No. 744,692. PATENTED NOV. 17, 1903

W. D'A. RYAN.

CEILING CONSTRUCTION.

APPLICATION FILED DEC. 22, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

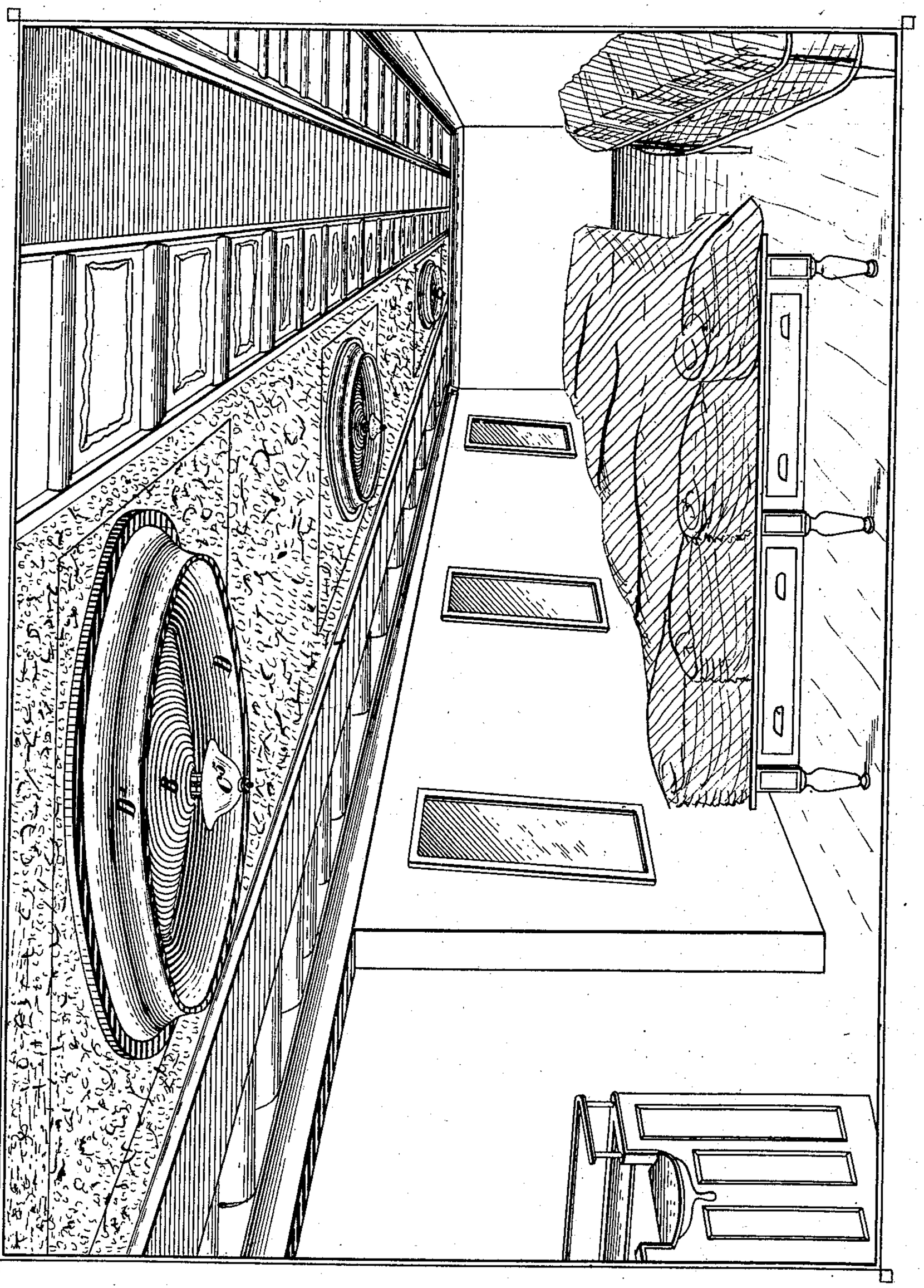

Fig. 1.

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Inventor
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by His Attorneys
Howson & Howson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.

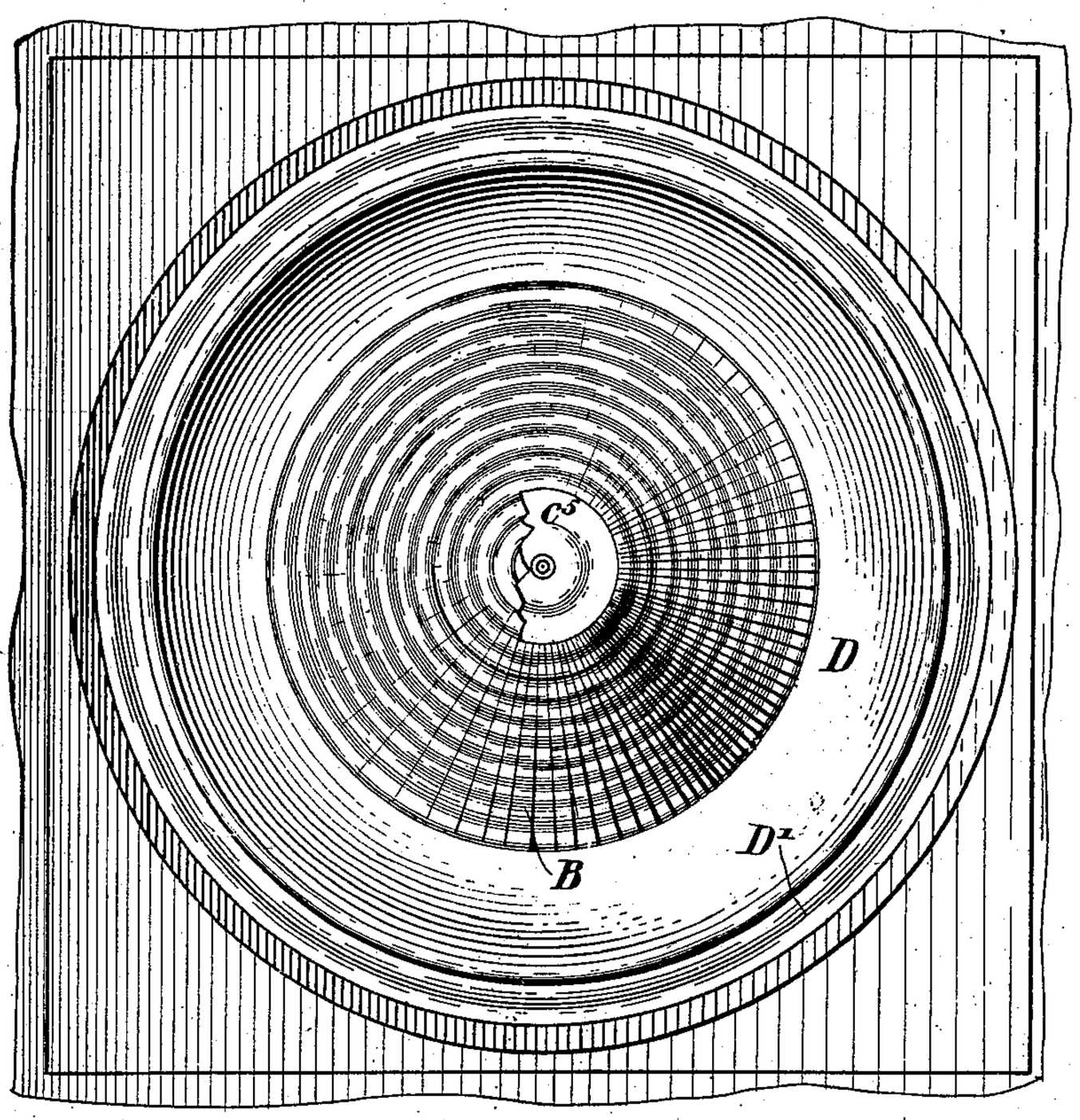
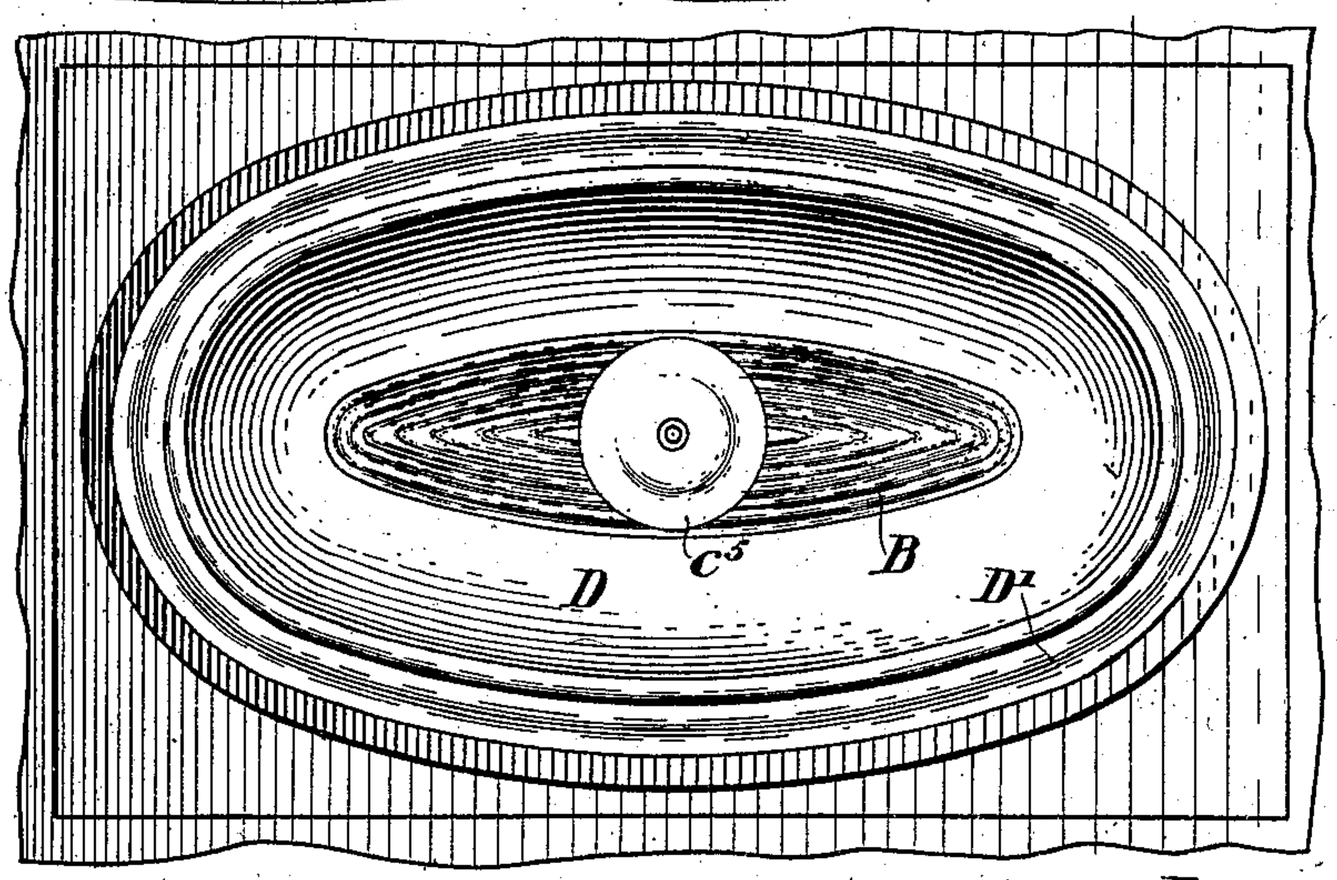


Fig 3



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NO MODEL. 4 SHEETS—SHEET 3.

Fig. 10.

Fig. 6.

Fig. 11.

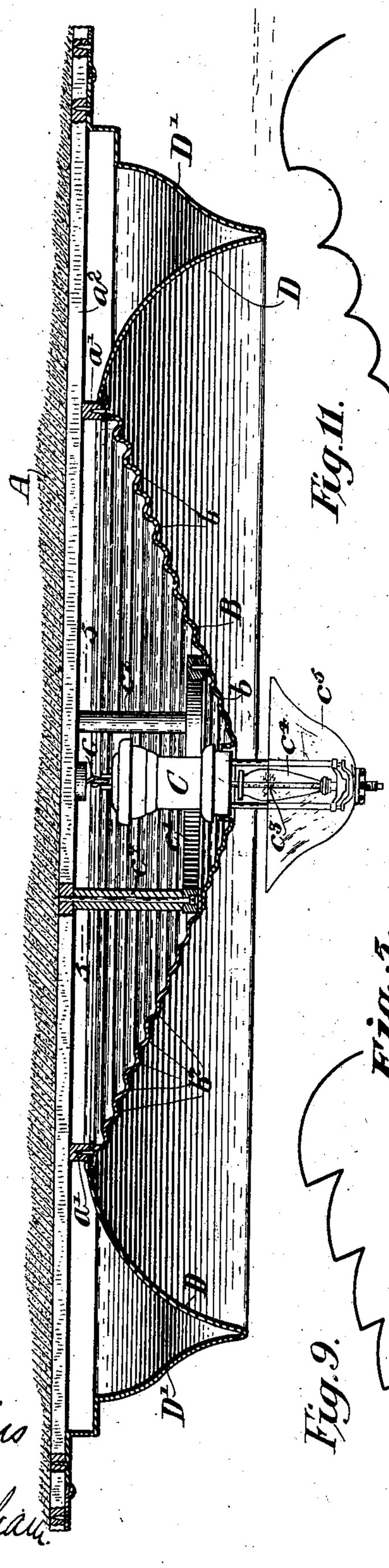

Fig. 7.

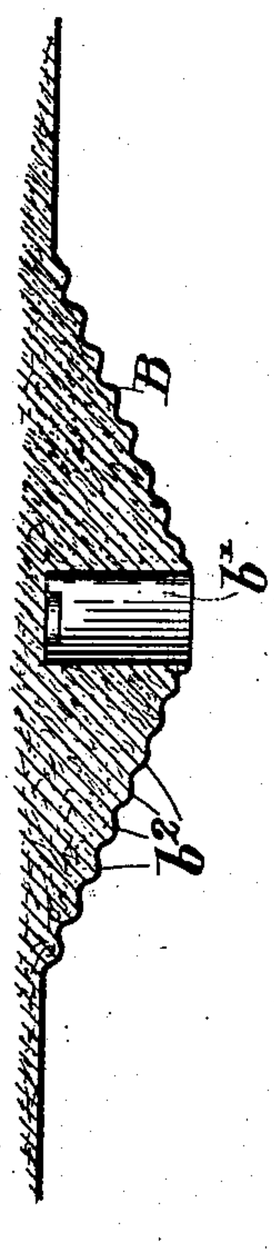

Fig. 4.

Fig. 5.

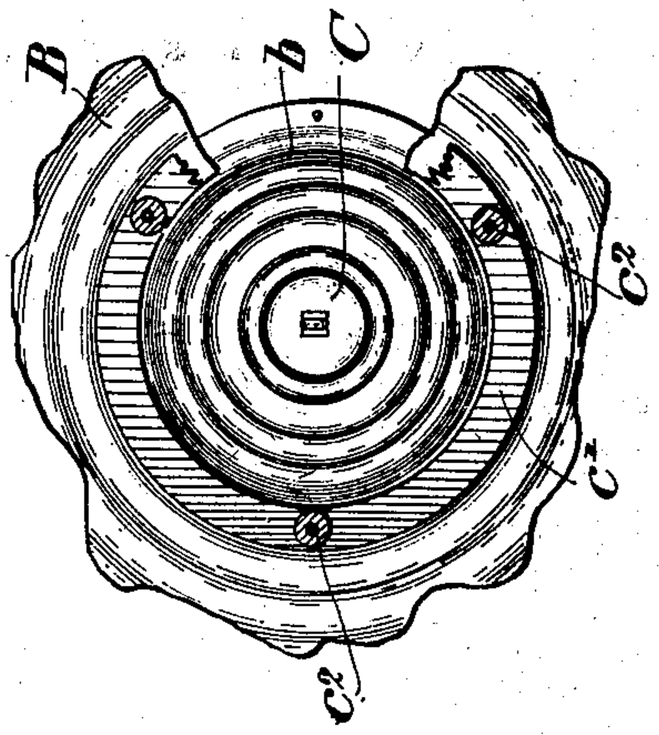

Fig. 9.

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No. 744,692. PATENTED NOV. 17, 1903.

W. D'A. RYAN.

CEILING CONSTRUCTION.

APPLICATION FILED DEC. 22, 1902.

NO MODEL. 4 SHEETS—SHEET 4.

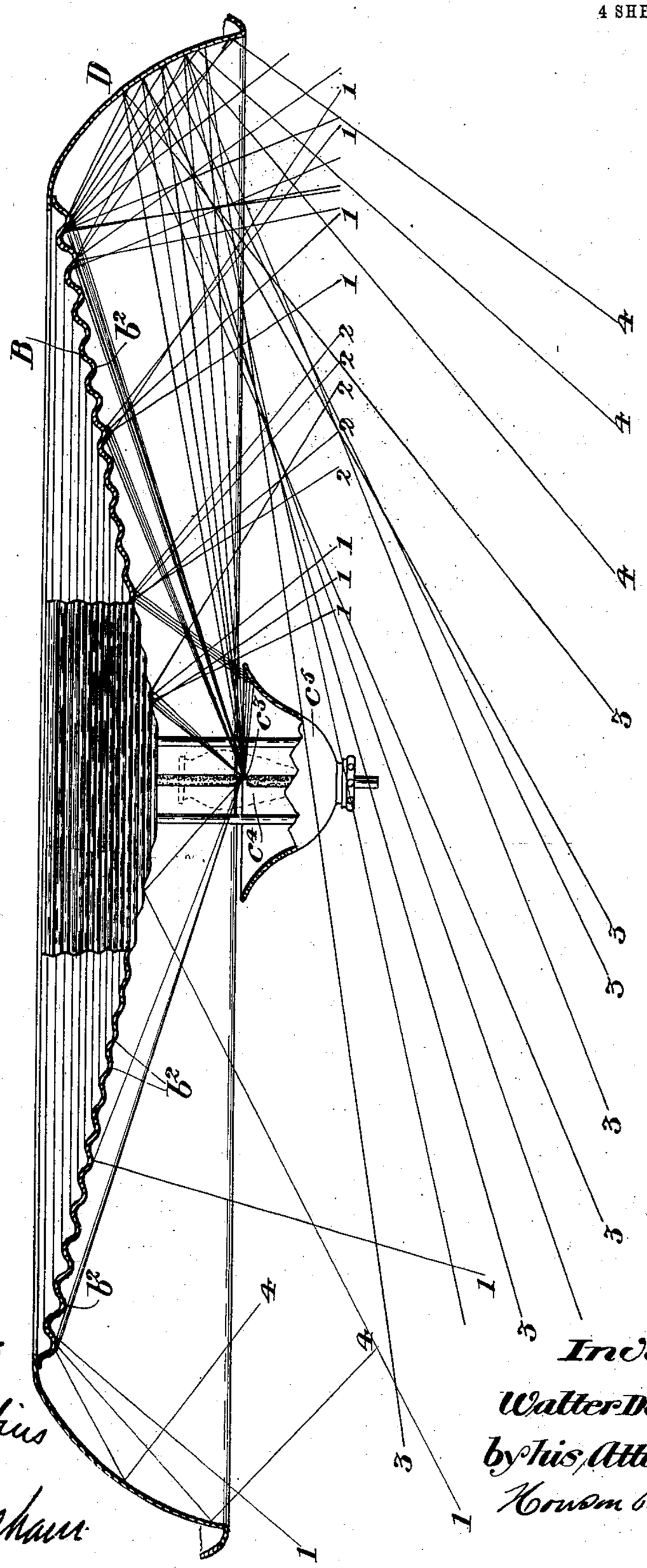

Fig. 8.

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No. 744,692. Patented November 17, 1903.

UNITED STATES PATENT OFFICE.

WALTER D'A. RYAN, OF LYNN, MASSACHUSETTS, ASSIGNOR OF TWO-THIRDS TO LONGLEY L. SAGENDORPH, OF PHILADELPHIA, PENNSYLVANIA, AND HARLAN P. LLOYD, OF CINCINNATI, OHIO.

CEILING CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 744,692, dated November 17, 1903.

Application filed December 22, 1902. Serial No. 136,220. (No model.)

To all whom it may concern:

Be it known that I, WALTER D'A. RYAN, a subject of the King of Great Britain and Ireland, and a resident of Lynn, Massachusetts, have invented certain Improvements in Ceiling Construction, of which the following is a specification.

My invention relates to certain improvements in ceiling construction; and it consists more particularly of an improved form of pressed-out plate or equivalent structure primarily designed to form a portion of a ceiling which shall serve as a reflector for an electric or other lamp.

A further object of my invention is to provide a form of ceiling construction whose parts shall bear such relation to a suitably-supported lamp that the uneven and objectionable distribution of light due to variations in the position of the source of light—as, for example, the traveling of the arc of an electric lamp—shall be corrected.

These objects I attain as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is an interior perspective view of a room, showing my improved ceiling construction as used in connection with the arc-lights, whereby the interior of said room is illuminated. Fig. 2 is an inverted plan view of a unit portion of my improved ceiling-reflector, showing the preferred method of uniting the light-reflecting portion thereof with rectangular ceiling-plates. Fig. 3 is an inverted plan view of a special form of my improved construction. Fig. 4 is a sectional elevation taken through the center of one of my reflector ceiling-sections. Fig. 5 is a sectional plan view taken on the line 5 5, Fig. 4. Fig. 6 is a sectional elevation of a portion of a ceiling-section, showing the construction of the same when used without the outside or second reflecting-surface. Fig. 7 is a sectional elevation showing my improved ceiling construction as used with a solid backing. Fig. 8 is a sectional elevation of a portion of my improved reflector, showing the paths taken by various rays of light emitted from an electric arc, especially illustrating the action of the reflector when the arc is on one side of the carbon tips; and Figs. 9, 10, and 11 are diagrammatic views illustrating special forms of reflecting-surfaces constructed according to my invention.

Referring to Fig. 4 of the above drawings, A represents the plaster or other body portion of a ceiling, which in the present case is provided with wooden furring-strips a^2, there being a ring a', of any suitable material, fastened to these strips and serving to support the outer edge of a reflecting-surface B. This in the case illustrated is constructed of sheet metal and may be described as of a conical shape, having a series of annular corrugations or projections b^2 lying in planes parallel with the base. These corrugations b^2, as shown in the figures, increase progressively in amplitude from near the apex of the conical surface toward its base, said apex being cut away to permit of the passage of an electric lamp C, which in the case illustrated is of the inclosed-arc type and hung from a hook c or any other convenient supporting device suitably fastened to the ceiling. If desired, these corrugations or annular projections may be of any of the various forms illustrated in Figs. 9, 10, and 11.

In order to facilitate the operation of installing the lamp or of removing it, I preferably form the portion of the corrugated reflecting-surface adjacent to its apex in a piece b separate from the remainder, supporting the edge of the main portion of said reflecting-surface by means of a metallic ring c', carried by pieces c^2, held to the furring-strips a^2 in any desired manner.

While the surface B is shown and described as corrugated, it is to be understood that I do not desire to confine myself exclusively to the specific construction shown in Figs. 4 and 8, since other forms of annular projecting portions—as, for example, those shown in Figs. 9, 10, and 11—may be employed either as comprising or as part of said surface B.

I preferably place the lamp C so that its center of light c^3 will be formed at some point below the imaginary apex of the corrugated surface B, while the upper portion of said lamp is hidden within the ceiling-section, there being also an opal or clear-glass inclos-

ing-globe c^4 and a shade c^5, usually of translucent material, for more evenly distributing the rays of light thrown down from said lamp. In the present instance I prefer that the said shade shall be primarily a reflector, and for this purpose silver it, so that its surface answers this requirement, or I form it wholly of some light-reflecting material.

In order to provide for a uniform distribution of the light emitted by the lamp irrespective of the position of the arc, I place a concave reflecting-surface D outside of and surrounding the surface B, said surface D being made to extend from the base or outer edge of the surface B to a horizontal plane preferably slightly under or passing through the source of light.

It will of course be understood that when there is no objection to the uneven distribution of light caused by traveling of the arc the reflecting portion D may be omitted and the concentrically corrugated or fluted surface B used by itself, being grooved at its edge, if desired, for direct junction to various forms of ceiling-plates. It will be further noted that the reflecting-section may have a solid backing, which in the form shown in Fig. 7 is of some material—as, for example, plaster-of-paris—capable of being molded to form the corrugations or flutings of progressively-increasing amplitude and which is in itself of a nature to efficiently reflect the light from the lamp. When such a construction is employed, I provide a recess in the solid portion, into which the upper part of a lamp may be inserted for a distance sufficient to bring the source of light in a proper position relatively to the reflecting-surface.

The practical action of my invention is illustrated diagrammatically in Fig. 8, where an electric arc is shown as formed to one side of a pair of carbon tips, in which position a very large portion of the light is cut off from the side of the carbons opposite to that on which said arc is formed. A certain portion of the light-rays (indicated at 1) strike the corrugations or annular projections of the surface B and are reflected down within the area which it is desired to illuminate. Certain others of the rays 2 strike the inner surface of the shade c^5, and being thereby reflected upwardly onto the corrugated surface B are in turn reflected downwardly upon the area under the lamp.

It will be noted that if the surface B were not corrugated all of the above-mentioned rays would have been reflected therefrom at such a high angle that they would have not been available for lighting, whereas by using the corrugations these rays are utilized within the area which it is desired to illuminate. All of the rays emitted by the arc above the plane of the top edge of the shade c^5 and below an imaginary conical surface extending from the arc to the edge of the base of the surface B strike the reflecting-surface D and are reflected thereby, as indicated at 3, downwardly within the area to be illuminated. This latter reflecting-surface is so designed and placed that when the arc is to one side of the carbons, and therefore delivering by far the greater portion of its light to the adjacent portions of the reflector, a large proportion of the light is reflected to the opposite side of the space to be illuminated.

In addition to the above-noted rays of light there are other rays which strike the outer curved portions of the corrugations—as, for example, those indicated at 4—which are reflected onto the surface D and from there turned downwardly, as well as across to the opposite side of the lamp. It will therefore be noted that by the use of a surface such as B, having corrugations or annular projections of progressively-increasing amplitude as they depart from the source of light, I am enabled to prevent the loss of those rays of light which would ordinarily be reflected at such an angle as to be practically valueless for the purpose of illuminating objects or areas adjacent to the lamp, while by the use of the outer concave surface D the objectionable lack of uniformity at any given point to be illuminated is obviated, since by this device the whole of the area served by a lamp provided therewith secures a uniform illumination irrespective of the position of the arc. Moreover, by the use of the shade c^5 all direct rays of the arc are cut off, thus making it concealed or semiconcealed, while practically utilizing all the light emitted in efficient illumination.

I claim as my invention—

1. A reflector having a reflecting-surface provided with a series of projections of progressively-varying amplitude for throwing down upwardly-emitted rays of an arc-lamp placed adjacent to said surface, and a second reflecting-surface formed concave to said source of light and so placed relatively thereto that the area thereunder is illuminated with substantial uniformity irrespective of variations in position of the arc relatively to the carbons of the lamp, substantially as described.

2. A reflecting ceiling-section adjacent to a source of light, said section including two reflecting surfaces or sets of surfaces, one of the same consisting of a series of annular projections of progressively-increasing amplitude and the other consisting of a curved surface concave to the source of light and surrounding said first surface, substantially as described.

3. A reflecting ceiling-section having a reflecting-surface formed in a series of curved sections of progressively-varying amplitude of curvature as they depart from a plane of reference, in combination with a second reflecting-surface forming substantially a continuation of the first surface and having an amplitude of projection beyond the plane of

reference of the first surface greater than that of any of said curved sections, substantially as described.

4. A reflector having a plurality of parts held together so as to form a continuous reflecting-surface, in combination with means for removably holding one of said parts in position, both of said parts of the reflector being corrugated and the removable part having an opening for a lamp at its center, substantially as described.

5. A substantially conical reflecting ceiling-section having an opening for the passage of a lamp placed in the line of its axis, said section having a detachable part adjacent to the opening, a reinforcing-piece for the edge of the main portion of the section and means for supporting said reinforcing-piece independent of the reflecting portions, substantially as described.

6. A substantially conical reflecting-surface, a series of annular projections in said surface progressively increasing in amplitude toward the base thereof in combination with a second reflecting-surface concave to the apex of the conical surface, and extending outwardly and downwardly until it is adjacent to a plane passing through said apex parallel to the base of said surface, substantially as described.

7. A reflector for a lamp, the same consisting of a substantially conical surface provided with a series of concentric corrugations said corrugations increasing in amplitude from the apex of the surface toward its base, substantially as described.

8. A reflector for a lamp, the same consisting of a substantially conical surface provided with a series of annular projecting portions, said annular projecting portions extending farther from a common surface of reference as they depart from the apex of the surface toward its base, substantially as described.

9. The combination of a substantially conical reflector with a source of light placed at a point outside of the same but in the line of the axis thereof, said surface having a series of corrugations increasing in amplitude from its apex toward its base, said corrugations being substantially parallel with said base, substantially as described.

10. A reflector having a reflecting-surface formed with a series of projections of progressively-varying amplitude, with a second reflecting-surface placed adjacent to the apex of said first surface and a source of light between said two surfaces, said second reflector being concave in form, substantially as described.

11. The combination of a substantially conical reflecting-surface having a series of annular corrugations increasing in amplitude from its apex toward its base, with a concave reflecting-surface adjacent to the apex of said conical surface and a source of light between said two surfaces, substantially as described.

12. A reflector having a reflecting-surface concave to a source of light, a second reflecting-surface formed with a series of projections of progressively-varying amplitude and adjacent to said concave surface, and a second concave reflecting-surface extending from the external periphery of the said second reflecting-surface, substantially as described.

13. The combination of a concave reflecting-surface, a substantially conical reflecting-surface having a series of annular projections of increasing amplitude from its apex to its base, a source of light supported between said two reflecting-surfaces and a third reflecting-surface extending from the base of the conical reflecting-surface, substantially as described.

14. A reflector for a lamp, the same consisting of a piece of sheet material having a series of concentric corrugated reflecting-surfaces, those of the surfaces farthest from the center having an amplitude of corrugation greater than those adjacent thereto, substantially as described.

15. A reflector for a lamp, having a surface formed with a series of concentric corrugations, said corrugations progressively increasing in amplitude as they depart from the center, substantially as described.

16. A reflector for a lamp, the same having a series of reflecting-surfaces at different distances from the lamp, said surfaces projecting for varying amounts beyond a common surface of reference and having between them areas shadowed from the lamp, substantially as described.

17. A reflector for a lamp, the same having a series of double-curved reflecting-surfaces projecting for progressively-increasing distances from a common surface of reference, in combination with a second double-curved reflecting-surface, outside of said series of surfaces and concave to the lamp, substantially as described.

18. A reflector for a lamp having a surface formed with a series of corrugations of progressively-varying amplitude, in combination with an additional surface beyond said corrugated portion and placed concave to the lamp, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WALTER D'A. RYAN.

Witnesses:

WILLIAM E. BRADLEY,

JOS. H. KLEIN.