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BUILDING CONSTRUCTION

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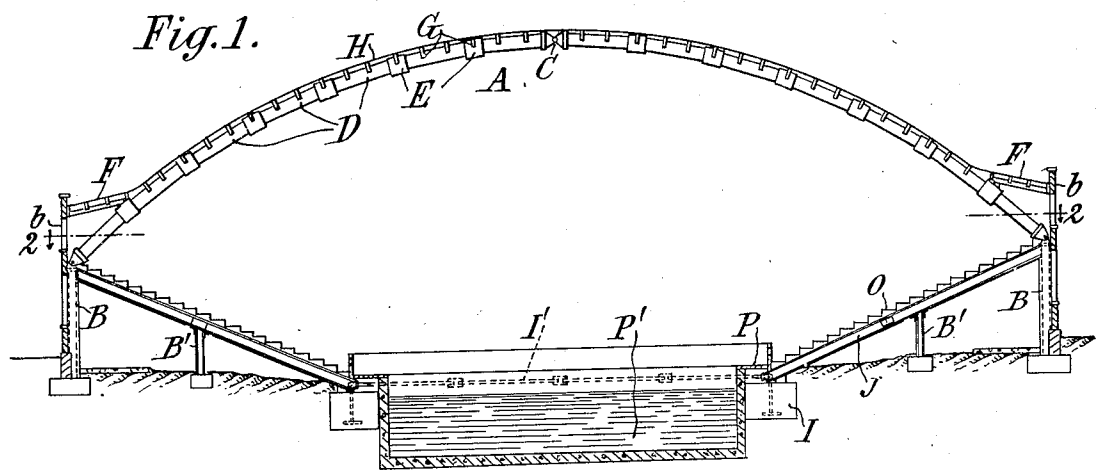
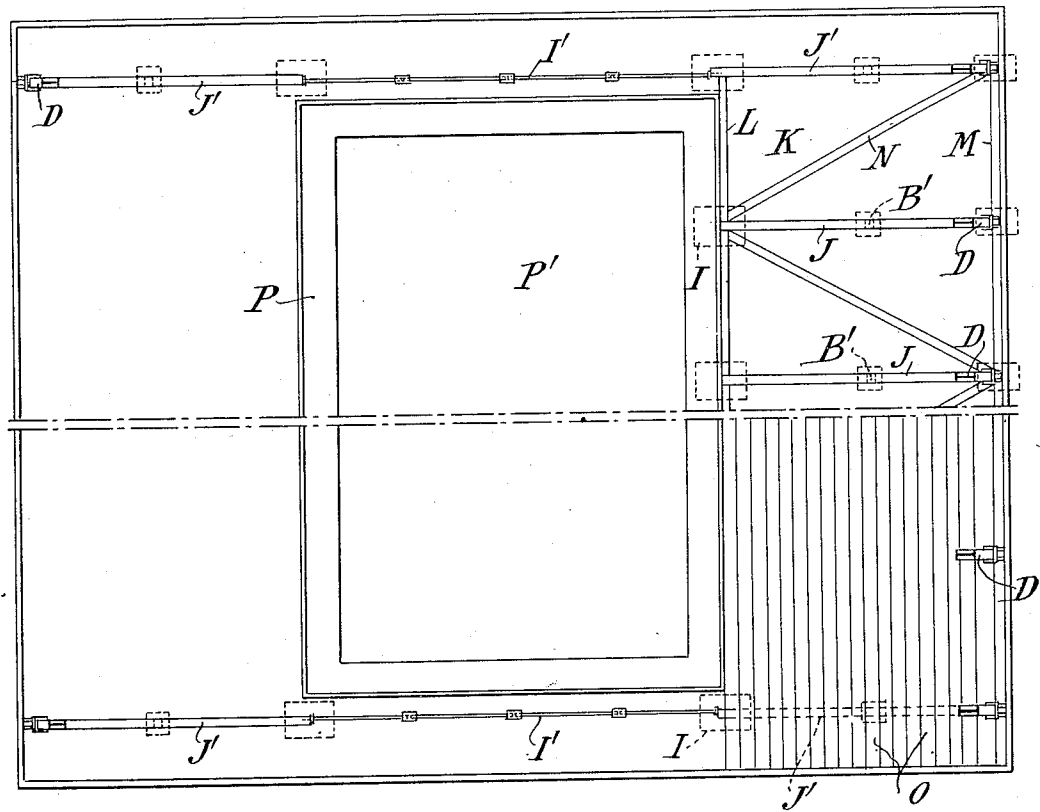


Fig. 2.



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BUILDING CONSTRUCTION

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The present invention relates to building constructions and aims to provide certain improvements therein.

The object of my present invention is to provide a long span arch building construction especially adapted for use as an auditorium, natatorium, arena, etc., wherein columns, supporting posts and other obstacles are eliminated from the interior so as to provide a maximum of unobstructed floor area. The invention also includes other features of novelty which will be hereinafter more fully described.

Certain embodiments of my invention are illustrated in the accompanying drawings, wherein,

Figure 1 is a transverse section of my invention applied to a natatorium.

Fig. 2 is a section taken substantially along the plane of the line 2—2 of Fig. 1, with part of the reviewing stand omitted.

Fig. 3 is a partial transverse section of a modified form of my invention applied to an auditorium.

Fig. 4 is a section taken substantially along the plane of the line 4—4 of Fig. 3, with the reviewing stand omitted.

Fig. 5 is a transverse section of one form of anchoring means applicable to the invention.

Fig. 6 is an enlarged fractional transverse section of a modified form of the invention.

Referring first to Figs. 1 and 2 of the drawings, let A indicate a long span arch supported at its ends upon columns B and hinged at its middle, as indicated at C. The arch A may be of any preferred construction, and as herein shown it consists of a plurality of arch segments D connected together by shoes E and provided at its ends with sub-segments F, the outermost ends of which are supported on the column extensions b. Mounted upon the arches and extending transversely thereof are the roof beams G which support the roof sheathing H.

In order to resist the horizontal thrust of the arches, the ends thereof tie in or are connected to anchoring means comprising dead weights I disposed inwardly in spaced relation to the bases of the columns B by suitable

connecting means, herein shown as girders J. These girders J may constitute the webs of a truss K consisting in addition to the webs J of the longitudinal members L and M and inclined webs N. This truss may also serve to support an inclined reviewing stand O, which may be constructed thereover to be supported wholly or partially thereby. Where the reviewing stand is of great width, supplementary columns B' disposed approximately midway of the truss longitudinal members may be employed to sustain part of the load.

The type of construction thus far described, it will be apparent, may be provided with a floor P at substantially the level of the lower edge of the truss K, or, if desired, the central portion of the floor may be cut away to provide a deep pool P' which may have a width substantially equal to the distance between the lower edges of the trusses K on opposite sides of the building, and a length substantially equal to the longitudinal dimension of the building. It will be understood that if desired the bottom of the pool may serve as the main floor of the building when the pool is drained.

Where the building is provided with a pool, a portion of the upward thrust of the girders J may be resisted by the counterweights I, or by the weight of the reviewing stands O, or by the combined action of both the reviewing stands and counterweights. It will be appreciated, however, that in the absence of the pool P', tie rods analogous to I' may connect the inner ends of the girders J of each arch at their points of connection with the dead weights I. Where such construction is employed, it will be obvious that the tie rods I' will extend below the level of the floor P.

In the construction shown in Figs. 3 and 4, instead of employing girders for resisting the horizontal thrust of the arches, I employ tie rods Q, the lower ends of which are anchored to the dead weights I, and the inner ends of said tie rods at the opposite ends of each arch are connected together by tie rods I' which extend beneath the floor P. The reviewing stands O in this construction, it will be ap-

preciated, may be independently supported by columns B² and girders J².

In Fig. 5 I have shown a modified form of anchoring means for the horizontal thrust-resisting members such as the tie rods Q, said anchoring means being so designed as to also resist the upward thrust of the tie rods Q. In this construction the end of each tie rod Q extends through an angular concrete abutment R and is secured therein through the medium of a washer *q* and a nut *q'* engaging over the inner end of the tie rod. The interior of the abutment R can be filled with rock or sand to constitute a dead weight, and is preferably formed with tie-in walls *r*. If desired, the vertical component of the abutment R may extend upwardly above the floor level to provide a guard wall around the pool or floor and thereby provide additional weight to the anchoring means. In Figs. 1 to 4 I have shown a guard wall S which may be of any preferred construction. It will also be apparent that the guard wall S in Figs. 3 and 4 may constitute the side walls of a pool the bottom of which is the floor P.

In the modification shown in Fig. 6, girders J² are connected to the columns B below the spring line of the arches a distance sufficient to provide headroom at the rear of the reviewing stand O' which is supported thereby. In this embodiment of the invention the horizontal thrust of the arches is resisted by the girders J², the dead weights (not shown) to which the girders are anchored and by that portion of the columns between the spring line or ends of the arches and the points whereat the girders J² are secured to said columns. In Fig. 6 I have shown the columns B as reinforced at the point whereat the arch end is mounted thereon by plates b', and I have also shown the girder J² as riveted to the flanges of the column B through anchor plates b² and b². It will be understood, however, that these details are merely illustrative of a practical manner of securing the parts together.

From the foregoing description it will be apparent that by my present invention I provide a long span arch building construction free from supporting posts and pillars, affording a maximum unobstructed floor area, and that I accomplish this in a simple, economical and practicable manner, and although I have shown and described certain preferred embodiments of my invention, it is to be understood that I do not wish to be limited to the specific details of the construction or to the arrangement of the members, since modifications thereof may be resorted to within the range of engineering skill without departing from the spirit of my invention.

What I claim is:

1. A building construction comprising a plurality of long span arches, supports for

the ends of said arches, and means for resisting the horizontal thrust of the arches comprising anchoring means spaced from the bases of the arch supports, and means connecting the ends of the arches to the anchoring means.

2. A building construction comprising a plurality of long span arches, supports for the ends of said arches, and means for resisting the horizontal thrust of the arches comprising anchoring means spaced inwardly from the bases of the arch supports, means connecting the ends of the arches to the anchoring means, said anchoring means comprising members connecting the inner ends of the connecting means together.

3. A building construction comprising a plurality of long span arches, supports for the ends of said arches, and means for resisting the horizontal thrust of the arches comprising anchoring means spaced from the bases of the arch supports, means connecting the ends of the arches to the anchoring means, said anchoring means comprising members connecting together the inner ends of the connecting means of at least two of the long span arches.

4. A building construction as defined in claim 3, characterized in that the anchoring means comprise tie rods.

5. A building construction comprising a plurality of long span arches, supports for the ends of the arches, means for resisting the horizontal thrust of the arches comprising anchoring means spaced from the bases of the arch supports, and means connecting the ends of the arches to the anchoring means, said anchoring means also functioning to resist the upward thrust of the connecting means.

6. A building construction comprising a plurality of long span arches, supports for the ends of the arches, means for resisting the horizontal thrust of the arches comprising dead weights spaced from the bases of the arch supports and means connecting the ends of the arches to said dead weights.

7. A building construction comprising a plurality of long span arches, supports for the ends of the arches, means for resisting the horizontal thrust of the arches comprising dead weights spaced from the bases of the arch supports and means connecting the ends of the arches to said dead weights, said dead weights also functioning to resist the upward thrust of the connecting means.

8. A building construction comprising a plurality of long span arches, supports for the ends of said arches, a floor below the level of the arch ends and means for resisting the horizontal thrust of the arches comprising anchoring means below the floor level spaced inwardly from the bases of the arch supports, and means connecting the ends of the arches to the anchoring means.

9. A building construction comprising a plurality of long span arches, supports for the ends of said arches, a floor below the level of the arch ends, an inclined stand extending
5 from the floor to within proximity of the arch ends and means for resisting the horizontal thrust of the arches disposed beneath the inclined stand.

10. A building construction comprising a
10 plurality of long span arches, supports for the ends of said arches, a floor below the level of the arch ends, an inclined stand extending from the floor to within proximity of the arch ends and means for resisting the horizontal thrust of the arches disposed beneath
15 the inclined stand and below the floor level.

11. A building construction comprising a plurality of long span arches, supports for the ends of said arches, a floor below the level
20 of the arch ends, an inclined stand extending from the floor to within proximity of the arch ends and providing head room at the rear of the inclined stand and means for resisting the horizontal thrust of the arches disposed beneath the inclined stand.
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12. A building construction comprising a plurality of long span arches, supports for the ends of said arches, a floor below the level of the arch ends, an inclined stand extending
30 from the floor to within proximity of the arch ends and means for resisting the horizontal thrust of the arches disposed beneath the inclined stands, a part of said means also functioning to support the inclined stand.

13. A building construction comprising a plurality of long span arches, supports for the ends of said arches, a floor below the level of the arch ends, an inclined stand extending
40 from the floor to within proximity of the arch ends and providing head room at the rear of the inclined stand, and means for resisting the horizontal thrust of the arches, said means being disposed beneath the inclined stand and tying in with the arch supports below the spring line of the arches.
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14. A building construction comprising a plurality of long span arches, supports for the ends of said arches, arch sub-segments connecting said arches with said supports, a
50 floor below the level of the arch ends, an inclined stand extending from the floor to the arch ends and providing head room at the rear of the inclined stand, and means disposed beneath the inclined stand for resisting the horizontal thrust of the arches.
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In witness whereof, I have hereunto signed my name.

LOUIS DAVIDSON.