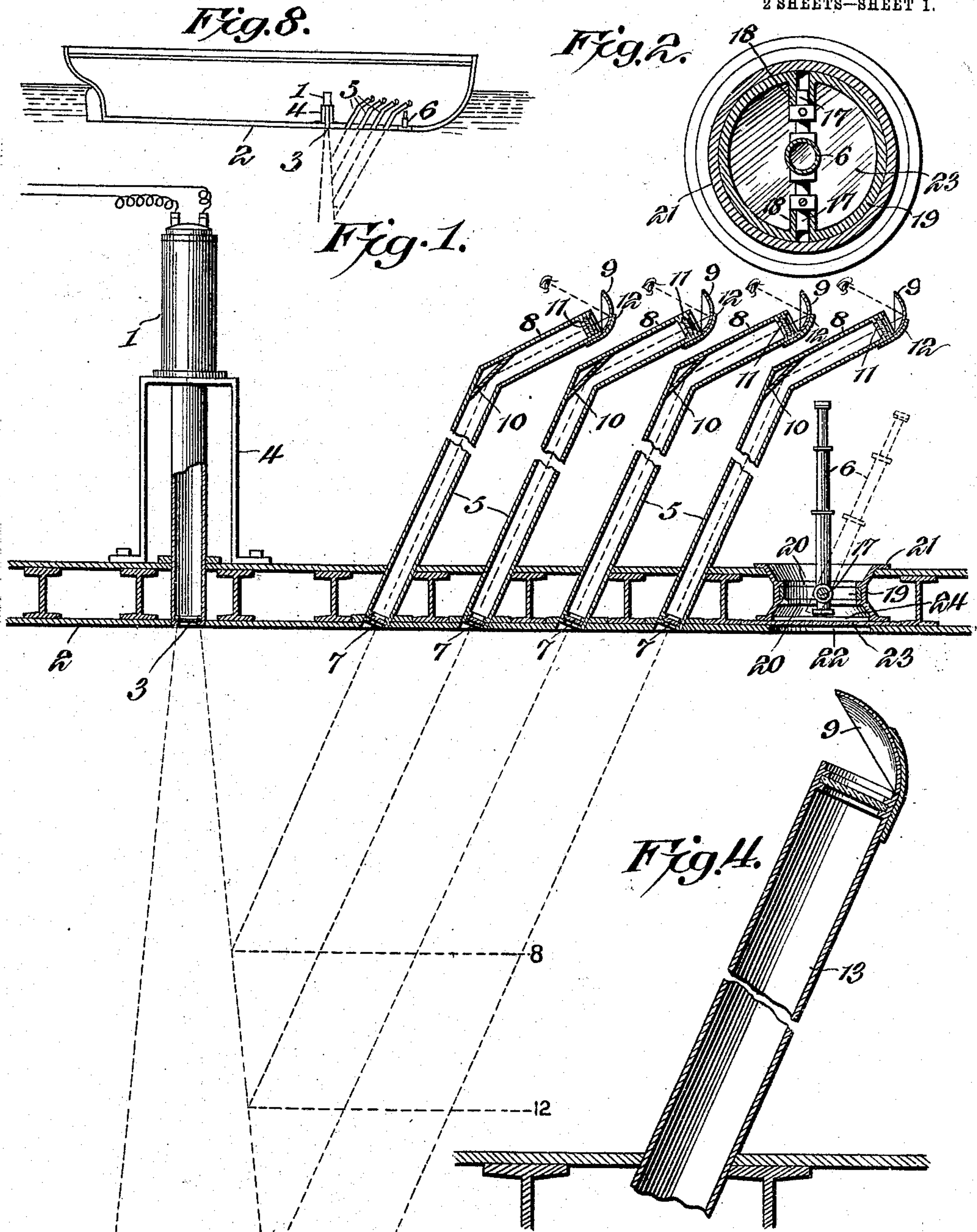


No. 885,087.

PATENTED APR. 21, 1908.

M. SAMAHA.  
SUBMARINE VIEWING APPARATUS.  
APPLICATION FILED MAY 11, 1907.

2 SHEETS—SHEET 1.



Witnesses  
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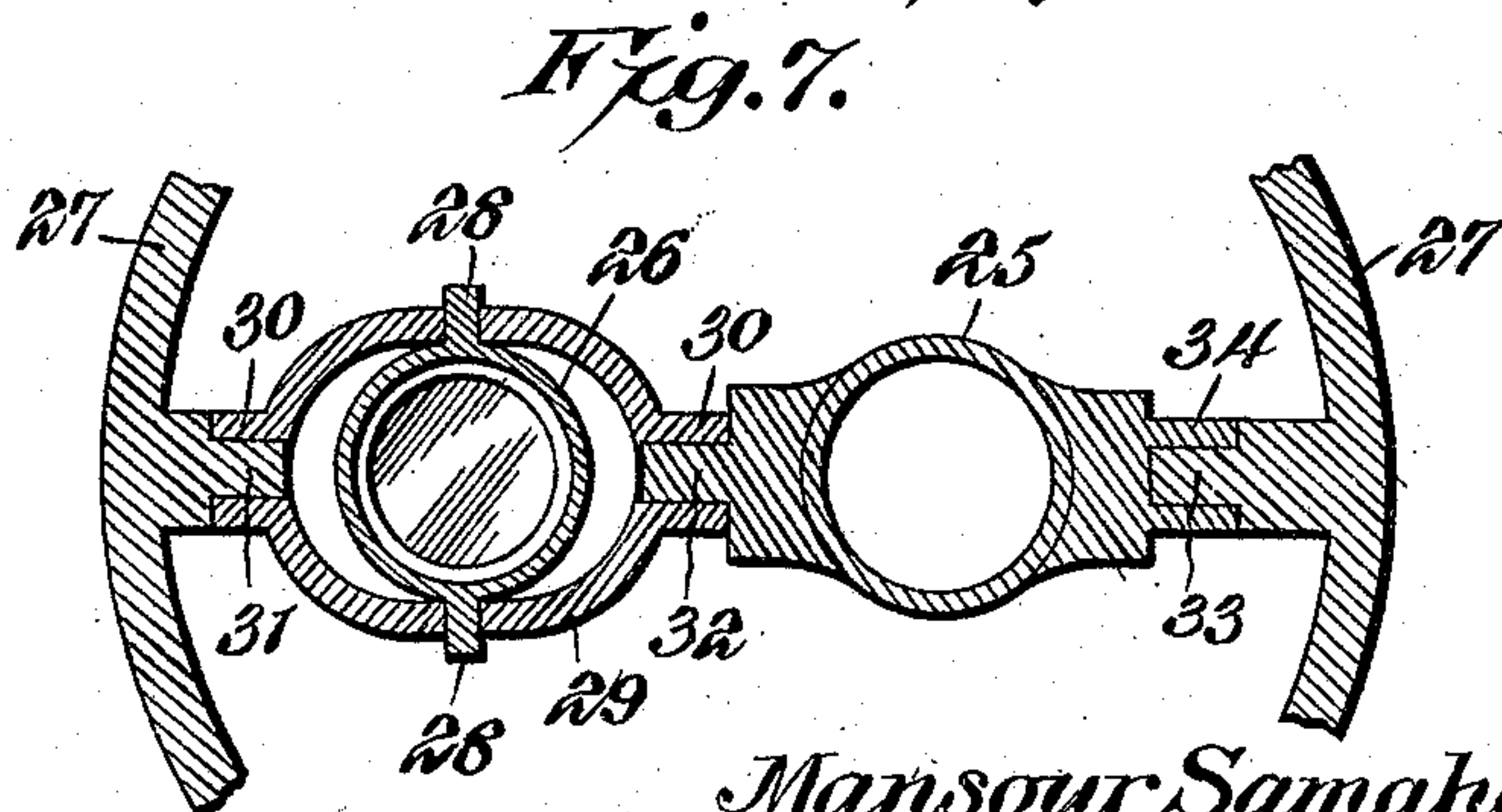
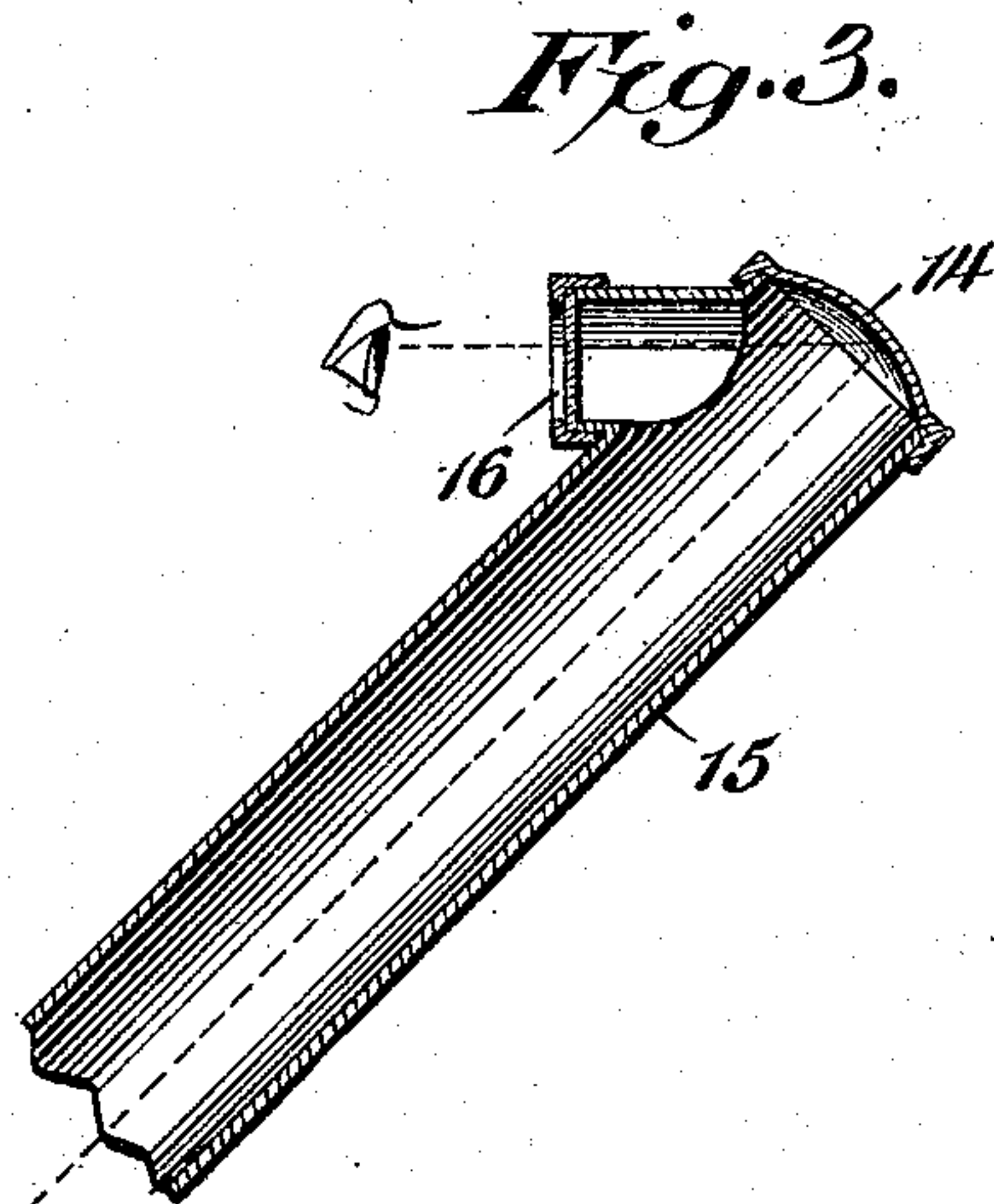
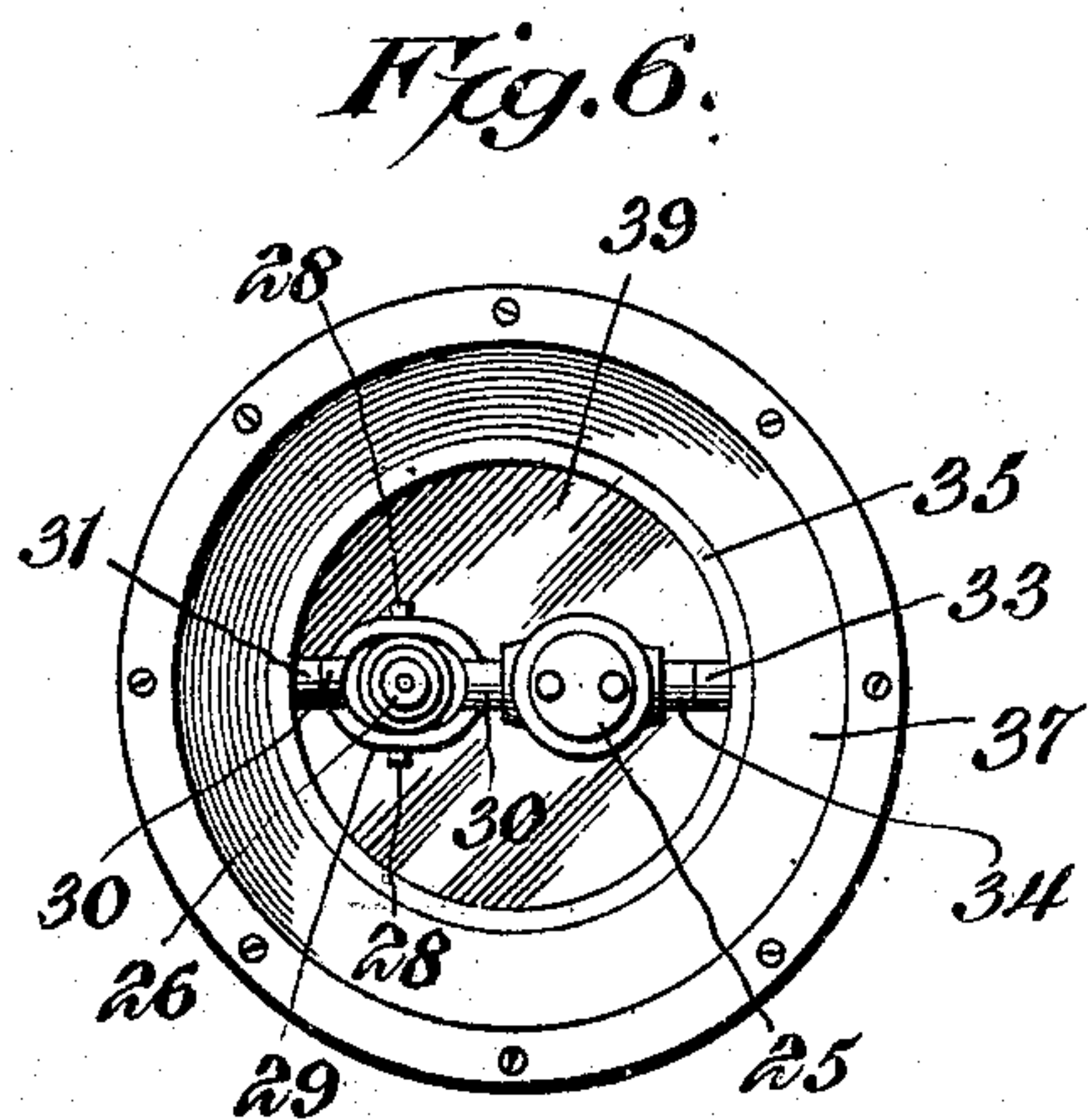
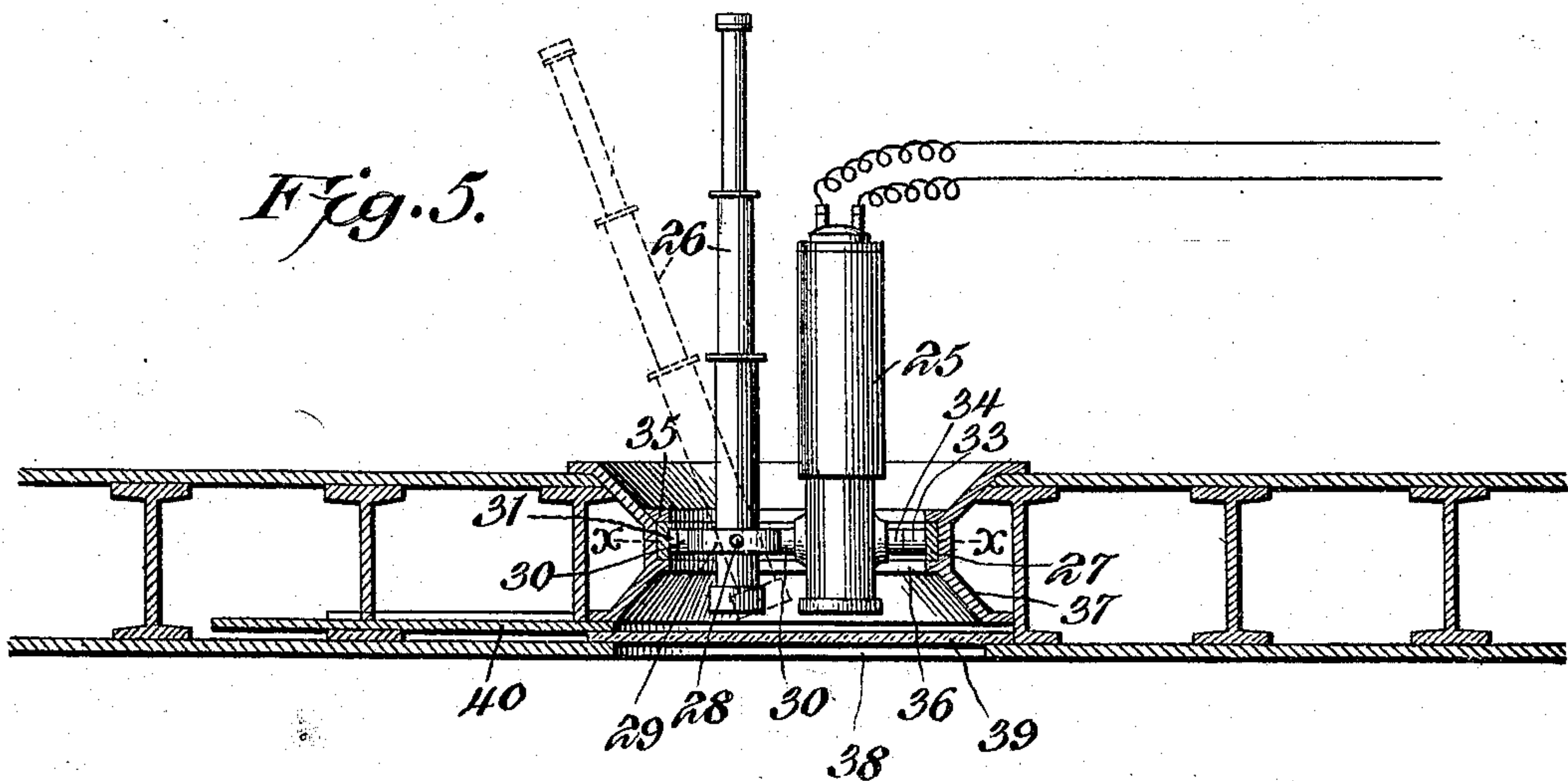
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

MANSOUR SAMAHA, OF WASHINGTON, DISTRICT OF COLUMBIA.

## SUBMARINE VIEWING APPARATUS.

No. 885,087.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed May 11, 1907. Serial No. 373,092.

*To all whom it may concern:*

Be it known that I, MANSOUR SAMAHA, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Submarine Viewing Apparatus, of which the following is a specification.

The invention relates to improvements in submarine viewing apparatus.

10 The object of the present invention is to provide a simple and comparatively inexpensive submarine viewing apparatus, designed to form a part of the equipment of submarine and various other kinds of vessels, and adapted  
15 ed to be effectively and advantageously employed in searching for torpedoes, mines, and the like, and in navigating a vessel in shallow or unknown waters, and in searching for sunken objects in salvage and other operations.  
20 tions.

A further object of the invention is to provide an apparatus of this character, adapted to afford the observer a plurality of submarine views at different predetermined depths  
25 or distances below the hull of a vessel, so that the apparatus will not only enable the bottom at different depths to be observed, but will indicate the depth of the water without adjustment of the apparatus.

30 Another object of the invention is to provide a submarine viewing apparatus, which will be located wholly within the lines of the hull, so as to offer no resistance to the passage of a vessel through the water, and also  
35 to prevent it from being injured through contact with floating, or other objects in the water and to avoid agitating the water and thereby interfering with the view.

40 With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims here-  
45 to appended; it being understood that various changes in the form, proportion, size and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

50 In the drawings:—Figure 1 is a vertical longitudinal sectional view of a submarine viewing apparatus, constructed in accordance with this invention. Fig. 2 is a detail sectional view, illustrating the manner of  
55 mounting the pivoted telescope. Figs. 3 and 4 are detail sectional views, illustrating

different forms of optical tubes. Fig. 5 is a vertical longitudinal sectional view of a submarine viewing apparatus, illustrating a modification of the invention designed particularly for use on submarine and other war vessels. Fig. 6 is a plan view, illustrating the manner of adjustably mounting the telescope and the search light. Fig. 7 is an enlarged sectional view, taken substantially on the line  $x-x$  of Fig. 5. Fig. 8 is a diagrammatic view, showing the arrangement of the apparatus within the hull of a vessel.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

The form of submarine viewing apparatus, illustrated in Fig. 1 of the drawings, is designed for use on steamers and various other vessels, both for searching for sunken objects in rivers and other comparatively shallow bodies of water, and also in navigating unknown and shallow waters, and it may be arranged in any convenient portion of the hull of a vessel. The submarine viewing apparatus may be installed either during the construction of a vessel, or after the completion of such construction in any convenient position. It is provided with a powerful search light 1, which may be of any preferred construction, and which pierces the hull 2 below the surface of the water, as clearly illustrated in Fig. 1 of the drawings. The search light 1, which is water tight, terminates at the exterior of the hull and is arranged wholly within the lines of the vessel, and the apparatus presents no projecting parts, so that it will in no wise affect the speed of a vessel, or agitate the water, or become broken or otherwise injured by objects in the water.

The hull of the vessel is provided with a suitable aperture for the lower end of the casing of the search light, which is provided at its lower end with a suitable glass 3. The glass 3 may be colored, so that the rays of light from the search light will be colored and easily distinguishable from the sun light, which will not interfere with the operation of the apparatus in shallow water during the day. The casing of the search light may be supported in a vertical position by a brace 4, or other suitable means. The brace 4 is composed of opposite sides and a connecting top portion. The top portion receives the search light, and the lower terminals of the sides are bent outward, and are secured to the hull of the vessel. The search light is designed to



be equipped with a high candle arc light and a powerful reflector, but as the particular construction of the search light does not constitute a portion of the present invention, a detail description and illustration thereof is deemed unnecessary. The hull of the vessel is also pierced for a group or series of optical tubes 5, arranged at an inclination so that the line of vision will intersect the rays of light of the search light at different distances from the hull 2, whereby the optical tubes will present to the observer fields of vision or views at different depths. These inclined optical tubes, which may be arranged at any angle, will have their lines of vision intersecting the rays of light of the search light at predetermined depths, so that when the bottom is viewed through any one of the group of optical tubes, the depth of the water will be known. This will enable the bottom to be observed and the depth of water to be ascertained without any adjustment of the apparatus. The powerful search light will enable the light to be reflected within the optical tubes from a considerable distance below the hull of the vessel, but in practice the fixed inclined optical tubes will be arranged so as to intersect the rays of light at intervals between the hull of the vessel and at distances of about twenty-five feet, which will be ample for all practical purposes, as the stationary inclined optical tubes are designed principally for searching comparatively shallow waters for missing objects, and also to facilitate the navigation of the unknown shallow waters and the like. When it is desirable to make observations at greater depth, an adjustable telescope 6 will be employed.

In Fig. 1 of the drawings, the axes of the stationary inclined optical tubes are indicated as intersecting the rays of the search light at intervals of four feet, and each optical tube, which may be constructed of any suitable material, is provided at the lower end with a plain, clear glass 7, and the optical tube is air tight to reduce to a minimum all interferences with the light reflected in it. The optical tube is provided, for convenience, with an angularly disposed upper portion 8, and it has a concave mirror 9 on which the reflected light is thrown by an angularly disposed or inclined mirror 10, located within the optical tube at the angle formed by the upper and lower portions thereof. The upper end of the optical tube is closed by a clear glass 11, and the concave mirror 9, which is supported by a suitable arm 12, is arranged exteriorly of the optical tube. The first optical tube of the series or group, or the one nearest the search light, is indicated as intersecting the rays of light at a distance of eight feet below the hull 2, and the light reflected in the first tube will be thrown on the concave receiving mirror 9, in which may be

seen all objects in the illuminated field of the first optical tube, and when the vessel is in motion, the objects will appear on the concave mirror in the form of a moving panorama, or a continuous submarine view.

For convenience of illustration, the group of optical tubes are shown in a straight line, but they may be arranged in a curved or other series, as preferred, and the optical tubes may extend to any convenient portion of the ship, where it is desired to have such submarine observations taken, and if desired, a straight optical tube 13 may be employed, as illustrated in Fig. 4. In Fig. 3 is illustrated another form of optical tube, which is provided at the upper end with a concave mirror 14. The optical tube 15 is provided at one side with a sight aperture, which is in the form of a tubular eye piece 16, having a plain glass through which the concave mirror is clearly visible. The group of optical tubes with their concave receiving mirrors will present to the observer submarine views at different depths or distances from the point of observation.

The telescope 6 is provided at the opposite sides with suitable pivots or trunnions 17, which are mounted in suitable bearings 18 of a rotary ring 19, adapted to permit the telescope to be turned, so as to swing across the rays of the search light as well as toward and from the same. In clear water with a powerful search light, submarine observations may be made at a considerable depth by means of the telescope, which is adapted to be arranged at different angles to the search light, so that the line of vision will intersect the search light at different distances from the hull or bottom of a vessel. The ring 19 is mounted between upper and lower horizontal flanges 20 of a sleeve 21, having flared upper and lower portions and suitably mounted at an aperture 22 of the hull 2. The aperture is covered by a suitable glass 23, and a slide 24 is provided for covering the aperture in event of any damage to the glass, and also when the apparatus is not in use. Any suitable means may be employed for operating the slide or closure, and the glass may be of sufficient strength, so that the slide or closure need be used only in event of accident. The flared upper and lower portions of the supporting sleeve afford the telescope a considerable range of vision in making submarine observations.

In Figs. 5 to 7 inclusive of the drawings is illustrated a submarine viewing apparatus, designed particularly for use on war vessels, submarine boats and the like for locating torpedoes, mines, submarine boats and the like. This form of apparatus comprises an oscillatory search light 25 and an oscillatory telescope 26, adapted to be arranged either parallel with or at an angle to the search light 25. The telescope and the search light are



mounted in and supported by a rotary ring 27, which enables the search light and telescope to be arranged to swing either longitudinally or transversely of the vessel, or at any intermediate angle. The telescope is provided at opposite sides with pivots or trunnions 28, which are journaled in bearings of an elliptical support 29, and the latter is provided at its ends with bearings 30 for the reception of pivots or trunnions 31 and 32 of the ring 27 and the search light 25. The journal 31 is located at one side of the ring, which is provided at its opposite side with a journal 33, fitting in a bearing 34 of the search light 25. By this construction, the telescope is adapted to swing either longitudinally or transversely of the elliptical support, and the search light is adapted to swing transversely of the said elliptical support. The rotary bearing ring 27 is mounted between upper and lower horizontal flanges 35 and 36, extending inwardly from a sleeve 37, which is provided with upper and lower flared or tapered portions to afford a relatively large amount of adjustment of the telescope and the search light. This will enable observations to be made at considerable distances in any direction. The upper flange 35 is in the form of a detachable ring, and the sleeve 37 is mounted at an aperture 38, which is covered by a plate 39 of glass, a slidable closure 40 being provided for closing the aperture 38 in event of injury to the glass.

By the aid of a powerful search light and a strong telescope, objects may be seen through clear water for a considerable distance, and the agitation of the illuminated water will operate to render objects more distinct.

Submarine and other vessels may be provided at different points with apertures, and the submarine viewing apparatus may be transferred from one set of apertures to another, so that a single apparatus may be used either fore or aft, or at either side of a vessel. Also the inclined optical tubes 5 may be pivotally mounted, so as to be arranged at different angles or inclinations. By pivotally mounting the optical tube 5, it will be enabled to take the place of two or three fixed tubes.

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

1. The combination with a hull, of a submarine viewing apparatus comprising a single search light, and a plurality of fixed optical tubes arranged at different distances from the axis of the search light, each having its axis arranged to intercept the axis of the search light at a predetermined distance from the hull.

2. The combination with a hull, of a submarine viewing apparatus comprising a single search light, and a plurality of optical

tubes arranged at different distances from the axis of the search light, each having its axis arranged to intersect the axis of the search light at a predetermined distance from the hull and provided at the observation end with a receiving mirror.

3. The combination with a hull, of a submarine viewing apparatus including a search light, and a pivotally mounted optical tube having its axis intersecting the axis of the search light and adapted to swing on its pivot to change the angle or inclination so as to intersect the axis of the search light at different distances below the hull.

4. In a submarine viewing apparatus, the combination of a hull provided with apertures located below the surface of the water, a single search light mounted within the hull at one of the apertures, and a plurality of optical tubes mounted within the hull at the other apertures and located at different distances from the search light and each being arranged at an angle to the search light with its axis intersecting the axis of the search light at a predetermined distance from the hull, said optical tubes being provided with receiving mirrors arranged in a series.

5. In a submarine viewing apparatus, the combination of a hull provided with apertures located below the surface of the water, a single search light mounted within the hull at one of the apertures, and a plurality of optical tubes mounted within the hull at the other apertures and located at different distances from the axis of the search light and each being arranged at an angle to the search light with its axis intersecting the axis of the search light at a predetermined distance from the hull, said optical tubes being provided with concave receiving mirrors arranged in a substantially horizontal series.

6. In a submarine viewing apparatus, the combination with a hull provided below the surface of the water with apertures, of a single search light mounted within the hull at one of the apertures, and a plurality of fixed optical tubes mounted within the hull at the other apertures and each arranged at an angle to the search light with its axis intersecting the axis of the search light at a predetermined distance from the hull and provided with angularly disposed portions, said optical tubes being also provided with concave receiving mirrors and having inclined mirrors located at the angles of the tubes.

7. The combination with a hull, of a submarine viewing apparatus including a search light located within the hull, and a telescope pivotally mounted within the hull and having a swinging movement independent of the search light so as to arrange its axis to intersect the axis of the search light at different distances below the hull.

8. In a submarine viewing apparatus, the combination with a hull having apertures, of



a fixed search light mounted at one of the apertures, and an optical tube located at the other aperture and mounted for pivotal and rotary movements.

5 9. In a submarine viewing apparatus, the combination with a hull having apertures, of a search light located at one of the apertures, a telescope located at the other aperture, a rotary supporting ring mounted at the latter  
10 aperture, and means for pivotally mounting the telescope on the supporting ring.

15 10. In a submarine viewing apparatus, the combination with a hull having apertures, of a search light located at one of the apertures, a sleeve mounted at the other aperture and provided with inner and outer flared portions, and an oscillatory telescope pivotally mounted between the flared portions of the sleeve.

20 11. In a submarine viewing apparatus, the combination with a hull having apertures, of a search light located at one of the apertures, a sleeve mounted at the other aperture and provided with inner and outer flared portions, a rotary ring mounted between the  
25 flared portions of the sleeve, and a telescope pivotally connected with the rotary ring.

30 12. In a submarine viewing apparatus, the combination with a hull having a sight aperture located below the surface, of a colored search light mounted within the hull at the said aperture, and an optical tube located

within the hull and arranged at an angle to the search light with its axis intersecting the axis of the search light at a distance from the hull, said optical tube being pivotally mounted and arranged to swing independently of the search light to cause its axis to intersect the axis of the search light at different distances from the hull. 35 40

13. The combination with a hull, of a submarine viewing apparatus including a search light, and a telescope located within the hull in coöperative operation, one of them being mounted for pivotal movement independent of the other so as to cause their axes to intersect at different distances beyond the hull. 45

14. The combination with a hull, of a submarine viewing apparatus including a search light located within the hull, and a telescope mounted within the hull for pivotal and rotary movements and arranged in coöperative relation with the telescope and adapted to swing on its pivot to cause its axis to intersect the axis of the search light at different distances beyond the hull. 50 55

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

MANSOUR SAMAH.

Witnesses:

JOHN H. SIGGERS,  
H. T. RILEY.