Oct. 7, 1930. C. D. FAHRNEY 1,777,556

TELEVISION

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Fig. 3.

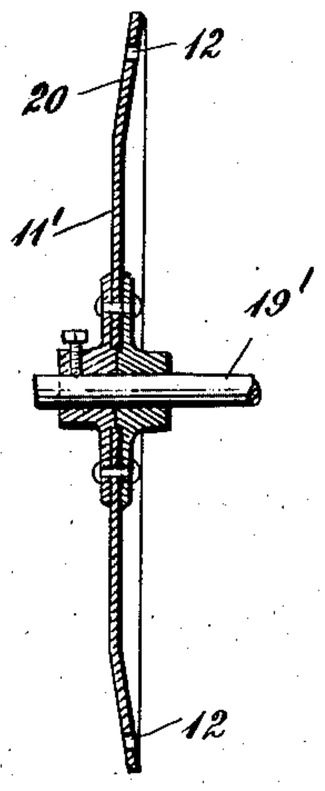


Fig. 1.

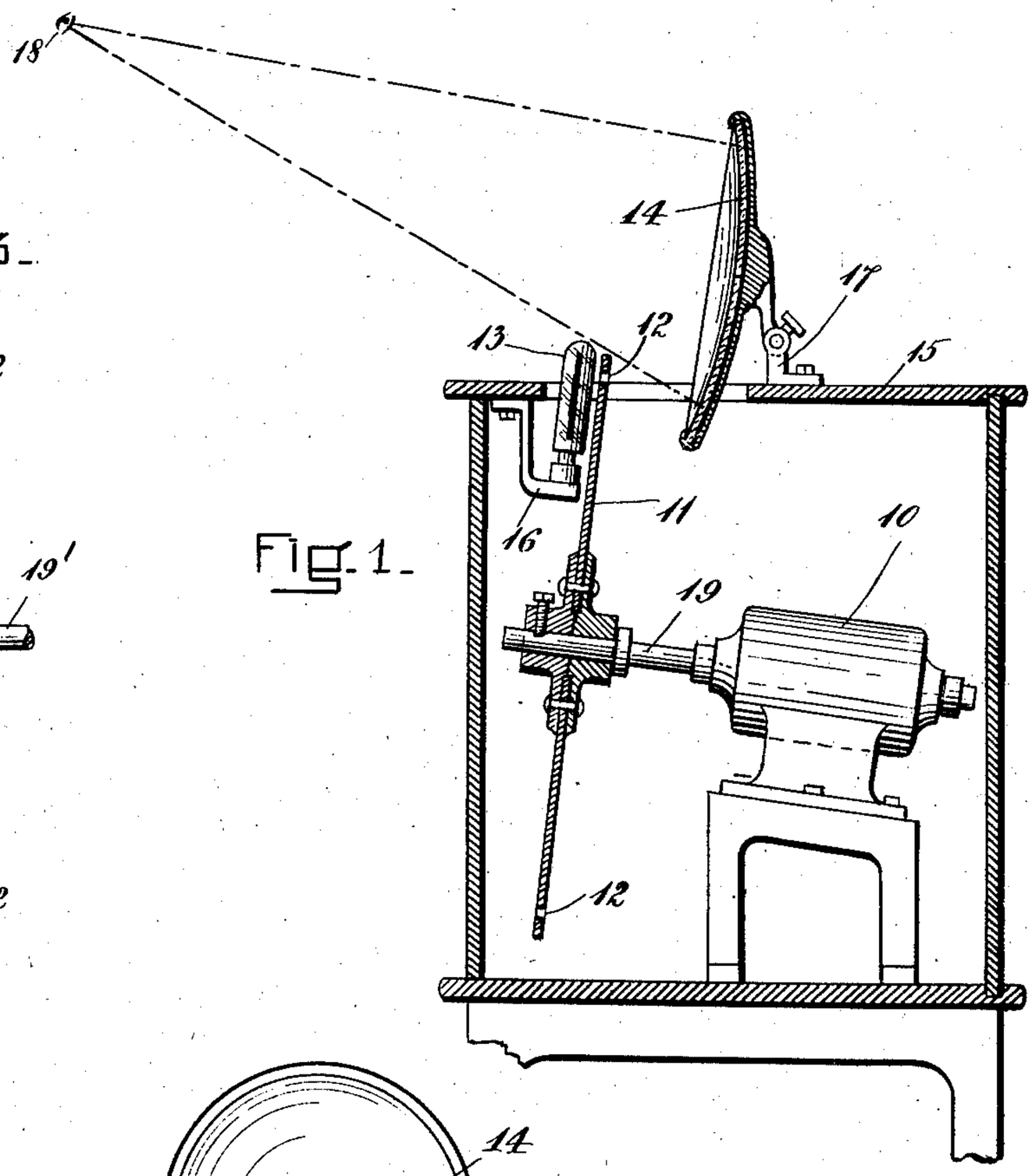
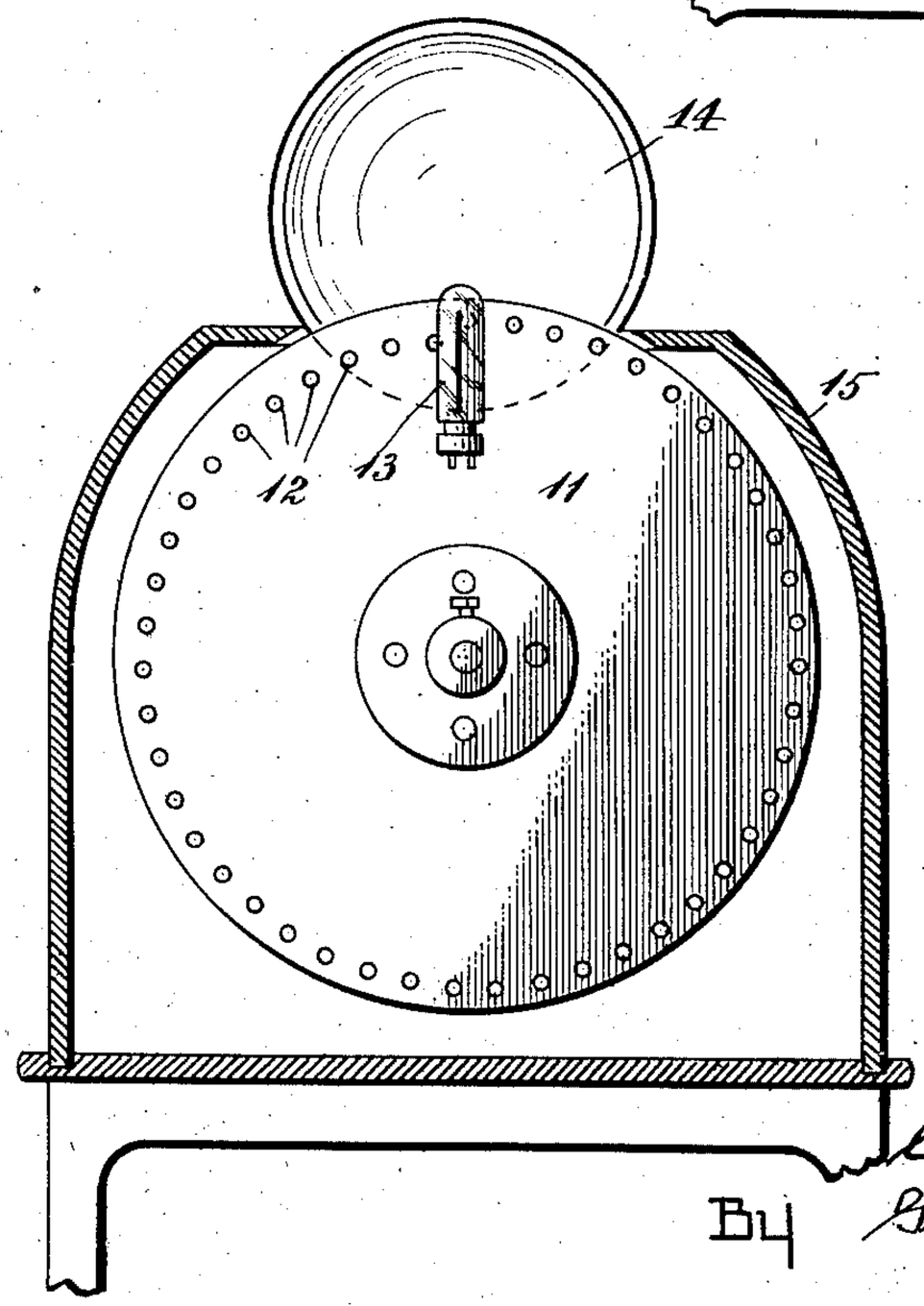


Fig. 2.



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Oct. 7, 1930. C. D. FAHRNEY 1,777,556

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Fig. 4.

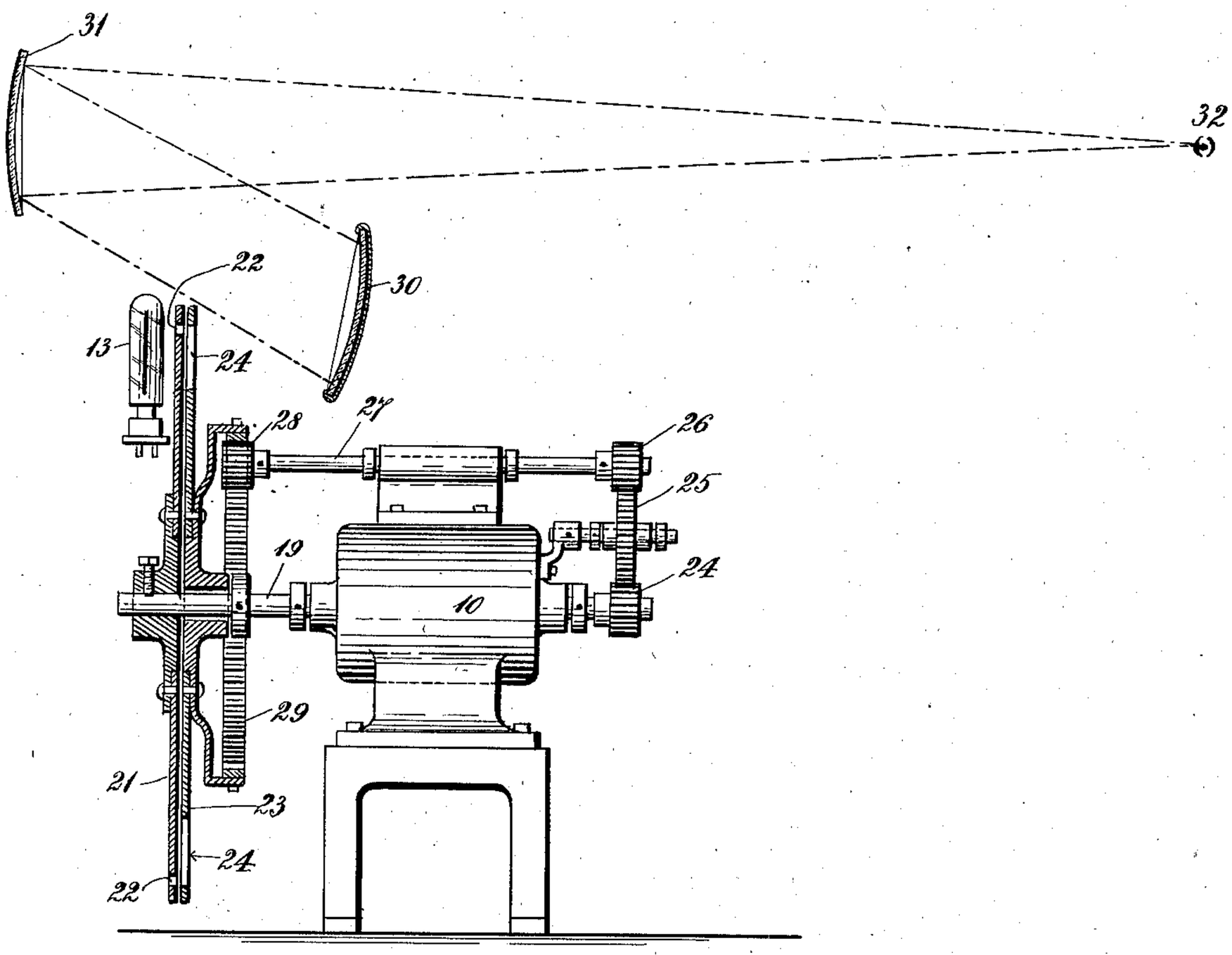

Fig. 5.

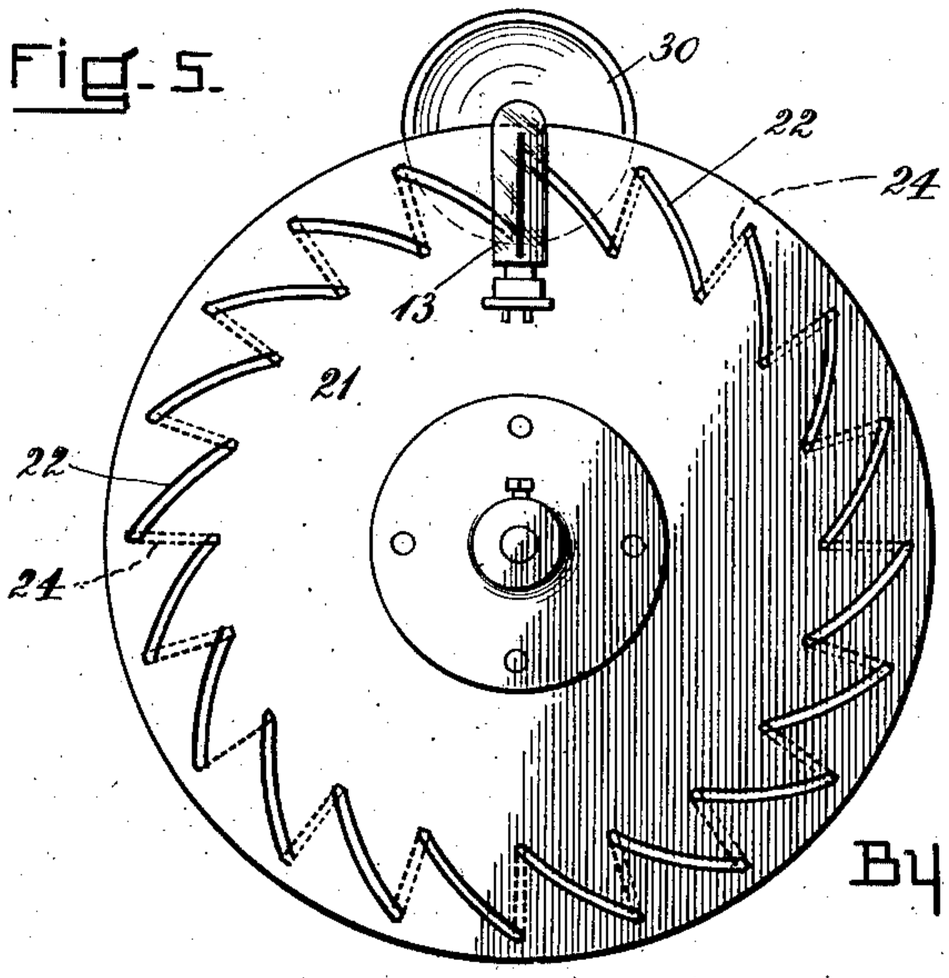

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Fig. 6.

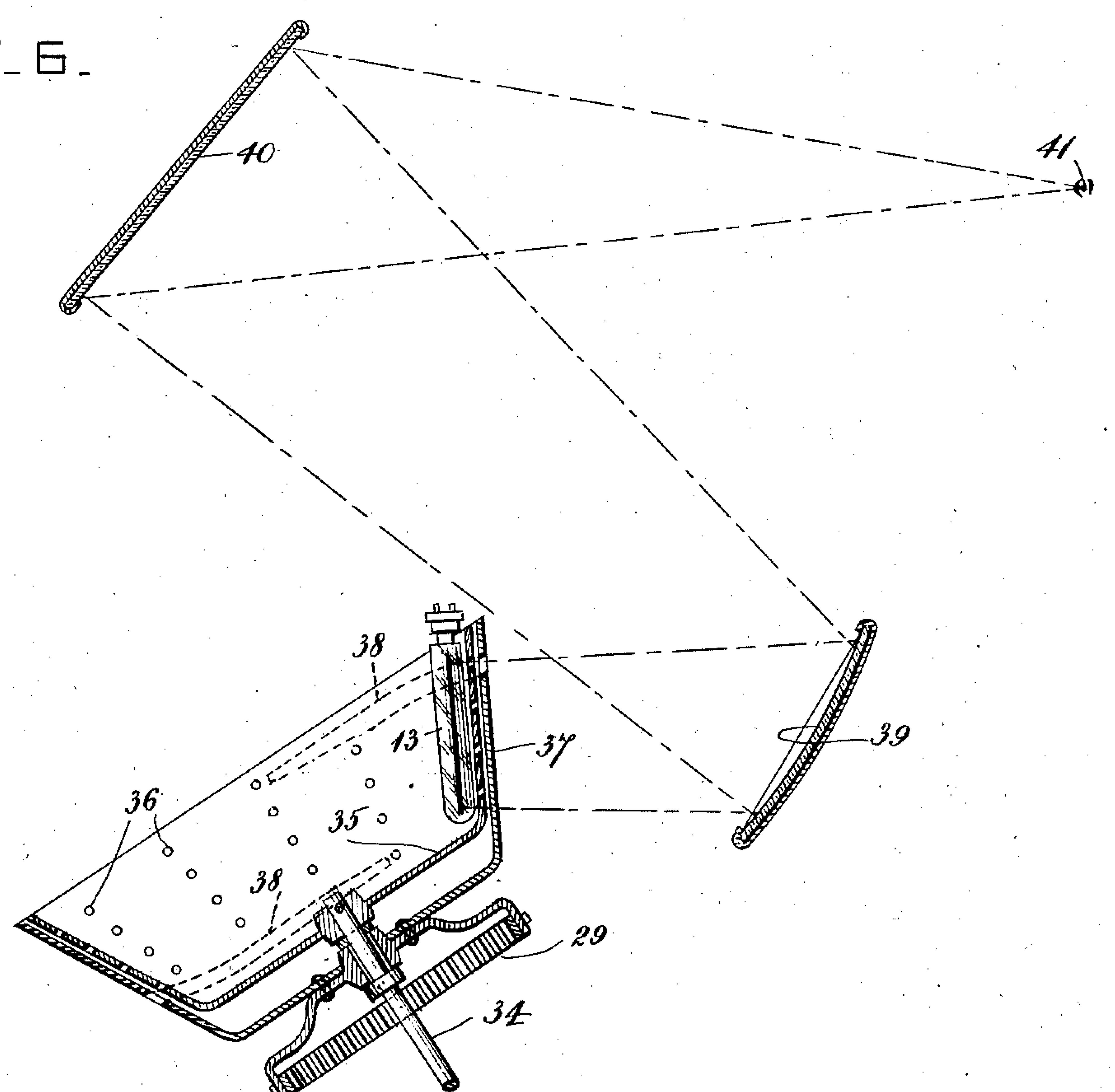

Fig. 7

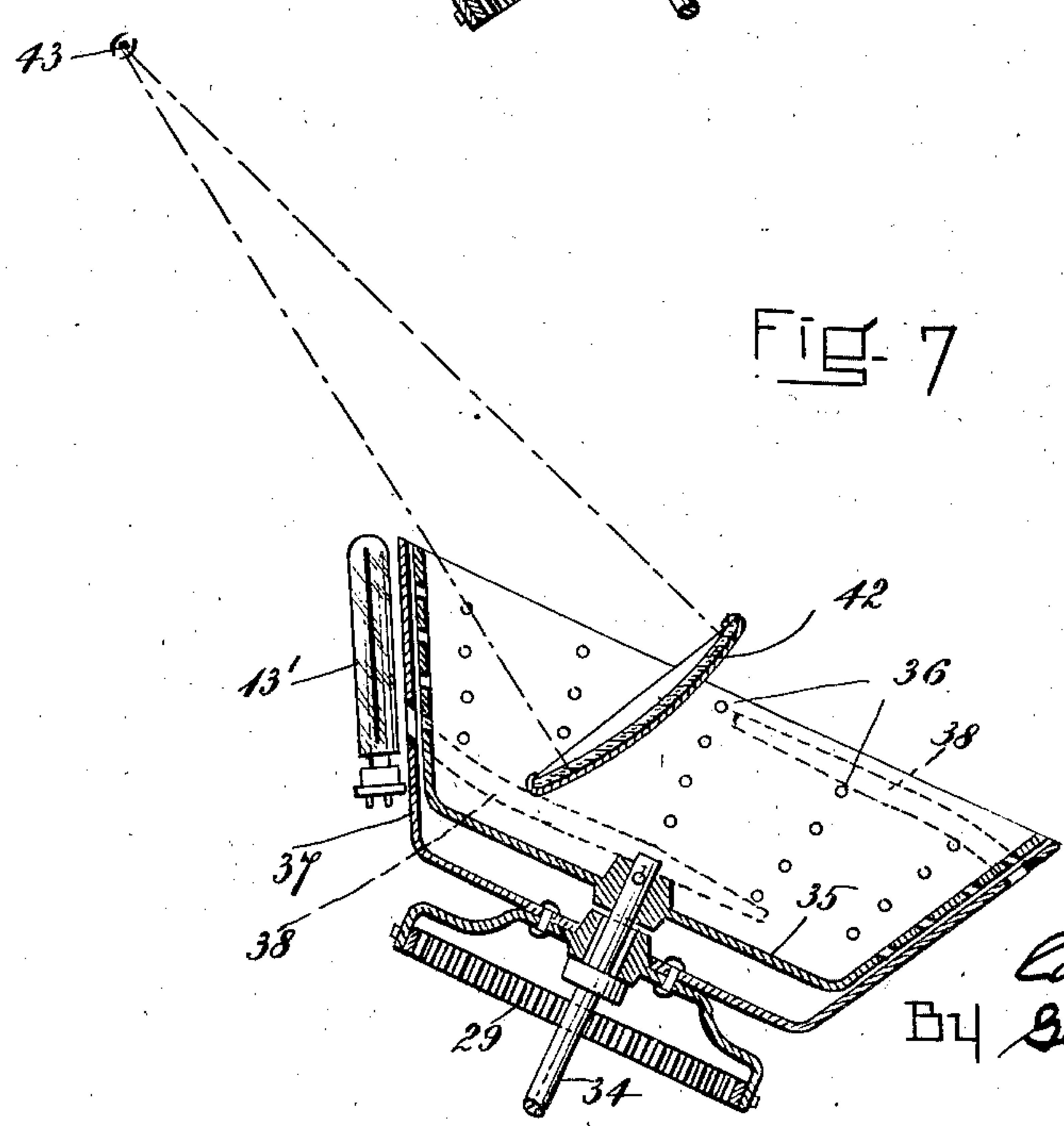

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Fig. 8.

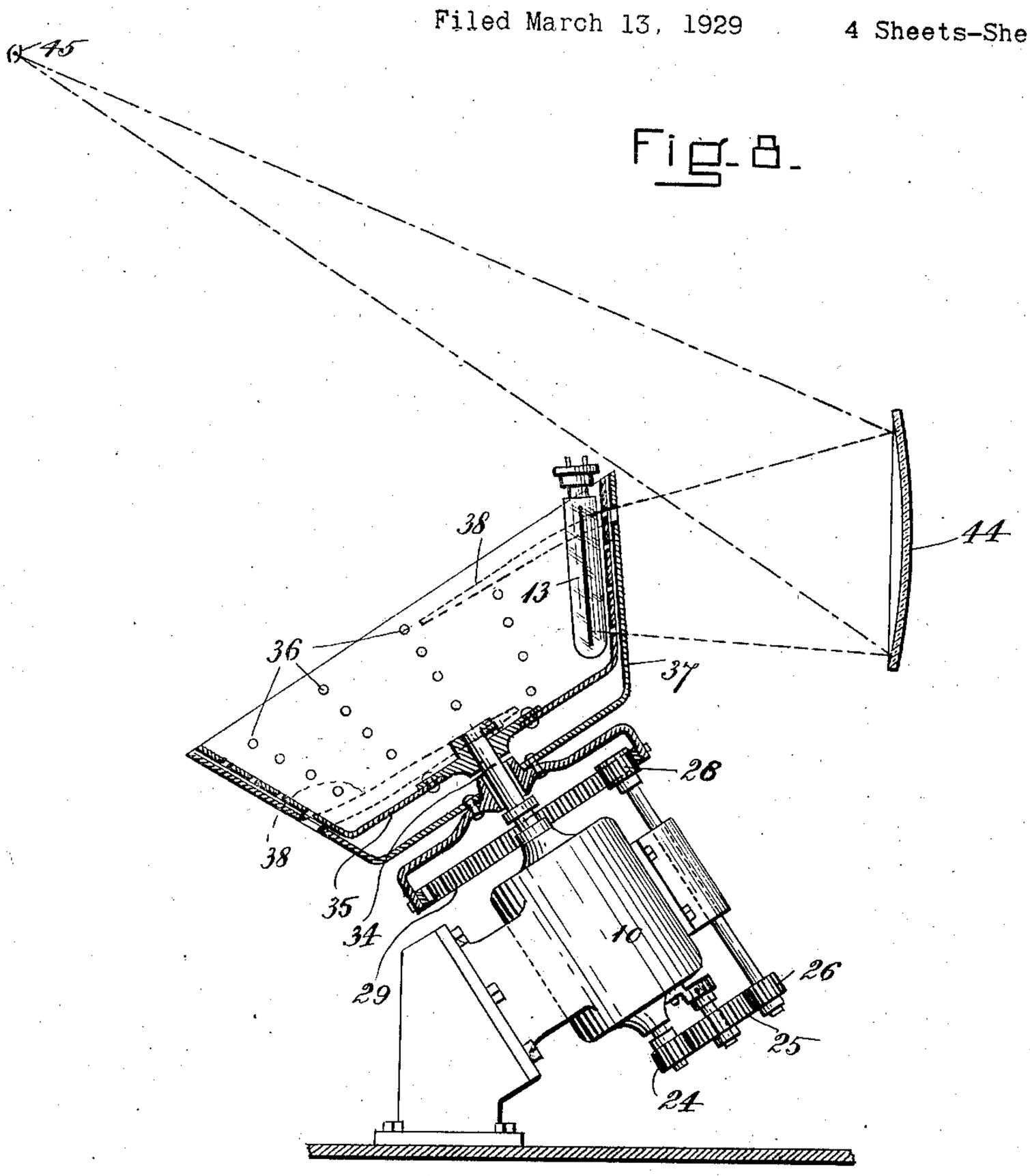
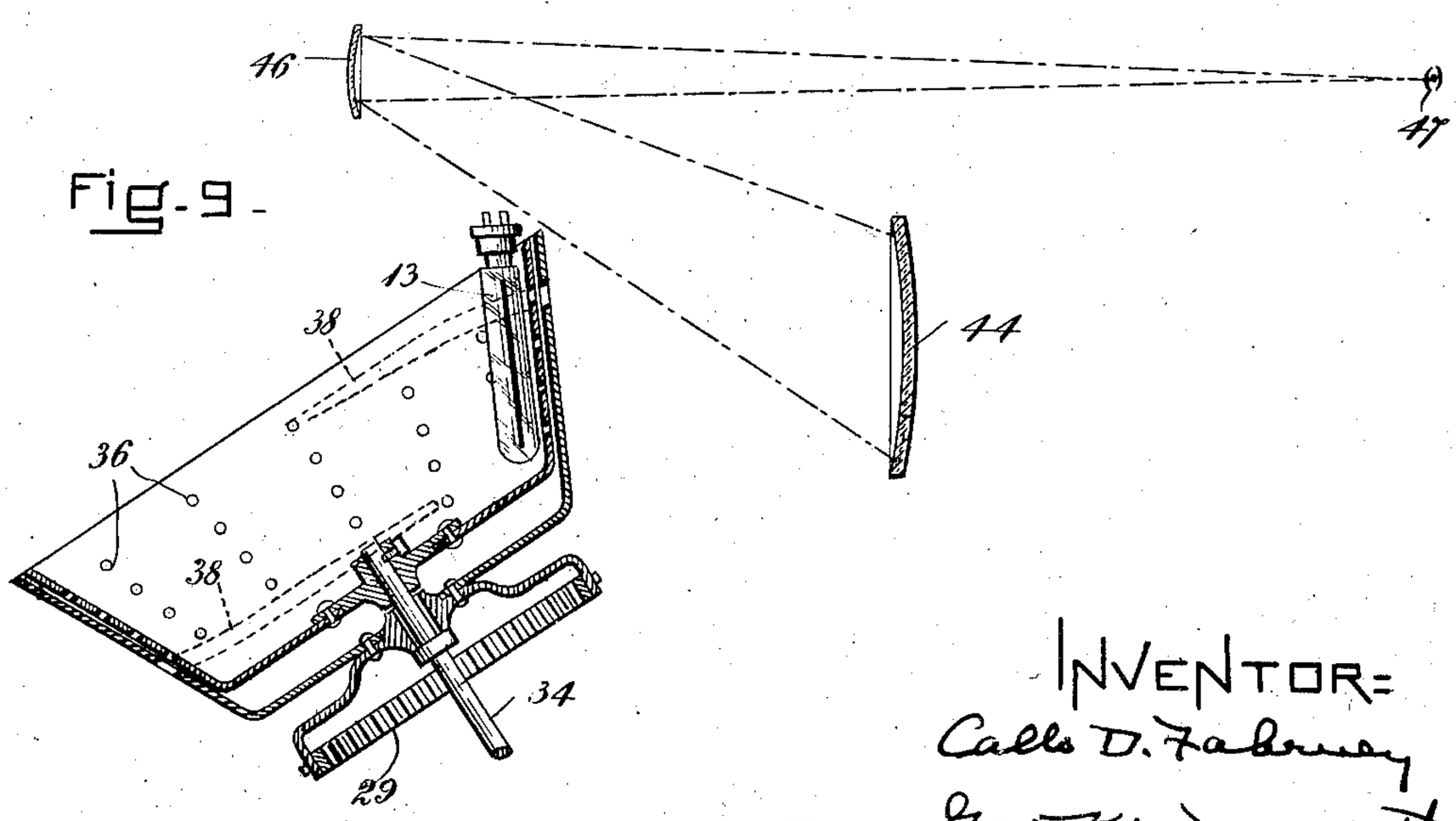


Fig. 9.



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ATTORNEY:

Patented Oct. 7, 1930 1,777,556

UNITED STATES PATENT OFFICE

CALLO D. FAHRNEY, OF CAMBRIDGE, MASSACHUSETTS

TELEVISION

Application filed March 13, 1929. Serial No. 346,689.

The principal objects of the present invention are to provide a television receiving apparatus by means of which a picture may be composed which shall have more detail and be clearer, and generally more pleasing, than is possible with the systems now in use, and in which the picture-receiving surface and the scanning member or members are so related that the picture may conveniently be viewed by an observer irrespective of the position of the apparatus. Other objects of the invention are to provide an extremely simple televisor which shall be economical in construction and efficient in operation. Further objects of the invention will hereinafter appear in the detail description of the specific embodiments thereof.

With the foregoing objects in view my invention contemplates the use of a magnifying mirror as a picture-receiving surface, either alone or in combination with another magnifying mirror, or else a plane surface upon which the picture is reflected from the mirror first mentioned and from which it is reflected to the eye of the observer.

My invention contemplates also the use of a scanning member which is inclined to the horizontal or else has its effective area so inclined that the picture may readily be seen by an observer located above the apparatus.

My invention contemplates also, and consists of, the parts and combination of parts hereinafter more fully described and set forth in the appended claims.

My invention may best be understood by having reference to the drawings which accompany and form a part of this specification in which—

Figure 1 is a vertical section of a television-receiving apparatus embodying my invention;

Fig. 2 is a front elevation partly in section of said apparatus;

Fig. 3 is a central section showing a modification of the scanning disc;

Fig. 4 is a central section of a further modification in which two cooperating scanning members are employed;

Fig. 5 is a front view of the apparatus shown in Fig. 4;

Fig. 6 is a fragmentary sectional view of a further modification in which the co-operating scanning members are shown as cones;

Fig. 7 is a fragmentary sectional view of another modification in which the lamp is placed on the outside of scanning members of the type shown in Fig. 6;

Fig. 8 is a central section of a modified form of television-receiving apparatus embodying my invention;

Fig. 9 is a fragmentary sectional view of the apparatus shown in Fig. 8, provided with two magnifying mirrors.

In the particular drawings selected for more fully disclosing the principle of my invention, 10 is a motor of any suitable type mounted on the shaft of which is a scanning disc 11 provided with a series of perforations 12 arranged in the form of a spiral and through which light from the lamp 13, the luminosity of which is varied by the received current, is projected to the concave or magnifying mirror 14. On the casing 15 enclosing the motor and its associated parts are mounted the said lamp 13 by the depending bracket 16 and the mirror 14 by the adjustable bracket 17. The motor rotates the scanning disc in synchronism with the analyzing disc at a transmitting station in the manner well understood and the picture formed or composed on the magnifying mirror 14 by the co-operation of the disc 11 and lamp 13 will be visible to a number of observers, the eye of one of which is indicated at 18.

It will be noted that the shaft 19 of said motor, and also the plane of the scanning disc, are inclined to the horizontal, so that as indicated in dotted lines in Fig. 1, the observer's line of sight takes in the entire surface of the mirror and clears the top of the scanning disc and lamp, whereas if said disc were rotated in a vertical plane the observer would have to move to a higher position in order to see the entire picture. However, it is not absolutely essential to incline the shaft and the disc because, as shown in Fig. 3, the shaft 19 may be horizontal and the effective or outer perforated

area 20 of the disc 11′ may itself be inclined to the horizontal and produce substantially the same result as the apparatus shown in Fig. 1.

In Fig. 4 the shaft of the motor carries the disc 21 provided with a series of arcuate slots 22, and has loosely mounted on it a co-operating disc 23 provided with a series of radial slots 24, the arrangement being that the ends of each arcuate slot terminates at the inner and outer ends of two of the contiguous co-operating radial slots, and the relative rotational speeds of the two discs is such that each radial slot is swept by an arcuate slot during the time that said radial slot moves a distance equal to its own width. The member 23 is rotated by the gears 24, 25 and 26, the latter being mounted on the shaft 27, and by the pinion 28 on said shaft and the annular gear 29 which meshes with said pinion and supports the disc 23. The motor being in synchronism with an appropriate analyzing apparatus at the transmitting station, the light transmitted through two co-operating slots 22, 24 from the lamp 13 impinges on the magnifying mirror 30 whence it is reflected to the magnifying mirror 31 in which the picture may be seen by the observers, one of which is indicated as having his eye at the point 32.

I have found in actual practice that when two such magnifying mirrors are employed, a better, more pleasing and more detailed picture can be formed than when a single picture-receiving surface is used.

In the modification shown in Fig. 6, the inclined shaft 34 carries the scanning member 35 which preferably is a surface of revolution of any suitable shape and is shown in the present instance as a cone provided with a plurality of rows of perforations 36, each row being arranged along a generatrix of said cone, and said perforations being disposed around said cone in such manner as to form a plurality of spirals, herein shown as four. The co-operating cone 37 is carried loosely on the shaft 34 and is provided with a plurality of slots 38 arranged to co-operate successively with said perforations, and each extending approximately one-half way around the periphery of said member in a diagonal direction. Gearing such as shown in Fig. 4 rotates the outer cone 37 at approximately one-eighth the speed of the inner perforated cone. Light in various degrees of luminosity, depending on the variations of the received current, is transmitted from the lamp 13 to the concave or magnifying mirror 39 whence it was reflected to the plane mirror 40 so that the picture may be viewed by a number of observers, the eye of one of which is indicated at 41.

In the modification shown in Fig. 7, the construction is identical with that of Fig. 6, except that the lamp 13′ is placed outside the co-operating scanning members and the magnifying mirror 42 is located inside the same at the appropriate angle to receive the picture which may be viewed by a number of observers, the eye of one of whom is indicated at 43.

In Figs. 6 and 7 the shaft 34 and also the effective portions of the scanning members are inclined to the horizontal so that as above explained with respect to Fig. 1, an observer located above the apparatus may conveniently view the picture.

As will be obvious, it is sometimes desirable to have the televisor located below the plane of the observer's eye and accordingly, by means of the present invention, the observer may see the picture without inconvenience.

In Fig. 8 the magnifying mirror 44 is so placed with respect to the apparatus that the picture may be viewed by observers stationed above said apparatus, the eye of an observer being indicated at 45. The gearing whereby the scanning members 35, 37 are rotated at the proper relative speeds is identical with that shown in Fig. 4 and the construction of said members is the same as above described in connection with Fig. 6.

In the modification illustrated in Fig. 9, the construction of the scanning members and their driving mechanism is identical with that shown in Fig. 8. The picture formed on the magnifying mirror 44 is reflected to the magnifying mirror 46 and may be seen by observers, the eye of one of whom is indicated at 47. In the arrangements of Figs. 8 and 9, the drive shaft and the effective surfaces of the scanning members are inclined to the horizontal so that as explained in connection with Fig. 1, the observer may conveniently view the picture formed by a televisor apparatus located beneath him.

Having thus described illustrative embodiments of my invention, without however limiting the same thereto, what I claim and desire to secure by Letters Patent is:—

1. A television receiving apparatus comprising in combination a scanning member having its effective area inclined to the horizontal, and a magnifying mirror associated therewith, as a picture-receiving surface.

2. A television receiving apparatus comprising in combination a scanning member, a lamp associated with said scanning member, a magnifying mirror so related to said member and lamp that light transmitted through said scanning member will impinge on said mirror, and a picture-receiving surface so arranged with respect to said mirror that the picture formed on the latter is reflected to said surface.

3. A television receiving apparatus comprising in combination a scanning member,

a magnifying mirror so related to said member and lamp that light transmitted through said scanning member will impinge on said mirror, and a second magnifying mirror so related to the mirror first mentioned that the picture formed on the latter is reflected on said second magnifying mirror.

In testimony whereof, I have hereunto subscribed my name this 11th day of March, 1929.

CALLO D. FAHRNEY.