Aug. 24, 1943. D. W. CARLSON 2,327,869

ROOF AND ITS SUPPORT

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Fig. 1.

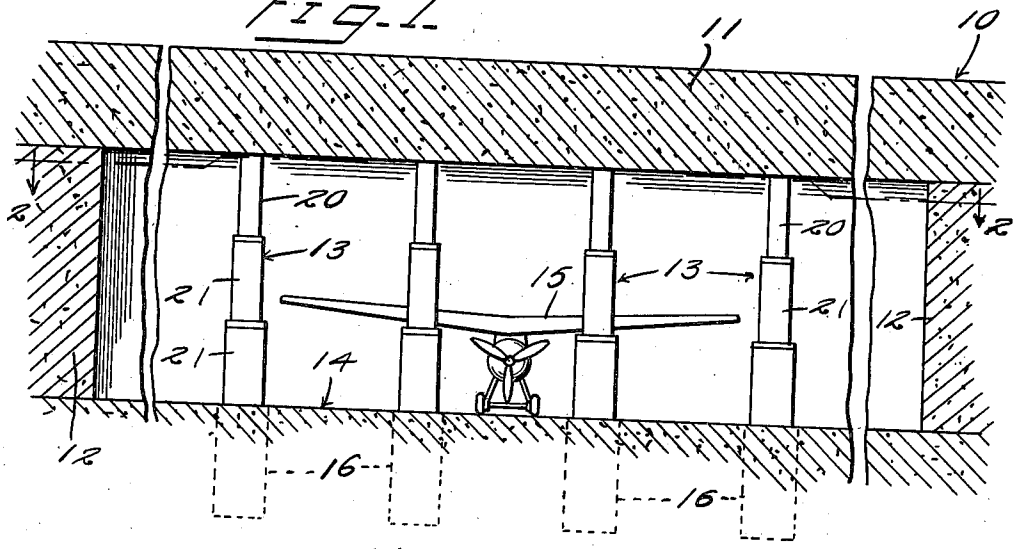
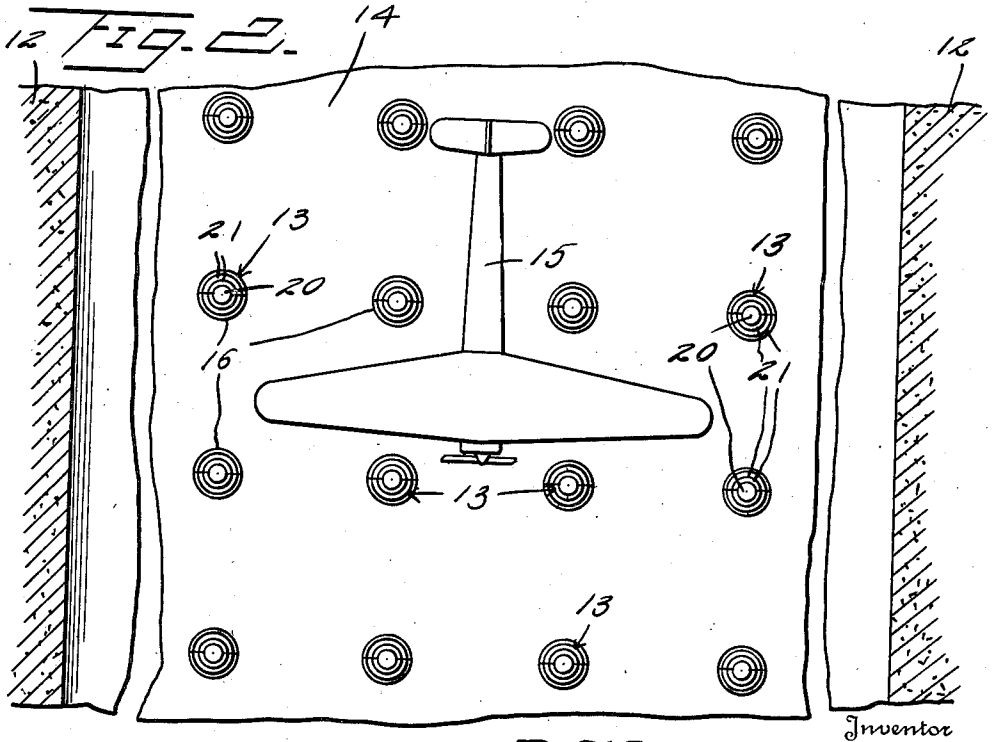


Fig. 2.



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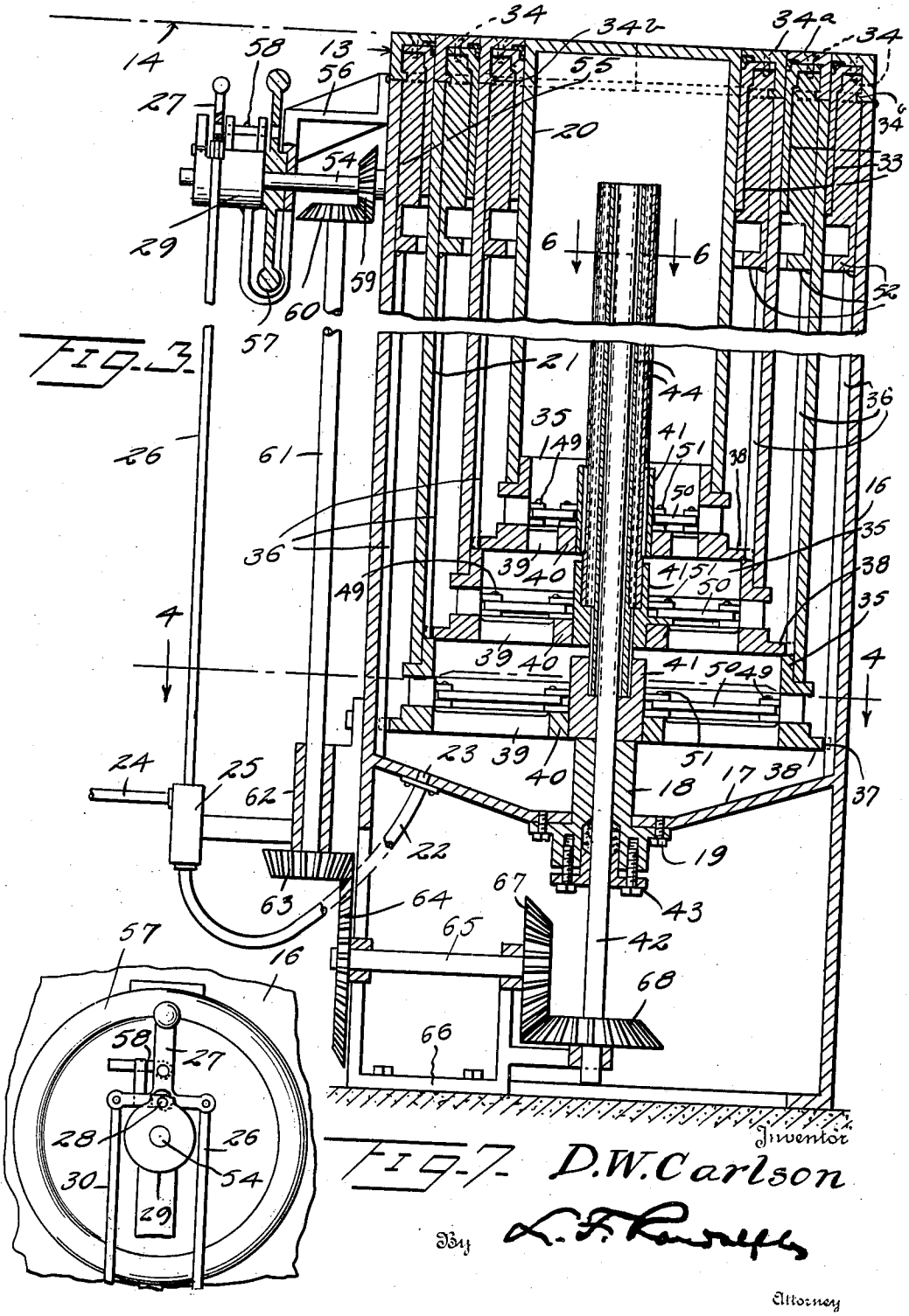


FIG. 3.

FIG. 7.

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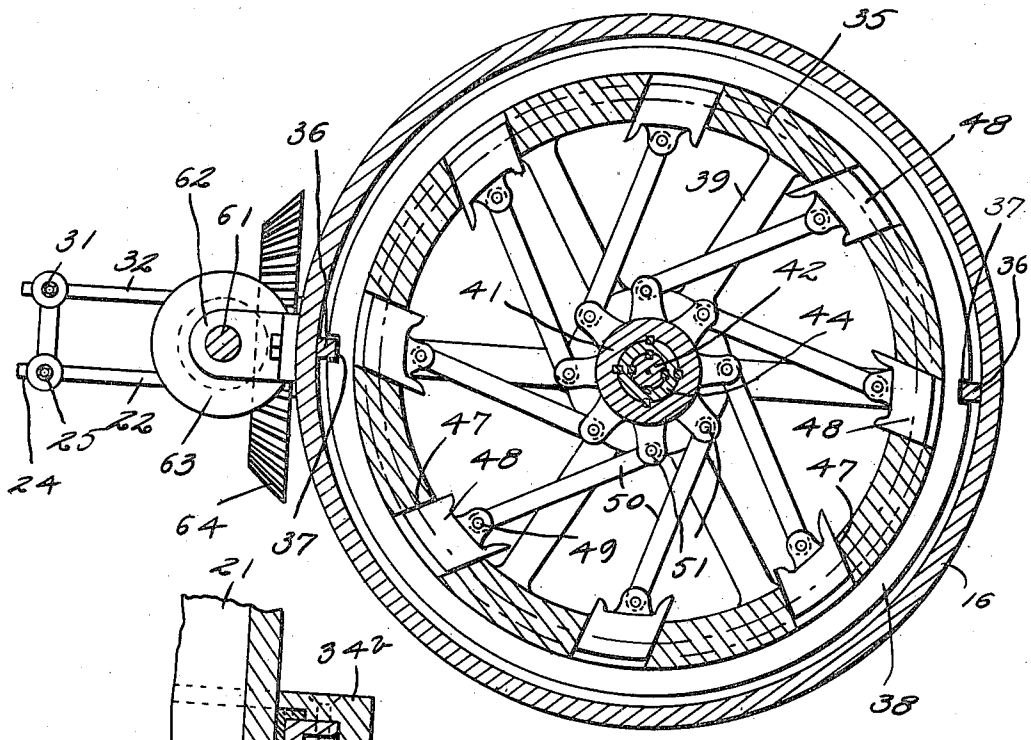
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ROOF AND ITS SUPPORT

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Fig. 4.



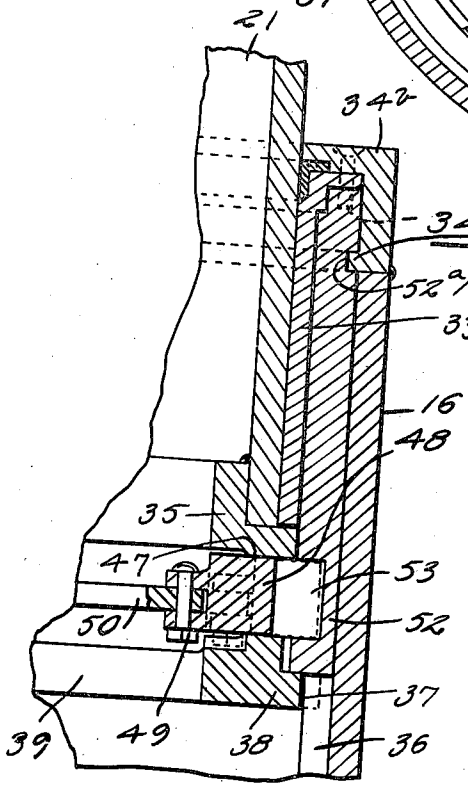


Fig. 5.

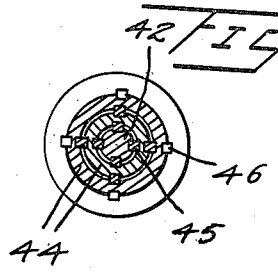


Fig. 6.

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UNITED STATES PATENT OFFICE

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ROOF AND ITS SUPPORT

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Application July 2, 1942, Serial No. 449,412

7 Claims. (Cl. 108—1)

This invention primarily relates to a roof for an airdrome and collapsible or retractile means for the support thereof, although the use of the invention is not limited to airdromes but is of general application.

The invention especially aims to protect aircraft on the ground as well as the personnel, the ammunition and supplies from bombing, ground attack and from gas attack.

Further, an object is to provide such a mechanism as will support a roof of any desired thickness and weight and provide such an aircraft protection as will be superior to an airdrome built in a hillside and one which can be more expeditiously installed. The present invention is of such character that the necessary amount of weight may be supported in the roof without the necessary huge arches ordinarily employed in this type of construction.

A prime object is to provide a multiplicity of supporting devices for the roof, each of which devices may be collapsed or retracted in order to enable maneuvering of aircraft beneath the roof.

Various additional objects and advantages will become apparent from a consideration of the description following taken in connection with accompanying drawings illustrating one operative embodiment by way of example.

In said drawings:

Figure 1 is a view through an airdrome embodying my invention, the roof and side walls being shown in vertical section;

Figure 2 is a horizontal sectional view taken on the line 2—2 of Figure 1;

Figure 3 is an enlarged approximately central vertical sectional view through one of the roof supports;

Figure 4 is a horizontal section taken on the line 4—4 of Figure 3;

Figure 5 is an enlarged, fragmentary, vertical sectional view showing one of the sections extended and about to be locked to another;

Figure 6 is a cross section taken on the line 6—6 of Figure 3, and

Figure 7 is a detail elevation looking toward the controls.

Referring specifically to the drawings wherein like reference characters designate like or similar parts, an airdrome is suggested at 10 in Figure 1. This airdrome has a roof 11 and may have side walls 12. Such walls 11 and 12 are adapted to be constructed of reinforced concrete and rubble and, for instance, from twenty to fifty feet in thickness. It will be realized that the walls 12 of themselves are insufficient to support the roof 11 and as a matter of fact, the walls 12 may be eliminated entirely.

In order to respectively support the rate weight of the roof 11 I provide a multiplicity of individual roof supports at 13. Each of these supports 13 is capable of individual complete retraction beneath the floor level 14 and the supports are so close together that they have to be retracted in order to permit aircraft such as 15 to enter or leave the airdrome or more beneath the roof 11. To avoid weakening or unduly weakening the support of the roof 11, only one or two or a very limited number of the supports 13 are retracted at a time to enable limited movement of the aircraft 15 whereupon after the aircraft passes the retracted supports the same are again extended before another support or a limited number of them are retracted to permit further slight advance of the aircraft.

My invention is not limited to any particular construction of the supports 13 as the same may be operated mechanically, hydraulically or in any other preferred manner. However, I show an operative embodiment by way of an example. Such support is detailed in Figures 3 to 7.

As previously stated and as well shown in Figure 7 the supports are capable of retraction completely beneath the ground line 14 with their upper surfaces flush therewith.

Each support 13 has a basal stationary barrel or cylinder 16 sunk below the floor 14. Disposed across barrel 16 above its base is a partition 17 centrally of which is fastened a hub 18 by means of screws at 19. Above partition 17, a central telescopic barrel or cylinder 20 is provided while any desired number of telescopic barrels or cylinders 21 are interposed between the same and the barrel 16, barrels 20 and 21 being capable of retraction completely within the barrel 16 below the floor line 14 as shown in Figure 7 and also capable of extension into supporting engagement with the roof 11 as best shown in Figure 1. Said barrels or cylinders 20 and 21 are interiorly in communication with each other and the interior of the barrel 16, in order to be projected or extended through the admission into the same of hydraulic fluid through a pipe or hose 22 attached to partition 17 and in communication with a port 23 in the latter. The hydraulic fluid from any suitable source passes through a conduit 24 through a valve mechanism 25 and thence into the pipe 22. Said valve mechanism 25 is connected through a link 26 with a rocker 27 pivoted at 28 to a block or support 29. Rocker 27 also has a link 30 pivoted thereto which controls an outlet

valve mechanism 31 communicating with the source of hydraulic fluid supply and with the interior of the barrel 16 through a conduit 32 connected to partition 17 and registering with an opening or port in the wall thereof. Thus the rocking of the element 27 controls the supply and exhaust of hydraulic fluid to the barrel 16, in order to extend or retract the sections 20 and 21, it being clear that the weight of such sections is sufficient to retract them when the valve mechanism 31 is open.

It will be clear that any suitable means may be provided to effect a seal between the valves or cylinders 16 and 21 and are accurately fitted to the adjacent cylinders. In order to enable attachment and detachment of the barrels 20 and 21 from each other and from the barrel 16, said bushings 33 are preferably removably fastened in place by bolt or screw means as at 34 to rings 34a welded or otherwise secured to the tops of the cylinders.

At the base of each barrel or cylinder 20 and 21 a ring 35 is fastened, such rings increasing progressively in diameter in downward direction as shown in Figure 3. The lowermost ring in the retracted position of the supports, rests on the hub 18 while the intermediate ring rests on the lowermost ring and the uppermost ring rests on the intermediate ring.

The cylinders or barrels 16 and 21 are held against turning relatively to each other by the interfitting of guide ribs 36 extending longitudinally on the barrels 16 and, with notches 37 provided in flanges 38 of the rings 35.

Each ring 35 has radial spokes 39 and a central bearing 40 in which a hub 41 is journaled. A vertical shaft 42 passes through the hub 18 and hubs 41, being journaled in the hub 18 and stuffing box thereof. Hollow or tubular shafts 44 extend rigidly one from each hub 41 and shafts are concentric with the shaft 42 and each is relatively, slidably telescoped. Relative turning of the shafts 42 and 44 is prevented, although they are relatively slidable, by one or more keys 45 carried by each shaft 42 and 44, and interengaged in grooves 46 in the adjacent shafts 44. Thus the shafts 42 and 44 and hubs 41 are adapted to turn as a unit.

Each ring 35 has any desired number of recesses 47 therethrough in which a latch or lock head 48 is slidable. Said heads 48 are pivotally connected at 49 to links 50, in turn pivoted at 51 to arms on the hub 41 so that through rotation of the hubs 41, the latch heads 48 may be projected beyond the rings as suggested in dotted lines in Figure 5 or retracted as shown in the other figures.

Keeper members 52 are fastened to the inner surfaces of the cylinders or barrels 16 and 21 and flanges 38 are adapted to engage the adjacent ones at their limit of projection. Such keepers 52 are solid at their upper portions and have grooves 53 into which the heads 48 extend when projected. Thus each cylinder or barrel 16, 20 and 21 in addition to the hydraulic pressure or in the absence thereof will support each other through the medium of the latch heads 48 and keepers 52 and the supports as a whole will support the roof 11. Rings 34a have inward flanges 34b which enter grooves 52a of the keepers 52 so that the upper structure of the cylinders may better withstand hydraulic pressure. To permit assembly of the rings 34a with their flanges disposed in grooves 52a, the rings 34a are made in sections, for instance halves.

The shaft 42 may be operated in any suitable manner. For instance, a short shaft 54 is journaled on the exterior of the stationary or basal barrel 16 in a bearing 55 and a bracket 56 and also in the element 29. Keyed to the shaft 54 is an operating hand wheel 57. Associated with the element 29 is a locking device 58 which is engageable in recesses in the rocker 27 and wheel 57, one at a time, to lock one against movement while the other is free for operation and vice versa. On shaft 54 a bevel gear wheel 59 is keyed which meshes with a bevel gear wheel 60 carried by a vertical shaft 61 journaled in a bearing 62 by which the valve structures 25 and 31 are mounted. At the base of shaft 61, a bevel gear wheel 63 is keyed and which meshes with a bevel gear wheel 64 carried by a shaft 65 journaled in a U-shaped bearing structure 66 fastened at the bottom of barrel 16. Gear wheel 67 keyed to shaft 65 meshes with a bevel gear wheel 68 keyed to the aforesaid shaft 42. As a result, through the turning of the wheel 57, the intermediate gearing described and traced will rotate the shaft 42 and shafts 44 as a unit and simultaneously operate the heads 48 to move them into or out of the keepers 52.

It will thus be seen that a multiplicity of the supports 13 are employed, that they are arranged relatively close together and that each is individually operable to retract the same flush with or below the ground level 14 or to project same into supporting engagement with the roof 11. It will also be realized, that but one or a limited number of the supports 13 should be retracted at the same time to permit a limited movement of the aircraft 15 whereupon as soon as the aircraft 15 moves over a retracted support, such support should be extended. Thus at no time should any support be retracted which is not absolutely necessary for passage of the aircraft thereover either in entering or leaving the airdrome or maneuvering beneath the roof 11.

Various changes may be resorted to provided they fall within the spirit and scope of the invention.

I claim as my invention:

1. In combination with a roof, a multiplicity of supporting means therefor, each means being retractile independently of the remainder to enable a body to be passed over it while retracted.

2. In combination with a roof and the floor therebeneath, a multiplicity of supporting means for the roof, each means being retractile approximately below the level of the floor independently of the remainder to enable a body to be passed over same while retracted.

3. In combination with a roof, a multiplicity of supporting means therefor, each means being retractile independently of the remainder to enable a body to be passed over it while retracted, each supporting means comprising relatively movable sections, and means to extend the sections hydraulically.

4. In combination with a roof, a multiplicity of supporting means therefor, each means being retractile independently of the remainder to enable a body to be passed over it while retracted, said supporting means constituting the sole support for the roof.

5. In combination with a roof, a multiplicity of supporting means therefor, each means being retractile independently of the remainder to enable a body to be passed over it while retracted, said supporting means each consisting of a telescopic section.

6. In combination with a roof, a multiplicity of

supporting means therefor, each means being retractile independently of the remainder to enable a body to be passed over it while retracted, said supporting means each consisting of a telescopic section and means to support the sections on one another.

7. In combination with a roof, a multiplicity of supporting means therefor, each means being retractile independently of the remainder to enable a body to be passed over it while retracted, said supporting means each consisting of a telescopic section and meansto interconnect the sections for support on each other.

DEAN W. CARLSON.