

No. 850,616.

PATENTED APR. 16, 1907.

A. P. BLIVEN.  
FLYING MACHINE.

APPLICATION FILED DEC. 17, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

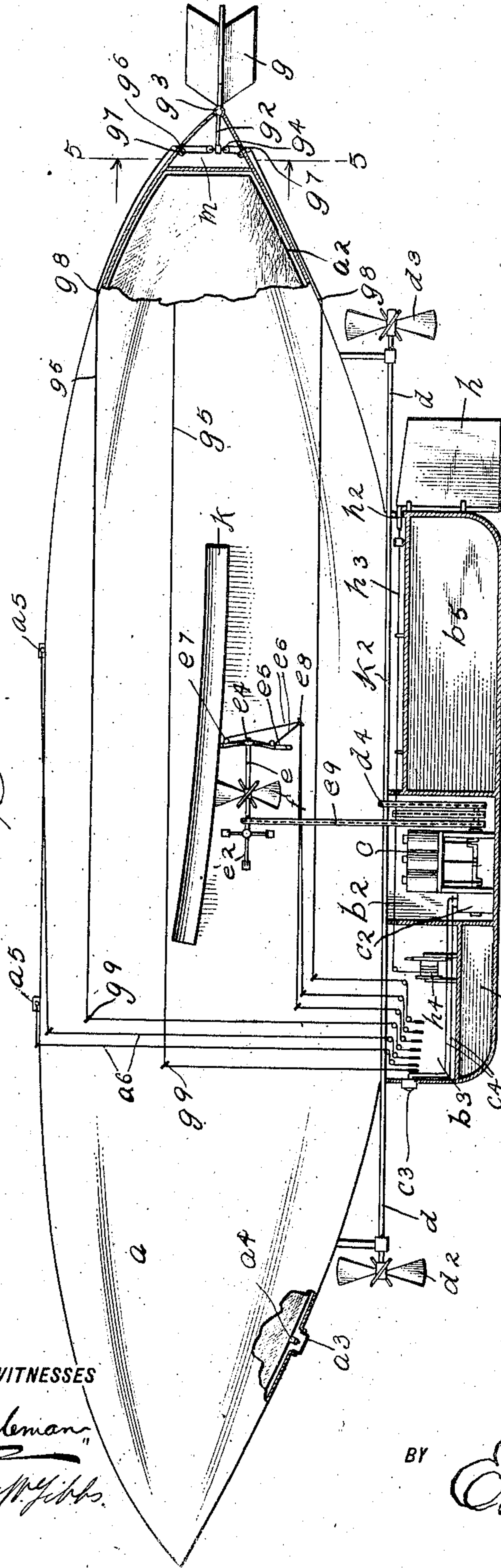
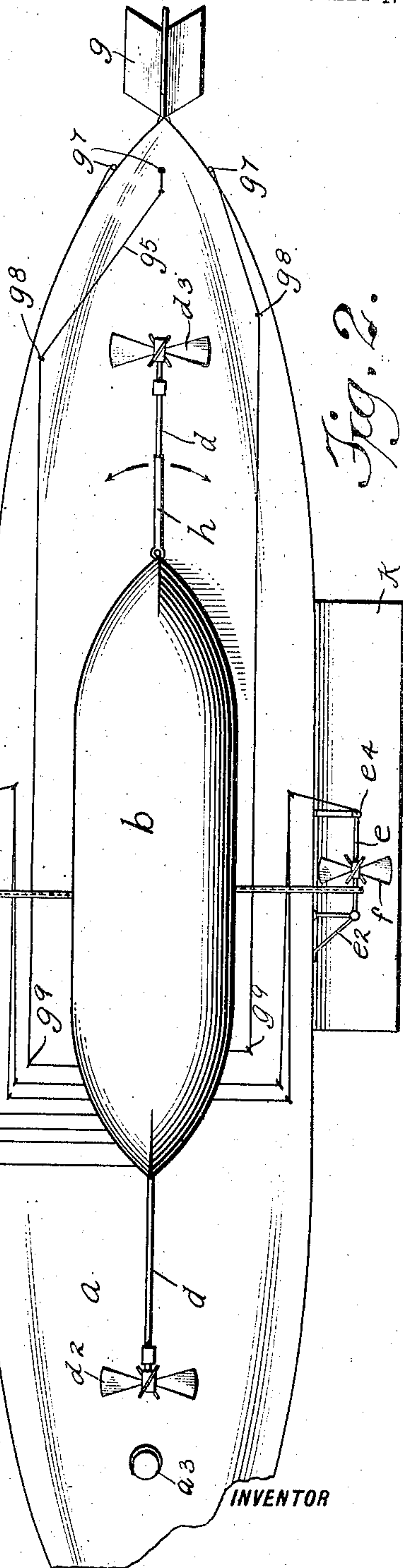


Fig. 2.



WITNESSES  
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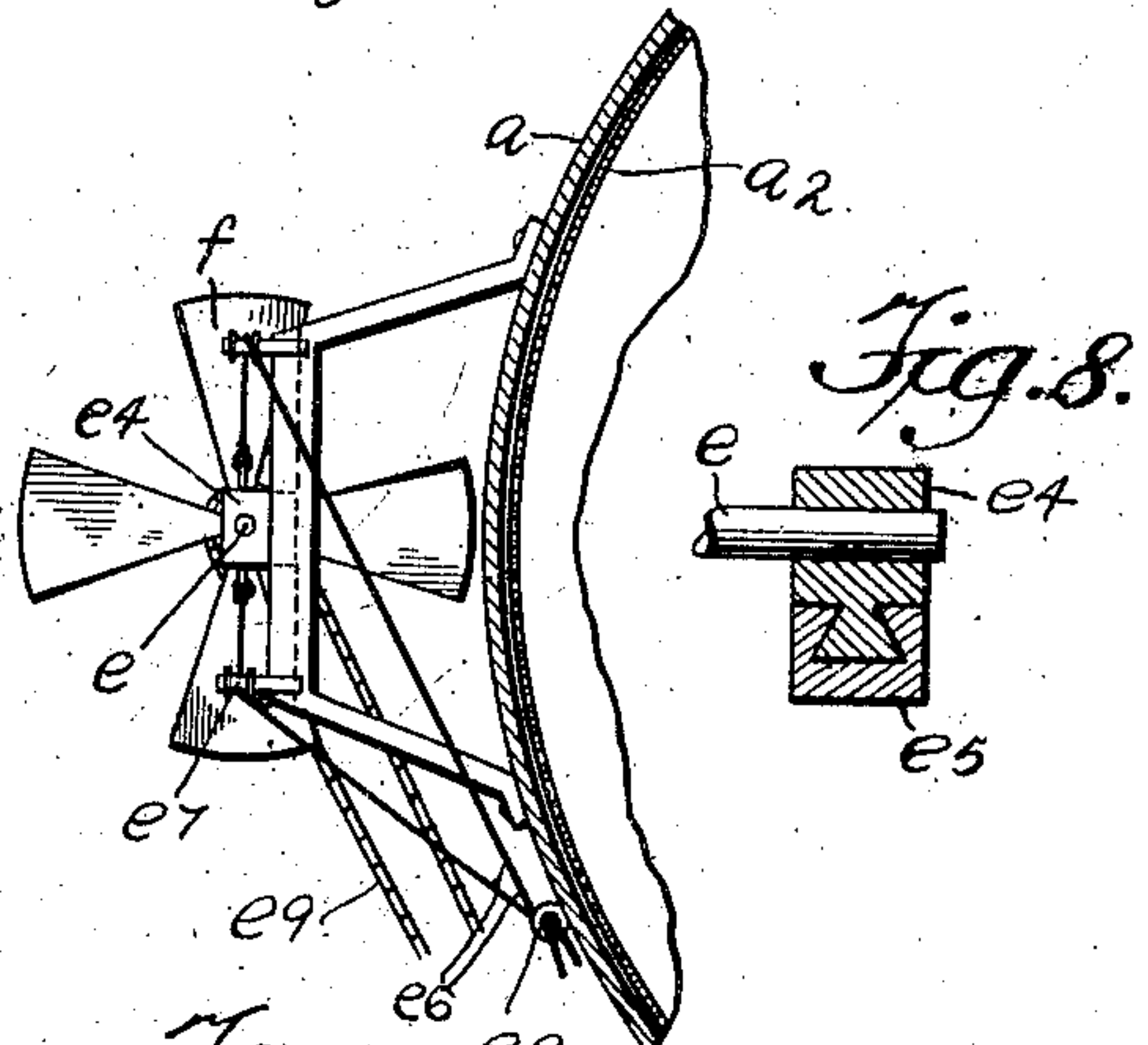
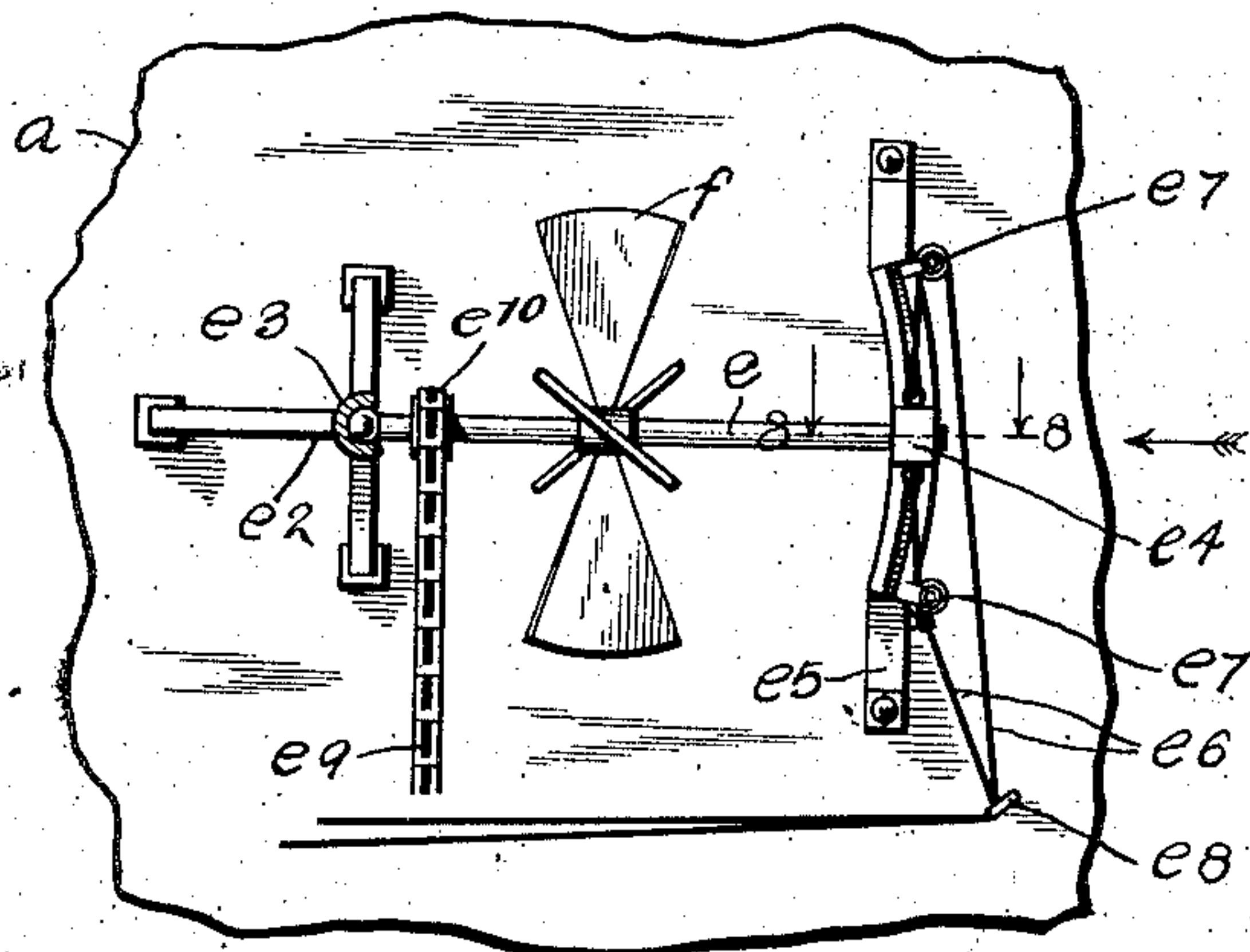
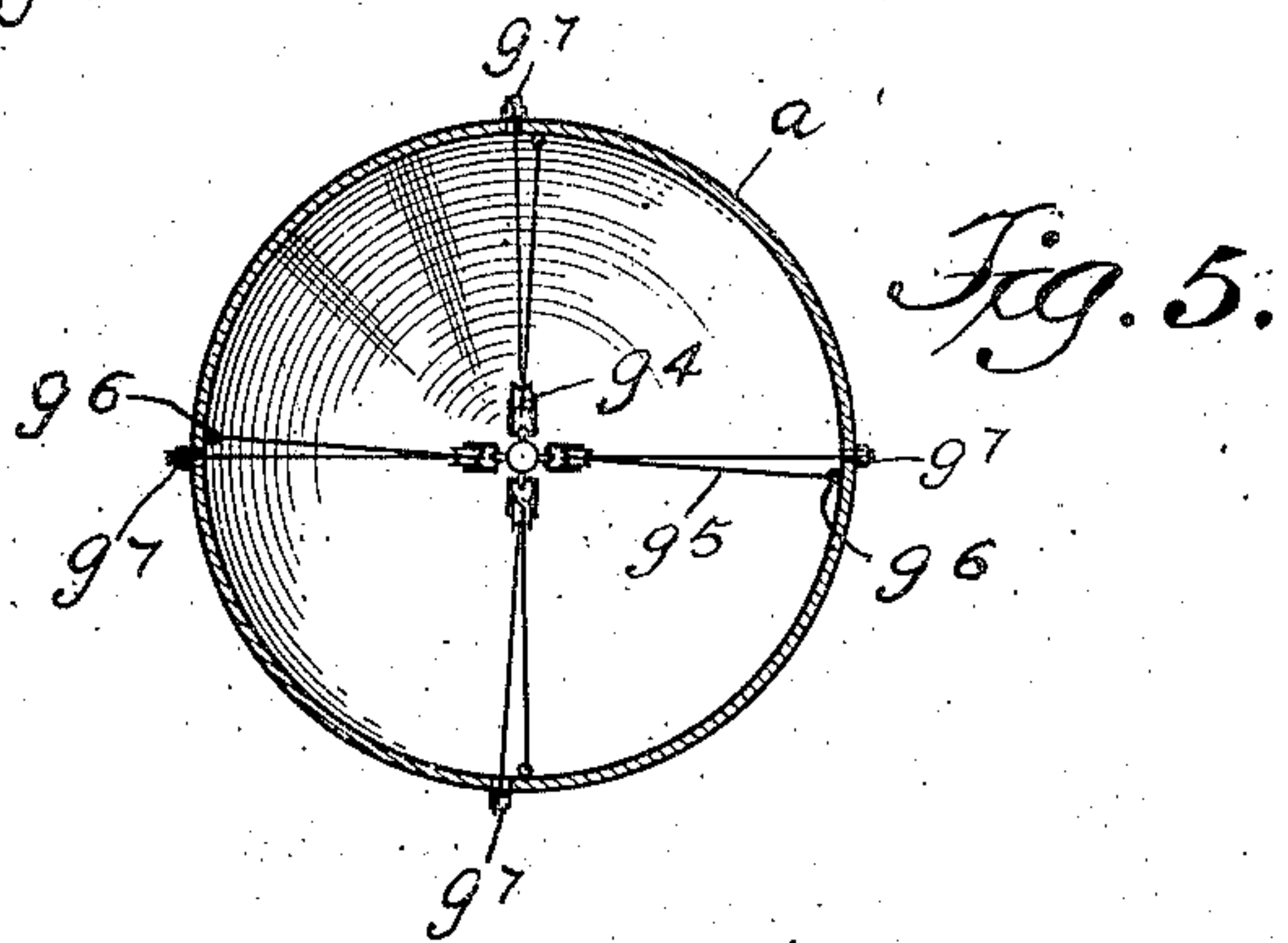
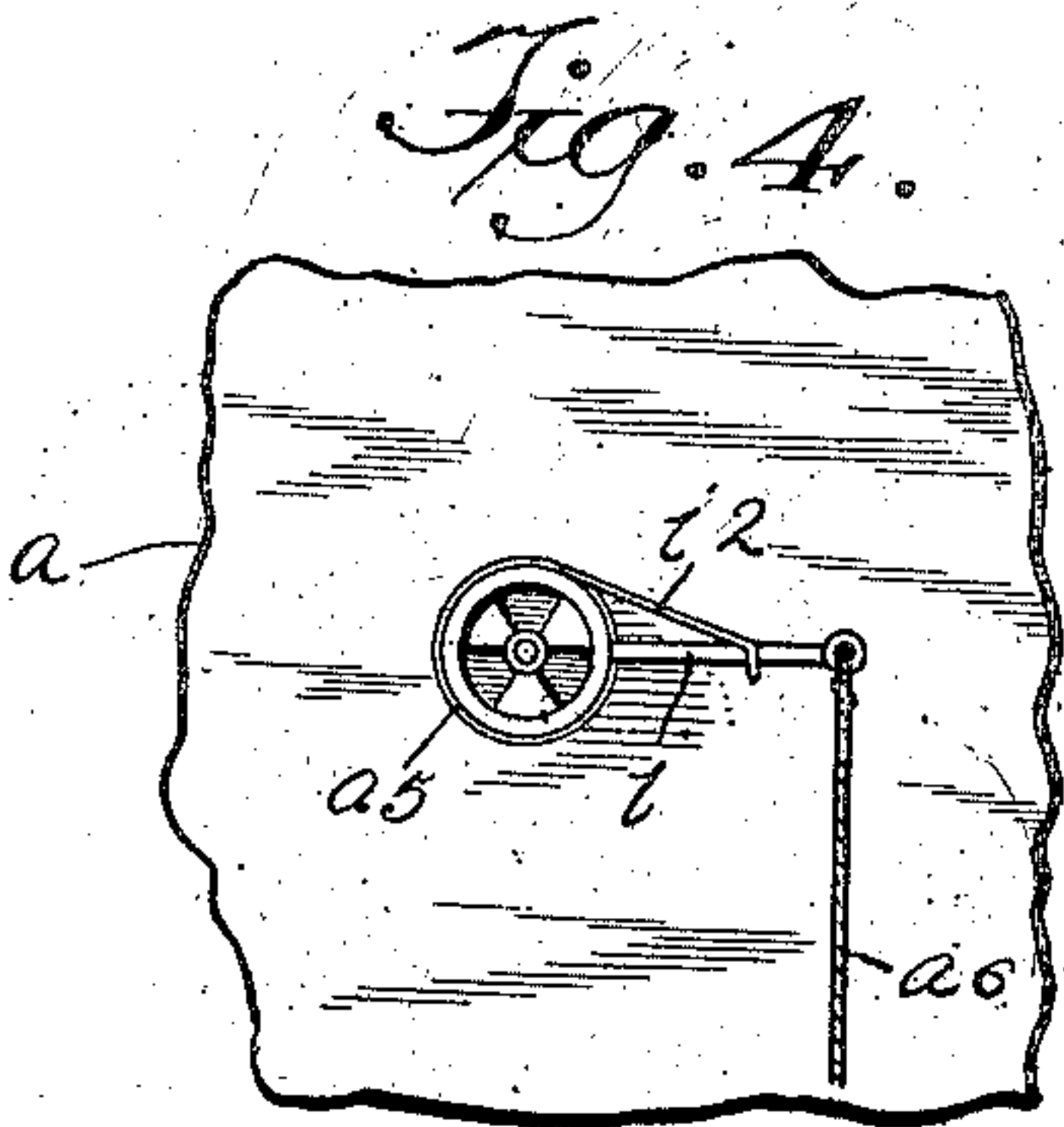
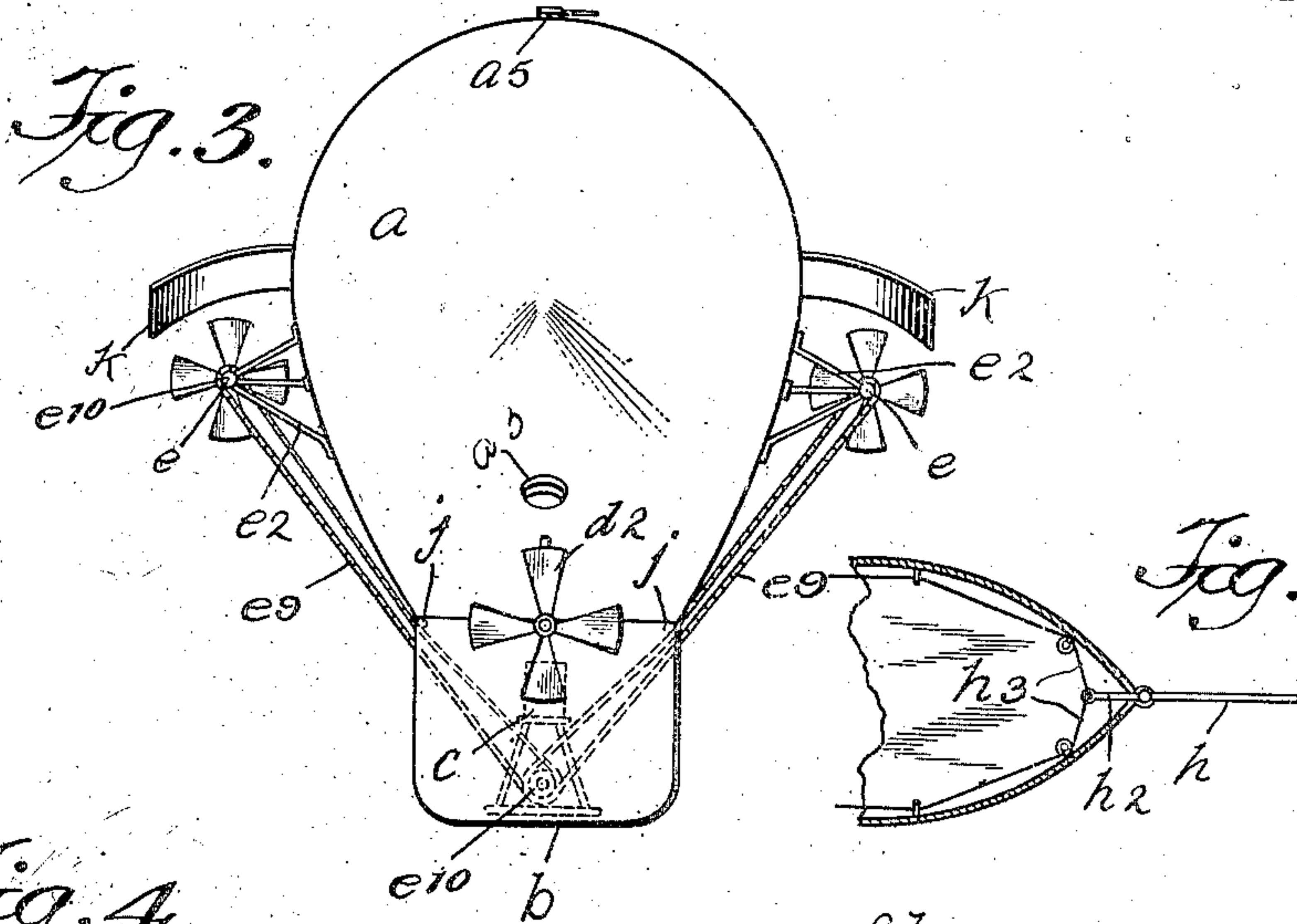
BY *Alonzo P. Bliven.*  
*Edgar Tate & Co.*  
ATTORNEYS

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2 SHEETS—SHEET 2.



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WITNESSES  
*Fig. 6.*  
A. R. Appleman  
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BY



# UNITED STATES PATENT OFFICE.

ALONZO P. BLIVEN, OF BROOKLYN, NEW YORK.

## FLYING-MACHINE.

No. 850,616.

Specification of Letters Patent.

Patented April 16, 1907.

Application filed December 17, 1906. Serial No. 348,305.

*To all whom it may concern:*

Be it known that I, ALONZO P. BLIVEN, a citizen of the United States, and residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Flying-Machines, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

10 This invention relates to flying-machines; and the object thereof is to provide an improved machine of this class having the highest possible carrying power and provided with suitable propellers, steering devices, and 15 means for operating the same; a further object being to provide a flying-machine which involves an oblong tapered gas balloon or receptacle which constitutes the chief carrying power and which is provided with or 20 from which is suspended a casing having an engine-room, a saloon, a ballast-chamber, and illuminating-gas tanks, together with propellers, steering or guiding devices, and other features necessary in the construction 25 and operation of a practical machine of this class; and with these and other objects in view the invention consists in a machine of the class specified constructed as hereinafter described and claimed.

30 The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by suitable reference characters in 35 each of the views, and in which—

Figure 1 is a sectional side view of my improved flying-machine; Fig. 2, a bottom plan view thereof; Fig. 3, a front end view; Fig. 4, a plan view of a valve device employed in connection with a balloon or gas-container; Fig. 5, a vertical section on the line 5 5 of Fig. 1 and showing means for operating one of the steering devices which I employ; Fig. 6, a side view, on an enlarged 45 scale, of one of the propellers with which the sides of the balloon or gas-container are provided; Fig. 7, an end view thereof looking in the direction of the arrow  $x$  in Fig. 6; Fig. 8, a partial section on the line 8 8 of Fig. 6, 50 and Fig. 9 a sectional plan view showing means for operating another steering device.

In the practice of my invention, I provide a balloon or gas-container  $a$ , which is tapered at both ends and the top portion of which,

as shown in the drawings, is preferably substantially semicircular in cross-section, while the bottom side portions thereof are preferably tapered inwardly in cross-section and provided with a depending longitudinally-arranged casing  $b$ . The balloon or gas-container  $a$  is composed of a main outer shell of aluminium or aluminium alloy constructed in any desired manner and an inner bag or gas-receiver  $a^2$ , composed of silk or other suitable flexible material and of the same 65 general shape as the main outer casing  $a$ , while the casing  $b$ , connected with or suspended from the main outer casing  $a$ , is also composed of aluminium or aluminium alloy constructed in any desired manner so as to 70 give the desired strength; but fibrous or other material may be used in the combination of the balloon-casing and casing  $b$ .

At any suitable point in the main outer casing  $a$  of the balloon or gas-container is a 75 manhole  $a^3$ , through which the bag  $a^2$  may be passed, and the bag  $a^2$  is provided with a corresponding valve device  $a^4$ , through which said bag may be filled with hydrogen gas, and the main outer casing  $a$  of the balloon 80 or gas-container is also provided at any suitable point, preferably at the top thereof, with valves  $a^5$ , of any preferred construction, and one of which is shown in Fig. 4, and which may be manipulated by means of cords  $a^6$ , 85 so as to release the air from the main outer casing  $a$  of the balloon or gas-container when the bag  $a^2$  therein is being inflated.

The casing  $b$  at the bottom of the balloon or gas-container contains a central engine-room  $b^2$ , a saloon  $b^3$ , a ballast-chamber  $b^4$ , and an illuminating-gas tank  $b^5$ , and within the engine-room  $b^2$  is an engine  $c$ , preferably operated by gas from the tank  $b^5$ , and said engine-room also contains an electrical generator  $c^2$  95 for operating a search-light  $c^3$  or for any other desired purpose, and the search-light  $c^3$  is connected with the generator by wires  $c^4$ .

Passing longitudinally between the casing  $b$  and the main body of the balloon or gas-container is a propeller-shaft  $d$ , having a front propeller  $d^2$  and a rear propeller  $d^3$ , and the propeller-shaft  $d$  is geared in connection with the power-shaft of the engine  $c$  by means of a drive-chain  $d^4$ . 100

At the opposite sides of the main body of the balloon or gas-container are mounted supplemental propeller-shafts  $e$ , the front 105



ends of which are supported in brackets  $e^2$  by means of ball-and-socket joints  $e^3$  or similar constructions, and the rear ends of which are mounted in bearing-blocks  $e^4$ , slidably connected with segmental supports  $e^5$ , secured in a vertical position to the main body of the balloon or gas-container, as are also the bracket-supports  $e^2$ , and connected with the bearing-blocks  $e^4$  are cords  $e^6$ , which are passed around pulleys  $e^7$ , arranged above and below the rear ends of the shafts  $e$ , and which are also passed through suitable keepers or eyes  $e^8$ , connected with the main body of the balloon or gas-container and carried into the saloon  $b^3$ , from which they may be operated for the purpose of raising and lowering the rear ends of the propeller-shafts  $e$ , and said propeller-shafts  $e$  are geared in connection with the power-shaft of the engine  $c$  by means of drive chains or belts  $e^9$  and corresponding wheels at  $e^{10}$  on said shafts.

The propeller-shafts  $e$  are provided with propellers  $f$ , and by means of the construction of the said shafts and method of supporting the same as herein described the rear ends of said shafts may be raised or lowered when desired, and the operation of the propellers  $f$  may thus be made to help in steering or raising and lowering the flying-machine as well as in the propulsion of said machine.

At the rear end of the balloon or gas-container is a rudder or steering device  $g$ , comprising four wings or blades connected with a shaft  $g^2$ , extending into the rear end of the main outer casing of the balloon or gas-container and supported by a ball-and-socket coupling  $g^3$ , and the inner end of said shaft is provided with pulleys  $g^4$ , as clearly shown in Figs. 1 and 5, and over each of which is passed a cord  $g^5$ , secured at  $g^6$  to the inner side of the main outer casing of the balloon or gas-container, and said cords are passed outwardly through said casing and over pulleys  $g^7$  and are passed through suitable keepers or eyes  $g^8$ , secured to the main outer casing of the balloon or gas-container and carried forwardly and passed through other keepers or eyes  $g^9$  over the saloon  $b^3$ , from which point they are carried downwardly into said saloon and may be operated to control the rudder or steering device  $g$  in any desired manner.

At the rear end of the casing  $b$  is a rudder  $h$ , having a tiller-arm  $h^2$ , which passes into the rear end of the casing  $a$  and with which are connected cords  $h^3$ , as clearly shown in Figs. 1 and 9, and said cords are carried forwardly over the gas-tank  $b^5$  and through the top of the engine-room  $b^2$  into the saloon  $b^3$ , where they are connected with a drum  $h^4$ , by means of which the rudder  $h$  may be operated in the usual manner.

The valves  $a^5$  in the top of the main outer casing of the balloon or gas-container are preferably of the ordinary register type, as shown in Fig. 4, and are controlled by an arm

$i$ , with which is connected a spring  $i^2$ , and the springs  $i^2$  normally hold the valves  $a^5$  closed, and the cords  $a^6$  are connected with the arms  $i$  of said valves, and by pulling on said cords the valves may be opened when desired.

At the point where the drive-chains  $e^9$ , which operate the propeller-shafts  $e$ , pass downwardly around the bottom side portions of the main outer casing of the gas balloon or container into the casing  $b$  are preferably placed antifriction-rollers, as indicated at  $j$  in Fig. 3; but the transverse dimensions of the casing  $b$  and the main outer casing of the balloon or gas-container may be regulated so as to render these antifriction-rollers unnecessary.

Arranged over the propeller-shafts  $e$  and propellers  $f$  and longitudinally of the main outer shell of the balloon or gas-container are downwardly and backwardly inclined and transversely-curved vanes or wing members  $k$ , which are preferably about one-fourth the total length of the balloon or gas-container and of a width equal to or slightly greater than the diameter of the propellers  $f$ , over which they are placed, and these wings or vanes impart a lifting power by reason of the air-currents that are forced out behind the propellers  $f$  in the operation thereof.

From the foregoing description and accompanying drawings it will be seen that the body of the main outer casing of the balloon or gas-container is approximately cylindrical in form and is pointed at both ends, and in practice its extreme length is about six times its greatest diameter at the center, and the comparative length of the casing  $a$ , which contains the engine-room, gas-tank, and saloon, is about one-third that of the balloon or gas-container, or a little over one-third. Although I have described the main outer shell or casing of the balloon or gas-container as composed of aluminium, fiber-board or other hard waterproof substance may be employed, and in cases where the balloon or gas-container is necessarily of great length the main outer casing or shell may be provided with interior braces to give it the desired strength, and in this event a number of the gas-bags  $a^2$  may be employed, if desired.

It will be understood that as the bag  $a^2$  is filled with gas the air in the main outer casing of the balloon or gas-container is expelled through the valves  $a^5$ , and after the bag  $a^2$  is fully inflated the said valves and the man-hole  $a^3$  is closed, and any gas that may escape from the bag  $a^2$  is retained in the main outer shell or casing of the balloon or gas-container, and if a number of the bags  $a^2$  are employed a corresponding number of manholes will be necessary and corresponding means for filling said bags. It will also be understood that the main outer shell or casing of the balloon or gas-container is separated from the bottom casing  $b$  by a horizontal floor  $k^2$ , as



shown in Fig. 1, and there is no communication between the casing *b* and the interior of the main outer shell or casing of the balloon or gas-container.

5 It will be observed that the rear end of the balloon or gas-container or the main outer shell thereof is provided with a chamber *m*, into which the end of the shaft or the rudder or steering device *g* projects, and the pulleys and cords by which said rudder or steering device is operated are all located in said chamber.

15 The casing *b* is of the form of a double-ended boat or barge, and the top side walls thereof may be provided forwardly of the gas-tank *b*<sup>5</sup> with any desired number or arrangement of windows.

20 In the drawings forming part of this specification the arrangement of the casing *b* and the various parts thereof is about midway of the main balloon or gas-container, and by means of this construction and arrangement the entire flying machine or apparatus is substantially balanced, and in practice means may be provided in the casing *b* for carrying explosive material or other substances or articles for use in war or for any other purposes.

30 By the arrangement of propellers and steering devices herein shown and described complete control of the machine may be obtained and the necessary power for propelling the same, and by employing the material herein specified a flying-machine may be made in the manner described that will be as light or lighter than the air it displaces and the desired or necessary load of persons or material may be easily carried to any desired height and retained at a high altitude for a number of days.

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

45 1. A flying-machine, comprising a main balloon or gas-container consisting of a casing tapered at both ends and substantially cylindrical in cross-section and provided at the bottom thereof with a supplemental casing which is of approximately one-third the length thereof, said casing containing an engine-room, a saloon and a gas-tank, an engine placed in the engine-room, a propeller-shaft passing between the supplemental casing and the main casing of the balloon or gas-container and geared in connection with said engine, and means for guiding or steering the flying-machine.

50 2. In a flying-machine, a balloon or gas-container, comprising a main outer casing substantially cylindrical in cross-section and tapered at both ends and provided with an interior bag adapted to be filled with gas, said casing being provided with valves to allow of the escape of air therefrom and with means for filling the bag therethrough, and

said casing being also provided at the bottom with a supplemental casing approximately one-third the length thereof and containing an engine-room, a gas-tank and a saloon, an engine placed in the engine-room, a main propeller-shaft passing longitudinally between the balloon or gas-container and the supplemental casing and geared in connection with said engine, supplemental propeller-shafts mounted on the opposite sides of the balloon or gas-container and geared in connection with said engine, a main rudder connected with the rear end of the balloon or gas-container, means for operating said rudder from the saloon of the supplemental casing, a supplemental rudder connected with the rear end of the supplemental casing, and means for operating said supplemental rudder from the saloon of the supplemental casing.

85 3. In a flying-machine, a balloon or gas-container, comprising a main outer casing substantially cylindrical in cross-section and tapered at both ends and provided with an interior bag adapted to be filled with gas, said casing being provided with valves to allow of the escape of air therefrom and with means for filling the bag therethrough, and said casing being also provided at the bottom with a supplemental casing approximately one-third the length thereof and containing an engine-room, a gas-tank and a saloon, an engine placed in the engine-room, a main propeller-shaft passing longitudinally between the balloon or gas-container and the supplemental casing and geared in connection with said engine, supplemental propeller-shafts mounted on the opposite sides of the balloon or gas-container and geared in connection with said engine, a main rudder connected with the rear end of the balloon or gas-container, means for operating said rudder from the saloon of the supplemental casing, a supplemental rudder connected with the rear end of the supplemental casing, and means for operating said supplemental rudder from the saloon of the supplemental casing, the supplemental propeller-shafts at the opposite sides of the balloon or gas-container being provided with means whereby the rear end thereof may be swung in a vertical plane from the saloon of the supplemental casing.

120 4. In a flying-machine, a balloon or gas-container, comprising a main outer casing substantially cylindrical in cross-section and tapered at both ends and provided with an interior bag adapted to be filled with gas, said casing being provided with valves to allow of the escape of air therefrom and with means for filling the bag therethrough, and said casing being also provided at the bottom with a supplemental casing approximately one-third the length thereof and containing an engine-room, a gas-tank and a saloon, an



engine placed in the engine-room, a main propeller-shaft passing longitudinally between the balloon or gas-container and the supplemental casing and geared in connection with said engine, supplemental propeller-shafts mounted on the opposite sides of the balloon or gas-container and geared in connection with said engine, a main rudder connected with the rear end of the balloon or gas-container, means for operating said rudder from the saloon of the supplemental casing, a supplemental rudder connected with the rear end of the supplemental casing, and means for operating said supplemental rudder from the saloon of the supplemental casing, the supplemental propeller-shafts at the opposite sides of the balloon or gas-container being provided with means whereby the rear end thereof may be swung in a vertical plane from the saloon of the supplemental casing, and the side of the main balloon or gas-container being also provided with longitudinal wings or vanes mounted over the supplemental propeller-shafts and extending outwardly thereover.

5. A flying-machine, comprising a balloon or gas-container composed of a main outer casing substantially cylindrical in cross-section and tapered at both ends and provided with a manhole and outlet-valves, a bag placed in said main outer casing and adapted to be inflated through said manhole, said balloon or gas-container being provided with a bottom supplemental casing which ranges longitudinally thereof and is separated therefrom and contains an engine-room, a gas-tank and a saloon, an engine placed in the engine-room, a main propeller-shaft mounted longitudinally between the balloon or gas-container and the supplemental casing and provided at its front end with a propeller and geared in connection with said engine, supplemental propeller-shafts mounted on the opposite sides of the balloon or gas-container and geared in connection with said engine, a four-blade rudder mounted in the rear end of the balloon or gas-container and having a swivel-support, means for operating said rudder from the saloon of the supplemental casing, a supplemental rudder connected with the rear end of the supplemental casing, and means for operating said rudder from the saloon of the supplemental casing.

6. A flying-machine, comprising a balloon-body or gas-container composed of an oblong casing approximately cylindrical in cross-section and tapered at both ends and provided with a manhole and outlet-valves, an inflatable bag placed in said body or gas-container and adapted to be inflated through said manhole, a supplemental boat-shaped casing connected with the bottom of the main oblong casing and approximately one-third the length thereof and provided with a

saloon, a gas-tank, and an engine-room, an engine placed in said room, propellers at the sides of the balloon-body and at the opposite ends of said supplemental casing and geared in connection with said engine, rudders at the rear end of the balloon-body and the rear end of the supplemental casing, and means for operating said rudders from the supplemental casing.

7. A flying-machine, comprising a main balloon-body, having a rigid casing and adapted to be inflated, a supplemental casing suspended longitudinally of the bottom of the balloon member, an engine placed in said supplemental casing, a main propeller-shaft arranged longitudinally of the bottom of the main balloon member and geared in connection with said engine, and supplemental propeller-shafts at the opposite sides of the main balloon member and geared in connection with said engine and adapted to swing in vertical planes.

8. A flying-machine, comprising a main balloon member composed of a main casing approximately cylindrical in cross-section and tapered at both ends and having an inflatable bag, a supplemental casing suspended longitudinally of the bottom of the balloon member, an engine placed in said supplemental casing, a main propeller-shaft arranged longitudinally of the bottom of the main balloon member and geared in connection with said engine, and supplemental propeller-shafts at the opposite sides of the main balloon member and geared in connection with said engine and adapted to swing in vertical planes.

9. A flying-machine, comprising a main balloon member composed of a main casing approximately cylindrical in cross-section and tapered at both ends and having an inflatable bag, a supplemental casing suspended longitudinally of the bottom of the balloon member, an engine placed in said supplemental casing, a main propeller-shaft arranged longitudinally of the bottom of the main balloon member and geared in connection with said engine, and supplemental propeller-shafts at the opposite sides of the main balloon member and geared in connection with said engine and adapted to swing in vertical planes, said supplemental propeller-shafts being provided with longitudinally-arranged and inclined shields which are placed thereover.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 14th day of December, 1906.

ALONZO P. BLIVEN.

Witnesses:

C. E. MULREANY,  
ALBERT W. GIBBS.