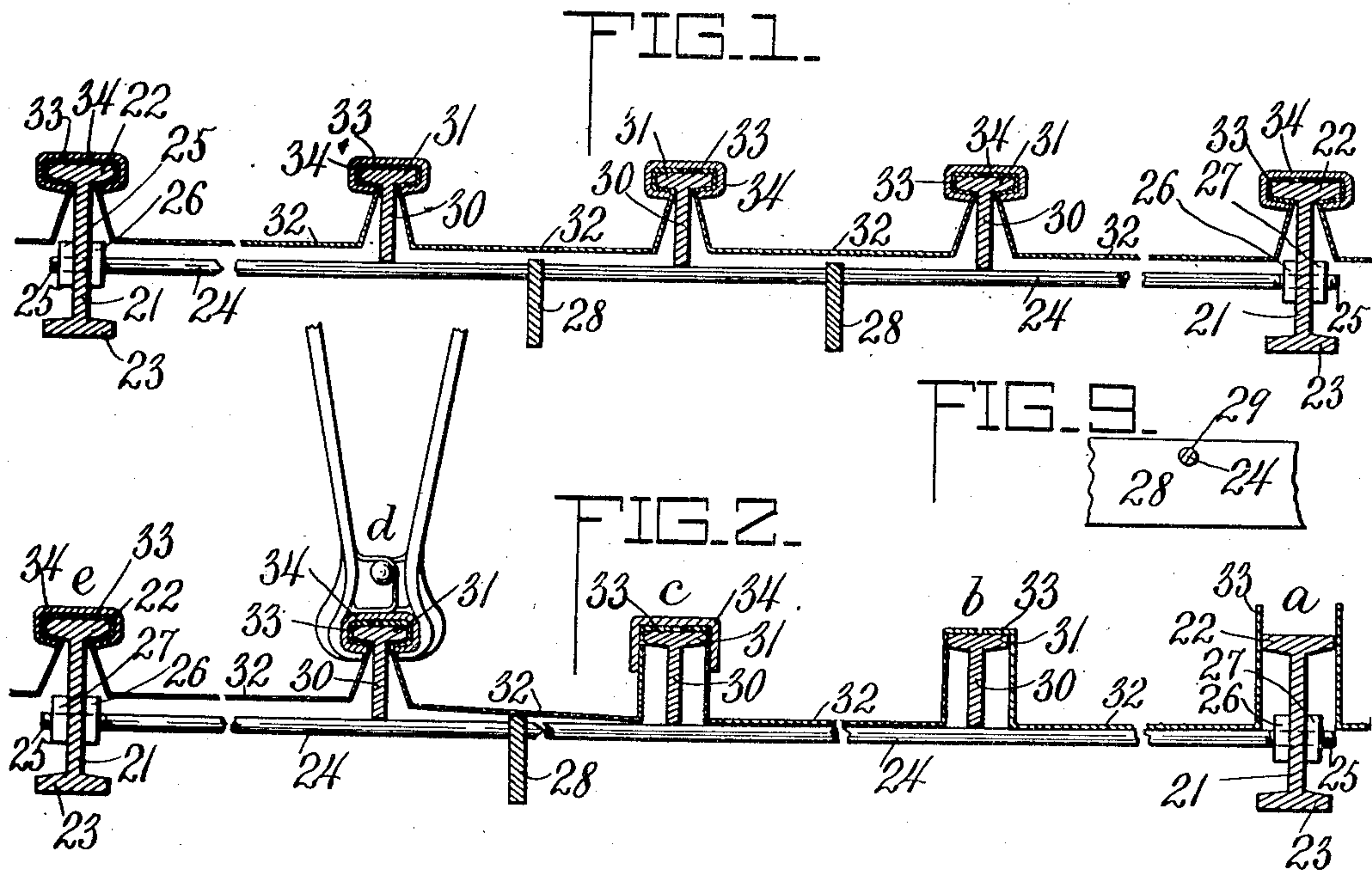


No. 872,018.

PATENTED NOV. 26, 1907.

E. B. REPP.
METAL STRUCTURE.

APPLICATION FILED JULY 5, 1907.



Witnesses

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FIG. 8.

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METAL STRUCTURE.

No. 872,018.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed July 5, 1907. Serial No. 382,286.

To all whom it may concern:

Be it known that I, EPHRAIM BENJAMIN REPP, a citizen of the United States of America, and a resident of New Windsor, in the county of Carroll and State of Maryland, have invented certain new and useful Improvements in Metal Structures, of which the following is a specification.

My invention is an improvement in framing for metal structures such as described, shown and claimed in my application filed February 12, 1907, Serial Number 356,982, which relates particularly to the construction of walls, rafters, braces and ridges in which I employ structural metal shapes and metal sheets combined therewith as a roofing or covering therefor.

The main object of my present invention is to provide an improved framing for metal structures in which structural metal shapes, metal roofing or covering sheets and binding or holding clamps for the roofing or covering sheets are employed.

Another object of my invention is to utilize single or sectional structural metal shapes.

Another object of my invention is to provide intermediate structural metal shapes, roofing or covering sheets, and metal binding or holding clamps which can be built up or constructed in strips separate from the structure for application thereto.

With these and other objects in view to enhance the value of such framing my invention consists in the novel features of construction and arrangement of parts as hereinafter described and claimed.

In order that my invention may be fully understood I will proceed to describe it with reference to the accompanying drawings, in which,

Figure 1 is a transverse section of my improved framing having main structural metal shapes of I-form, intermediate structural metal shapes of T-form, metal roofing or covering sheets having their edges overlapping the shapes, and metal binding or holding clamps; parts between the shapes being omitted. Fig. 2 is a similar view showing the method of building the framing. Fig. 3 is a detail transverse section showing a shape of I-form and the edges of the roofing or covering sheets overlapping. Fig. 4 is a similar view, showing a sectional shape of I-form composed of a pair of channel shapes secured together by an inner binding or holding clamp. Fig. 5 is a similar view showing

a shape of I-form and roofing or covering sheets having their edges overlapping the shapes. Fig. 6 is a similar view showing a sectional shape of I-form composed of a pair of channel shapes secured together by suitable means such as bolts. Fig. 7 is a similar view showing a shape of I-form and outer and inner covering sheets having their edges overlapping the shapes. Fig. 8 is a similar view showing a sectional shape of T-form composed of a pair of angle or L-shapes, roofing or covering sheets having their edges lapping the shapes and inserted therebetween, the shapes secured by suitable means such as bolts and an inverted T-shape having its leg inserted between the legs of the angles and held in place by the bolts. Fig. 9 is a detail side view of a part of an intermediate metal bar for supporting the tie rods.

Referring to Figs. 1 and 2 of the drawings, I show a framing constructed with main or principal structural metal shapes of I-form having webs 21, outwardly projecting outer flanges 22, and outwardly projecting inner flanges 23. These main or principal shapes are separated or held at the desired distance apart by means of tie-rods or stress-rods 24, having screw-threaded ends 25 extending through perforations in the webs 21 of the main or principal shapes, where they are secured adjustably thereto by inner spacing nuts 26 and outer locking nuts 27.

Between the main or principal shapes and parallel therewith are intermediate metal supporting bars 28 for the tie rods 24, which are preferably passed through openings 29 at the edges of the bars 28. These tie rods 24 and nuts 26 and 27 prevent lateral motion or vibration to the framing. Located above and resting upon the tie rods 24 are a series of intermediate structural metal shapes of T-form having legs 30 and outwardly projecting flanges 31. Extending from shape to shape are metal roofing or covering sheets 32 having their edges 33 turned up against the shapes and overlapping the outwardly projecting flanges thereof. 34 are binding clamps grasping the outwardly projecting flanges whereby the edges 33 of the sheets are securely held to the shapes while permitting the expansion or contraction of the sheets or their ready removal or replacement.

In Fig. 7 I have shown outer and inner metal covering sheets applied to the outer and inner flanges of I-shapes.

As shown in Figs. 4 and 6 the structural

metal shapes of I-form may be composed of a pair of channels 21^a having their inner parts secured together by an inner binding clamp 34 as shown in Fig. 4 or by a stove bolt 24^a and nut 27^a as shown in Fig. 6. In Fig. 8 I have shown a structural metal shape of T-form composed of a pair of angles or ells and the edges 33^a of the sheets 32 are in this instance inserted between the angles or ells and secured by bolts 24^b and nuts 27^b. 35 is an inverted T-shape having its leg inserted between the angles or ells and secured by the bolts. Where this form of shape is used for the intermediate shapes the shapes and sheets can be assembled in strips before being applied to the framing.

Instead of having the edges 33 of the sheets 32 merely overlap the flanges 22 the edges 33^b may be overlapped as shown in Figs. 3 and 4.

Referring again to Fig. 2, I there show the method of building my improved framing. I place the main or principal shapes in position. Then I place the intermediate supporting bars 28 at the desired distance apart between the main or principal shapes and pass the tie rods 24 through perforations in the webs 21 and the openings 29 in the intermediate supporting bars 28. I then free the screw threaded ends 25 of the tie rods 24 at the inner side of the webs 21 of the main or principal shapes and apply the spacing nuts 26 to said screw threaded ends 25 and reinsert the screw threaded ends 25 through the webs 21 of the main or principal shapes and secure them by placing the locking nuts 27 on the extremities of the screw threaded ends 25 against the outer sides of the webs 21 of the main or principal shapes. I then take the metal roofing or covering sheets 32 and turn up the edges 33 thereof a sufficient height so that they will project above the flanges 22 as shown at *a*. Then turn the edges 33 down upon the flanges 22 as shown at *b*. Then apply a binding clamp 34 thereto as shown at *c*. Finally, I take a pair of tongs as shown at *d*, whereby the binding clamp 34 and the edges 33 of the sheets 32 are tonged or bent to conform approximately to the flanges 22, and thus tension is produced transversely of the sheets 32. The completed joint is shown at *e*.

It will be understood that in describing the structural metal shapes, either as single or sectional, I refer to both the main or principal shapes or the intermediate shapes as in carrying out my invention I may use tees, angles, ells, eyes, or channels, either singly or in pairs.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent.

1. A framing comprising a structural metal shape having outwardly projecting flanges, metal roofing or covering sheets having their

edges overlapping the flanges of the shape and a metal binding clamp for holding the edges of the sheets to the flanges of the shape.

2. A framing comprising a structural metal shape having outwardly projecting flanges, metal roofing or covering sheets having their edges overlapping the flanges, and a binding clamp having its edges tonged or bent to conform approximately to the flanges for holding the edges of the sheets to the flanges.

3. A framing comprising a structural metal shape having outwardly projecting flanges, metal roofing or covering sheets having their edges overlapping the flanges of the shape and lapped, and a metal binding clamp for holding the lapped edges of the sheets to the flanges of the shape.

4. A framing comprising a structural metal shape, formed in sections, and having outwardly projecting flanges, metal roofing or covering sheets having their edges overlapping the flanges of the shape and a metal binding clamp for holding the edges of the sheets to the flanges of the shape and the sections of the shape in position.

5. A framing comprising a structural metal shape formed in sections having outwardly projecting flanges, metal roofing or covering sheets having their edges overlapping the flanges of the shape, a metal binding clamp for holding the edges of the sheets to the flanges of the shape and the outer parts of the sections of the shape in position and means for securing the inner parts of the sections of the shape together.

6. A framing comprising a structural metal shape, formed in sections, and having outwardly projecting flanges, metal roofing or covering sheets having their edges overlapping the flanges of the shape, an outer metal binding clamp for holding the edges of the sheets to the flanges of the shape and the outer parts of the sections of the shape in position, and an inner metal binding clamp for securing the inner parts of the sections of the shape together.

7. A framing comprising a series of structural metal shapes, having outwardly projecting flanges, metal roofing or covering sheets having their edges overlapping the flanges of the shapes, and metal binding clamps for holding the edges of the sheets to the flanges of the shapes.

8. A framing comprising a plurality of structural metal main shapes having outwardly projecting flanges, structural metal intermediate shapes having outwardly projecting flanges, metal roofing or covering sheets having their edges overlapping the flanges of the shapes, and metal binding clamps for holding the edges of the sheets to the flanges of the shapes.

9. A framing comprising a structural metal I-shape, providing outer and inner outwardly projecting flanges, inner and outer

metal covering sheets having their edges overlapping the flanges and metal binding clamps for holding the edges of the sheets to the flanges of the shapes.

5 10. A framing comprising a plurality of structural metal main shapes having outwardly projecting flanges, tie rods and nuts by which the main shapes are spaced apart and held from lateral motion or vibration,
10 a series of structural metal intermediate shapes having outwardly projecting flanges and supported upon the tie rods, metal roofing or covering sheets having their edges overlapping the flanges of the shapes and
15 metal binding clamps for holding the edges of the sheets to the flanges of the shapes.

11. A framing comprising a plurality of structural metal main shapes having outwardly projecting flanges, tie rods and nuts
20 by which the main shapes are spaced apart and held from lateral motion or vibration, intermediate metal bars for supporting the tie rods, a series of structural metal intermediate shapes having outwardly projecting

flanges and supported upon the tie rods, 25 metal roofing or covering sheets having their edges overlapping the flanges of the shapes and metal binding clamps for holding the edges of the sheets to the flanges of the shapes. 30

12. A framing comprising a plurality of structural metal main I-shapes, each formed in sections, having outwardly projecting inner and outer flanges, inner metal binding clamps, tie rods and nuts by which the main 35 shapes are spaced apart and held from lateral motion or vibration, a series of structural metal intermediate shapes having outwardly projecting flanges and supported upon the tie rods, metal roofing or covering sheets 40 having their edges overlapping the flanges of the shapes and outer metal binding clamps for holding the edges of the sheets to the flanges of the shapes.

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