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CORRUGATED ROOFING AND THE LIKE

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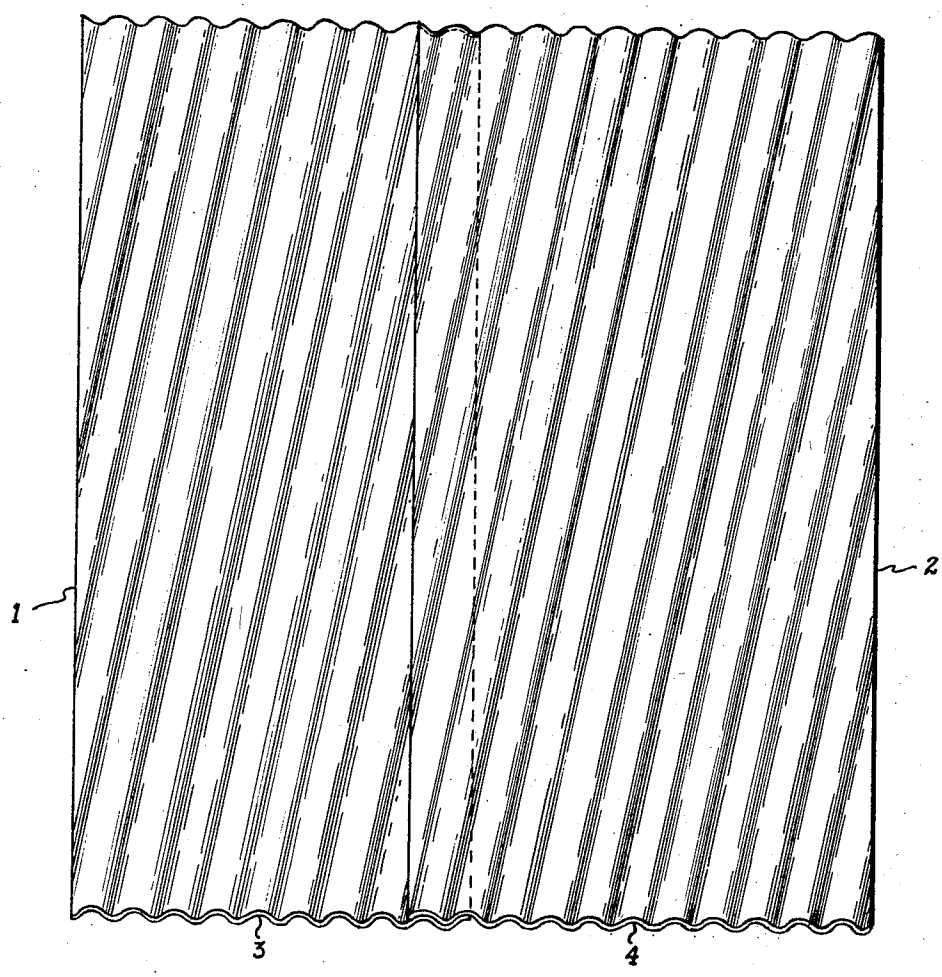


FIG. 1.

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CORRUGATED ROOFING AND THE LIKE

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6 Claims. (Cl. 108—13)

My invention has for its object the provision of improvements in corrugated roofing or siding of the usual or ordinary type. This type makes use of corrugated metal sheets, the corrugations being parallel to one of the axes of the sheets. Usually the sheets have a longer and a shorter dimension, and the corrugations extend in the direction of the longer dimension. For this reason, the sheets may be said to be corrugated with longitudinal corrugations. This, however, is not a necessary limitation either on the corrugated sheets in ordinary roofing and siding, or on the structure of my invention as hereinafter described. Also, the pitch and depth of the corrugations may be varied as desired, as is also true of the usual roofing and siding. It will be understood that in commercial practice a particular pitch and depth of corrugation for a given gauge or weight of sheet has come to be standard practice and may, likewise, be employed with my invention. The sheets themselves are usually of iron or mild steel galvanized to increase their corrosion resistance; but the particular material of the sheets is, likewise, not a limitation on my invention any more than on the usual type of roofing or siding. Consequently, hereinafter, I shall not again refer to the pitch and depth of the corrugations, the weight, gauge, or material of the sheets, or the dimensions of the sheets themselves.

In laying up ordinary corrugated roofing or siding, the individual sheets are laid in rows with side laps. Each sheet is lapped upon one edge one or more corrugations by the next adjacent sheet, which, in turn, is lapped as to its other edge in a similar manner. The rows of sheets are likewise lapped transversely, a row higher on the wall or roof slope lapping the upper edge of the next lower row.

In the use of such structures, which generally have been found quite satisfactory, it nevertheless is known that their most vulnerable feature lies in the ease with which water can penetrate a side lap, especially in a roof. If some object or material has collected in the bottom of a corrugation at the beginning of a lap, it can, under some circumstances, dam up the water and cause it to rise high enough in the dammed corrugation to flow into the adjacent corrugation, which is lapped by the cover sheet, and between the sheets, so that it can drip over the edge of that corrugation into the interior of the building. In the warehousing of certain commodities, this cannot be tolerated; and in all types of building it is an undesirable feature.

An object of my invention is the provision of a structure which, while involving no extra parts and no change in the mode of application of the roofing or siding, very greatly diminishes the tendency for leakage to occur in the way described above.

It is also an object of my invention to attain a greater effective strength in the sheet with corrugations of the same pitch and depth, as respects the ability of the sheet to span spaced purlins or other supports without sag.

These and other objects of my invention, which will be set forth hereinafter, or will be apparent to one skilled in the art upon reading these specifications, I accomplish by that certain construction and arrangement of parts of which I shall now describe an exemplary embodiment. In the drawing, I have illustrated two corrugated sheets, formed in accordance with my invention and lapped as in a roof or siding so as to form the structure of my invention.

Briefly, in the practice of my invention, I have found that I can attain its objects by forming my sheets with parallel corrugations, which corrugations, however, are not parallel to the sheet edges. In other words, I cock the corrugations in my sheets a slight amount relative to the sides of the sheets themselves. The precise angularity of the cocking is not a limitation on my invention for reasons which will be apparent hereinafter; but in ordinary practice, I form my corrugations so that they lie at an angle of about 10° to those side edges of the sheet which they would parallel in the corrugated product heretofore current in the art.

As to the manufacture of sheets with cocked corrugations, as hereinabove outlined, the ordinary corrugating equipment may be employed without difficult change. Most corrugated sheets are formed by passing plain sheets through corrugating rolls having mating ribs and depressions directed parallel to the axes of the rolls. The sheets are presented to the rolls with a side edge parallel to the roll axes, and the ideal corrugating operation involves successive bending of the metal, as distinguished from a stamping or drawing action. In the formation of sheets with cocked corrugations, it is only necessary to introduce the sheets into the corrugating device with a side edge at an angle to the plane of the axes of the rolls, the angle being the same as but in the opposite direction to the desired angularity of the cocking of the corrugations. The operation of the corrugating machine and the manner in which it successively bends the metal in different portions of the sheets remain the same. I am not, how-

ever, limited to any particular mode of forming corrugations in my sheets and may employ any available corrugating apparatus.

Referring to the drawing, I have shown a sheet 1, lapped by a sheet 2 at one side. Both sheets are provided with corrugations, indicated at 3 and 4, which corrugations are not parallel to the edges of the sheets, nor parallel to the lapped area. Instead, the corrugations approach the side edges of the sheets and run out there, as will be apparent from the figure. The mode of lapping the sheets, however, and the mode of application of them to purlins or other supporting members in the roof or walls of the building structure are not varied. The mode of making the lap is, likewise, not varied; and my sheets, like those of the prior art, are capable of being lapped greater or lesser distances by fixed increments.

I have already indicated that where an obstruction occurs in a corrugation of the lapped sheet where the lap starts, it is entirely possible for water to be dammed up in that corrugation to a point where it will pass through the lap to the interior of the building. The sheets are usually in fairly close conformation in the lapped portion. It might be thought that excessive water dammed up in the way heretofore described might run out between the sheets in the valley of a lapped corrugation. But to do so, it has to pass through a long and narrow throat between the two juxtaposed sheets, and in doing this, it encounters very great resistance. Consequently, when an obstruction occurs damming up the water adjacent to a level which will permit it, the line of least resistance for the passage of water will frequently be found to be transverse the lap. The throat between the sheets in this direction is almost always of very much less length than the throat between the sheets in the directions of the corrugations themselves.

But when the corrugations are cocked, as in the product of my invention, it will be noted that the corrugations themselves run out at the sheet edges. As a consequence, if a corrugation becomes obstructed, so that water tends to enter the throat between the sheets in the lapped portion, its tendency will be to run out with the next corrugation at the side edge of the sheet below the obstruction. This will be its path of least resistance; and the tendency of water to pass through the lap to the interior of the building is thus very greatly diminished.

It will be obvious that the sheets of my invention should be laid up both in roofing and siding, as illustrated in the drawing, i. e., in such manner that the cocked corrugations run out to the edge of the lapping sheet, rather than vice versa. This, however, is easily accomplished and becomes automatic after the first sheet is properly installed, since then the remainder of them in any given roof or wall panel must, likewise, be properly installed.

The sheets as laid in any given installation will normally have the same length and the same width (except at the edges of the panel, where they may be cut); but whether the sheets are of the same length or of varying lengths, where they are to be laid together, they are preferably so made that one corresponding corner of each sheet has a starting lip of the same shape.

My structure provides yet another advantage in this: since the corrugations are cocked in each sheet, the transverse stiffness of the sheets is improved. A direction of primary stiffness now lies more nearly on the diagonal of the sheets than in the conventional product. The direction of greatest flexibility, instead of being transverse the sheets, now lies more nearly on the opposite diagonal. Hence, my sheet, for given dimensions, for given gauge, and for given pitch and depth of the corrugations, when installed on the same purlins or other supports, is capable of retaining its pitch with less sag due to weight and provides a stiffer roof or wall panel. By the same token, the sheets of my invention are capable of providing equal resistance to sag or forcible deflection when laid on purlins or other supports spaced a further distance apart.

Modifications may be made in my invention without departing from the spirit of it, as will be evident from the foregoing explanation. Having thus described my invention in an exemplary embodiment, what I claim as new and desire to secure by Letters Patent is:

1. A corrugated metal sheet for laying in lapping relationship in non-horizontal roofing or siding, in which sheet the corrugations run in a direction non-parallel to both axes of the sheet and lie at a substantial angle to both axes, and in which the corrugations are so related to the dimensions of the sheet that a plurality of such sheets may be laid in edgewise lapping relationship in a row extending in a horizontal direction with a fixed side lap of approximately the width of one corrugation while maintaining a disposition of the sheet ends in a horizontal line, and with the corrugations running out to the lapping edge of each such sheet in the direction of the downward pitch of the lapped structure.

2. The structure claimed in claim 1 wherein diagonally opposite corners of the said sheet have a starting lip of the same shape.

3. The structure claimed in claim 1 wherein the said sheet has a major and a minor axis and wherein the angularity of the corrugations to the major axis of the sheet is of the order of 10°.

4. A roofing or siding structure comprising edgewise lapped sheets, said sheets having parallel corrugations, said corrugations in the said sheets lying in the same direction and disposed aslant to the edges of the sheets whereby said corrugations run out at the lapping edges of the said sheets, in the downward direction of the pitch of the lapped structure.

5. The structure claimed in claim 4 in which the said corrugations meet the lapping edges of the said sheets at an angle of the order of 10°.

6. A roofing or siding structure comprising rectangular corrugated sheets, said sheets being disposed in substantially horizontal rows, with one edge of each sheet lapping the other edge of an adjacent sheet, the rows of sheets lapping each other at their edges, said sheets having the corrugations therein disposed at an angle to the major and minor axes thereof and being so laid that the said corrugations run out at the lapping edge of the sheets in each row, in the downward direction of the pitch of the lapped structure.

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