

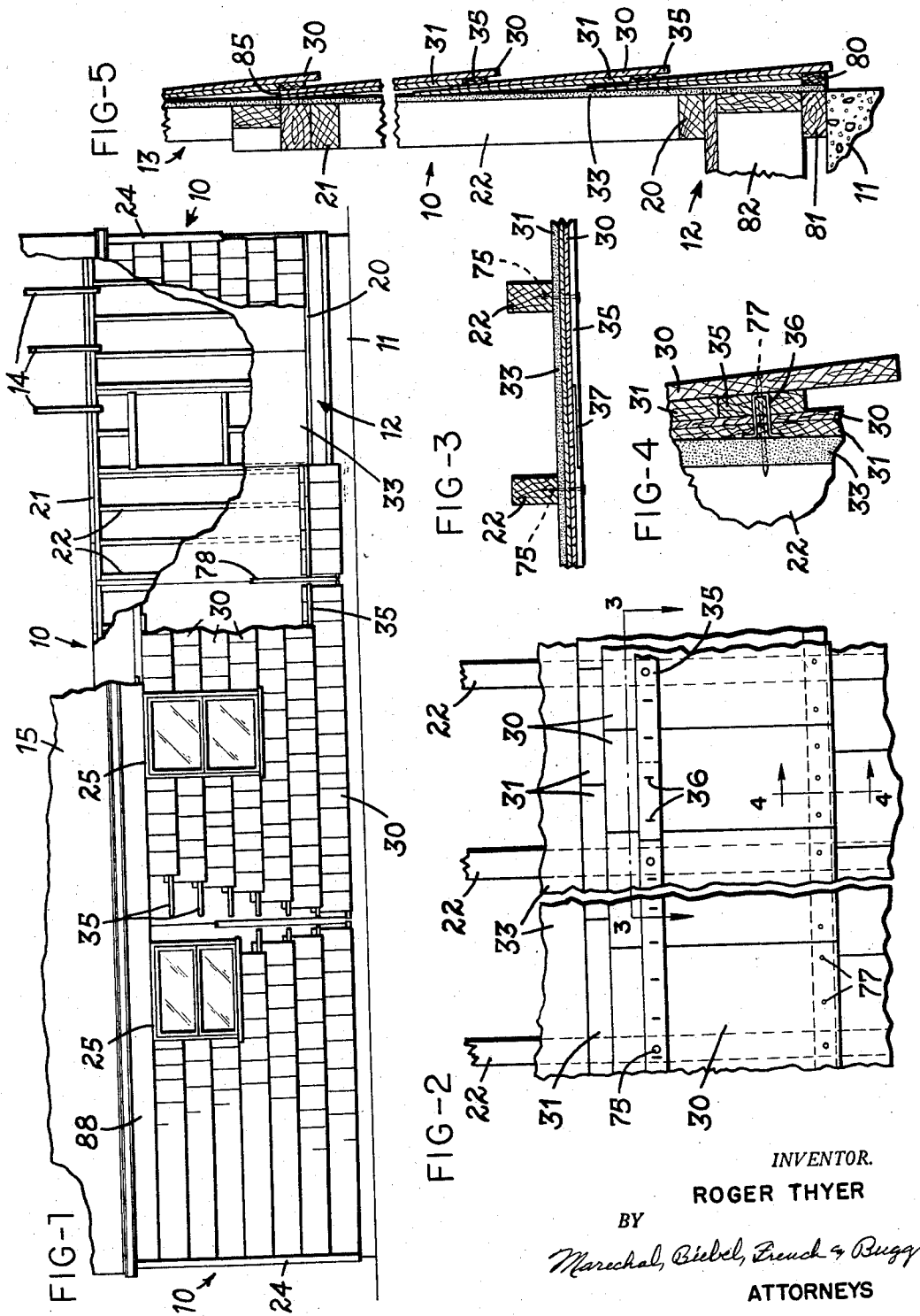
June 30, 1959

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PREFABRICATED HOUSES

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2 Sheets-Sheet 1



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BY

*Marshall, Biebel, French & Buggy*

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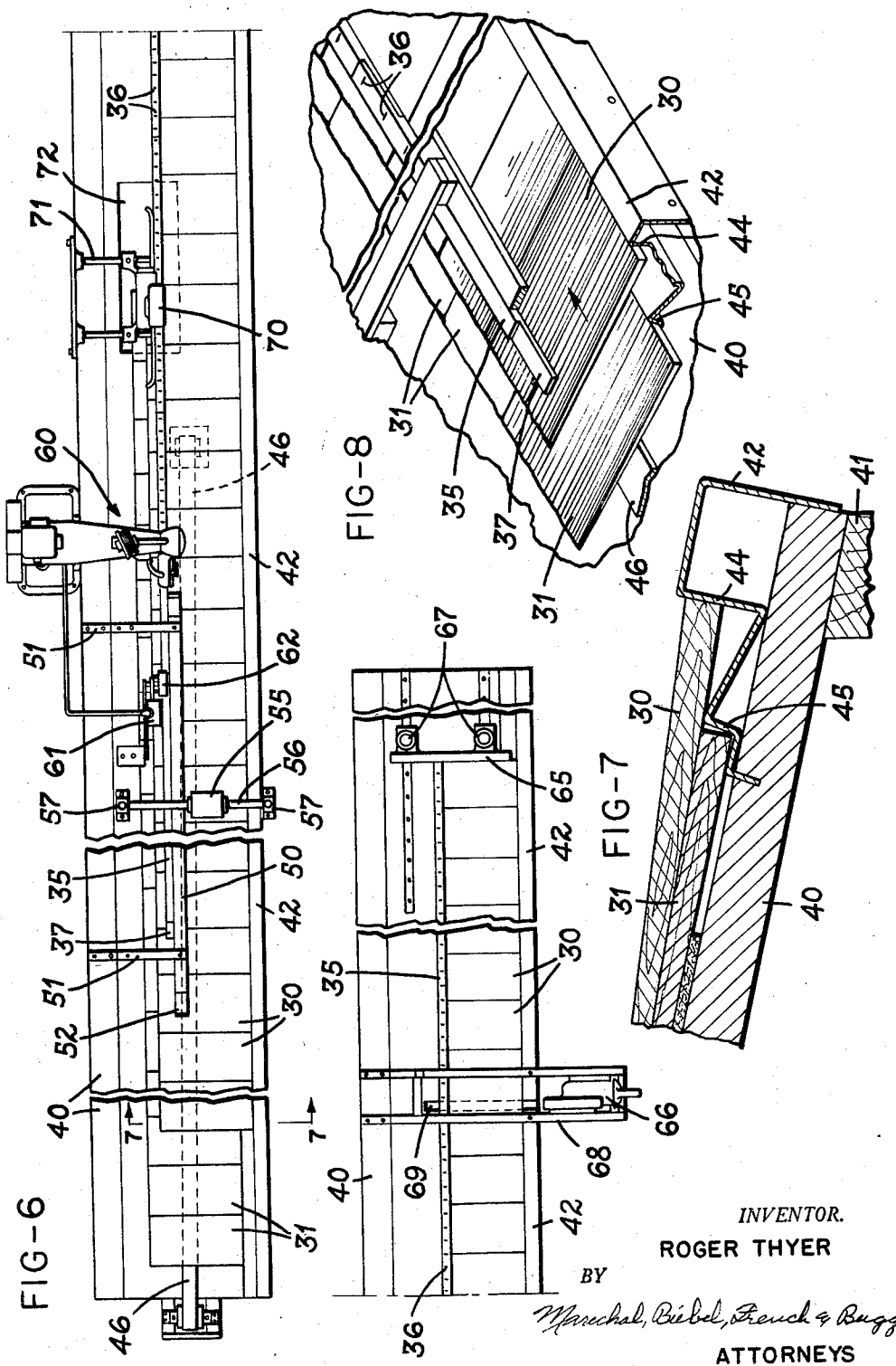
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## PREFABRICATED HOUSES

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3 Claims. (Cl. 1—66)

This invention relates to prefabricated houses. More particularly the invention has relation to the prefabrication of wall sections for prefabricated houses, and it is especially concerned with the exterior finishing of such wall sections.

As is well known, shingles are an excellent exterior finishing material for use on a house, from the several standpoints of general appearance, performance, and especially initial cost as compared with other preferred materials such, for example, as lap siding. However, the use of shingles offers one disadvantage in the labor required for their application. The handling of individual shingles necessarily consumes a corresponding amount of time and labor, and specific provision must also be made for maintaining all shingles in each row in the proper horizontal alignment. In addition, since shingles are of random widths, it is virtually always necessary to saw by hand a single shingle of the proper width to complete each row, in order to fill the space between the next to last shingle and the corner board, window or door frame or other part which terminates the row, and this is an especially costly operation in terms of both time and labor.

This difficulty involved in the exterior finishing of house walls is especially important in prefabricating operations. Thus if the shingling is done at the building site, it normally requires the services of skilled carpenters at correspondingly high labor rates, and even a skilled carpenter can not too greatly speed up the application of individual shingles, especially on an already erected wall. The application of individual shingles at the factory while the wall sections are horizontal requires somewhat less physical effort, but it is still time consuming. In fact, this tends to be a major bottleneck in prefabricating operations in that shingling ordinarily requires comparatively so much more time than any other step of prefabrication that it tends to retard all of the other steps and thus the production of the factory as a whole.

It is accordingly a primary object of the present invention to provide an improved method of prefabricating wall sections for a house which utilizes shingles as the exterior finish for the walls and especially which enables the shingles to be applied to each wall section at the factory with such ease and speed as to establish a time for the shingling operation sufficiently comparable with the time required for the other prefabricating steps to make possible an overall reduction in the production time for each wall section and thus to increase the production rate of the factory as a whole.

An additional object of the invention is to provide such a method which will facilitate the joining of the shingled areas of adjacent wall sections and gables during erection of the house at the building site and which will thus reduce both the time and labor required for completion of the house.

A further object of the invention is to provide a method of shingling a prefabricated wall section wherein the shingles are first preassembled and connected in elongated

2

rows or pallets including both an inner or under course and an outer course of shingles together with a substantially continuous wooden strip which acts as a connector for the several shingles enabling the production of a continuous row or pallet adapted to be cut to any desired length up to the length of a wall section. Another object is to provide such a method wherein these individual shingle assemblies are then applied to the frame of the wall section by first nailing through the connecting strip to the studs of the frame, mounting successive assemblies with the under course shingles therein seated on the top edge of the connecting strip on the next lower assembly, and then fastening all of the outer course shingles to the connecting strip on the next lower assembly or row.

It is also an object of the present invention to provide shingle assemblies or pallets and shingled wall sections produced as outlined above to accelerate the production and erection of prefabricated houses.

Further objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

In the drawings—

Fig. 1 is a view in side elevation of a portion of a prefabricated house constructed in accordance with the invention and with portions broken away to illustrate details of internal construction;

Fig. 2 is an enlarged fragment of Fig. 1;

Fig. 3 is a fragmentary section on the line 3—3 of Fig. 2;

Fig. 4 is a further enlarged fragmentary section on the line 4—4 of Fig. 2;

Fig. 5 is a fragmentary section through the gabled end wall of the house shown in Fig. 1 and on a somewhat larger scale;

Fig. 6 is an extended, two-part view showing somewhat diagrammatically an arrangement of apparatus forming a production line for carrying out the method of assembly and connecting shingles in accordance with the invention;

Fig. 7 is an enlarged fragmentary section taken on the line 7—7 of Fig. 6; and

Fig. 8 is a fragmentary perspective view looking generally from left to right in Fig. 6.

Referring to the drawings, which illustrate preferred embodiments of the invention, the house shown fragmentarily in Figs. 1—5 includes a plurality of prefabricated wall sections 10 and a foundation 11 supporting a floor 12, and the house is provided with end gables 13 and trusses 14 cooperating with the roof 15. Each of the wall sections 10 is shown as comprising a bottom plate 20, a top plate 21 and a plurality of vertical studs 22, these frame parts being formed of standard 2 x 4 lumber. Since it is not practical to handle a single wall section of greater length than 16 to 18 feet, two or more sections are nailed or bolted together to form the longer walls of the house, the joints between sections at the corners of the house being provided with corner members 24 such as boards or shingles. Frames 25 of conventional construction are inserted in the window or door openings in each wall section 10.

The exterior finishing of each of the wall sections 10 is provided by multiple rows of double course shingles, an outer course of shingles 30 and an inner or under course of shingles 31. The butts of the outer course shingles overlie the butts of the under course shingles by a predetermined distance as shown, and these outer course shingles are preferably of a finished and high grade, but since the under course shingles are wholly covered, they may be of an inferior grade. Between the shingles and the frame of the wall section is a layer of sheathing 33, which may advantageously be of wood or of a fiber or other suitable insulating board nailed directly to the studs

22. The prefabricating operations of the invention include substantially complete construction of these wall sections 10 at the factory in order to reduce to a minimum the requirements of labor and time at the building site.

In accordance with the invention, the under and outer course shingles in each row are preassembled and connected by a substantially continuous wooden strip 35 of a lesser width than the distance by which the outer course shingles overhang the under course shingles, satisfactory results having been obtained with these strips 35 formed by conventional plaster laths. The strip 35 is superimposed on the outer course shingles 30 near but spaced below the tips thereof, and it is secured to both courses of shingles by small nails or equivalent means such as wire stitches or staples 36. As shown in Figs. 3 and 8, each long strip 35 is composed of a plurality of shorter length sections of ship lap construction as indicated at 37 to provide an essentially continuous strip in each complete shingle assembly or pallet.

Figs. 6-8 illustrate diagrammatically the method of preassembling shingles in accordance with the invention on an elongated work table 40 shown as tilted to a convenient working angle and having supporting legs 41. Along the front edge of the work table is a guide member 42 which has a generally Z-shaped configuration providing offset guide strips 44 and 45 for receiving the butt ends of the shingles 30 and 31 respectively, and the Z-shape of this guide member minimizes frictional contact thereof with the shingles as shown in Fig. 7. In addition, the under course shingles 31 are shown as riding on a conveyor belt 46 which may be provided with a suitable drive motor (not shown) and which is arranged at a downward angle in the direction of travel of the shingles along the work table in order to impart a biasing force tending to urge the shingles into the properly maintained guided contact with the guide strips 44 and 45. Preferably the belt 46 will travel continuously at a faster rate than the shingles to maintain a continuous frictional drive on the shingles while permitting them to slip with respect to the belt.

In practicing the method of the invention on this work table, the under and outer course shingles are superimposed by hand at the assembling station formed by the left hand end of the table as viewed in Fig. 6, with proper care being taken to have the junction between each adjacent pair of under course shingles 31 covered by an outer course shingle 30. The assembled but still unconnected shingles then pass under a guiding and holding member 50 shown as a metal strap supported by overhanging brackets 51 and having its left hand end turned up at 52 to guide the successive shingles thereunder. Downward pressure on the advancing shingles is also maintained by an idler roller 55 mounted by shaft 56 on brackets 57 to overlie the advancing outer course shingles, and this roller may be duplicated and provided with a belt similar to the belt 46 if desired.

The successive laths which form the connecting strip 35 are superimposed on the advancing shingles as they approach the securing station represented by the electrically operated stitcher indicated generally at 60, and the guide member 50 serves also as a guide for the placing of these laths. The securing operation is preferably performed at relatively close intervals in order to assure that the parts are all properly secured together, satisfactory results having been obtained with staples or stitches applied at intervals of the order of two inches, and the ends of these staples or stitches are preferably clinched, as indicated in Fig. 4, as by having a suitably hard surface or back-up plate on table 40 at the securing station. For automatic operation of the stitcher 60, a control switch 61 may be mounted on the work table adjacent the path of the shingles for actuation by a cam wheel 62 riding on the lath strips 35 and designed to actuate the switch 61 periodically at the desired frequency as explained above.

The assembled and connected shingles advance beyond the securing station until they reach the desired length. Accordingly, the work table is desirably equipped with an adjustable stop 65 spaced beyond a severing station represented by a hand operated power saw 66. The stop 65 is mounted for adjustment lengthwise of the table to the proper fixed distance beyond the saw 66, as indicated at 67. The saw is in turn mounted on a frame 68 and operates in a slot 69 in the table top. Thus when the assembled shingle pallet reaches the desired length established by contact with the stop 65, it is merely necessary to interrupt the feed long enough to operate the saw 66 to cut off the portion of the shingles between the saw and the stop, after which the assembling operation proceeds following removal of the cut length from the table.

Fig. 6 also shows a saw 70 mounted between the stitcher 60 and saw 66 and operating lengthwise of the table on a stand 71 in cooperation with a slot 72 in the table top. This saw is used optionally to trim the tips of the assembled shingles extending beyond the strip 35, the resulting trimmed shingle pallets being utilized in special locations on the wall section as described below. For general use, however, the tips of the single pallets remain untrimmed as shown in Fig. 5.

The shingle pallets assembled as described in connection with Figs. 6-8 are applied to the wall sections in the manner illustrated in Figs. 1-5. The several rows of shingles are applied successively one above the other by first nailing the strip 35 of each pallet to each of the studs 22 as indicated at 75, and the butts of the under course shingles of each successive row are then seated on top of the strip 35 of the next lower row. All outer course shingles are then finally secured in place by means of nails 77 positioned to secure the butt end of each shingle 30 directly to the strip 35 on the next lower row, thus establishing a strong construction since each nail 77 traverses not only the thick portion of a shingle 30 and the strip 35 but also the tips of the next lower inner and outer course shingles as well as the sheathing 33 as shown in Fig. 4. It will be apparent that equivalent fastening means such as staples or stitches can be used in place of and as equivalent to the nail 77.

Since the shingles in each pallet assembled as described in connection with Figs. 6-8 are held together only by the supporting strip 35 of the pallet, which may extend to a length as great as the 16 to 18 foot width of a single wall section, the individual pallets are quite limber and may require relatively careful handling, especially in the longer lengths. This is not disadvantageous, however, since in factory prefabricating operations, the shingling is most conveniently done with the wall sections lying horizontally so there are no particular stresses thereon while the pallet is being nailed in place. It is therefore unnecessary to nail or otherwise to secure the butts of the shingles together prior to application to the wall section, thus further saving in time and materials.

The method of the invention results in the production of shingle pallets in which both the under and outer courses of shingles have their side edges in flush coplanar relation at both ends of the row, and the length of each pallet may be accurately predetermined by the setting of the stop 65. It is therefore possible to form such pallets in proper lengths to fit precisely between the corner members 24 and door or window frames 25 or between adjacent frames 25 in the same wall section, thus eliminating a large proportion of the otherwise necessary special cutting and fitting of the last shingle in each row as described above, and the invention also facilitates joining the rows of shingles at the junction between adjacent wall sections on the same wall of the house.

Referring to Fig. 1, it will be noted that gaps are shown between the shingles adjacent the junction between the left hand pair of wall sections, which gaps are readily formed by removing one or two shingles from the end of the strip 35 to avoid a butt joint between both the under

5

and outer course shingles in the same vertical plane. These gaps are laced in during erection of the house by means of individually applied shingles, but since this represents a relatively small proportion of the total shingling operation and would in any case be required for conventional shingle application, it does not appreciably detract from the advantages of the invention as outlined above. Fig. 1 also shows a strip of building paper 78 covering the junction between the end studs on adjacent wall sections to assure a weather-tight joint.

The precise manner of application of the bottom row of shingles depends upon whether the house is built with a floor as shown at 12 in Fig. 5 or on a concrete slab in place of the foundation 11. For a house to be erected with a floor, the bottom row of shingles is advantageously applied at the building site in the form of special pallets constructed as shown in Fig. 5 with a spacer strip 80 nailed to the back of the butts of the outer course shingles, and the next to bottom row of shingles is left unnailed along its lower edge at the factory to provide for proper application of the bottom row at the site as shown. The lower edge of the lowermost pallets is nailed directly through the strip 80 into the sill 81 to cover the floor and the joists 82. For houses to be built on a slab, the bottom row of shingles may be applied at the factory with the spacer 80 being nailed directly into the bottom plate 20.

Fig. 5 also shows the manner of finishing the junction between the top of a wall section and the end gable 13. The top row of shingles on the wall section has its tips trimmed as indicated at 85 and as described in connection with the saw 70 in Fig. 6. The gable is shingled with preassembled shingles in essentially the same manner as the wall sections, with the bottom row being applied in such position as to overhang and fit with the top row on the wall section as shown in Fig. 5. A similar row of trimmed shingles can be used along the top of the side wall sections and then finished by a top facing board 88, preferably after removing the strip 35 therefrom, or the top shingle row can be separately applied in the form of individual shingles.

It will therefore be apparent that the invention greatly facilitates the use of shingles in the prefabrication of houses by reducing both the time and the labor required for shingling operations. Since the shingles are automatically properly aligned during preassembly and connection with the strips 35, correctly aligned placement of all rows on the wall is readily obtained. In addition, both the assembling and the application of the shingle pallets are so simple that both operations can be performed by relatively unskilled help, correspondingly reducing the labor cost, and these advantages are further enhanced by the reduction in the time and labor required for erection of the house due to the greater amount of work which can be done at the factory as a result of the invention. At the same time, the entire operation including the preassembly and the application of the pallets is so greatly accelerated as compared with the use of individual shingles that the wall sections can be shingled at substantially the same rate required for initial assembly of each section frame, thus assuring steady operation of the complete factory production line and resulting in reduced overall cost of the finished house.

The invention is also important as providing a properly insulated and weatherproof wall section at minimum cost, and especially as making practical the use of highly economical sheathing and exterior finishing materials on the same wall. Thus while the shingle pallets of the invention can be utilized in conjunction with wooden sheathing, entirely satisfactory results may be obtained with the use of sheathing of the asphalt-impregnated pressed fiber type which could not as a practical matter be utilized with conventional individually applied shingles because it is too soft to hold nails with adequate firmness. With the present invention, however, the reinforcing strips

6

of the shingle pallets provide both for securing these pallets directly to the studding and also for securing the individual shingles together and to the wall as a whole even when such relatively soft sheathing is used. At the same time, the use of an asphalt-impregnated sheathing eliminates the conventionally required building paper over the entire wall which should otherwise be used for proper sealing, with resulting further economy of production and materials.

While the methods and products herein described constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to these precise methods and products, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. In a method of prefabricating a wall section of a house, the steps of assembling individual shingles into an under and an outer course at an assembling station with the butts of said outer course of shingles overhanging the butts of said under course shingles by a predetermined distance, advancing said assembled courses of shingles while maintaining said overhanging relation thereof, superimposing on said advancing courses of shingles a substantially continuous wooden strip of less width than said predetermined overhanging distance with said strip located near but in spaced relation with the tips of said outer course shingles, securing said strip to each said shingle at a work station spaced from said assembling station to form a continuous assembly, and periodically severing a leading end portion of predetermined length from said advancing assembly to provide a complete assembly of said predetermined length and with both the leading and trailing ends of said complete assembly having both said courses of shingles with the exposed side edges thereof flush with each other.

2. In a method of prefabricating a wall section of a house, the steps of assembling individual shingles into an under and an outer course at an assembling station with the butts of said outer course of shingles overhanging the butts of said under course shingles by a predetermined distance, advancing said assembled courses of shingles while maintaining said overhanging relation thereof, superimposing on said advancing courses of shingles a substantially continuous wooden strip of less width than said predetermined overhanging distance with said strip located near but in spaced relation with the tips of said outer course shingles, securing said strip to each said shingle at a work station spaced from said assembling station to form a continuous assembly, advancing said assembly into contact with a stop spaced beyond said work station, and severing said assembly at a severing station spaced between said work station and said stop at a predetermined distance from said stop to provide a complete assembly of a length equal to said last named distance and with both the leading and trailing ends of said complete assembly having both said courses of shingles with the exposed side edges thereof flush with each other.

3. In a method of prefabricating a wall section of a house, the steps of assembling individual shingles into an under and an outer course at an assembling station with the butts of said outer course of shingles overhanging the butts of said under course shingles by a predetermined distance, advancing said assembled courses of shingles while maintaining said overhanging relation thereof, superimposing on said advancing courses of shingles a plurality of successive wooden strips of ship-lap configuration and less width than said predetermined overhanging distance with said strip located near but in spaced relation with the tip of said outer course shingles, securing said strips together and to each said shingle at a work station spaced from said assembling station to form a continuous assembly, advancing said assembly into contact with a stop spaced beyond said work station, and severing said assembly at a severing station spaced be-

tween said work station and said stop at a predetermined distance from said stop to provide a complete assembly of a length equal to said last named distance and with both the leading and trailing ends of said complete assembly having both said courses of shingles with the exposed side edges thereof flush with each other.

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