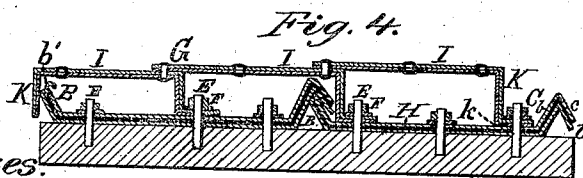
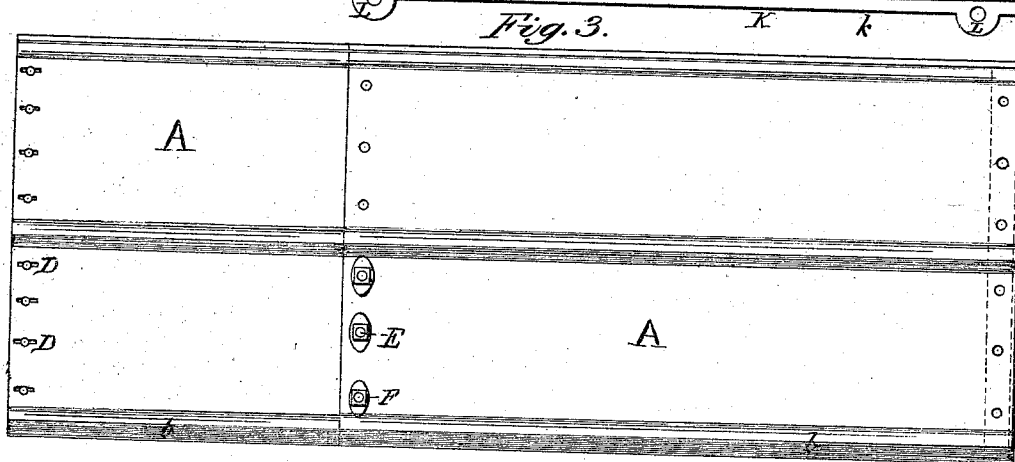
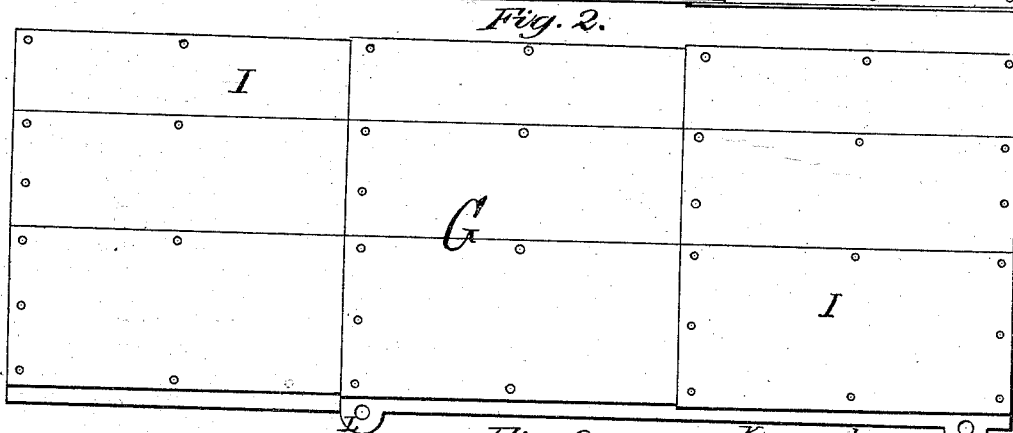
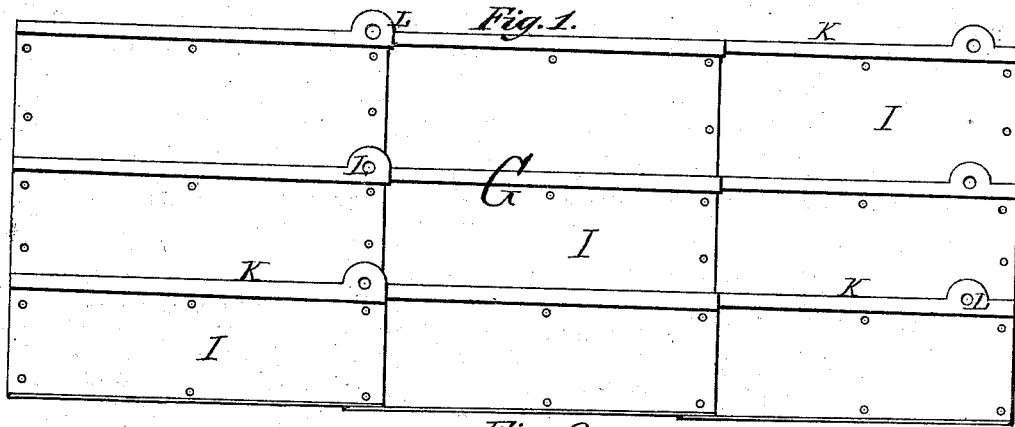


No.148,022.

J. S. BALFOUR.
Metallic-Roofs.

Patented March 3, 1874.



Witnesses.
Wm. Howard
A. Moore

Inventor.
James S. Balfour
By Cox & Cox Attys.

UNITED STATES PATENT OFFICE.

JAMES S. BALFOUR, OF CHILLICOTHE, MISSOURI, ASSIGNOR OF ONE-HALF
HIS RIGHT TO WESELEY A. JACOBS, OF SAME PLACE.

IMPROVEMENT IN METALLIC ROOFS.

Specification forming part of Letters Patent No. **148,022**, dated March 3, 1874; application filed
July 21, 1873.

To all whom it may concern:

Be it known that I, JAMES S. BALFOUR, of Chillicothe, Livingston county, and State of Missouri, have invented certain new and useful Improvements in Metallic Roofs, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to an improvement in metallic roofs; and consists, first, in providing rectangular plates or sheets, the longitudinal edges of which are arranged respectively as follows: A lip having been formed upon one edge, the edge provided with the lip is turned upward at an angle of about forty-five degrees, the lip being toward the plate. The other edge is bent upward and away from the plate at an angle somewhat nearer the perpendicular, and carried down so as to form in section a shape analogous to an inverted V, the apex of which fits the lip of the adjoining plate. The sheets or plates are attached to the wood-work of the roof by means of bolts passing through elongated longitudinal slots. A strip of rubber or similar material is placed within the plates and over the slots and bolts to prevent leakage, and the whole securely fastened in place by nuts that fit upon the projecting ends of the bolts. My invention consists, secondly, in providing plates, one of the longitudinal edges of which is carried downward at a right angle, and the extreme edge bent to form a horizontal lip, the vertical portions being of sufficient height to carry the upper parts of the sheets clear of the joints of the other plates, as will more fully appear. The plates thus formed are fitted and riveted together, the unbent ends being carried over and secured to the upper part of the adjoining plate beyond the angle thereof, thus forming a roof with a continuous succession of longitudinal air-chambers. The horizontal lips are permitted to project at intervals, and are cut to form ears in such positions that they will fit over the bolts that are used, with their nuts, to fasten the plates first described, as well as the second roof.

The roof thus constructed and arranged is designed to be filled and fastened above that first described, its object being to afford se-

curity against fire, which is effected by means of the air-chambers, which extend across the entire roof, thus insuring a free circulation of air, and, consequently, preventing the possibility of excessive heat coming in contact with the wood-work beneath the lower roof as long as the upper roof remains.

The object of the invention is to provide a roof of superior construction, durability, and safety.

Figure 1 is a top view of the upper roof G. Fig. 2 is a bottom view of same. Fig. 3 is a plan view of the lower roof. Fig. 4 is a cross-section of the roofs when combined.

A is a rectangular plate, of any metal used in the construction of roofs, one of the longitudinal edges of which, B, provided with the narrow lip *b'*, is bent upward and outward at an angle of about forty-five degrees, the lip *b'* being turned toward the center of the plate. The other longitudinal edge, C, is bent upward and away from the center of the plate at an angle of nearly or about forty-five degrees, its extreme edge *c* being carried downward and outward, so as to fit over the lip *b* upon the next plate, and to form, in connection therewith, a complete protection against the water. At the ends of the plates A are cut the longitudinal slots D, through which project the threaded ends of the bolts E, that, when attached to the wood-work of the roof, are used, with their nuts F, to hold the plates A in position, as well as the second roof. The slots D are cut longitudinally to permit the plates to expand and contract without damage to the roof, and a strip or band, H, of rubber or similar material, fitting over them and the bolts E, between the plates A, and held in place by the nuts F, prevents leakage, and serves to securely seal the joints. G is the second roof, which may be composed of metal or clay, in which I I are the plates, having one of their sides, K, turned downward, and terminating in the horizontal lip *k*. The plates I are riveted together, the vertical sides K being fitted one within the other, and the upper unbent edges of the plate carried beyond the side K of the next plate, and riveted to its upper part. At intervals to correspond with the bolts E are

placed the ears L, which are formed of projections of the horizontal lip *k*. The roof G is made smaller than the lower roof, so that its sides will be within the outside joints of the latter, whereby the necessity of additional gutters or pipes is obviated.

To attach the roof G, the nuts F are removed and the ears L passed over the bolts E, when the nuts are replaced and secured, thus firmly fastening all the parts. There is thus formed a series of ventilators or air-chambers of great practical utility in preventing the ignition of the combustible matter beneath the lower roof, the roof G precluding any danger from burning matter that may be blown or may fall from adjacent buildings.

In putting the roof together, great care should be taken not to apply the bolts E with too great force, as by so doing there will be danger of rendering the slots D inoperative, whereby the roof will be damaged.

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

1. The roofing-plates A, provided with the slots D, for permitting expansion and contraction, substantially as shown and described.
2. The slots D, in combination with the band H, or its equivalent, for the uses and purposes shown and described.
3. The combination of the plates I, having the vertical sides K, with the lower roof, forming the air-chambers shown, for the uses and purposes set forth.

In testimony that I claim the foregoing improvement in metallic roofs I have hereunto set my hand and seal this 1st day of July, 1873.

JAMES S. BALFOUR. [L. S.]

Witnesses:

DANL. G. SAUNDERS,
E. J. MARSH.