

(No Model.)

L. H. MONTROSS.

METALLIC ROOFING.

No. 373,373.

Patented Nov. 15, 1887.

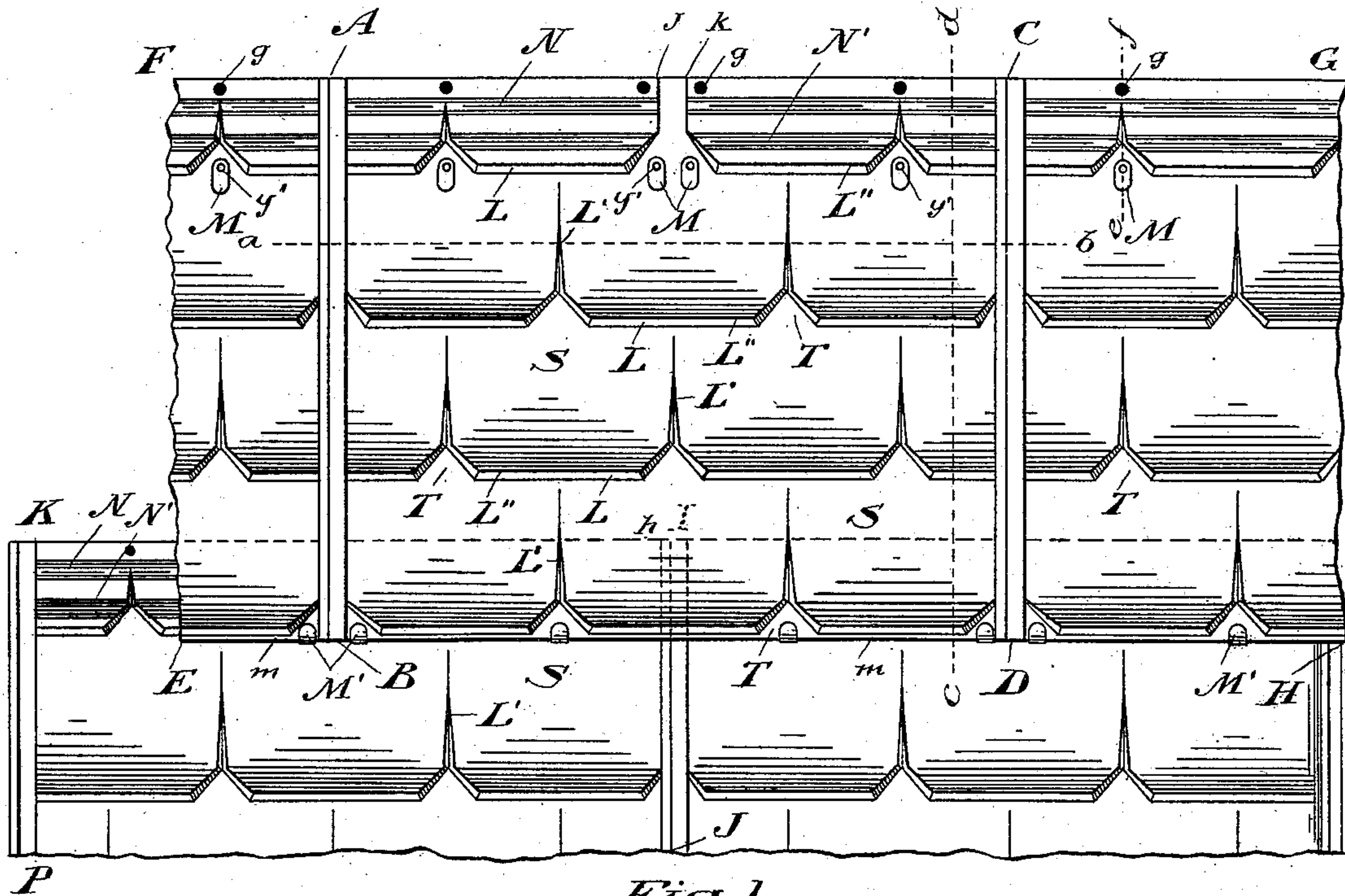


Fig. 1.

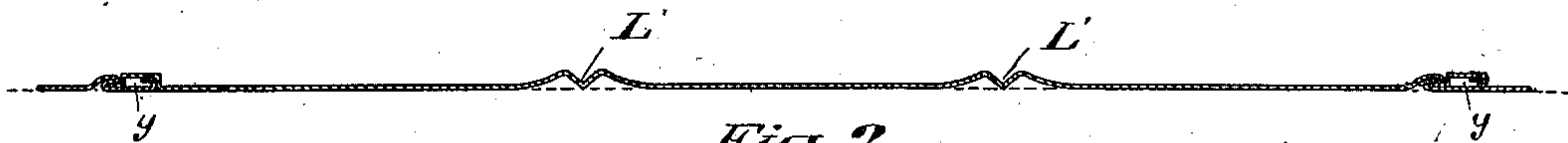


Fig. 2.



Fig. 3.

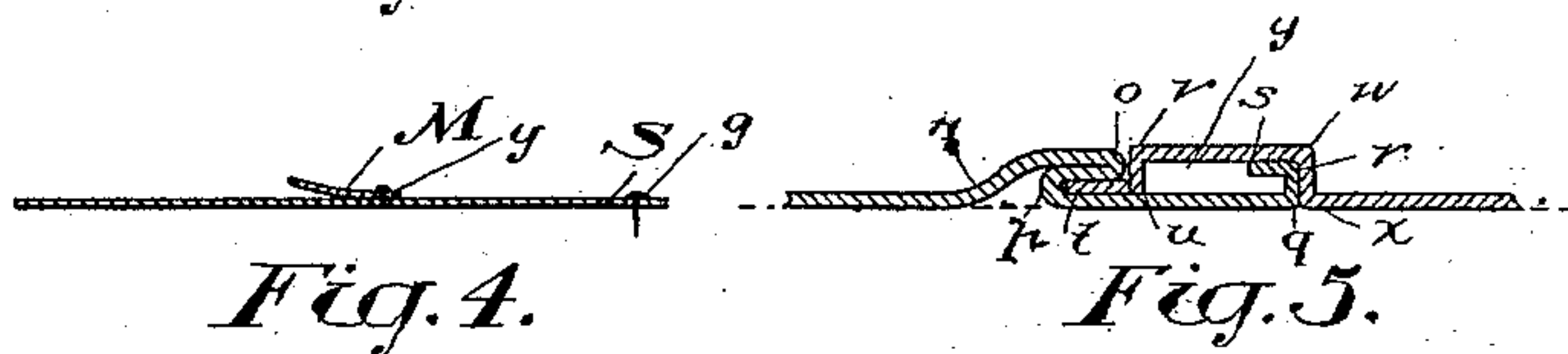


Fig. 4.

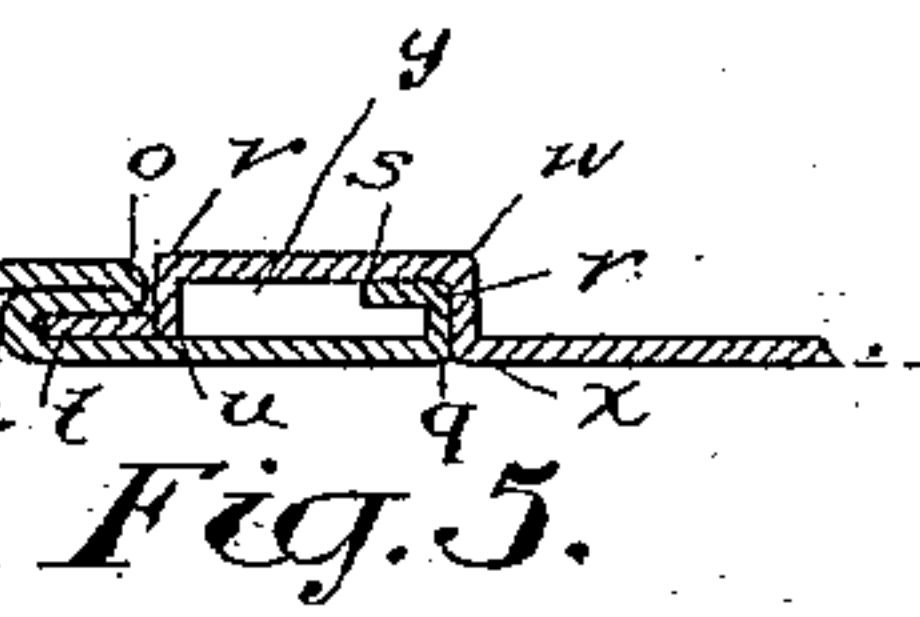


Fig. 5.

Witnesses.

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# UNITED STATES PATENT OFFICE.

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## METALLIC ROOFING.

SPECIFICATION forming part of Letters Patent No. 373,373, dated November 15, 1887.

Application filed July 2, 1887. Serial No. 243,243. (No model.)

*To all whom it may concern:*

Be it known that I, LEVI H. MONTROSS, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Metallic Roofing, of which the following is a specification.

The object of the invention is to provide a metallic shingle for roofing purposes which is strong and readily and cheaply made, and may be secured rigidly to the roof, though nailed merely on its upper side, and which, owing to its peculiar shape and mode of attachment, may be of more than ordinary size; and it consists, essentially, of a metallic shingle with peculiarly-shaped strengthening-corrugations, the upper side of which shingle is alone nailed to the roof, while the lower side overlaps a shingle nailed on the next lower row, and is secured in position by cleats riveted to the lower shingle and turned over on the upper one, while the adjoining sides of shingles are secured together without employing nails by a peculiar lock-joint, so as to afford play for the contraction and expansion of the shingles under the influence of cold and heat, the lock-joint forming a safety-trough for the water, as well as being strong to resist damage which might be caused by tramping on the roof.

Figure 1 is a plan showing a single shingle and parts of four adjoining shingles in position on the roof. Fig. 2 is a section through a metallic shingle on line *a b* in Fig. 1, showing lock-joint and corrugations. Fig. 3 is a vertical or transverse section through a metallic shingle on line *c d* of Fig. 1. Fig. 4 is a section through a cleat and along the trough on top of a shingle through line *e f* in Fig. 1. Fig. 5 is a detail of lock-joint.

In the drawings like letters of reference indicate similar parts in the different figures.

In Fig. 1, A B C D are the corners exposed of the top side of a single metallic shingle, which is preferably in the shape of a rectangular parallelogram, A B E F being the corners of part of shingle on left, C D G H being part of a shingle to the right, H I J K part of another shingle, and I J K L a part of still another shingle. The drawings indicate the mode of breaking joints in the different rows

and the manner in which the first-named three shingles overlap the two latter.

It will be seen that shingle A B C D and the next adjoining shingles on same row are nailed to the roof on their upper sides at *g*. A B and C D indicate the position of the lock-joints, hereinafter described, between adjoining shingles, while the lower side of each shingle in a row overlaps the top of the shingle nailed down to roof in the next lower row, and are held securely down by turning over the cleats M', riveted or rigidly secured to the top of the lower row of shingles, and hammering them down onto the lower edge of the shingles on the next upper row, where they fit in recesses formed in the corrugations. The dotted line *h* indicates the position of the tops of the shingles overlapped. The cleats M at the top of the figure show the cleats riveted, soldered, or otherwise rigidly secured to the shingles, and not covered by the overlapping of the shingles on the next row above and before being turned over and hammered down, so as to grip the lower edge of a shingle, as shown by cleats M'.

N N' are grooves sunk into the surface of the upper part of each shingle, and *i* the raised portion of a beveled edge.

In Fig. 3 is shown a cross-section of the part of shingle overlapped by the next adjoining upper shingle. Between lines *j* and *k*, at upper center part of shingle, is a flat space left to receive the lock-joint of two adjoining shingles in next row above where the joint is broken, the lock-joint between shingles of one row coming in the center of the shingles in the rows above and below.

L are the raised beveled sides of lower portion of imitation shingles, the metal gradually rising from the roof-line L' and culminating at L''. L' also marks the line of trough between the small imitation shingles. The lower corners of these imitation shingles S when in position on a sloping roof are cut off, as shown at T, at an angle of about forty-five degrees, thus forming a V-shaped recess. The corrugations or raised portions are made for strengthening purposes, to prevent the shingle buckling, as well as to produce an artistic effect. The corner of shingle adjoining lock-joint K



P illustrates the mode of overlapping adjoining rows of shingles and the grooves N and N' formed in the shingle overlapped.

When roofs are nearly flat, or with a very slight pitch, I find it very effective in making a water-tight joint to fill the groove N' with a strip of fibrous cord and paint, which effectually prevents water being drifted up between the joints. The office of these grooves N N' formed in the upper part of each row of shingles is to prevent capillary action, which has a tendency to draw the wet up through the joints of the shingles, as well as to prevent water and snow from being drifted in between the shingles. The part of shingle marked *m* at the lower side is a small strengthening rim extending out beyond the side of the raised beveled side L, as seen more clearly in cross-section, Fig. 3.

Fig. 2 shows a cross-section through the line *a b* and the manner of forming the lock-joints between adjoining shingles in a row, as well as the corrugations formed by the troughs at L'. Along this section-line the metal shingle rests on the roof, and between L' and L'', as shown in Figs. 1 and 3, it gradually rises, forming a strengthening-corrugation to prevent buckling. The lock-joint is formed by bending or shaping the adjoining sides of different shingles in the same row, as shown, the one interlocking with the other.

The side of a shingle is shaped as shown by the letters *n o p q r s*, (*vide* Fig. 5,) which makes a form adapted to interlock with the side shaped *t u v w x*, that portion inclosed by the interlocking of the sides at *y* forming a water-trough, the portion *s r q* forming a strut or support for the underlying edge of the adjoining shingle, so as to preserve the box-shaped form of trough *y*, even though subjected to a heavy pressure or blow. A pocket is formed having two thicknesses of metal on the upper side at *n o p*, to admit of the flange *t u* and form a stiff covering therefor, while at the same time an opening is left to admit of the rectangular portion of the adjoining shingle *u v w x* being part of the trough *y*.

Fig. 3 is a vertical section through the line *c d* in Fig. 1, and shows the strengthening-corrugations and grooves, the various letters indicating the position of the corresponding parts referred to in Fig. 1, and the method of forming an overlapping joint at grooves N N' in the lower part of the figure.

1 2 indicate the line of roof which is covered by the shingles.

Fig. 4 is a cross-section through one of the cleats M on the line *e f*. (Shown in Fig. 1.) This shows the cleat slightly curled up and ready to be turned over with a hammer and hammered down, so as to grip the lower edge of the overlapping shingle in the next adjoining upper row. *y'* is the rivet which secures the cleat to shingle, and *g* is a nail-head, that portion between *g* and *y'* being along the line of trough.

I have thus formed a shingle for metallic

roofing which is strong and durable and well adapted to retain its shape under blows or pressure on its surface, and being nailed only on the upper side allows of play, so as to admit of contraction and expansion under the influence of heat and cold without causing injury or a breaking up at the joints, which is usually the case in extremes of temperature with metallic roofing of ordinary construction. The lower edge is held down by cleats on the next adjoining row of shingles below and covers the grooves N N', which are adapted to prevent capillary attraction of water through between the joints, forming a storm-proof joint on roofs of one-fifth pitch or over, and if a strip of fibrous material and paint is introduced into the groove N' the efficiency of this overlapping joint is enhanced, and this mode of stopping joints is specially adapted for comparatively flat roofs, making them perfectly water-tight.

By my peculiar shape of corrugations and mode of attachment of shingles to the roof I am able to make use of a very large-sized shingle, which may be held rigidly and durably in position for a long period without buckling or breaking up at the joints.

What I claim as my invention is—

1. A metallic roofing-shingle nailed to the roof along its upper side and provided with cleats riveted or otherwise secured to the shingle in recesses formed in the strengthening-corrugations at top of said shingle and adapted to be turned over so as to grip the lower edge of a shingle in place on the next upper row which overlaps the corrugations adjoining these cleats, the sides being interlocked by a lock-joint formed by bending the metal at the sides of shingles in a row, and constructed, when thus bent, to form a water-trough, as well as to permit of contraction and expansion, the lower side of the shingle being held in place by the cleats formed on the shingle in the next adjoining row below, substantially as specified.

2. A series of metallic roofing-shingles each formed of a single piece of metal and secured to the roof by being nailed thereto along their upper side, the shingles in one row breaking joint with those in adjoining rows and overlapping the upper parts of shingles in the adjoining row below, to which they are secured by cleats fixed on the lower row and turned up over their edges, the sides of adjoining shingles in a row being interlocked by the bending or shaping of the metal, and constructed, when so bent, to provide a safety water-trough inside of said lock-joint, and a strong joint adapted to resist blows or pressure, as well as to permit of the lateral expansion and contraction of the shingles, substantially as specified.

3. The combination, in adjoining roofing-shingles, of the pocket *n o p q r s*, formed along the side of a shingle, *n o p* being a double thickness of metal, and *q r s* a strengthening-strut, and adapted to receive and interlock with the flange *t u*, and the rectangular corru-



gations *u v w x*, formed on side of adjoining shingle and resting on top of strengthening-strut *q r s* in such a manner as to form within said lock-joint a safety water-trough, *y*, substantially as described and specified.

4. In a metallic shingle formed of a single piece of metal, the pocket *n o p q r s*, formed along one side, *n o p* being a tongue of a double thickness of metal, and *q r s* a strengthening-strut, and adapted to receive and interlock with a flange and rectangular projection formed on another shingle, substantially as specified.

5. In a metallic shingle formed of a single piece of metal, the combination of the flange *t u* and rectangular corrugation *u v w x*, adapted to interlock with a pocket formed in an adjoining shingle, so as to admit of lateral expansion and contraction, as well as to form a safety water-trough, substantially as specified.

6. A metallic roofing-shingle nailed to the roof at *g* and having grooves *N N'* and flat portion *j k* formed in the upper center part thereof to form a bed for the lock-joint on adjoining shingles in the upper row, and cleats *M*, in combination with the shingles secured to the roof in the upper row, which overlap and overlie the grooves *N N'*, and the strengthening-corrugation at *i*, substantially as specified.

7. A metallic roofing-shingle nailed to the roof at *g* and having grooves *N N'* sunk transversely therein, the groove *N'* being adapted to hold fibrous cord and paint, in combination with the cleats *M*, which, with the overlapping sides of the metallic shingles in the next adjoining upper row of shingles, form a water-tight joint, substantially as specified.

8. A metallic shingle nailed along its upper

side to the roof and having a rim, *m*, formed in the lower side thereof, and V-shaped recesses in the strengthening-corrugations between *L* and *L'*, in combination with the cleats *M'*, rigidly secured to the shingles in next adjoining lower row, and which hold the lower side of shingles in place, substantially as specified.

9. A metallic shingle formed from a single piece of metal and having rigidly attached thereto in recesses formed in upper corrugation cleats *M*, adapted to secure the lower edge of an adjoining shingle, and having at its upper end, when fixed in position on a sloping roof, grooves *N N'*, said shingle being stamped into small panels in imitation of dimension-shingles, having their lower corners cut off at an angle of about forty-five degrees, with grooves between said imitation shingles, and strengthening-corrugations raised from the roof on the lower halves of said imitation shingles, together with rim *m* on the lower side, and pocket *n o p q r s*, formed on one side, and flange and rectangular projection *t u v w x*, formed on the other, substantially as described, and for the purpose specified.

10. A metallic shingle stamped in the form of a number of dimension-shingles having contiguous sides and having their lower corners cut off at an angle of about forty-five degrees, with grooves between said dimension-shingles, and strengthening-corrugations raised from the roof on the lower halves of said dimension-shingles, substantially as specified.

Toronto, June 14, 1887.

L. H. MONTROSS.

In presence of—

JOHN G. RIDOUT,

CHARLES C. BALDWIN.