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PREFABRICATED BUILDING AND BUILDING CONSTRUCTION

Filed Nov. 28, 1936

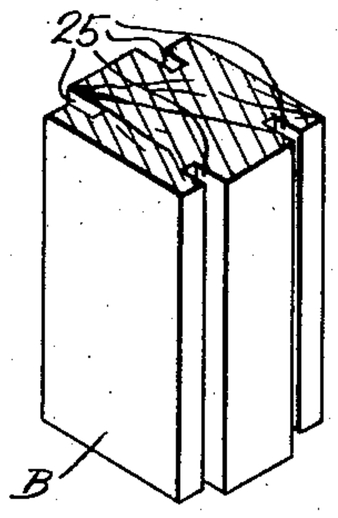

FIG. 2

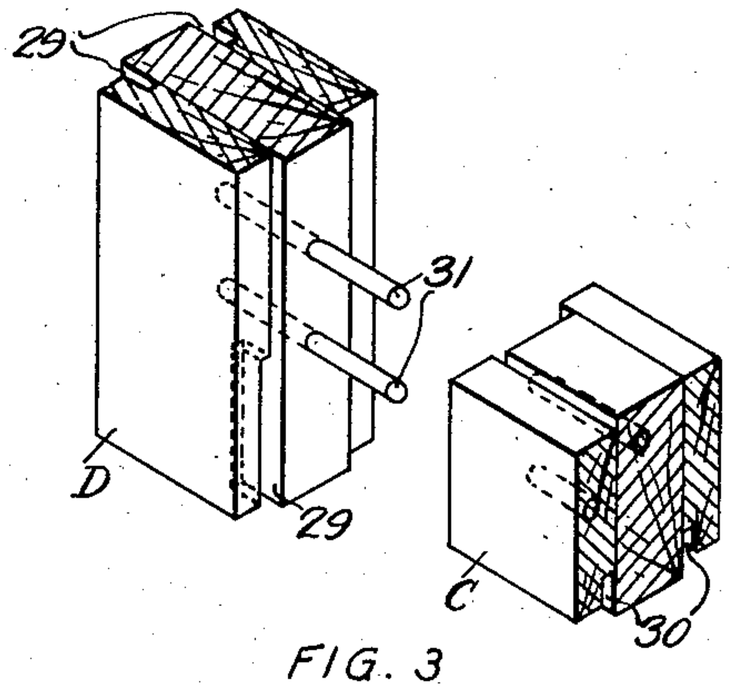

FIG. 3

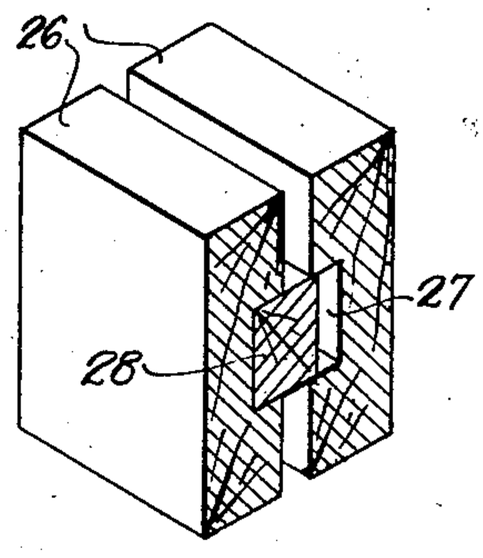

FIG. 4

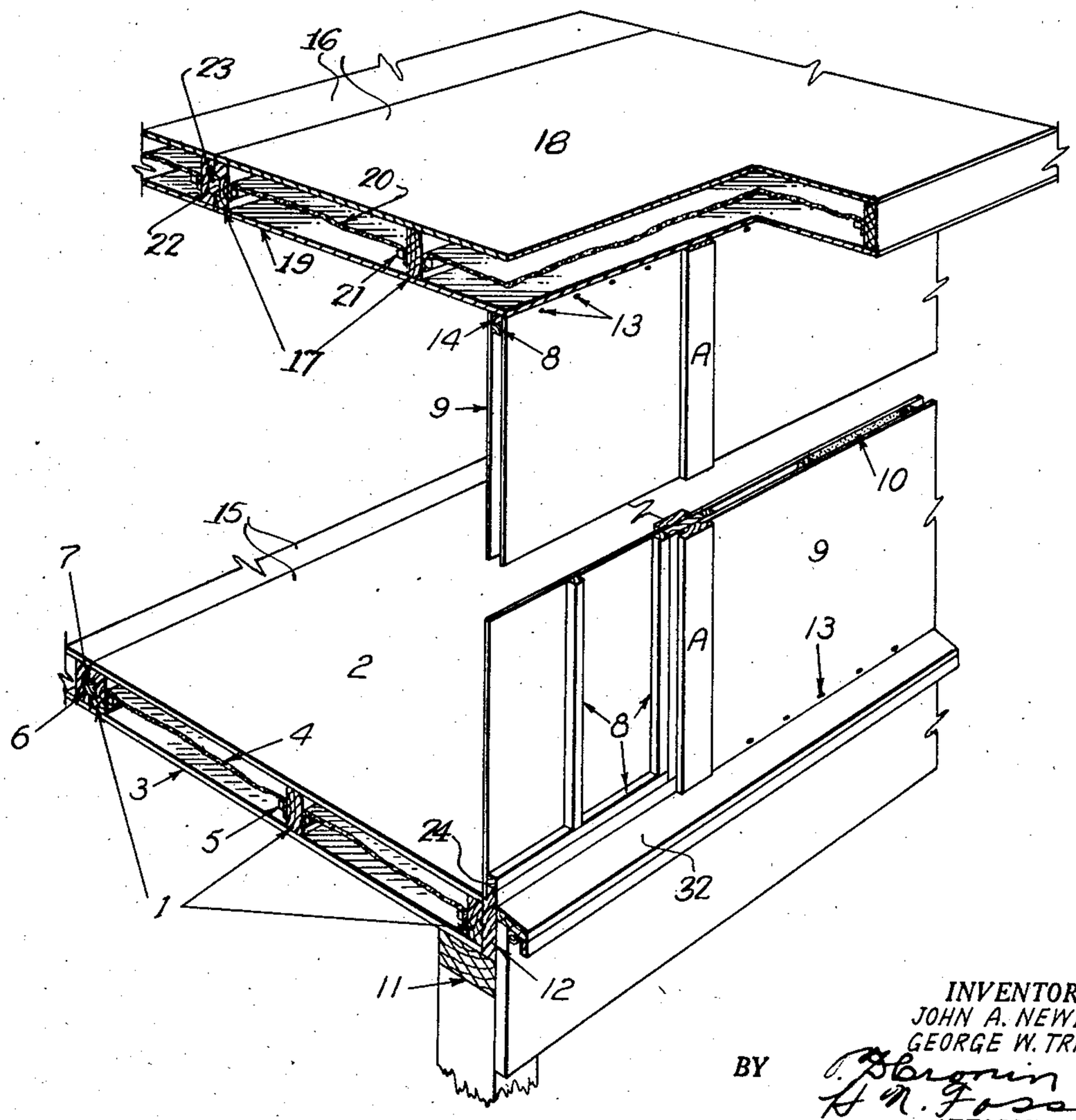

FIG. 1

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PREFABRICATED BUILDING AND BUILDING CONSTRUCTION

John A. Newlin, Madison, Wis., and George W. Trayer, Alexandria, Va., dedicated to the free use of the Public in the Territory of the United States of America

Application November 28, 1936, Serial No. 113,236

1 Claim. (Cl. 20—1)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This application is made under the act of March 3, 1883, as amended by the act of April 30, 1928, and the invention herein described, if patented, may be manufactured and used by or for the Government for governmental purposes, without the payment to us of any royalty thereon.

We hereby dedicate the invention herein described to the free use of the Public in the territory of the United States of America to take effect upon the granting of a patent to us.

This invention pertains to wood buildings in which the structural units are so built and so combined as to reduce the labor and time of erection or assembly of the buildings. The structural units consist of wood or building board panels, which may be made up in one of any number of ways, and splines and mullions. In the description in this patent application, we have chosen to use panels of the stressed covering type, although we do not limit the scope of our patent to the use of this type of panel.

By panels of the stressed-covering type, we mean panels which are comprised of a wood framework to which are glued, with casein or other suitable glue, covering plates, which may be sheets of plywood or building board of suitable structural properties, to form what is virtually a box girder. The panels are designated as stressed-covering panels because any load applied to a panel of this type is so distributed that the cover plates carry a large proportion of the load. This unity of action is due to the complete and continuous rigid joint formed by the glue between the framework and the cover plates.

The panels are joined together by means of the mullions and splines which are so grooved and so designed that the panels may be fitted together at the time of erection without alterations. The obvious method of accomplishing this is to prefabricate the panels, mullions, and splines in a factory leaving only the assembling to be done at the site of erection.

Our invention can best be described by referring to Figures 1 to 4 which are illustrations of the units and the methods of combining them.

Fig. 1 is an isometric view showing an assembled section of a typical wood building comprising stressed-covering roof, floor, and wall panels, mullions, splines, and foundation sills.

Figure 2 is an isometric section of a typical one-piece mullion.

Figure 3 is an isometric section of a typical dowel joint between a 3-piece laminated mullion and a 3-piece laminated window sill.

Figure 4 is an isometric section of a typical roof panel groove and spline joint.

The floor panels 15, are made up of a wood framework 1, to which are glued, with casein or other suitable glue, the upper 2, and the lower 3, cover plates which may be sheets of plywood or building board of suitable structural properties to form what is virtually a box girder. Within the panels a blanket type insulation 4 may be attached with batten strips 5, as illustrated, or the space may be filled with loose insulation material. Lateral edges of the panels are provided with grooves 6, to provide space for a spline 7.

The roof panels 16, are made up in the same manner as are the floor panels 15. The wood framework 17, has glued to it upper cover plate 18, and lower cover plate 19. The blanket type insulation 20, is held in place by batten strips 21. The lateral edges of the panels are provided with grooves 22 to accommodate splines 23. This form of construction is further illustrated in Figure 4, in which the joist-like lateral edges of two adjacent roof panels are 26, one of the grooves is 27, and the spline is 28.

The wall panels in Fig. 1 are constructed in the same manner as the floor and roof panels except that the framework is made up of lighter members 8, and the cover plates 9, are thinner. The minimum thickness of the framework of these wall panels is largely governed by the type of doors and windows used in the structure. Top and bottom members of the panel framework as well as the end vertical members are set in from the edges of the plywood faces in order to provide the structural joints which will be described later. The spaces between the framework may be filled with loose insulation material 10, or with the blanket type as is illustrated in the floor and roof panels.

Adjacent wall panels are connected by means of mullions. A typical 3-piece mullion is A, Figure 1, and a typical solid mullion is B, Figure 2. Grooves 25, in mullion B are typical for places where the wall panel cover plates 9, project from both adjacent wall panels. A typical construction where window and door frames appear, is shown in Figure 3. The two grooves 29, on the window side of mullion D, extend up only to the bottom of the grooves 30 in the window sill C. One of these two grooves 29 is not shown in Figure 3 but it is positioned at the back of the mullion corresponding to that of the other one at the front of the mullion. The two dowels 31, serve to position the mullion and sill and to join

them together. Mullions, sills, and other similar members may obviously be made up in any suitable well-known manner. Laminating them as A in Figure 1 and C and D in Figure 3 may reduce the cost of the lumber, will facilitate the seasoning of the lumber, and will permit the use of low grade lumber in the center lamination.

In erecting a building using the unit construction system as illustrated in Figure 1, a suitable foundation is built on which is placed a wood sill consisting of two pieces 11 and 12. Piece 11, is laid flat on the foundation posts and piece 12, is placed, on edge, on piece 11 and fastened thereto. Piece 12 is provided with a rabbet 24, on the inside upper edge, of proper size and shape to permit a suitable junction and fit between the inner cover plates 9, of the wall panels and the upper cover plates 2, of the floor panels. No rabbet is needed on the outside face of piece 12, since the outer cover plates 9, of the wall panels rest on top of the water table 32. While the floor panels would normally be placed on the sills before the wall panels are erected, the construction illustrated and described permits the placement and removal, as for repairs, of the floor panels independently of the wall panels.

The mullions such as the one illustrated in Fig. 1 (A), and the extending cover plates of the wall panels fit over the sill piece 12, and the panels are fastened by screws or nails 13, thereto. Similarly, the top edges of the wall panels receive and are fastened by screws or nails 13, to a wood strip 14, securely fastened to the roof panels along the wall and partition lines.

The plywood edges of the adjacent wall panels 9, are fitted into the parallel grooves in the mullion A. The edges of the plywood 9, may be coated with a mastic before assembling them to protect them from moisture and to prevent air infiltration.

The general idea behind prefabricated buildings is to put the difficult and intricate part of the work inside the factory, thus reducing the time and expense of assembly on the site to a minimum and providing the masses of the population with acceptable low-cost housing. This can be accomplished in numerous ways by using several types of fundamental construction panels and methods of connecting them. However, we have in this patent application preferred to describe a panel of the stressed-covering type and a joint system consisting of mullions, splines, and sills.

We have found that this particular construction lends itself remarkably well to prefabrication by actual experience in erecting a building.

The system herein described is superior because the units are simple and readily made with accuracy in a factory; and because the stressed-covering panels are inherently strong and rigid the floors and walls of the building can be made thinner and consequently much lighter than walls and floors made by ordinary wood frame construction. This, of course, is an advantage in prefabrication because of the economy in materials and because of the storage and transportation problems involved.

With this unit type construction, it is a simple matter to obtain flexibility of design by varying the size of the fundamental units or by arranging the existing units in various combinations.

The simplicity of the mullion system of connecting the panels reduces the labor cost and the time of erection.

We choose to use plywood for the panel cover plates 2, 3, 9, 18, and 19, because its structural properties are suitable, it results in light weight construction and eliminates the necessity for other interior and exterior wall, floor and ceiling coverings.

Having fully described our invention, we claim:

A prefabricated building structure having inwardly rabbeted wooden sills with horizontal and vertical longitudinal ribs, a floor of stressed-covering panels and splines resting on and supported by the horizontal ribs of the rabbeted portion of the sills, walls of stressed-covering panels and mullions fitting over and supported by the vertical surface of the rabbeted portion of the sills, and a ceiling of stressed-covering panels and splines resting on and supported by the walls.

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