

May 31, 1932.

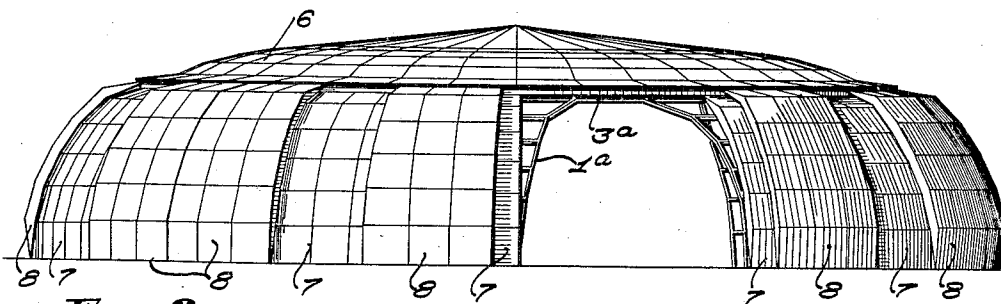
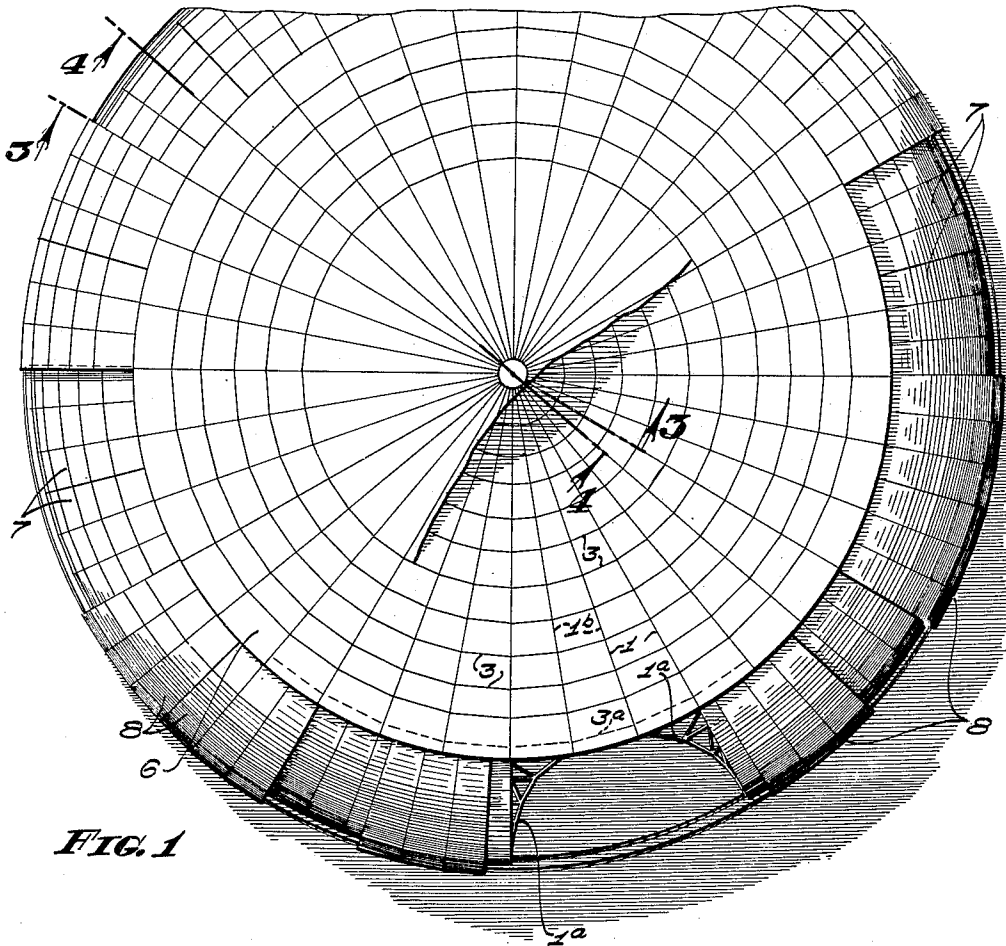
W. H. SMITH

1,861,069

DIRIGIBLE AIRSHIP HANGAR

Filed Oct. 15, 1929

3 Sheets-Sheet 1



INVENTOR.
WILLIAM H. SMITH
BY
A. B. Borman
ATTORNEY

May 31, 1932.

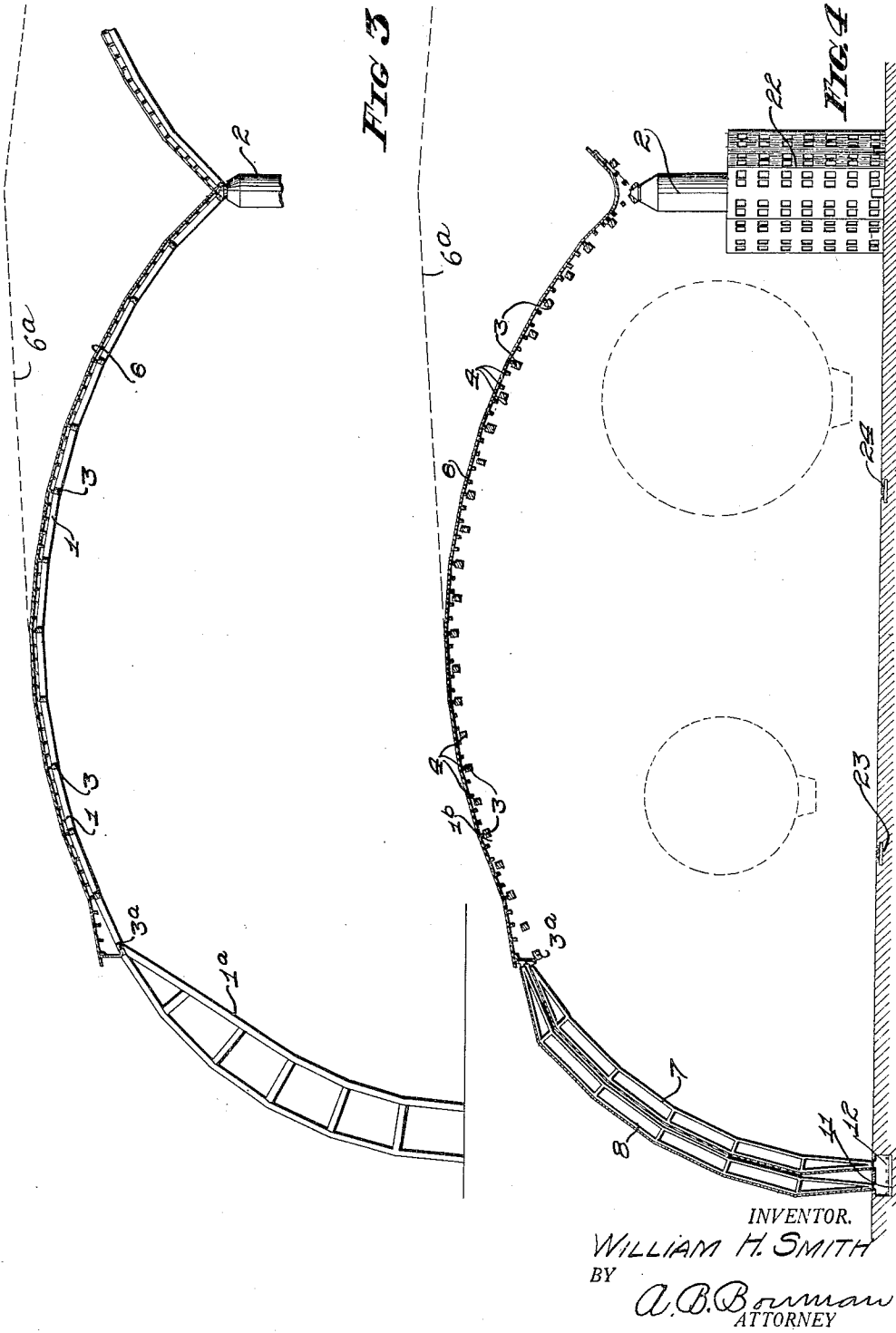
W. H. SMITH

1,861,069

DIRIGIBLE AIRSHIP HANGAR

Filed Oct. 15, 1929

3 Sheets-Sheet 2



May 31, 1932.

W. H. SMITH

1,861,069

DIRIGIBLE AIRSHIP HANGAR

Filed Oct. 15, 1929

3 Sheets-Sheet 3

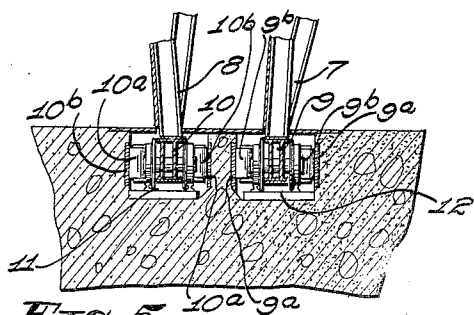


FIG. 5

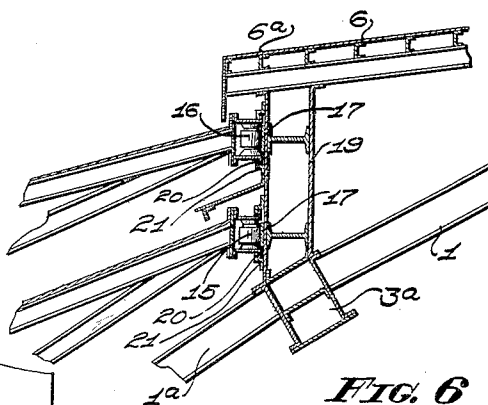


FIG. 6

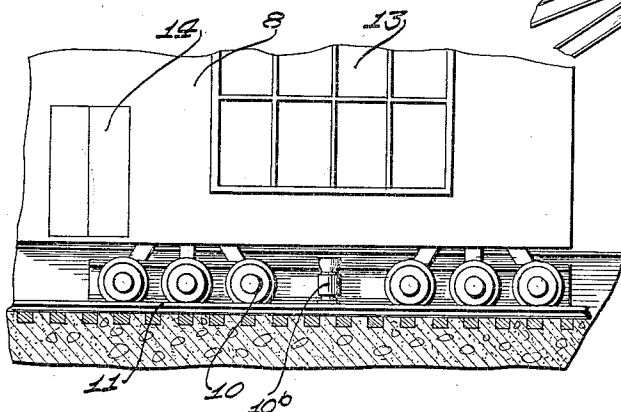


FIG. 7

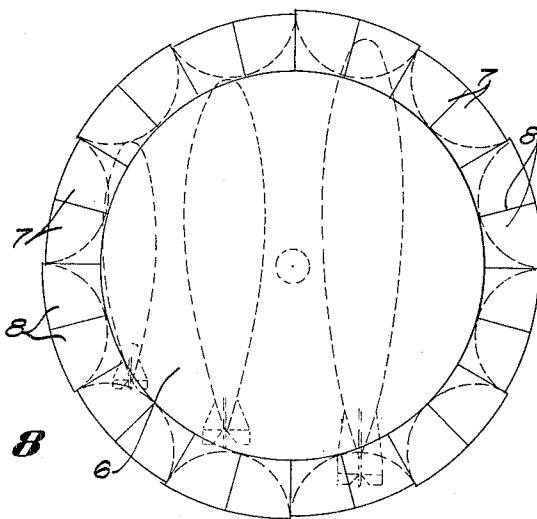


FIG. 8

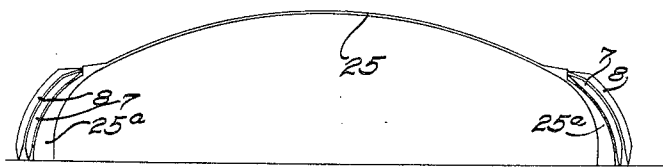


FIG. 9

INVENTOR.

WILLIAM H SMITH

BY

A. B. Bowman
ATTORNEY

UNITED STATES PATENT OFFICE

WILLIAM H. SMITH, OF SAN DIEGO, CALIFORNIA

DIRIGIBLE AIRSHIP HANGAR

Application filed October 15, 1929. Serial No. 399,759.

My invention relates to dirigible airship hangars, and the objects of my invention are: First, to provide a hangar for this purpose adapted to permit entrance and exit of airships with the longitudinal axis thereof substantially parallel with the direction of the wind no matter from what point of the compass the latter may come; second, to provide a hangar of such a shape as to offer equal space for accommodating airships entering any one of a number of angularly displaced doorways thereto; third, to provide a hangar of the form best adapted to withstand the force of wind; fourth, to provide a hangar of a form presenting the smallest arch possible commensurate with the accommodations provided for; fifth, to provide a hangar of a form presenting the minimum external surface for a given effective space within the hangar; sixth, to provide a substantially circular hangar having a plurality of doors around its periphery, the spacing of which is reduced at their base to a minimum, and having doors therefor which may be maneuvered without interfering with each other; seventh, to provide a door structure which is adapted to be supported in a manner offering inherent stability against wind forces; eighth, to provide a hangar in which the weight thereof is distributed between a relatively large number of peripheral supports and a common central support, which may be made of great strength without interfering with the accessibility or utility of the hangar; ninth, to provide a hangar structure in which all longer dimensions thereof are of arcuate form, thereby eliminating the need for elaborate provisions to be made for expansion and contraction due to variation in temperature; tenth, to provide a hangar structure of a form adapted to house several airships of various sizes and so arranged as to permit all shops, offices, and storerooms to be located in a central position if desired so as to reduce the distance between the airships and the shops to a minimum; eleventh, to provide a hangar structure adapted to permit the entrance or exit of several airships at the same time in a given direction, and twelfth, to provide an airship hangar

in which an airship of the greatest dimensions adapted to be accommodated may be turned around within the hangar.

With these and other objects in view as will appear hereinafter, my invention consists of certain novel features of construction, combination and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon which form a part of this application, in which:

Figure 1 is a fragmentary plan view of my hangar with one pair of outer doors in their open position; Fig. 2 is a side elevational view thereof, showing the two doors open; Fig. 3 is a section taken along the line 3—3 of Fig. 1; Fig. 4 is a section taken along the line 4—4 of Fig. 1; Fig. 5 is an enlarged fragmentary view of the lower portion of both of the doors; Fig. 6 is an enlarged fragmentary view of the upper end of the doors; Fig. 7 is a side view of the door supporting structure; and Fig. 8 is a diagrammatical plan view of the hangar, showing the relative position of the doors and accommodating space for the airships, and Fig. 9 is a diagrammatical view of a modified form of hangar.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawings.

The hangar is in plan circular or polygonal in outline, and in cross section simulates an umbrella structure, in that it comprises a plurality of radially extending ribs or arches 1, the outer ends of which are supported on the periphery of the hangar, while the inner ends are supported on a common central column 2, as best shown in Fig. 4. The radial ribs or arches 1 are connected together by means of concentrically arranged ring girders 3, the lowermost one 3a forming the upper portion of the doorways, the side portions thereof being formed by arched girderwork 1a extending laterally from the ribs 1 and connected to the ring girder 3a at points intermediate the ribs 1. Other equally spaced ribs 1b are secured at their

outer ends to the ring girder 3a and are supported at their inner ends on the central column 2. Interconnecting latticework 4 is provided for bracing the structure.

6 It will be understood that for a hangar suitable for housing modern airships of the largest dimensions, the rise and span of the ribs or arches 1 will be relatively great, and as the construction of these arches and girders will follow recognized engineering practice, details thereof are omitted in the drawings.

10 The central column 2 is of sufficient strength to support all of the radial arches 1 and 1b and may be of a height approximately one half of the total arch rise.

15 The frame work of the hangar above the ring girder 3a is covered by means of a suitable material, such as corrugated steel, forming a substantially weatherproof roof 6. If desired, the entire upper portion may be covered by a roof superstructure 6a of slightly coned form extending over the concavity formed by the frame work, as indicated in dotted lines in Figs. 3 and 4.

20 Alternate doorways are provided with a pair of inner sliding doors 7 and outer doors 8. These doors are substantially segmental in outline and extend from the base of the arches up to the lower margin of the roof 6, thus forming movable side sections extending entirely around the building, if desired. The door pairs 7 and 8 are offset radially so that they may be moved into overlapping relation, as best indicated in the fragmentary view shown in Fig. 5. It is obvious that adjacent doors instead of adjacent pairs may be offset in this manner.

25 The bases of the doors are mounted on trucks 9 and 10, which are adapted to move on tracks 11 and 12, respectively, extending around the hangar. The trucks are preferably arranged to be driven by electric motors, not shown in the drawings, which may be either directly geared to the truck axle or connected by other traction means, such as a winch and cable or rack and pinion. In order to relieve the truck wheels of the relatively great lateral thrust, side rollers 9b and 10b are provided, which run on ways 9a and 10a in the sides of the pits, as indicated in Figs. 5 and 7.

30 The doors conform in form to the shape of the hangar and are covered over their lower portion with corrugated steel or the like, while their upper portions are preferably provided with windows 13. Ordinary sized doors 14 are also provided at the base of the doors 7 and 8 for allowing entrance and exit to and from the hangar when the latter are closed. The upper ends of the doors 7 and 8 are provided with rollers 15 and 16, which are adapted to be supported on suitable rollways 17 and 18, supported on a ring-shaped girder work 19 extending around the hangar

over the upper end of the doorways. The lower end 6a of the roof 6 is supported on the upper end of said ring girder work 19, and is adapted to slightly overlap the upper ends of the doors 7 and 8. Owing to the overhanging form of the doors 7 and 8, they bear with considerable force against the ring girder 19, and thus are relatively stable and capable of withstanding considerable outwardly directed pressure which might occur due to considerable air disturbances around the hangar, without danger of falling over. However, in order to prevent any possibility of their being thrown outwardly, they are provided with downwardly extending lugs 20, which are adapted to extend into channel members 21 on the ring structure 19 in case of outward movement of the upper end of the door, that is, in case the rollers leave the rollways.

In order that the sills of the doors 7 and 8 be flush with the floor of the hangar, tracks 11 and 12 may be positioned in pits, as indicated in Fig. 5, the track being completely concealed below the surface of the floor.

Around the central column 2 may be provided a circular building 22, which may house the workshops, storerooms, and offices of the hangar. If desired, other buildings may be provided in the space otherwise occupied by one or more of the doors, preferably occupying the position from which direction, for the particular locality of the hangar, the wind very rarely blows.

Owing to the unique form of the hangar, it is obvious that airships may be moved into and out of the hangar from practically any angle and it is therefore unnecessary to wait for the wind to veer to any one direction before operations may be commenced.

In the case of the largest type of airship, housing facilities are provided alongside the central column, while smaller craft may be accommodated closer to the outer side of the hangar, as best indicated in the diagrammatical view Fig. 8. It will also be noted that several large and small ships may be accommodated at the same time. If it is necessary to move the position of any one of the ships in order to pass through a doorway suitable for use in the particular case, the airships in the hangar may be conveniently swung around the central column by means of suitable tow cars mounted on circular tracks 23 and 24, whereby the airship which it is desired to take out may be readily maneuvered into position opposite the doorway.

It will be understood that any other suitable mechanical or manual means may be substituted for carrying on the maneuvering of one or more airships within the hangar.

A modified form of hangar is shown diagrammatically in Fig. 9. In this arrangement the upper portion 25 is carried out in the form of a full dome, no central support

being provided. The entire interior is thus clear of all obstacles and it is possible to accommodate an airship of a length substantially equal to the interior diameter of the hangar and maneuver it into position for passing through any one of the doors 25a. It is obvious that the dome form of structure offers great advantages in regard to the construction of a hangar of the magnitude necessary for accommodating airships of great dimensions. The structure follows the form illustrated in Figs. 1 to 8 in respect of all portions with the exception of the central column and the span of the ribs or arches, which are necessarily greater.

Though I have shown and described a particular construction, combination and arrangement of parts and portions, I do not wish to be limited to this particular construction, combination and arrangement, but desire to include in the scope of my invention the construction, combination and arrangement substantially as set forth in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a hangar for air ships, an enclosure having a substantially circular base, a plurality of angularly related radially extending arch members supported at their upper inner portions at an elevation below their apexes at the center of said enclosure and at spaced apart points on the periphery thereof, and doorways formed between the outer portions of said arches.

2. In a hangar for airships, a central rigid column, a plurality of arched frame members of substantially semi-elliptical form, the one end of said frame members being supported in spaced relation on a circle around said column as axis, their inner ends being supported on said column at an elevation below their apexes, and transverse girders rigidly connecting said arch members together.

3. In a hangar for dirigible airships, a central supporting column, a plurality of arched frame members extending radially from a point on said column at an elevation below the apexes of said arched members, and supported at their outer ends on a circle substantially around the base of said column, girder members extending laterally between said arched frame members and forming arched doorways between the outer end portions of said frame members, a roof extending over the upper portions of the structure formed by said frame members and girder members, and door members slidably mounted in front of said doorways and forming with said roof a complete enclosure for said structure.

4. In a hangar for dirigible airships, a main supporting framework, including a plurality of radially extending arch mem-

bers supported at their outer ends at spaced apart points, a central supporting column for supporting the inner ends of said arched members at an elevation below their apexes, a roof extending over the upper portion of said framework, the eaves thereof lying intermediate said outer ends and said apexes, and sectional side members extending from the base of said arched frame members to the eaves of said roof, said sectional side members being mounted on trucks and adapted to be shifted in overlapping relation for forming doorways between said arch members.

5. In a hangar for dirigible airships, a main supporting frame having a base of substantially circular shape, a roof extending over the upper portion of said frame, the eaves of said roof lying on a circle within said base, a plurality of doorways in the side portions of said frame, a plurality of sectional side members extending from the base of said frame to the eaves of said roof, alternate side members being displaced radially with respect to the center of said frame structure, and means for enabling said side members to be moved in overlapping relation for forming doorways at different points around said hangar, said side members forming with said roof a complete enclosure for said main supporting frame.

6. In a hangar for dirigible aircraft, a main supporting frame, a central supporting member therefor, said frame including radially extending arched trusses from said central supporting member, and said trusses being supported at their outer ends in spaced relation on a common circle around said central supporting member, substantially arched shaped doorways formed between the outer portions of said trusses, a roof extending over the upper portion of said supporting frame the eaves of said roof lying intermediate the outer ends and the apexes of said trusses and near the upper end of said arched doorways, sectional side members extending from the base of said trusses to the eaves of said roof, said side members being formed in pairs of a width equal to the distance between the center lines of said doorways, and said arch members, alternate pairs of said side members being arranged in radially offset relation, means for enabling said side members to be shifted around the base of said framework into overlapping relation, thereby exposing said doorways, and means for securing said side members at their upper ends to said supporting frame.

7. In a hangar for airships, an enclosure having a substantially circular base and including radially extending arched trusses having a common central support, the outer ends of certain of said arch members being supported at spaced apart points on the periphery of said base, doorways formed be-

tween said outer ends and door members slidably mounted in front of said doorways.

8. In a hangar for airships, an enclosure having a substantially circular base, arch members extending radially from the center of said base, the outer ends of certain of said arch members being supported at spaced apart points on the periphery of said base, doorways between said outer ends concentrically disposed ring members interconnecting said arch members, and other of said arch members terminating at one of said ring members and door members slidably mounted in front of said doorways.

15 In testimony whereof, I have hereunto set my hand at San Diego, California, this 2nd day of October, 1929.

WILLIAM H. SMITH.

20

25

30

35

40

45

50

55

60

65