

(No Model.)

2 Sheets—Sheet 1

W. ORR & P. S. BROWN.
SHEET METAL STRUCTURE.

No. 383,759.

Patented May 29, 1888.

Fig. 1.

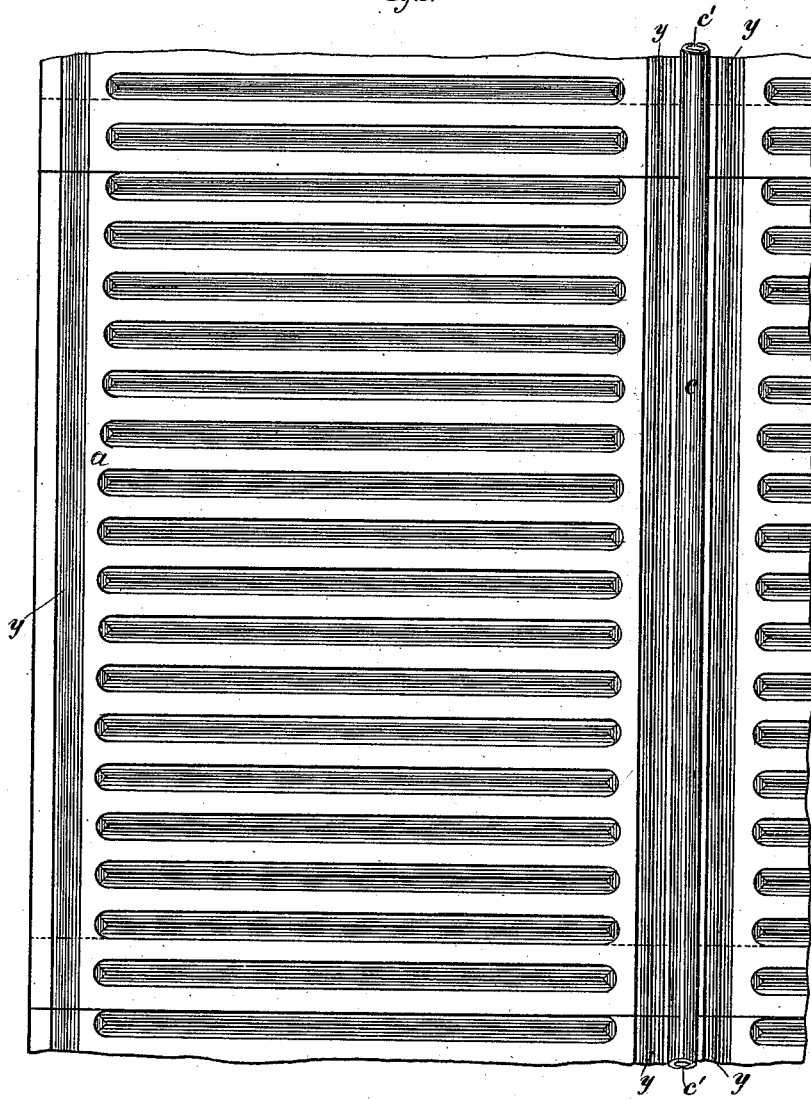


Fig. 3.

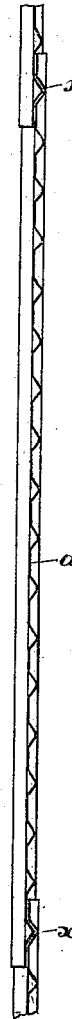
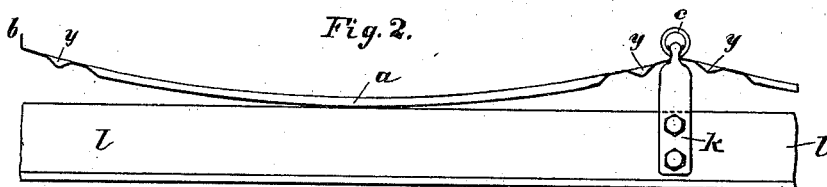


Fig. 2.



Attest:
Emma Arthur.
Edmond Steer,

Inventors.
Wm. Orr &
P. Stuart Brown.
By Knight & Co.
Attys.

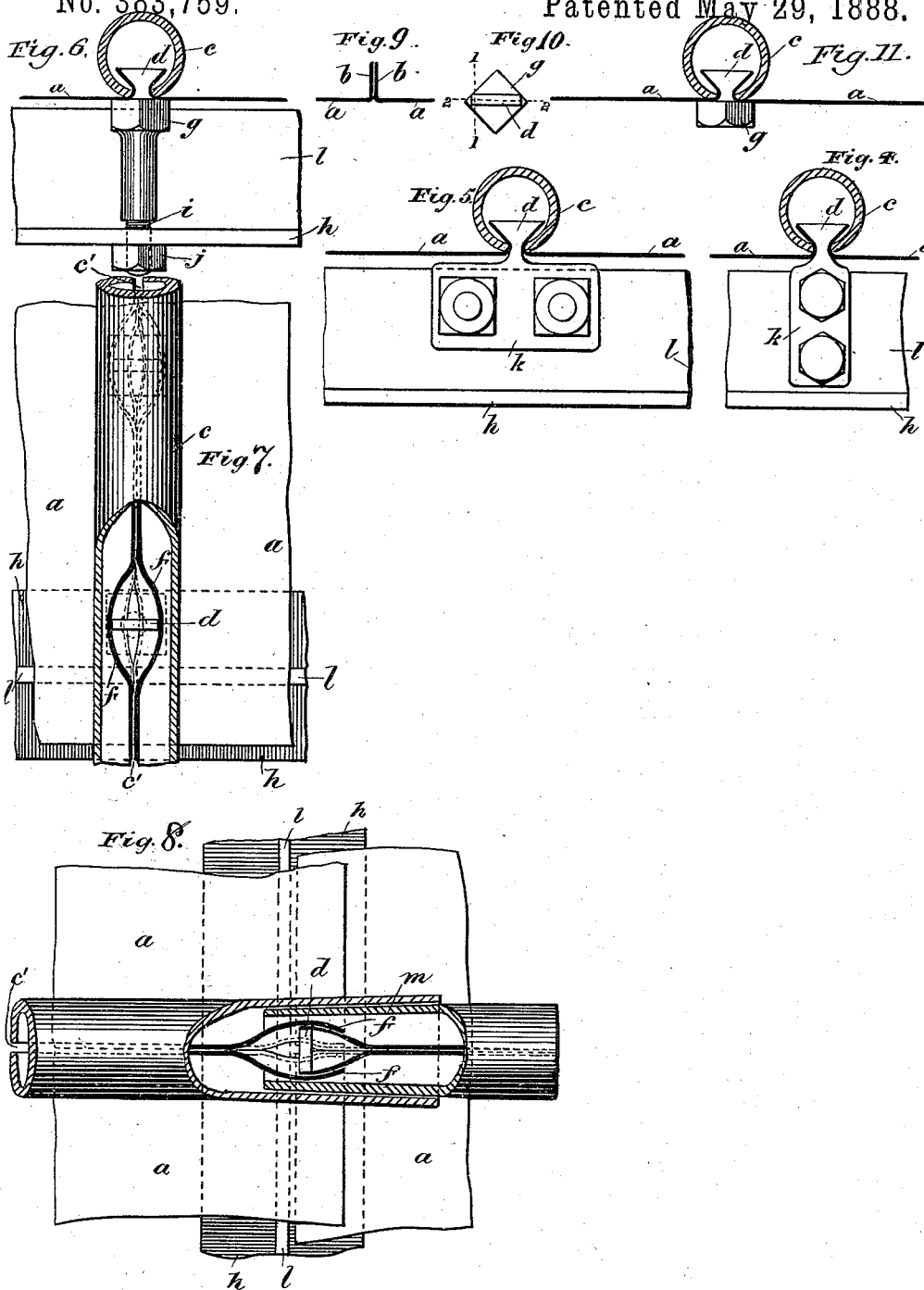
(No Model.)

W. ORR & P. S. BROWN.
SHEET METAL STRUCTURE.

2 Sheets—Sheet 2.

No. 383,759.

Patented May 29, 1888.



Attest:
Emma Arthur,
Edward S. tur,

Inventors:
Wm. Orr &
P. Stark Brown
By Knight Bros.
attys.

UNITED STATES PATENT OFFICE.

WILLIAM ORR AND PETER STUART BROWN, OF GLASGOW, COUNTY OF
LANARK, SCOTLAND.

SHEET-METAL STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 333,759, dated May 29, 1888.

Application filed August 22, 1887. Serial No. 247,579. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM ORR and PETER STUART BROWN, citizens of the United Kingdom of Great Britain and Ireland, residing at Glasgow, in the county of Lanark, Scotland, have invented new and useful improvements in sheet-metal structures, in sheets employed in such structures, and in means for securing or fastening them together; and we do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the manufacture or art to which it relates to make and use the same.

This invention relates to structures or buildings the roofs or walls, or both, of which are composed of galvanized iron or other metal sheets; and it has for its object, first, to provide improved sheets to be used for such purposes, and, second, to secure the sections of such sheets together and to their supports without the necessity of employing bolts or rivets, as heretofore ordinarily practiced, the improved fastenings, besides being applicable with the improved sheets, being also equally applicable with ordinary galvanized or other metal sheets.

On the accompanying drawings, Figure 1 is a plan showing the improved sheets and mode of fastening them together. Fig. 2 is a transverse section of Fig. 1, showing the mode of inserting and holding the edges of the sheets in the fastener and of connecting the structure to its supports. Fig. 3 is a longitudinal section of Fig. 1, showing the mode of joining the top and bottom edges of the sheets. Fig. 4 is a side elevation of the fastener drawn to a larger scale than Fig. 2. Figs. 5 and 6 illustrate modified forms of the clip or wedge used in conjunction with the fastening-tube. Fig. 7 is a part plan and part horizontal section of the arrangement in Fig. 6. Fig. 8 is a part plan and part horizontal section showing the mode of joining two lengths of the fastening together. Figs. 9, 10, and 11 are details, hereinafter referred to.

The invention, besides being applicable to the roofs and walls of buildings, is applicable to close fencing, and in that adaptation it is a further development of the invention for which Letters Patent of the United States,

dated March 15, 1887, No. 359,463, were granted to William Orr, one of the present applicants.

The several figures on the accompanying drawings illustrate the invention in its adaptation to sheet-metal roofing; but from the description of these figures its application to the walls of buildings, close fences, and like purposes will be equally understood.

In erecting a roof the metal sheets *a*, of which it is constituted, have their sides or edges where the sheets meet bent upward at right or other angles to the plane of the sheets, as indicated at *b*, Fig. 9, and over the said upwardly-bent portions of the adjacent edges of two sheets a tube, *c*, having a slot, *c'*, extending throughout its length, is placed in such a way that these portions *b* enter the interior of the tube through the slot.

At distances apart in the lengths of the sheets clips or wedges are forced between the meeting edges *b*, so that one part of the wedge enters the interior of the tube. Fig. 10 is a plan of a wedge such as we prefer to employ, and, as shown by the said figure, the head or part *d* of the wedge which enters between the bent edges *b* of the plates is much narrower measured on the line 1 1 than on the line 2 2. The head *d* of the wedge is entered between the bent edges *b* of the roofing-sheets with its longest measurement parallel to the length of the slot *c'* in the tubes *c*. After being so entered the wedge is turned half round until its head *d* assumes the position shown at Figs. 7 and 8, which has the effect of forcing or thrusting the bent edges *b* of the roofing-sheets apart within the tube *c*, as at *f*, and of preventing them from again passing out through the slot. The wedge has a square or other angular part, *g*, to which a key is applied to turn it round, as described.

At positions where it is necessary or usual to secure the roofing-sheets *a* to purlin bars or supports *h* the fastener may, as seen at Fig. 6, have a screwed part, *i*, formed on it, the said part passing through a hole in the sole of the purlin bar or support, and having a nut, *j*, screwed upon it; or, as seen at Figs. 2, 4, and 5, the fastener may have a palm, *k*, made on it and be bolted to the vertical leg or arm *l* of the purlin bar or support. In some

cases this class of wedge only is necessary, the class Figs. 10 and 11, which have no means of connecting them to the purlin-bars, being only employed when the forms shown at Figs. 4, 5, and 6 are provided only at comparatively long intervals.

When the roof is too broad from the ridge to the eaves to enable one length of tube to be conveniently employed, the tubes are joined as indicated in horizontal section at *m*, Fig. 8—that is to say, the end of one tube is widened or expanded to receive another. By this method of joining the sections of sheet-metal roofing together the necessity of overlapping the edges of the sheets in the direction of from the ridge to the eaves of the roof and of riveting or bolting the plates or sections together at the said junction is obviated and an equally wind and water tight structure is obtained with less expenditure of labor and at less cost. At points in the roof where it is not required to secure the sheets *a* to supports or purlin-bars, but where wedging is desirable, instead of using the form of wedge shown by Figs. 10 and 11, a hand key or tool having its end or point similarly shaped to the wedge may be used to force the bent edges *b* of the sheets apart within the slot of the tube.

It is evident that with our construction the tube can be placed at the interior of the roof, in which case the said tubes act as gutters to carry off any moisture which may leak through the meeting edges of the roofing metal sheets.

Figs. 4 to 11 illustrate the application of the improved fastenings in conjunction with plain or ordinary metal sheets; but, as giving greater strength and rigidity of structure, it is preferred to employ the improved formation of sheets shown by Figs. 1, 2, and 3 of the drawings. These sheets constitute in transverse section an arc of a circle, and at or near their ends, where in constructing a roof one or more corrugations extend partially across each sheet, the convex surface of the corrugation in one sheet fits into the concave surface of the corrugation in the next, as seen at *x*, Fig. 3, whereby a wind and rain tight joint at that part is obtained. Instead of the cross-corrugations being made only at the ends of the sheets, they may be made throughout their entire length, and on that part of the surface between the points where the cross-corrugations are terminated and the bent edges of the sheets are inserted in the tubular fasteners one or more longitudinal corrugations may be made, as at *y*, to afford additional stiffness. The sheets are arced and the corrugations are produced upon them by submitting plain sheets to the action of creasing apparatus.

In adapting the invention to the walls of buildings, to close fencing, and like purposes, the tubular fasteners constitute standards or supports, which are or may be braced together by cross or horizontal bars, as described with reference to Fig. 4 of the appended drawings.

Having now described the invention, what we desire to claim and secure by Letters Patent is—

1. In a sheet-metal structure, the combination of the tube *c*, having slot *c'*, into which are passed the edges of two adjacent sheets of metal, and wedges or clips by which the edges of said sheets are spread at points within the tube, substantially as set forth.

2. In a sheet-metal structure, the combination of the tube *c*, having slot *c'*, into which are introduced the edges of two adjacent sheets of metal, and a wedge or clip having the head *d*, and two or more faces for the reception of a tool for rotating said clip, as set forth.

3. In a sheet-metal structure, the combination of the tube *c*, having slot *c'*, into which are passed the edges *b* of two adjacent sheets, *a*, and a wedge or clip by which the edges *b* are spread within the tube, the said tube being secured to purlin bars or supports *h*, substantially as set forth.

4. In a sheet-metal structure, the combination of the tube *c*, the sheets *a*, with edges secured as set forth, and the wedge or clip having a projection for securing the structures to purlin bars or supports, substantially as described.

5. The combination of a tube having a slot and sheets inserted therein, as described, of clips for securing the sheets in the tube, having ends projecting outward and secured to the purlin-bar by a nut, as set forth.

6. In the construction of sheet-metal structures, a metal sheet having a series of corrugations or indentations across its surface, and its longitudinal edges bent at an angle to the plane of the sheet, the said bent edges being inserted in slotted tubes, and the corrugations at the ends of one sheet superposed on those of the next, substantially as and for the purpose set forth.

In witness whereof we have hereunto set our hands and seals this 5th day of August, 1887.

WILLIAM ORR. [L. S.]

P. STUART BROWN. [L. S.]

Witnesses:

GEO. M. CRUIKSHANK,
Fel. Inst. Patent Agents, 62 St. Vincent Street, Glasgow.

WALLACE FAIRWEATHER,
Fel. Inst. Patent Agents, 62 St. Vincent Street, Glasgow.