Dec. 26, 1944. J. A. ROBERTSON ET AL 2,366,149

ROOF STRUCTURE

Filed Aug. 2, 1943

Fig. 1

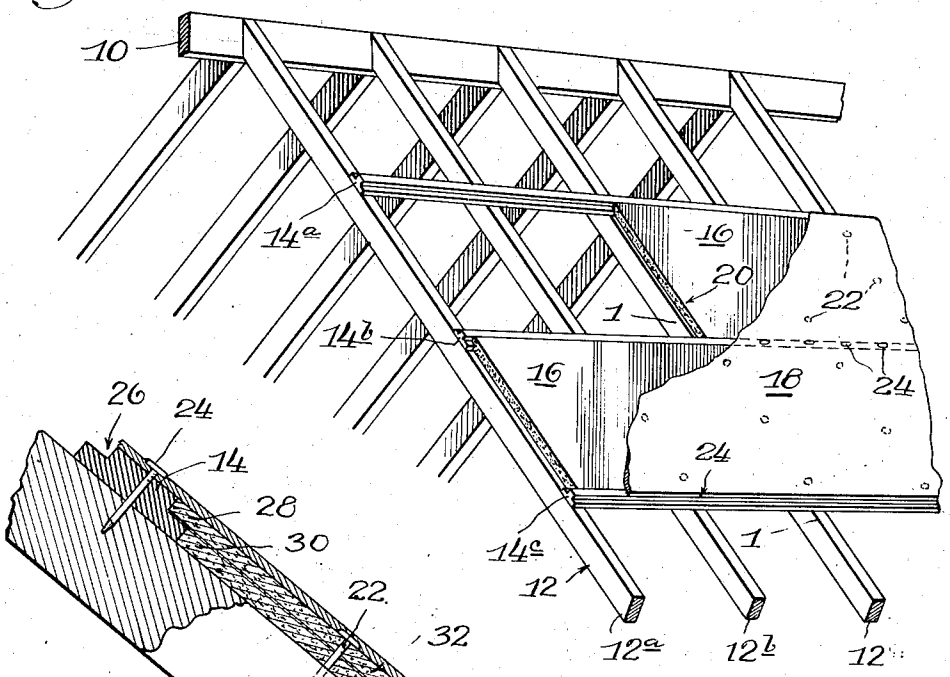


Fig. 2

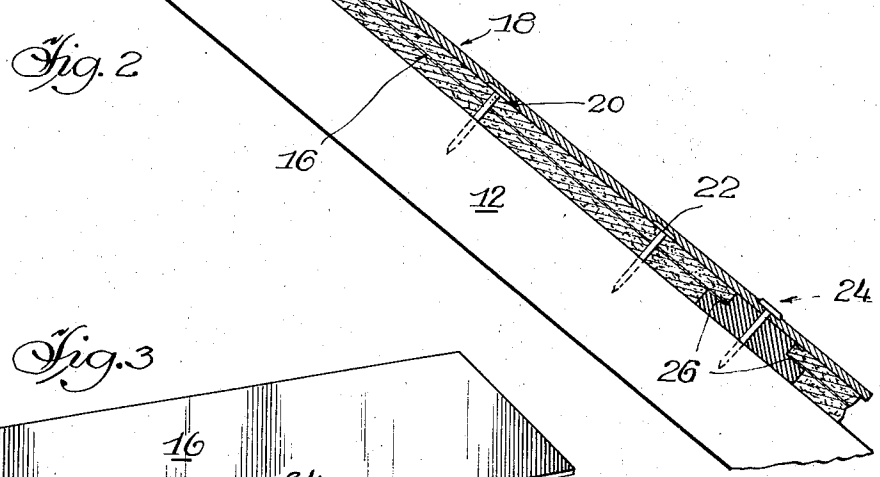
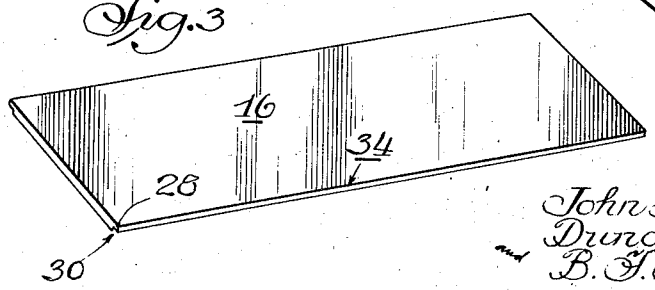


Fig. 3



INVENTORS.
John A. Robertson
Duncan S. Payne
and B. F. Arendt
by T. B. Sloan Atty.

Patented Dec. 26, 1944 2,366,149

UNITED STATES PATENT OFFICE

2,366,149

ROOF STRUCTURE

John A. Robertson, Deerfield, Duncan S. Payne, Chicago, and Beach Frederick Arendt, Park Ridge, Ill., assignors to United States Gypsum Company, Chicago, Ill., a corporation of Illinois

Application August 2, 1943, Serial No. 497,018

4 Claims. (Cl. 108—1)

This invention pertains to a roof construction and particularly to a special type of a combination of supports, and sheet-like members which when assembled will form a suitable deck for further application of roof coverings or the like.

In the construction of ordinary roof structures, it is customary to have the rafters meet at the apex of a common ridge rafter. Of course, the other ends of the rafter are supported by the plates, which in turn are an integral part of the structure. Applied transversely to the rafters are a series of tongue and groove or shiplapped edge boards which are fastened in the customary manner by means of nails to the rafters. Though it is considered good practice to apply the tongue and groove or shiplapped edge board in a diagonal method, since it greatly reinforces the roof structure, the customary method, however, is to apply the boards transversely to the rafters. This method of application not only decreases the cost, saves considerable amount of labor, as well as material, but also is considerably easier to erect. The formed roof deck is then ready for the application of the customary roof coverings, for example, such as applied roofing of an asphaltic nature, slate, asbestos cement, and the like.

In addition to offering many advantages, as well as overcoming the difficulties enumerated above, this invention provides a suitable roof deck construction that can be readily adapted to different types of roofs and offers a number of economies, as well as erection advantages.

Though this roof construction is specifically directed to the use of a particular type of wallboard or a laminated structure, possessing the features described herein below, in combination with the special types of purlins, as applied to the roof rafters, it obviously can be adapted to a number of other modifications, extensions and constructions, which a person skilled in the art can readily foresee, particularly in light of the spirit of the principles underlying in this invention, as described in the drawing forming a part hereof.

Fig. 1 shows partly in section the supporting roofing structure, as well as the sheet-like members in place, together with the covering. Fig. 2 is a section taken along line 1—1 showing a part of the supporting rafter, purlins, and the sheet-like members attached to the rafters and in place between the special purlins, with the entire assembly covered in the manner shown. Fig. 3 is a plan view slightly in perspective, showing the sheet-like member and the special edges of a complementary nature, which fit into the recesses provided on the special purlin figure.

This construction system is a combination of a number of elements, each cooperating with the other in order to form a roof deck possessing strength, ease of erection, low cost of erection, little waste, and other advantages which will become apparent to those skilled in this art. In erecting this construction, a ridge rafter 10 is generally erected in place by means of temporary supports not shown in the drawing. To this ridge rafter 10 are attached at suitable distances apart a series of supporting rafters, 12*a*, 12*b*, 12*c*, etc. The lower part of the supporting rafters, 12*a*, 12*b* and 12*c* are attached to a plate not shown on the drawing, as used in customary construction. Transversely overlying the supporting rafters are a series of equally spaced apart, especially formed purlins or retaining members, having a longitudinal margin or recess, capable of receiving a complementary edge forming a part of the sheet-like member 16. A series of the purlins 14*a*, 14*b*, 14*c*, etc., are in practice spaced apart the width of the sheet-like member 16. Likewise the distance between the rafters 12*a*, 12*b*, 12*c*, is a fractional multiple of the length of the sheet-like member 16.

The sheet-like members or wallboard having the special recessed edges 28 and 30 are placed between the purlins 14*a* and 14*b* in such a manner that the lower part of said sheet is supported directly by the rafters 12 and also is suspended freely in the space between the rafters by being partly supportable by the projection 28 forming an integral part of the sheet-like member 16 and engaging the recess 26 of the purlin 14.

Though it is possible to attach the sheet-like member 16 to the recess 26 by means of nails or other suitable attaching means, such as adhesive, it is not the intention to form this feature a part of the invention, since fastening by means of nails along the edges of the projection 28 to the purlin 14 has a tendency to destroy the projection 28 and thereby prevent the salvage of the material for further use. In addition, it has been found that when the projections 28 are fastened by means of nails or other types of fastening devices, the purlins 14 when exposed to highly humid conditions have a tendency to twist and thereby destroy the projecting edge 28 of the sheet-like member 16. However, the sheet-like member 16 is fastened by means of nails 20 directly to the supporting rafters 12. The attaching means 20 are covered by a covering means 18

which in turn protects the nails 20 as well as the sheet-like members against the weather.

The covering means 18 may consist of any conventional type of roof covering, such as impregnated asphalt felt, or other suitable base-like material to which further roof coverings can be applied. This roof covering 18 is attached to the purlin 14 and the rafter 12 by means of long nails 24 which are driven through the entire assembly and retain the combination in place. Though it is desirable to cover the nail heads 24 with some other waterproofing material, such as asphalt or a lapping cement of an asphaltic nature, it is not entirely necessary, since it has been found that the nail head 24 when properly inserted will maintain sufficient pressure to prevent the entrance of rain to the underlying structure.

The sheet-like members may consist of a suitable wallboard having a longitudinal margin of projections 28 and the recess 30 which is complementary to the edges 26 of the longitudinal margins of the purlins 14. The sheet-like member consists of a laminated structure comprising at least two sheets, the lowermost of the said sheets being of such a width which will fit between the widest longitudinal margins of the purlin 14 and which will be directly in contact with the rafter 12, while the upper sheet is of such width which will fit between the marginal recesses 26 of the purlins 14. Any suitable means for attaching the two sheets can be used, though it is preferred to use the laminated structure and adhesive described in a co-pending patent application of Camp and Kolmodin Serial No. 496,074. This laminated structure as described in the co-pending patent application is particularly suitable for use under humid conditions and can be used conveniently in this type of structure. However, it is not intended to be limited to that particular laminated structure, for obviously the lowermost sheet is in supportable contact with the rafter 12 and thereby does not need the superior adhesive strength and character which would be desirable in sheets which are normally suspended along their marginal edges and ends.

In erecting the substructure of this invention, it is desirable that the ends of the sheet-like members 16 fall over a common rafter in the same course. However, the succeeding courses and in particular the adjacent courses should not have the ends of the sheet-like member 16 fall over a common rafter in alignment with each other. A staggered or broken joint panel system of erection is highly desirable, for it not only adds to strength of the finished structure but also reinforces each succeeding course as it is applied to the supporting rafters.

It is obvious that a careful study of the elements underlying this invention will show that each element cooperates with each other to form a combination which when assembled in accordance with principles underlying this invention as defined hereinabove, and claimed in the appended claims will provide a roofing structure with unexpected and novel properties as well as other advantages.

It is claimed:

1. In a roof deck, in the combination with supporting rafters spaced apart a multiple fraction of the length of the sheet-like member, a purlin having substantially an inverted T section erected transversely of the said supporting rafters, the longitudinal marginal edges of the said purlin having a complementary load supportable recess to engage in juxtaposition a like complementary longitudinal load transmittable marginal projection forming the upper part of edges of said sheet-like members, the lower surface of said sheet-like member supported partly by the supporting rafters, the ends of said sheet-like members, abutting over a common rafter in the same course and on other rafters in adjacent courses, but between said purlins, the said purlins and said sheet-like members attached to the rafters.

2. In a roof structure comprising supporting rafters, a series of spaced purlins attached transversely to said supporting rafters, the said purlins having a longitudinal, marginal recess to receive the upper edge marginal portions of a laminated wallboard; a laminated wallboard structure comprising sheet-like members made from gypsum, fiber or the like, placed in a face to face relationship, the upper portion of said laminated structure being wider than the other and being of such width as to be engaged within the longitudinal, marginal recesses of said transversely spaced purlins; the lower portion of said laminated structure disposed between said purlins, and supported by said rafters; a covering means for the said purlins and laminated structure, and means for attaching said covering means to said purlins and laminated sheet-like structure whereby a rigid, tight, weather resistant construction is obtained.

3. In the structure of claim 2, wherein the said laminated sheet-like members consist of laminated gypsum wallboard.

4. In the construction of claim 2, wherein the said laminated wallboard structure comprising at least two sheets of wallboard are adhesively secured by means of a water resistant adhesive consisting of partially dextrinized farinaceous paste and an asphalt emulsion of the clay type.

JOHN A. ROBERTSON.
DUNCAN S. PAYNE.
B. F. ARENDT.