

Aug. 7, 1962

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3,047,912

BUILDING STRUCTURES

Filed Aug. 18, 1959

2 Sheets-Sheet 1

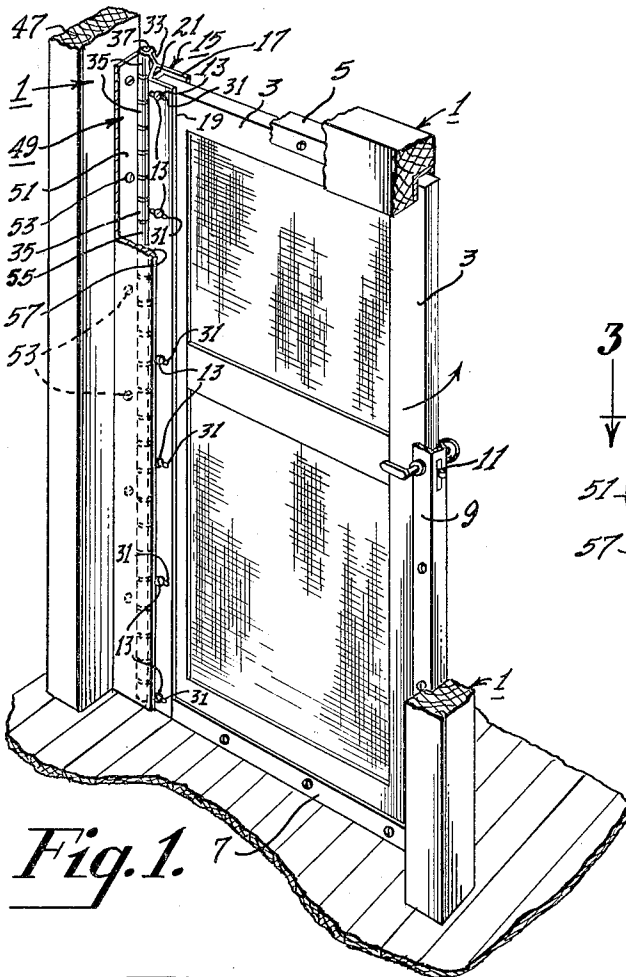


Fig. 1.

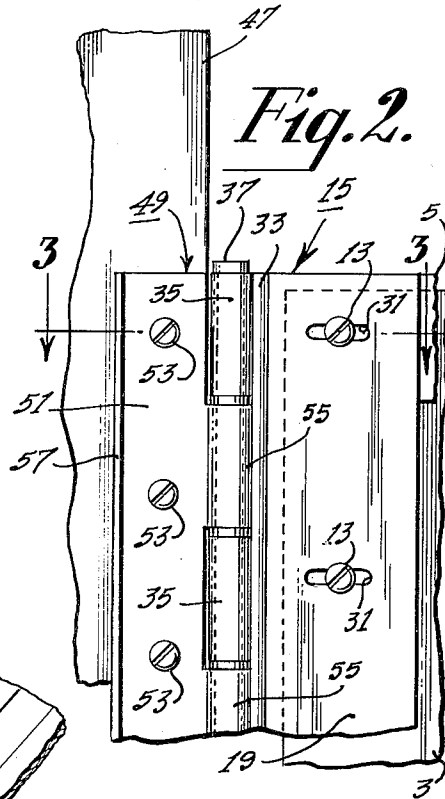


Fig. 2.

Fig. 4.

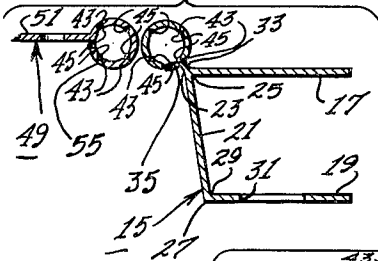


Fig. 5.

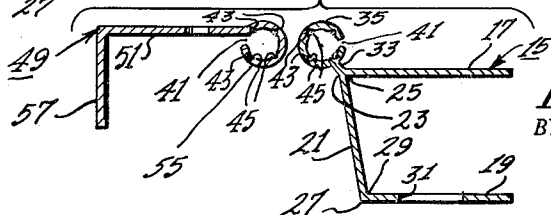
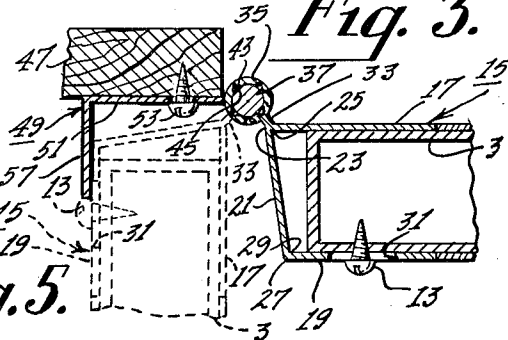


Fig. 3.



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2 Sheets-Sheet 2

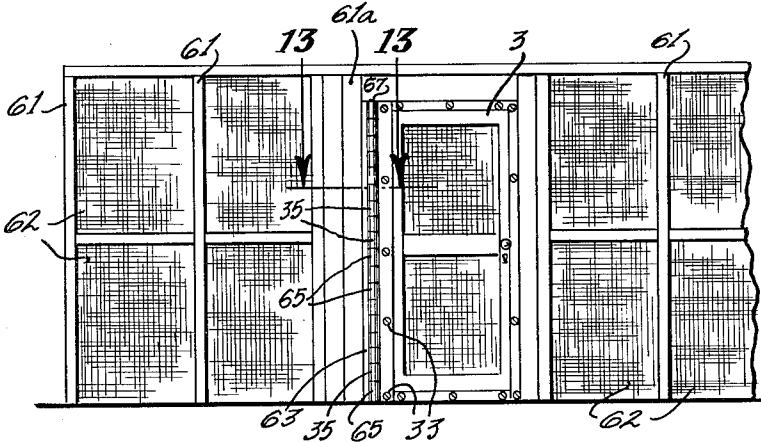
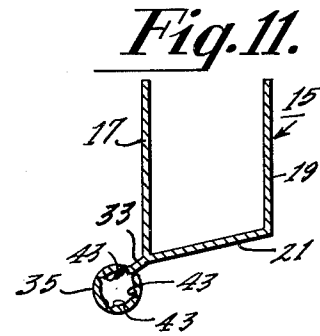
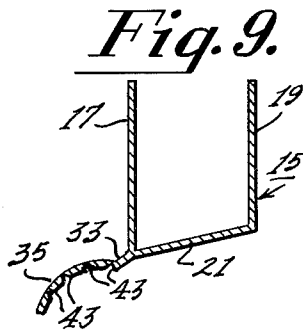
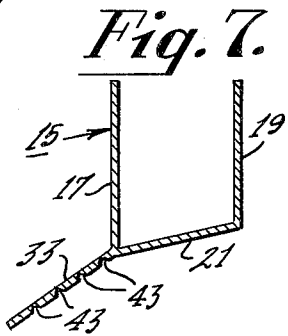
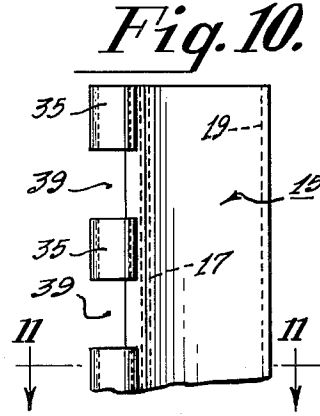
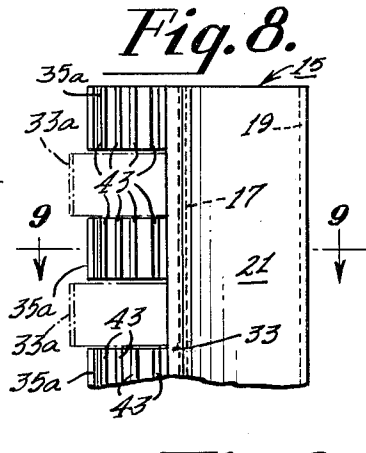
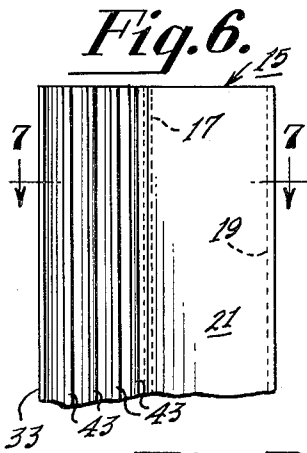


Fig. 12.

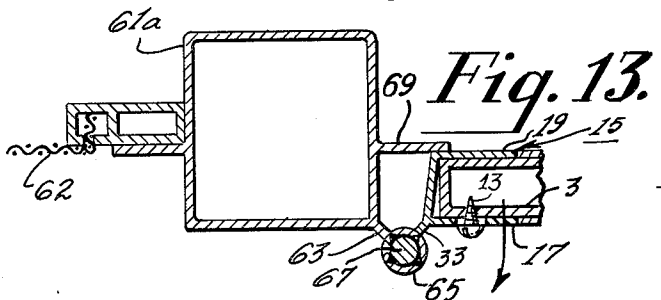


Fig. 13.

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1

3,047,912
BUILDING STRUCTURES
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This invention relates to building structures, and more particularly to structures including hinge means for swinging closure devices such as doors, windows, and the like.

In certain building structures, such as enclosed porches, patio enclosures, screened rooms, expandable rooms, and the like, use is often made of screen doors and/or storm doors of various types. Such doors are often constructed of relatively thin, light-weight metal, such as aluminum, and are made in standard sizes. Quite frequently, however, the door frames into which such doors are to be set are found to be oversize. To adapt the doors to such oversize frames, they are provided with expanders of similar metal in the form of channel members. These channel members can be adjustably fitted onto the door frames to bring the doors to such size and shape as to snugly fit the door frames in which they are to be mounted.

Doors of the type under consideration are customarily attached to the door frames by means of piano hinges one leaf of which is secured to a jamb of the door frame and the other of which is secured to the adjacent expander member of the door. The attachment of one leaf of the hinge to the expander member adds to the cost of manufacture of the door assembly. Moreover, conventional hinges of the type under consideration sometimes are subject to distortion which results in forcing the door out of line with the frame. Also, as sometimes happens, the butt or leaf of the hinge secured to the door may come loose. This necessitates repair, which adds further to the cost, to say nothing of being a source of annoyance and inconvenience.

When a door of the type set forth is installed, it is also necessary to install some sort of a door stop against which the door abuts in the fully closed position. Customarily, door stops in the form of elongated L-strips are mounted on the door frame for cooperation with the door. This, to, adds to the cost of installation.

Another difficulty which is frequently encountered in door installations of the type under consideration is that no provision is made for lubrication of the hinges. After a period of use when dirt particles and other foreign matter accumulate in the hinge sockets, the hinges become clogged and/or squeaky, and the doors drag when opened or closed.

The primary object of the present invention is to provide an improved combination structural member and hinge which is free from the aforementioned and other difficulties characteristic of prior art structures of this sort.

More particularly, it is an object of the present invention to provide an improved combination structural member and hinge which is not only sturdy in construction, but which is comprised of a minimum number of parts.

Another object of the present invention is to provide an improved door attachable expander and hinge structure which, while sturdy, will nevertheless be free to yield more or less so that, even if the building whereon it is mounted settles somewhat, it will still retain the door to which it is attached in suitably fitting relation with the door frame.

Still another object of this invention is to provide an improved expander and hinge structure which avoids the need for additional door stop means at the hinge side

2

of the door, thereby minimizing labor and installation costs.

A further object of the present invention is to provide an improved hinge structure which is self lubricating and, therefore, requires a minimum of attention.

It is also an object of the present invention to provide an improved, door attachable expander and hinge structure which is of simple construction, which can be manufactured readily, which can be installed easily, which is pleasing in appearance, and which is highly efficient in use.

In accordance with the present invention, there is provided an elongated, hollow, structural member having a longitudinal corner from which an integral, longitudinal web extends in angular relation to a face of the member. This web preferably runs along the entire length of the structural member and is formed with one or more pintle receiving hinge sockets along its outer or free edge. The structural member may be a channel-like door expander, for example, which can be attached to a door along one side thereof, or it may be a tubular member useful as a stud in a wall or panel structure and on which a door can be mounted. In any case, this hollow structural member with its integral hinge sockets serves as one of a pair of piano type hinge members. By making the web integral with the hollow structural member, the need for stocking separate hinge leaves and for attaching such hinge leaves to the hollow structural member is eliminated, thereby saving storage and labor costs.

The other member of the hinge comprises an elongated leaf adapted for mounting on a jamb, for example, and provided along one longitudinal edge thereof with one or more pintle receiving hinge sockets adapted to cooperate with the aforementioned hinge sockets of the hollow structural member. This latter leaf preferably also runs along the full length of the structural member and is preferably formed with a laterally extending flange adjacent the longitudinally extending edge thereof opposite the hinge socket edge, the flange being disposed to be engaged by a door in its closed position and, therefore, to act as a stop for the door. Thus, the last mentioned hinge member, when mounted in place, at once provides a door stop without need for mounting an additional door stop. Consequently, the stocking of separate door stops and the labor of installing such separate door stops are also eliminated.

Each of the hinge sockets is preferably formed along the inner face thereof with one or more longitudinally extending grooves in which a suitable lubricant may be packed. Accordingly, more or less permanent lubrication is provided for the hinge to minimize friction and wear. The hinge sockets may be either fully closed or left slightly open, as desired. In the latter case, lubricant can be applied to the hinge pintle along the open socket portions either in lieu of the permanent lubricant if the latter is omitted initially, as may sometimes be found desirable, or in addition to the groove packed lubricant. In any case, ample lubricant can be provided to insure proper hinge lubrication. Integral hinge and expander or jamb structures as described above, when extending substantially the full length of the expander and jamb structures, have all the advantages of a piano hinge and, in addition, strength, firmness, neatness, and ease of manufacture and installation. Moreover, by reason of the web, they can accommodate themselves to reasonable settling of buildings. Such structures are also easy to keep clean and are pleasing to the eye.

The novel features of the invention, both as to its organization and method of operation, as well as additional objects and advantages thereof, will be more readily understood from the following description, when read in con-

3

nection with the accompanying drawings, in which FIG. 1 is perspective view, partly in fragmentary section, showing a door mounted with an expander and hinge structure in accordance with one form of the present invention,

FIG. 2 is a fragmentary, front elevation showing the expander and hinge structure of FIG. 1 as seen when the door is open,

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 2 and viewed in the direction of the appended arrows,

FIG. 4 is an exploded, fragmentary, sectional view showing an expander and hinge structure according to the present invention wherein the hinge sockets are of the closed form,

FIG. 5 is a view similar to FIG. 4 but showing a hinge structure having open hinge sockets.

FIGS. 6, 8 and 10 are fragmentary, elevational views showing steps in the production of one form of expander according to the present invention,

FIGS. 7, 9 and 11 are sectional views taken, respectively, along the lines 7—7 of FIG. 6, 9—9 of FIG. 8, and 11—11 of FIG. 10, as viewed in the direction of the appended arrows in each case,

FIG. 12 is a front elevation of a portion of a porch enclosure employing hollow stud and hinge structures, as well as expander and hinge structures, all in accordance with the present invention, and

FIG. 13 is a fragmentary, enlarged sectional view taken along the line 13—13 of FIG. 12 and viewed in the direction of the appended arrows.

Referring more particularly to the drawings, there is shown, in FIG. 1, a door frame 1 for a door 3 which may be a combination storm and screen door, for example. The door 3 may have an aluminum frame and may be provided with a top rail 5, a bottom rail 7, and a side rail 9 on the side thereof which carries a latch and lock mechanism 11. This structure is fairly conventional and is not believed to require further explanation.

Mounted along the left margin of the door 3 (as viewed in FIG. 1) by means of screws 13 is an elongated expander 15 of channel form. The expander 15 is an integral unit having a pair of spaced, parallel parts 17 and 19 connected to each other by a transverse part 21 which is preferably angularly related to the parallel parts 17 and 19 for a purpose presently to be set forth. The transverse part 21 joins the part 17 at a longitudinally extending corner 23 and forms an acute angle 25 with the part 17; and it joins the part 19 at a longitudinally extending corner 27 to form, with the part 19, an obtuse angle 29. The door 3 is received in the channel between the parts 17 and 19. The part 19 has a plurality of vertically spaced, horizontal slots 31 through which the screws 13 extend, the slots 31 permitting horizontal adjustment of the expander 15 on the door 3 to accommodate the door to an oversize door opening.

Formed integrally with the integral expander parts 17, 19, 21 and extending outwardly thereof from the corner 23 at an angle of about 135° with the parallel parts 17 and 19 is a web 33 which runs the entire length of the expander 15. The outer edge of the web 33 is formed with a plurality of longitudinally spaced sockets or knuckles 35 adapted to receive therein a pintle 37. It will be apparent, now, that the web 33 with its pintle sockets or knuckles 35, together with the expander part 21, form one leaf of a piano-type hinge, all an integral part of the expander structure. Thus, the need for a separate leaf to be attached to the expander by screws or the like, as has been customary practice heretofore, is entirely avoided.

The combined, unitary expander and hinge leaf structure thus far described can be made in various ways. For example, it can be extruded initially as a continuous structure in the form shown in FIGS. 6 and 7 where the web 33 is relatively wide transversely. Spaced portions 33a of the web are then blanked out to form the spaces

4

39 (FIG. 10), after which the retained and longitudinally spaced portions 35a are first given an initial curl, as shown in FIGS. 8 and 9. Thereafter, the portions 35a are further curled into complete, cylindrical form to provide the spaced sockets or knuckles 35, as shown in FIGS. 10 and 11. Preferably, however, the unit is extruded in the form shown in FIG. 11 with the cylindrical socket running the entire length of the expander unit, the socket then being blanked out at the spaces 39 to provide the spaced socket knuckles 35. In either case, the knuckles 35 may be either substantially completely closed along their lengths, as shown in FIGS. 2, 3, 4, 10 and 11, or they may be left somewhat open to provide longitudinal slots or openings 41, as shown in FIG. 5, for a purpose shortly to be set forth. Also, the inner surface of the cylindrical knuckles 35 are preferably formed with one or more longitudinally extending grooves 43 in which a suitable lubricant 45, such as graphite, oil soaked felt pads, or the like can be packed to provide relatively permanent lubrication for the hinge. If desired, additional lubricant, or lubricant in lieu of the lubricant packing 45, may be applied to the pintle 37 at the knuckle slots or openings 41.

Secured to the jamb 47 of the door frame 1 is the other leaf member 49 of the piano-type hinge. This second leaf member comprises an elongated leaf or plate 51 which is secured to the jamb 47 by screws 53. The leaf 51 is formed along one edge thereof with a plurality of cylindrical sockets or knuckles 55 formed similarly to the knuckles 35 and disposed to fit into the spaces 39 in coaxial alignment with the knuckles 35 and for co-action with the latter knuckles. The pintle 37, of course, extends through the knuckles 55 as well as the knuckles 35 to thereby join the two leaves in cooperative relation. The knuckles 55 may also be provided with grooves 43 in which suitable lubricant is packed. If desired, the knuckles 55 may also be formed slightly open with a slot 41 as described above.

Adjacent its other longitudinal edge, the leaf 51 is formed with a laterally extending flange 57 which acts as a door stop. The flange or stop 57 preferably extends along the entire length of the leaf member 49 and is engaged by the expander part 19 when the door is fully closed, as shown in dotted lines in FIG. 3. By simply mounting the leaf member 49 on the jamb 47, there is, at the same time, provided the door stop 57, thus avoiding the need for mounting an additional stop on the jamb. As will be noted from the dash lines in FIG. 3, ample clearance is provided for the heads of the screws 53 when the door is fully closed by reason of the angular relation between the expander transverse part 21 and the expander parallel parts 17 and 19 on the one hand, and the angular relation between the part 21 and the web 33 on the other hand.

In FIGS. 12 and 13 are shown a portion of a porch enclosure employing a door mounting and hinge structure according to the present invention. The enclosure includes one or more hollow, elongated studs 61 between which screening 62, wall panels, or the like are mounted. One of the studs 61a, of square, tubular form in cross-section, is formed, by extrusion, with an outwardly extending web 63 at one corner thereof. The web 63 is similar to the web 33 and has, along its outer edge, a plurality of spaced sockets or knuckles 65. A combination expander and hinge structure such as described above and attached to a door 3 is mounted, by means of a pintle 67, on the hollow stud member 61a when the knuckles 35 thereof are brought into axial alignment with the knuckles 65. The stud 61a has formed integrally therewith a laterally extending flange 69 which runs the length thereof and acts as a door stop upon engagement of the expander part 19 therewith. In essence, the hollow, tubular stud 61a with its web 63 and knuckles 65 takes the place of the leaf member 49 of the previously described structure.

From the foregoing description, it will be seen that there has been provided an improved building structure which has the previously mentioned advantages over similar prior art structures. Although only two forms of the invention have been set forth, it will, no doubt, be readily apparent to those skilled in the art that many other forms thereof, as well as variations in the ones described which fall within the spirit of the present invention, are possible. It is therefore intended that the foregoing shall be taken as illustrative, and not in a limiting sense.

What is claimed is:

1. In a combined structural member and hinge, the combination of an elongated, hollow member having a corner longitudinally thereof, a web integral with said member extending outwardly from said corner at an obtuse angle with one side of said hollow member along the length thereof, said web having hinge socket means spaced from said corner along its outer, longitudinal edge for reception of a pintle, said web and an adjacent portion of said member comprising a first leaf of a leaf-type hinge, a second leaf member comprising another leaf of said hinge, said second leaf member having hinge socket means cooperative with said first named socket means for also receiving said pintle whereby to join said leaves in cooperative relation, and stop means on said second leaf member adapted to be engaged by said hollow member when it is swung into closed relation with said second leaf member, said web being adapted to maintain

said adjacent portion of said first leaf spaced from said second leaf member whereby to prevent binding of said first leaf against said second leaf member when said hollow member is in said closed relation with said second leaf member.

2. The combination set forth in claim 1 wherein said stop means comprises a laterally projecting flange on said second leaf member.

3. The combination set forth in claim 1 wherein said second leaf socket means is disposed along one longitudinal edge of said second leaf member in axial alignment with said socket means of said hollow member, and wherein said stop means comprises a longitudinally extending flange on said second leaf member, said flange projecting laterally from said second leaf member.

4. The combination set forth in claim 1 wherein said first leaf and said second leaf member extend along substantially the full length of said elongated, hollow member.

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