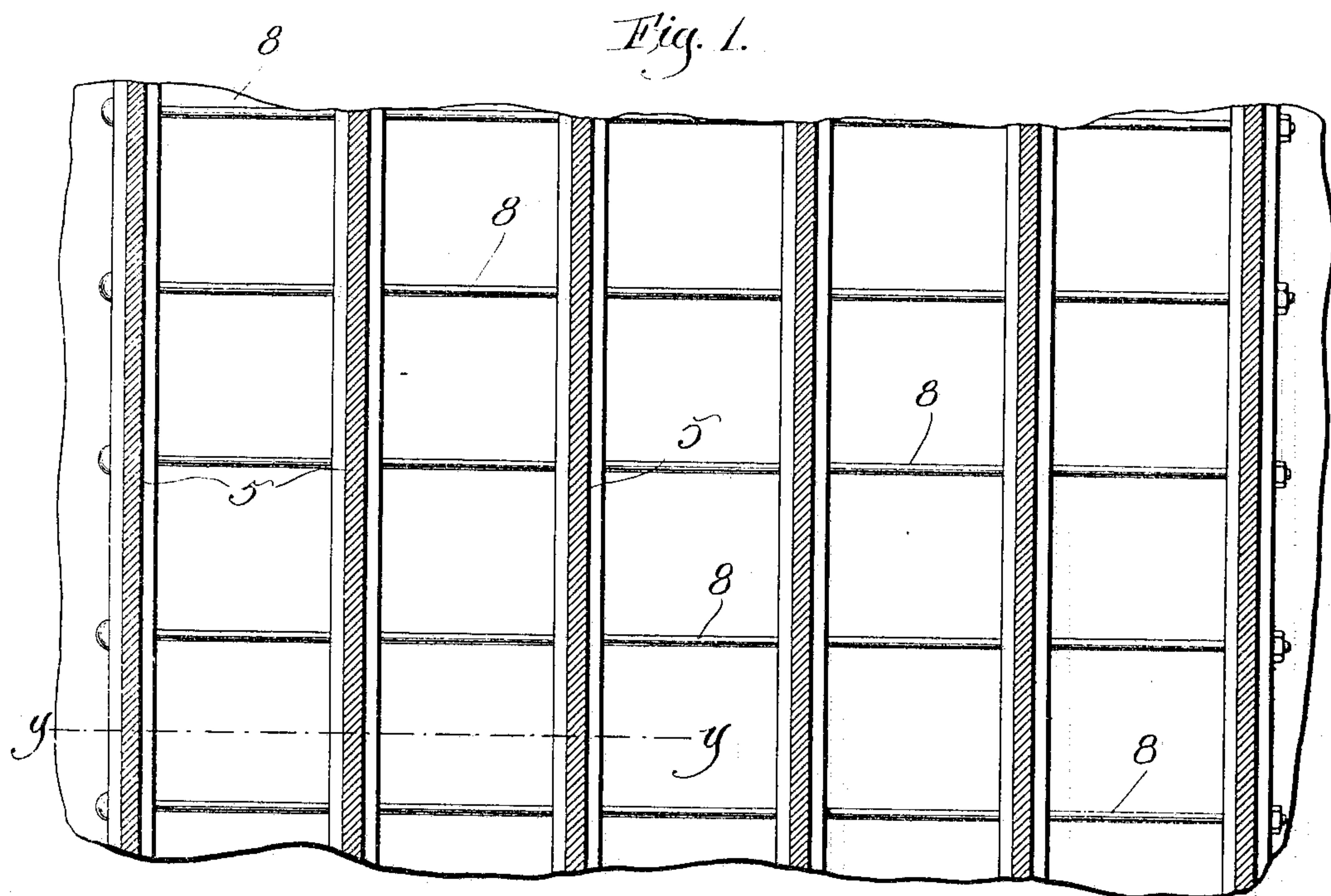
No. 769,762.

PATENTED SEPT. 13, 1904.

J. M. McCLELLON.
MEANS FOR STAYING PLATES.

APPLICATION FILED MAY 21, 1904.

NO MODEL.



Witnesses:

Thomas Drummond,
S. Wm. Lutton.

Inventor.

James M. McClellon,
by Lewis Gregory, Attys.

UNITED STATES PATENT OFFICE.

JAMES M. McCLELLON, OF EVERETT, MASSACHUSETTS.

MEANS FOR STAYING PLATES.

SPECIFICATION forming part of Letters Patent No. 769,762, dated September 13, 1904.

Application filed May 21, 1904. Serial No. 209,102. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. McCLELLON, a citizen of the United States, residing at Everett, county of Middlesex, and State of Massachusetts, have invented an Improvement in Means for Staying Plates or Sheets, of which the following description, in connection with the accompanying drawings, is a specification, like figures on the drawings representing like parts.

This invention relates to means for staying plates or sheets which are subjected to pressure. Such sheets or plates are very frequently found in boiler construction, and one very familiar illustration of them is at the sides of the fire-box of an ordinary locomotive-boiler.

The commonly-accepted method of staying sheets in boiler construction is by use of stay-bolts; but the objection to the use of stay-bolts for this purpose, especially in locomotive-boilers and in other places where the construction is subjected to more or less strain, such as is due to the expansion and contraction of the parts or to the racking of a locomotive, is that the stay-bolts one after the other become broken, until finally the number of sound stay-bolts left is insufficient to stand the strain and an accident is liable to occur. In my improvements I do away with all stay-bolts and stay the flat surfaces by means of ribs which tie the sheets together. Preferably the ribs will extend parallel to each other and the full length of the sheets. Said ribs may be made separate from both sheets, but connected to each, or each sheet may be made with ribs which project toward each other and stand in alinement and are connected together by any suitable means.

In the drawings, Figure 1 is a section on the line *x x*, Fig. 2. Fig. 2 is a section on the line *y y*, Fig. 1, showing one form of my invention. Fig. 3 is a cross-section through two sheets, showing a slightly-modified form of the invention; and Fig. 4 is a section similar to Fig. 3, showing still a different form of the invention.

The two sheets which are to be stayed are designated by 3 and 4, respectively. These sheets may be the sheets or plates at the sides

of the fire-box in a locomotive or the inner and outer shell of a boiler or any other sheets or plates which are required to withstand pressure tending to force them apart or toward each other.

In the form of my invention shown in Fig. 2 the sheet 3 is formed with suitable ribs 5, which are connected to the sheet 4 in some suitable way, preferably by providing said sheet with other ribs, 6, to which the ribs 5 are connected. The ribs 5 and 6 are formed to overlap at their meeting edges and are secured together by some suitable means, such as bolts. The special form of overlapping illustrated in Fig. 2 is effected by making the ribs 6 with the longitudinal grooves 8^a, into which the edges of the ribs 5 enter. Said ribs are tied together by cross-rods 8, which extend perpendicular to the ribs and pass through all the ribs between the sheets.

In Fig. 4 the sheets 3 and 4 are each provided with the ribs 5' and 6'', which overlap each other; but in this instance the overlapping is effected by positioning the ribs so that they lie one alongside of the other. Each of the ribs is also provided with a head 9, which lies in a longitudinal groove 10 in the other rib. In this embodiment of my invention I have illustrated the overlapping ribs as secured together by means of individual bolts 11. It will be understood, however, that the long tie-bolts 8, such as shown in Figs. 1 and 2, can be used in place of the short bolts, if desired, and I would also state that the short bolts 11 might be used in place of the long bolts or rods 8 in Figs. 1 and 2. One advantage of the construction shown in Fig. 4 is that all the strain is taken directly by the ribs, owing to the interlocking of the heads 9 in the recesses 10, and the bolts 11 therefore are not subjected to any shearing strain, their only purpose being to hold the heads 9 within the recesses 10.

In Fig. 4 I have illustrated the invention as applied to that type of boiler which comprises an inner and an outer shell, and 3 represents the outer shell, and 4 the inner shell. 12 represents water-tubes which extend through the flue or combustion-chamber of the boiler and are expanded into the inner

shell 4. Opposite to each water-tube is an aperture in the shell 3, closed by a removable plug 13. Where individual short bolts 11 are used for securing together the overlapping ribs, I propose to locate these bolts so that they can be put in place and the nuts screwed thereon through the apertures in the outer shell 3.

In the forms of the invention shown in Figs. 2 and 4 the ribs 5 and 6 are integral with the sheets 3 and 4, respectively. It is not essential to my invention, however, that the ribs should be integral with the sheets, as they may be separate therefrom, but connected thereto in some suitable way. Such a form of the invention is shown in Fig. 3, wherein the ribs 5^a have dovetailed edges 14, which are received in dovetailed grooves 15, formed in the sheets 3 and 4, respectively. In this latter embodiment of my invention the ribs 5^a, which form the connection between the sheets 3 and 4, are made in one piece, while in Figs. 2 and 4 the connection between said sheets is made in two parts 5 and 6, which are secured together. Where the connecting means between the sheets is made in two parts, as shown in Figs. 2 and 4, I prefer to make the separate parts of the connection integral with the sheets—that is, make the ribs 5 integral with the sheet 3 and the ribs 6 integral with the sheet 4; but my invention would not be departed from if these ribs 5 and 6 were separate from said sheets, but secured thereto in any appropriate way.

Where this method of staying sheets is used in boiler construction, the ribs will preferably be given such a direction as not to interfere in any way with the circulation of the water or steam within the water or steam chamber. For instance, in the fire-box of a locomotive said ribs would extend vertically.

While the invention is especially adapted for use in boiler construction, I do not wish

to be limited to any particular use, for with appropriate modifications this method of staying sheets can be used for staying any sheets or plates which are subjected to pressure and require staying, whether said sheets are flat or slightly curved.

Various changes can be made in the construction and arrangement of the parts, therefore, without departing from the invention.

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

1. A means for staying sheets and plates comprising a rib or ribs connecting said sheets and integral with one of them.

2. Two sheets or plates to be stayed, one of said sheets having ribs integral therewith, and means to secure said ribs to the other sheet.

3. A means for staying sheets or plates comprising a plurality of parallel ribs extending perpendicularly from one sheet and integral therewith, and means to connect said ribs to the other sheet.

4. In boiler construction, two sheets forming between them a steam or water space, and a plurality of parallel ribs connecting said sheets and integral with one of them.

5. Two sheets or plates to be stayed, each of them having ribs integral therewith, and means to secure the ribs together.

6. Two sheets or plates to be stayed each having integral therewith a plurality of parallel ribs extending perpendicular therefrom, and means to connect the ribs together.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES M. McCLELLON.

Witnesses:

LOUIS C. SMITH,
MARGARET A. DUNN.