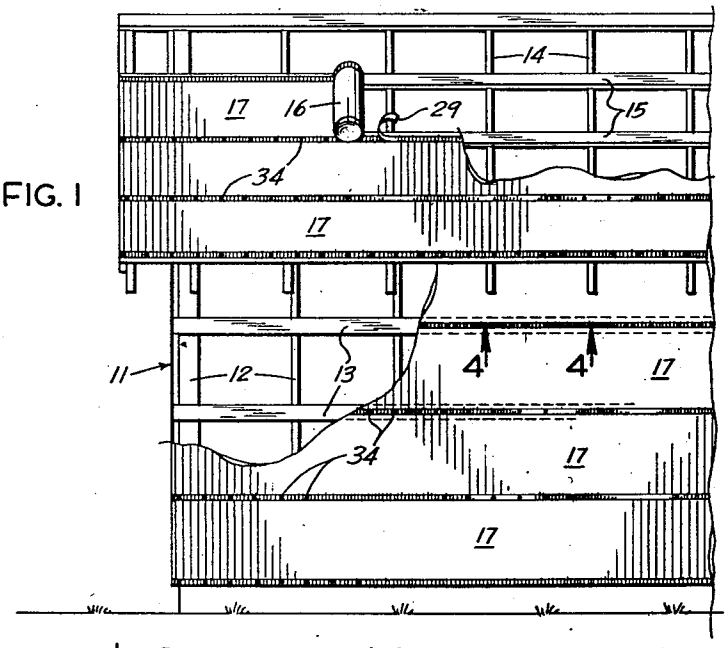
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BUILDING MATERIAL

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FIG. 1



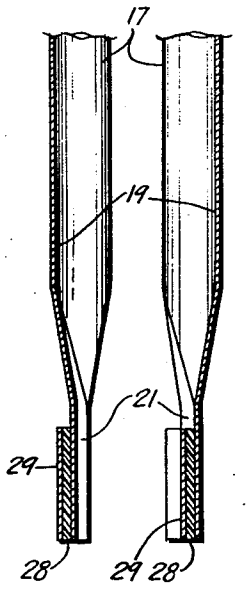


FIG. 5 FIG. 6

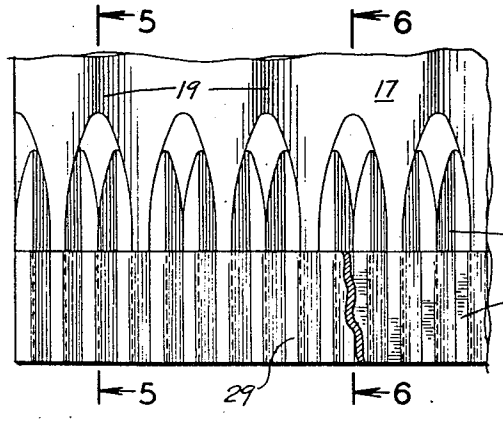


FIG. 2

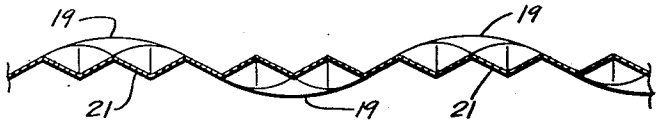


FIG. 3

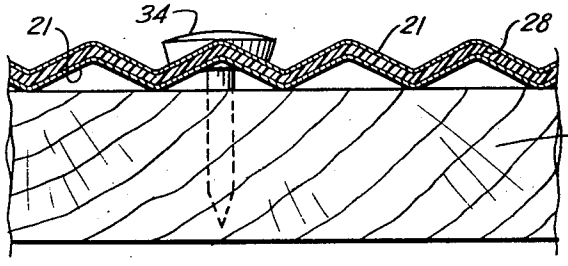


FIG. 4

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BUILDING MATERIAL

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FIG. 7

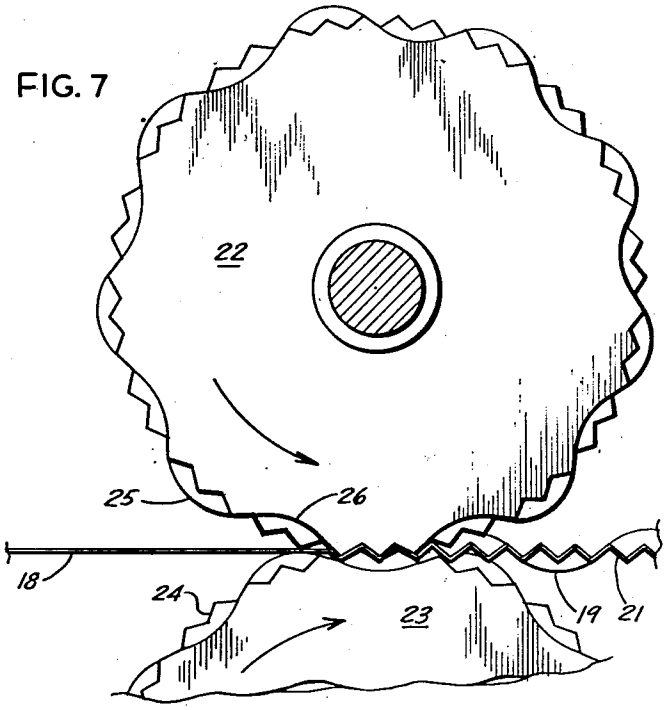


FIG. 9

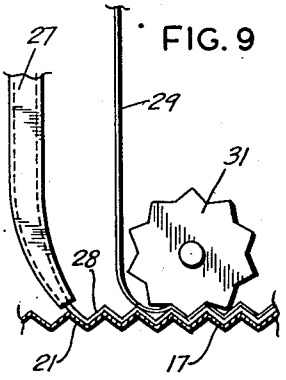
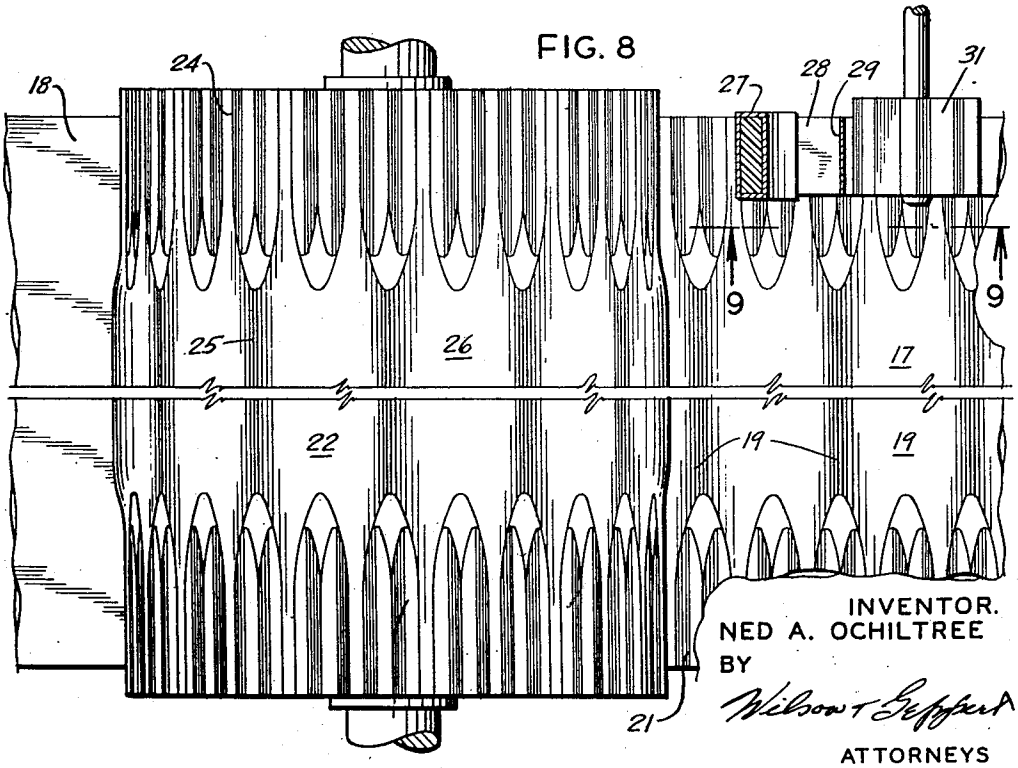


FIG. 8



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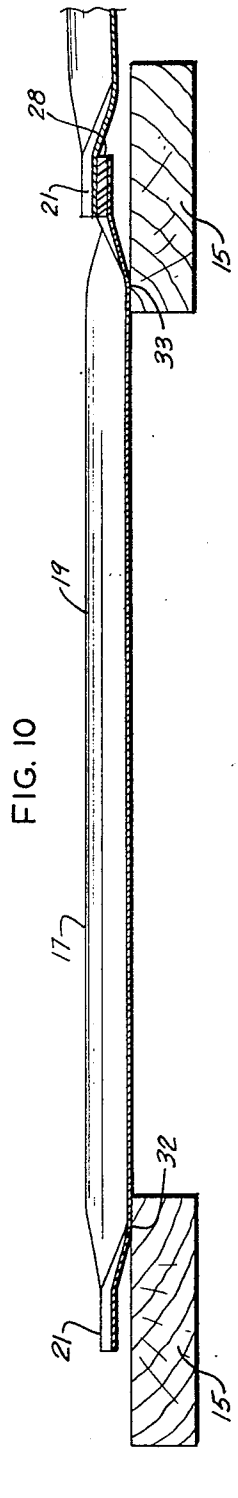


FIG. 10

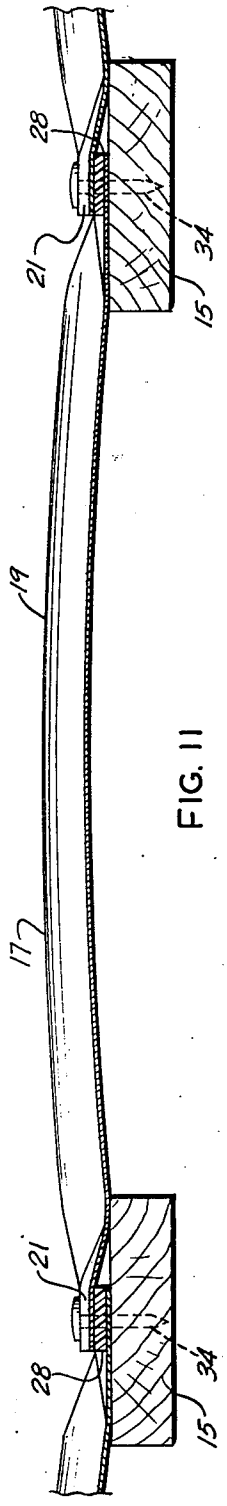


FIG. 11

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United States Patent Office 2,781,877 Patented Feb. 19, 1957

2,781,877

BUILDING MATERIAL

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Application January 31, 1955, Serial No. 485,100

8 Claims. (Cl. 189—86)

This invention relates to building material and more particularly to sheet material adapted to be employed as siding or sheathing and also as roofing of the general type disclosed in my prior Patent No. 2,369,487, issued February 13, 1945, upon which the present invention constitutes an improvement.

Sheet building material of such weight and flexibility that it is capable of being rolled into a cylindrical roll or bundle and shipped in that form to the place of use where it is unrolled on the building structure and laid with adjacent sheets or strips in overlapping relation, is becoming increasingly popular. Such material made of galvanized iron, copper, aluminum or other suitable sheet metal, or, if preferred, of suitable plastic composition, affords such economies in production, transportation, storage, and handling, and possesses such longevity in use, that it has received the cordial approval of both dealers and users.

It has been found, however, that if the overlapping margins of the strips fail to perfectly nest or interfit, because of variations or irregularities in form or spacing of the corrugations, leakage of air and occasionally even water through the joint between the overlapping strips sometimes occurs.

One object of my present invention is to overcome this possibility of leakage by so forming the margins of the strips that a leakproof joint between the overlapped margins will be insured, even though the transversely extending strengthening corrugations of two overlapped sheets are not in exact alignment.

Another object is to produce a handleable roll of sheet building material provided along one margin with a strip of mastic sealing material so covered and enclosed by a strip of non-adhesive protective material that when the sheet is unrolled for laying on a building skeleton the protective strip may be readily removed, leaving the mastic sealing strip exposed to lie between and conform to the configuration of the overlapping strips to serve as a seal which will prevent the passage of wind and water between the overlapped strips.

Another object of my invention is to provide sheet material which will be capable of use not only on the roofs of buildings, but also as siding. By reason of the leakproof joints provided by my invention, the strips may, if preferred, be laid with vertical instead of horizontal overlaps. Also if desired, the strips may be laid vertically in a continuous strip starting at the bottom of one side, up and over the peak of the roof and down to the bottom of the opposite side. This is particularly true on buildings which are oval or curved in their cross-section.

Still another object of my invention is to provide a sheet or strip of material which will not only be strengthened by the provision of transversely extending corrugations but will be further strengthened by having its edges crimped in finer corrugations whereby a maximum number of load bearing areas supported by the skeleton of the building are presented. These areas, larger in number than the strengthening corrugations, reduce the likelihood of compression or distortion of the sheet as the result of weight imposed against its outer surface.

A further feature of my invention resides in the additional strengthening of the sheet in a manner to increase its load bearing abilities. This desideratum is attained by so forming the sheets or strips that the crimped margins of the sheets lie between the planes containing the outer extremities of the strengthening corrugations, so that when the margins are forced inwardly by the fastening nails the sheets will be subjected to bending stresses tending to bow them outwardly at their centers, thereby providing an arching effect which increases the resistance of the sheets to inward bending.

A further advantageous feature of my invention resides in the fact that sheet roofing material embodying the principles of my invention may be commercially produced economically and without the precision of dimensions required to produce accurate nesting of large strengthening corrugations extending to the edges of the strips.

A still further object is to provide a sheet of building material of the character indicated which can be easily handled in transit and storage and which can be unrolled upon the surface to be covered and quickly nailed in position to form a strong and durable covering with leakproof joints between successive sheets and which by reason of its strength and rigidity will not only cover but will add to the strength of the building structure upon which it is laid.

Other objects and many of the inherent advantages of my invention should be readily appreciated as the same becomes better understood by reference to the following description when considered in connection with the accompanying drawings.

Referring to the drawings,

Figure 1 is a fragmentary elevation of a building structure the roof and side wall of which are shown as partially covered with strips in accordance with my invention;

Fig. 2 is a fragmentary plan view of one of the strips;

Fig. 3 is an edge view on an enlarged scale looking upwardly at the edge of the strip of Fig. 2;

Fig. 4 is an enlarged sectional view through a joint formed by overlapped strips taken on the line 4—4 of Fig. 1;

Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 2;

Fig. 6 is a similar view on the line 6—6 of Fig. 2;

Fig. 7 is a fragmentary end elevation of cooperating crimping and corrugating rolls embodied in a machine capable of producing my novel strips;

Fig. 8 is a plan view of the parts shown in Fig. 7;

Fig. 9 is a sectional view on the line 9—9 of Fig. 8;

Fig. 10 is an enlarged fragmentary sectional view showing the position of a laid strip before being nailed; and

Fig. 11 is a similar view showing in exaggerated form the arching tendency of the strip produced by the nailing.

Referring now to the drawings more in detail, reference character 11 indicates generally a portion of a building structure having a skeleton composed of uprights 12, cross strips 13, rafters 14, and roof strips 15. This skeleton structure may be of conventional or preferred construction, but, instead of being closely covered with roofing and siding boards to form a substantially uninterrupted bed for the covering strips to be applied, the uprights and rafters are crossed by nailing strips or members 13 and 15, respectively, approximately three inches in width and spaced apart a slightly less distance than the width of the sheets or strips to be applied so that when the overlapped sheets or strips are laid the fastening nails will enter the nailing strips and securely anchor the sheets in position.

The sheet material contemplated by my invention is handled by the dealer and brought to the job in the form of rolls, one of which is indicated by reference character **16**, which are composed of rolled or coiled strips such as sheet metal, galvanized steel, copper, aluminum or other suitable material, the rolls being of a size which can be easily handled and economically stored.

The sheets or strips of which rolls exemplified by **16** are composed are indicated generally on the drawings by reference character **17**. These sheets, as will be apparent from Figs. 2, 3, 7, and 8, are formed from flat sheets or strips **18** of suitable sheet material which are provided with transversely extended strengthening corrugations **19** extending transversely of the strip and terminating short of the edges thereof. The marginal portions lying between the edges of the strip and the ends of the corrugations **19** are provided with smaller corrugations or crimps **21** of predetermined smaller size than the corrugations **19**.

The formation of the corrugations and the crimped margins may be accomplished by passing a previously formed sheet **18** between a pair of corrugating and crimping rolls **22** and **23** illustrated in Figs. 7 and 8. These rolls are provided along their marginal ends with crimping corrugations **24** and in the area between these crimping corrugations the perimeters of the rolls are provided with larger corrugations forming crests **25** and valleys **26**, the complementary crests and valleys of the cooperating rolls resulting in the production of the corrugations **19** in the sheet passing between them.

The marginal crimps of the sheets are approximately identical in size and shape or at least complementary to the extent that the crimps of an overlapping sheet will nest with the crimps of an underlying sheet. A snugger fit and a better joint are, therefore, produced by means of the crimped edges than are attainable with sheets having large size transverse corrugations extending from edge to edge as in my earlier patent. Furthermore, by making the crimps of smaller size than the strengthening corrugations, the number of load supporting and bearing areas are increased, thus affording a firmer support for the sheets and decreasing the likelihood of deformation or crushing from the application of weight or blows against the outer surfaces of the covering material.

In order that the sheet-layers on the job may not be required to apply the sealing material between the overlapping margins of the sheets, my invention contemplates the application of such material before the sheets are rolled into bundles. Preferably, this application of sealing material is made simultaneously with the formation of the strengthening corrugations and the crimped margins, this method of application being exemplified in Figs. 7 and 8. After the sheet passes the crimping and corrugating rolls, it passes beneath a sealing strip applicator in the form of a nozzle **27** to which a suitable mastic is fed in any preferred manner from a suitable supply. This mastic is laid in a strip **28** along one margin of the sheet and, as the sheet passes along, a strip of protective material **29** such as paper or the like is fed by suitable mechanism to the sheet and imposed upon the mastic strip **28** by a corrugated pressure roll **31**. This protective strip of non-adhesive material enables the strip to be coiled or rolled without causing the coils to be stuck together by the mastic. When the roll is uncoiled the paper strip may be readily stripped off, as shown in Figs. 1 and 2, leaving the mastic strip exposed to contact by the overlapping margin of the contiguous sheet. One of the joints sealed by the mastic strip between the overlapping sheets is illustrated on an enlarged scale in Fig. 4.

When one of the sheets is unrolled on a roof, for instance, as illustrated in Fig. 1, it will be supported adjacent its margins upon the nailing strips **15** in substantially the position shown in Fig. 10. From this figure it will be apparent that the sheet rests on the points **32** and **33** upon the strips **15** while the crimped margins **21** lying in the median plane of the corrugated area of the sheet

are spaced upwardly or outwardly from the nailing strips. The underlying upper margin of the sheet together with the overlying margin of the next laid sheet are then secured by nails **34** extending as shown in Fig. 4 through the crests of the marginal crimps. As the nails are driven home the crimped margins of the underlapping and overlapping sheets are forced toward the nailing strip and the body of the sheet fulcruming on the point **33** has a tendency to rise along its opposite edge. When, however, that edge is likewise nailed down, as shown at the right in Fig. 11, the fulcruming action about the contact points **32** and **33** of the ends of the large corrugations with the outer surfaces of the nailing strips produces an arching effect upon the sheet which is illustrated in exaggerated scale in Fig. 11. This arching action strengthens the sheet so as to substantially increase its load bearing abilities and results in a stronger more rigid structure than is attainable by the use of sheets in which the strengthening corrugations extend from edge to edge. Furthermore, the securing nails driven through the crests or ridges of the crimps project a shorter distance from the nailing strip than would similar fastening nails driven through the crests of the large strengthening corrugations. The nails, therefore, hold the sheet directly against the nailing strip so that the cantilever action on the nails produced by loads or forces exerted against the surface of the sheet is much less than would be exerted upon nails extending through the crests of the large corrugations.

In addition to the increased strength of the sheets resulting from their construction and manner of nailing so as to produce an arching effect as above explained, the crimping of the sheets along the margins also increases substantially the strength of the sheet over that of sheets in which the large strengthening corrugations extend from edge to edge. The rolling operation by which the sheets, particularly if formed of metal, are corrugated and crimped, as previously explained, is in fact a drawing operation which is more severe for the crimped portions than for the larger corrugations, consequently, the elastic limit of the metal in the smaller corrugations or crimps is raised substantially. This increased strength in critical sections, together with the shape of the crimps and their unique arrangement along the centroid of the larger strengthening corrugations minimizes the spread of the large corrugations under a flexural load, thereby stiffening the corrugations and strengthening the entire sheet against deflections under load.

It should be apparent from the foregoing that by my novel method I have provided an improved sheet adapted for building covering, either side or roof, which is sufficiently flexible to be coiled into rolls for shipment and handling, is substantially stronger than plain or corrugated sheets heretofore produced, and the increased inherent strength of the sheet and its ability to withstand flexural loads without deformation is further increased by the nailing of the sheet to its supports which produces in the sheet a load resisting arching effect.

As previously explained, my improved sheet is adapted for use either as roofing material or siding material and the strips may be laid horizontally or vertically, as preferred, since the mastic strips embodied in the commercial rolls of the material insure leakproof joints by sealing the space between the overlapped sheets and also sealing the perforations in the sheets caused by the nailing.

The structural details and proportions of the sheets shown and described, as well as the steps of the method employed in its production may obviously be varied within considerable limits without departing from the spirit of my invention as defined in the following claims.

I claim:

1. A strip of sheet building material comprising a central area provided with transversely disposed major corrugations of substantial depth and width and marginal areas at the opposite sides of said central area provided

with transversely disposed minor corrugations of lesser depth and width than said major corrugations, said major corrugations terminating at the inner boundaries of said marginal areas and merging endwise into the inner ends of said minor corrugations.

2. A roll or bundle of sheet building material consisting of a strip of flexible sheet material provided continuously along the longitudinal margins of the sheet with transversely extending narrow and shallow corrugations, the area of the sheet between said margins being provided continuously with transversely extending wider and deeper corrugations terminating at said margins and merging endwise into said marginal corrugations.

3. A strip of sheet building material comprising a central area and marginal areas extending lengthwise of said strip along the sides of said central area, said central area being provided with trnsversely extending strengthening corrugations of substantial depth and width terminating at said marginal areas and said marginal areas being provided with transversely extending corrugations lesser in depth and width but greater in number than said strengthening corrugations, disposed in longitudinal alignment with and merging endwise into said major corrugations.

4. The strip of sheet building material defined in claim 3 having a strip of mastic sealing material extending along one of said marginal areas and conforming to the undulations of said area and secured to a surface thereof, and a protective strip of non-adhesive material overlying and detachably secured to said mastic strip.

5. A strip of sheet building material provided with major transverse strengthening corrugations terminating at the margins of said strip and with minor corrugations extending transversely of said margins, the inner ends of said minor corrugations merging endwise into the outer ends of said major corrugations, the crests and valleys of said major corrugations extending substantially equal distances from the median plane of the sheet and the crests and valleys of said minor corrugations likewise extending substantially equal distances from said median plane but lesser distances than said major corrugations.

6. A strip of sheet building material having major strengthening corrugations disposed transversely of the central portion of the strip and terminating at the margins of said strip, and minor marginal corrugations extending transversely of said margins and merging endwise into said major corrugations, the ends of said major corrugations providing on the lower face of the strip at the

juncture of said major and minor corrugations a series of fulcrum means disposed in a line extending longitudinally of the strip whereby an upward arching stress longitudinally of said major corrugations is created in said strip upon the application of downward pressure to said margins.

7. In a building construction of the type having a frame structure including nailing members disposed in parallel spaced apart relation, the combination of marginally lapped strips of sheet material having transversely extending strengthening corrugations terminating at spaced distances from the edges of the strip, the ends of said corrugations providing fulcrums resting on said strips, and having marginal corrugations merging endwise into said strengthening corrugations, and fastening means for securing said lapped margins to said members and for producing a cantilever action about said fulcrums lengthwise of said corrugations to thereby impose an arching stress upon said strips between said members whereby said strips are stiffened and strengthened.

8. In a building structure of the type having a skeleton frame including spaced apart nailing members, the combination of strips of corrugated material corresponding in width to the spacing of said members, having corrugated margins disposed in lapped relation overlying said members and having strengthening corrugations between the margins merging endwise at said margins into the corrugations of said margins, the ends of said strengthening corrugations forming a series of spaced apart fulcrums contacting said members, and means for forcing said margins toward and securing the same to said members whereby a cantilever action about said fulcrums is produced to create an arching stress longitudinally of said corrugations in said strips.

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