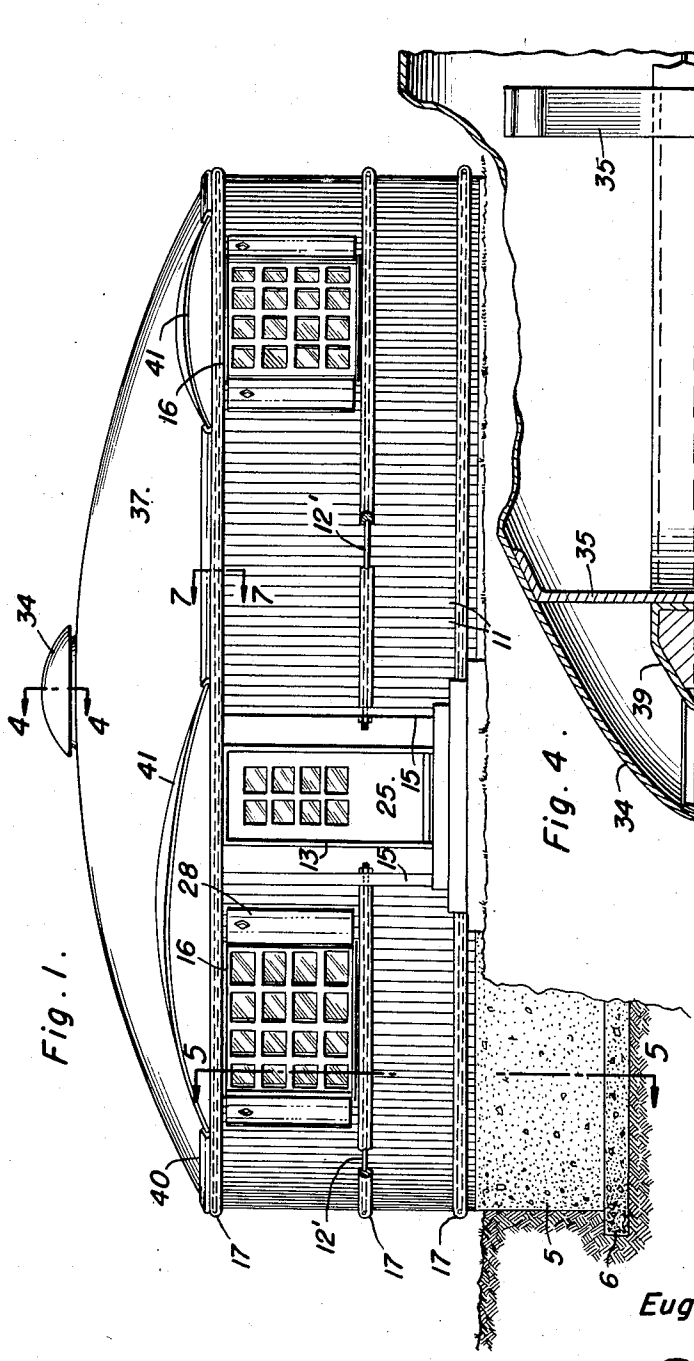
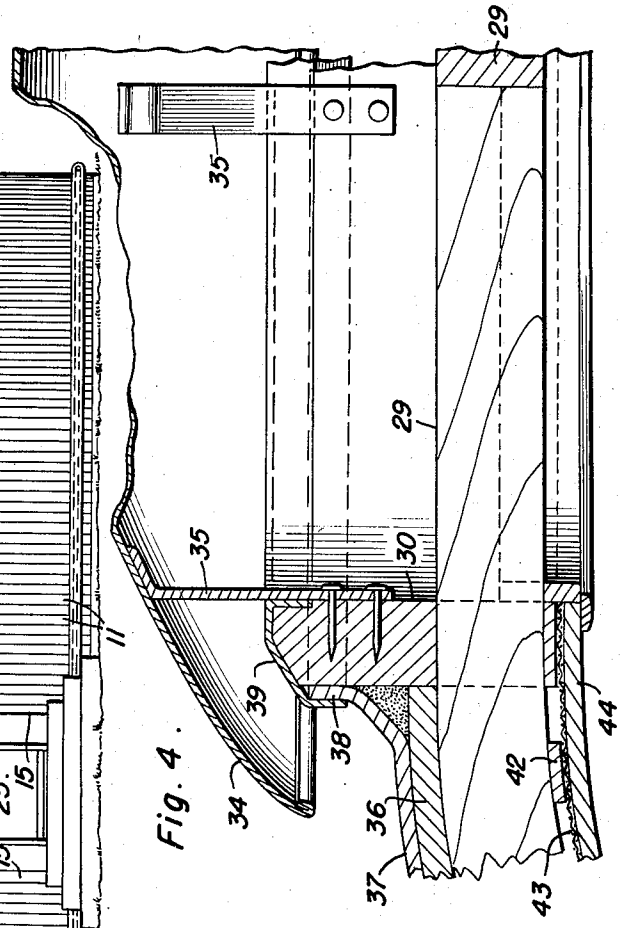
Aug. 25, 1953 E. A. JOHNSON 2,649,625

TORNADO PROOF BUILDING

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Fig. 2.

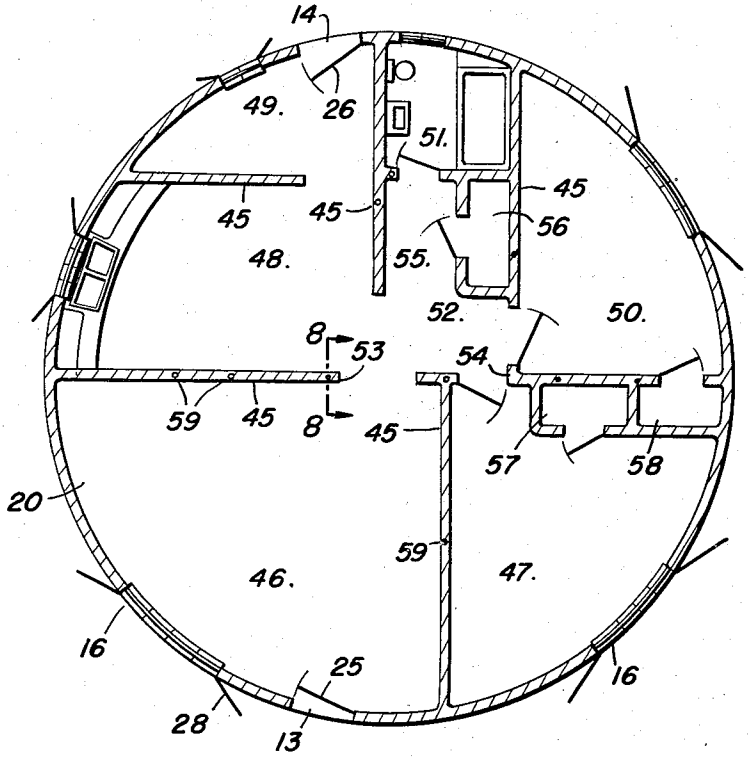
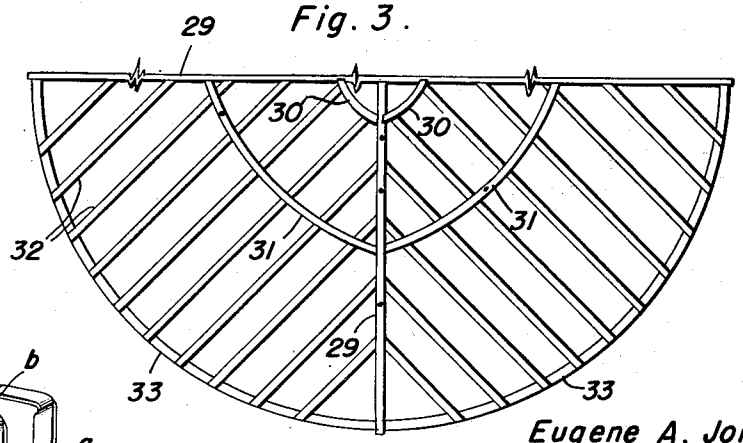


Fig. 3.



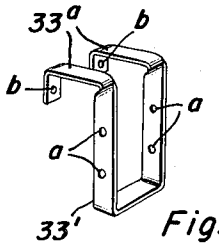


Fig. 9.

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Fig. 5.

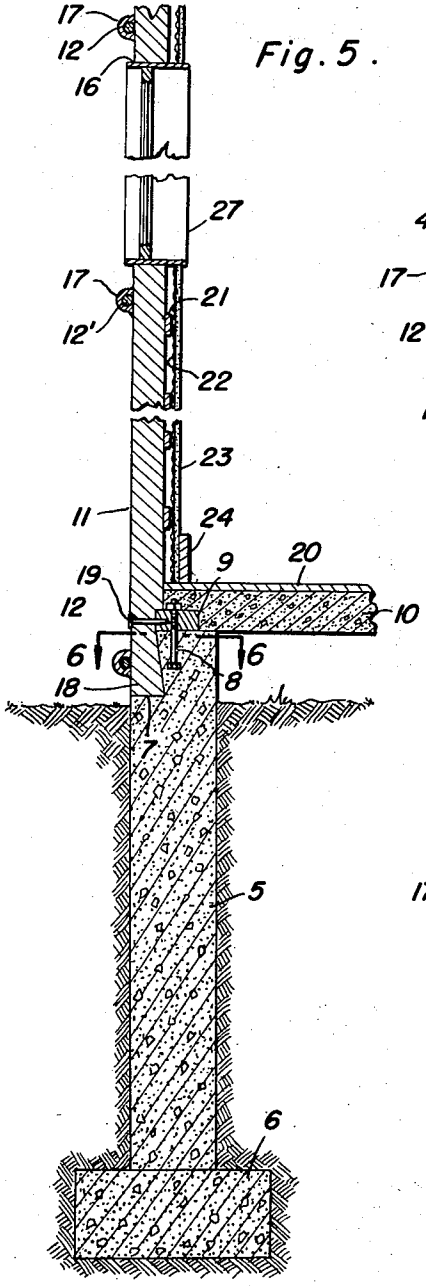


Fig. 7.

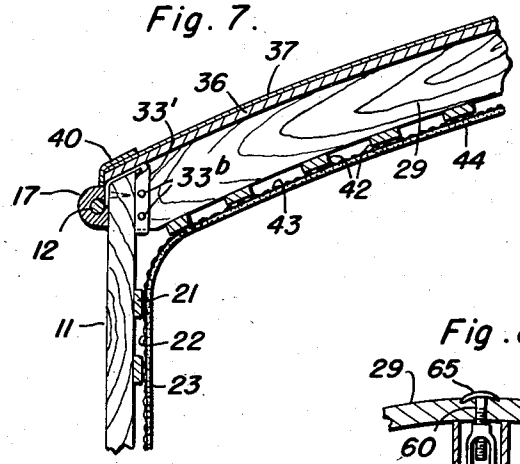


Fig. 8.

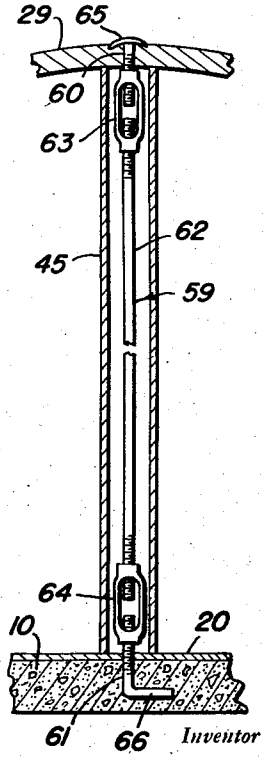
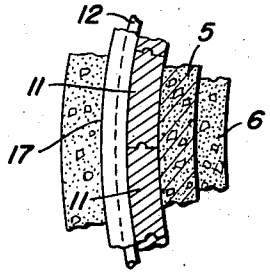


Fig. 6.



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UNITED STATES PATENT OFFICE

2,649,625

TORNADO PROOF BUILDING

Eugene A. Johnson, Great Falls, Mont.

Application August 18, 1948, Serial No. 44,843

3 Claims. (Cl. 20—1)

1

This invention relates to a circular building in the nature of a one-story dwelling, and the primary object of the invention is to provide a building of this kind which is simple and durable in construction and which will provide a secure shelter for use in tornado swept localities.

Another object is to provide, in a building of the above kind, a cylindrical outer wall of simple and sturdy construction, in combination with a cylindrical foundation wall joined to the cylindrical outer wall of the building proper in an efficient manner.

Another object of the invention is to provide, in a building of the above kind, a novel ventilator-equipped roof construction joined to the cylindrical outer wall of the building proper in an efficient manner and so as to provide no projecting eaves under which strong winds may act to cause damage.

Still another object of the invention is to provide, in a building of the above kind, a most practical arrangement of rooms, halls, and the like.

The exact nature of the present invention will become apparent from the following description when considered in connection with the accompanying drawings, in which:

Figure 1 is a front elevational view of a building constructed in accordance with the present invention.

Figure 2 is a floor plan thereof.

Figure 3 is a fragmentary plan view of the foundation frame of the roof structure.

Figure 4 is an enlarged fragmentary section taken on line 4—4 of Figure 1 and broken away, showing details of the roof structure at the ventilator.

Figure 5 is an enlarged fragmentary vertical section taken on line 5—5 of Figure 1.

Figure 6 is a fragmentary horizontal section taken on line 6—6 of Figure 5.

Figure 7 is a fragmentary vertical section taken on line 7—7 of Figure 1 and illustrating the roof and outer wall construction where they meet.

Figure 8 is a fragmentary vertical section taken on line 8—8 of Figure 2.

Figure 9 is an enlarged perspective view of one of the supporting brackets for the main rafters.

In erecting the present building, a cylindrical concrete foundation wall is poured upon a circular concrete footing 6, with the foundation wall projecting a short distance above the ground. At the top, the foundation wall 5 is provided with an external undercut rabbet 7.

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Anchored in and projecting upwardly from the top of the foundation wall 5 inwardly of the rabbet 7 are stud bolts 8 which pass through a circular sill 9 and have nuts threaded thereon so as to securely anchor said sill 9 upon the upper edge of the foundation wall. A floor 10, preferably of reinforced concrete, is provided so that its margin overlies the upper edge of the foundation wall 5 and the sill 9.

The building proper includes an outer cylindrical wall composed of a plurality of vertical wooden staves 11 set in edge to edge relation and held in circular formation by means of hoop rods 12 which completely encompass the staves near the top and bottom of such cylindrical wall, and by external binding rods 12' extending around the cylindrical wall from opposite sides of the front doorway 13 to opposite sides of the rear doorway 14 (Figures 1 and 2), and which are anchored at their ends to suitable standards 15 rigidly erected at opposite sides of said doorways. The rods 12' are located intermediate the top and bottom of the cylindrical outer wall on a level just below the bottoms of the window openings 16. The hoop rods 12 and binding rod 12' are covered by molding strips 17 which are nailed to the staves 11 and which have grooves to receive said hoop and binding rods as shown clearly in Figures 5 and 7. At their lower ends, the staves 11 are formed with semi-dovetail tennons 18 which fit and are engaged in the rabbets 7. Also, the staves 11 are nailed and thereby anchored to the sill 9 as at 19, and it will be apparent that the construction insures that the circular wall of the building is effectively tied down to the foundation wall.

The floor 10 may have a covering of tile or heavy linoleum as at 20. Secured across the inner sides of the staves 11 are spaced nailing strips 21 to which is fastened metal lathing 22 for anchoring the interior plaster finish 23 of the outer cylindrical wall. Also, a suitable baseboard 24 may be provided in the usual way. Suitable doors 25 and 26 are provided for the front door opening 13 and the rear door opening 14 that are left in the outer wall, and suitable windows 27 are fitted in the window openings 16 which are cut in the outer wall. Folding shutters 28 are preferably provided for the windows.

The roof structure includes a foundation frame composed of main arched rafters 29 extending radially of the frame at ninety degree intervals and joined at the center of the roof. Relatively short bowed braces 30 are provided between the main rafters near the center of the roof, and

intermediate the center and the outer edge of the roof the main rafters are connected by bowed cross rafters 31 that also act as braces. In each quadrant of the foundation frame of the roof there is provided a series of parallel secondary arched rafters 32 that are disposed parallel to each other and to the radial center line of the quadrant. Securely fastened to the inner sides of the staves 11 near the upper ends of the latter are purline beams or plates 33 which are connected to the main rafters 29. The outer ends of the secondary rafters 32 may be recessed in these purline beams or plate 33 and may be nailed or otherwise securely fastened to the latter. The main rafters 29 terminate at the inner side of the outer cylindrical wall, and there is no eave projecting outwardly beyond said outer cylindrical wall under which strong winds may act to cause damage. Securely fastened to and hooked over the upper ends of adjacent staves 11 are stirrup-like supporting brackets 33', and the outer ends of the main rafters 29 are seated and secured in these brackets to effectively support said main rafters at their outer ends. Each bracket 33' includes a U-shaped strap metal member apertured at *a* and having angular end extensions 33*a* apertured at *b*, the apertures being adapted to receive fastening bolts 33*b*, or the like. At the center, or within the braces 30, the roof is left open to provide a ventilator opening over which is mounted a ventilator hood 34 by means of suitable brackets 35 fastened to the braces 30. It will be noted that the braces 30 extend above the rafters so as to provide a coping around the ventilator opening. This provides for free entrance or exit of air through the ventilator while excluding rain and the like. Sheathing 36 is laid and secured upon the rafters and provided with a suitable covering 37 which is turned up at the outer sides of the braces 30 as shown at 38 in Figure 4. Metal flashing 39 is placed over the upper edges of the braces 30 and the adjacent upturned edge of the covering 37. Metal flashing 40 is also provided over the outer edge of the covering 37 and sheathing 36 where the roof joins with the outer cylindrical wall of the building. The roof is preferably arched as at 41 over the windows and doors so as to direct rain and the like laterally beyond the sides of said windows and doors before it leaves the edge of the roof. Nailing strips 42 are secured on the undersides of the rafters, and metal lathing 43 is attached to these nailing strips to receive and anchor the inner plaster finishing coat 44 of the ceiling.

As shown in Figure 2, the interior of the building is suitably partitioned as at 45 so that substantially the front half of the building is used to provide a large living room 46 and a relatively smaller front bedroom 47 disposed side by side, and so that the rear half of the building provides a kitchen 48 behind the living room, a utility room 49 behind the kitchen, a rear bedroom 50 behind the front bedroom 47, a bathroom 51 between the utility room and the rear portion of the rear bedroom, a transverse hall 52 connecting the kitchen and rear bedroom and communicating with the living room and front bedroom through adjacent doorways 53 and 54 at the back of the latter rooms, and a longitudinal hall 55 connecting the transverse hall 52 with the bathroom. A suitable closet is preferably constructed at one side of the hall 55 as at 56, and additional closets 57 and 58 are constructed in the front bedroom with doorways leading respectively from the closet 57 to said front bedroom and from the closet 58 to the rear bedroom. In this way, the rooms are most conveniently located with respect to each other and are most readily accessible through short halls somewhat centrally located with respect to the building.

Adjustable tie rods 59 pass through the main rafters 29 and the partitions 45 and are anchored in the floor 20 to connect the roof to the floor and prevent the suction effect of tornadoes from detaching the roof. As shown in Figure 8, each tie rod 59 includes short end sections 60 and 61 and a long intermediate section 62 connected by turnbuckles 63 and 64. The section 60 has a head 65 which bites into the rafter, and the section 61 has a lateral end 66 embedded in the floor.

Due to the circular form of the building in plan, the slightly domed form of the roof, and the durable nature of the building construction, a very desirable one-story dwelling is provided that affords a secure shelter for use in a tornado swept locality. The building may be erected rather quickly and cheaply and presents a sightly appearance.

From the foregoing description, it is believed that the construction and advantages of the present invention will be readily understood and appreciated by those skilled in the art. Minor structural changes are contemplated, such as fairly fall within the scope of the invention as claimed.

The shutters keep debris from breaking the window panes when closed during a windstorm. The roof arches 41 extend beyond the shutters, and one arch will serve for both the front door and the living room window.

Having described the invention, what is claimed as new is:

1. In combination with a cylindrical foundation wall projecting a short distance above the ground and formed at the top with an external undercut rabbet, a circular building including a circular sill anchored upon the upper edge of said foundation wall, an outer cylindrical wall composed of a plurality of contiguous vertical staves abutting against and directly anchored near their lower ends to the sills, said staves being provided at their lower ends with tennons fitting and seated in said rabbet of the foundation wall, a floor supported at its edge on the edge of the foundation wall and the sill, and hoops surrounding the cylindrical outer wall adjacent the top and bottom of the latter and retaining the staves in circular formation.

2. In combination with a cylindrical foundation wall formed at the top with an external undercut rabbet, a circular building including a circular sill anchored upon the upper edge of said foundation wall, an outer cylindrical wall composed of a plurality of contiguous vertical staves abutting against and directly anchored at their lower ends to the sill, said staves being provided at their lower ends with tennons fitting and seated in said rabbet of the foundation wall, a floor supported at its edge on the edge of the foundation wall and sill, and hoops surrounding the cylindrical outer wall adjacent the top and bottom of the latter and retaining the staves in circular formation.

3. The combination according to claim 2, and a circular roof of the same diameter as the outer side of said wall overlapping the upper edge of the wall with its outer edge flush with said outer side.

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