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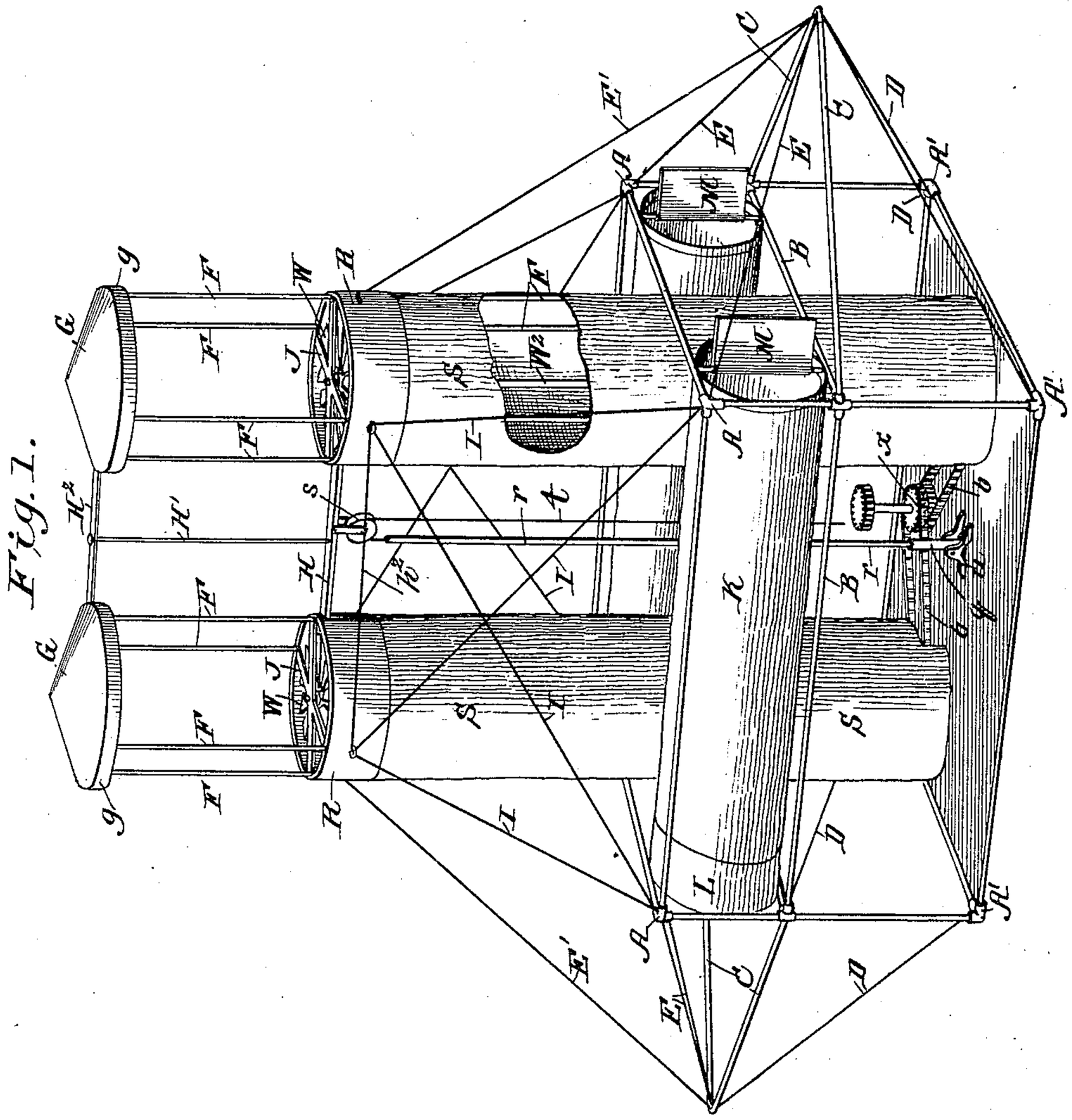
J. C. WALKER.

AIR SHIP.

No. 467,069. Patented Jan. 12, 1892.

Fig. 1.



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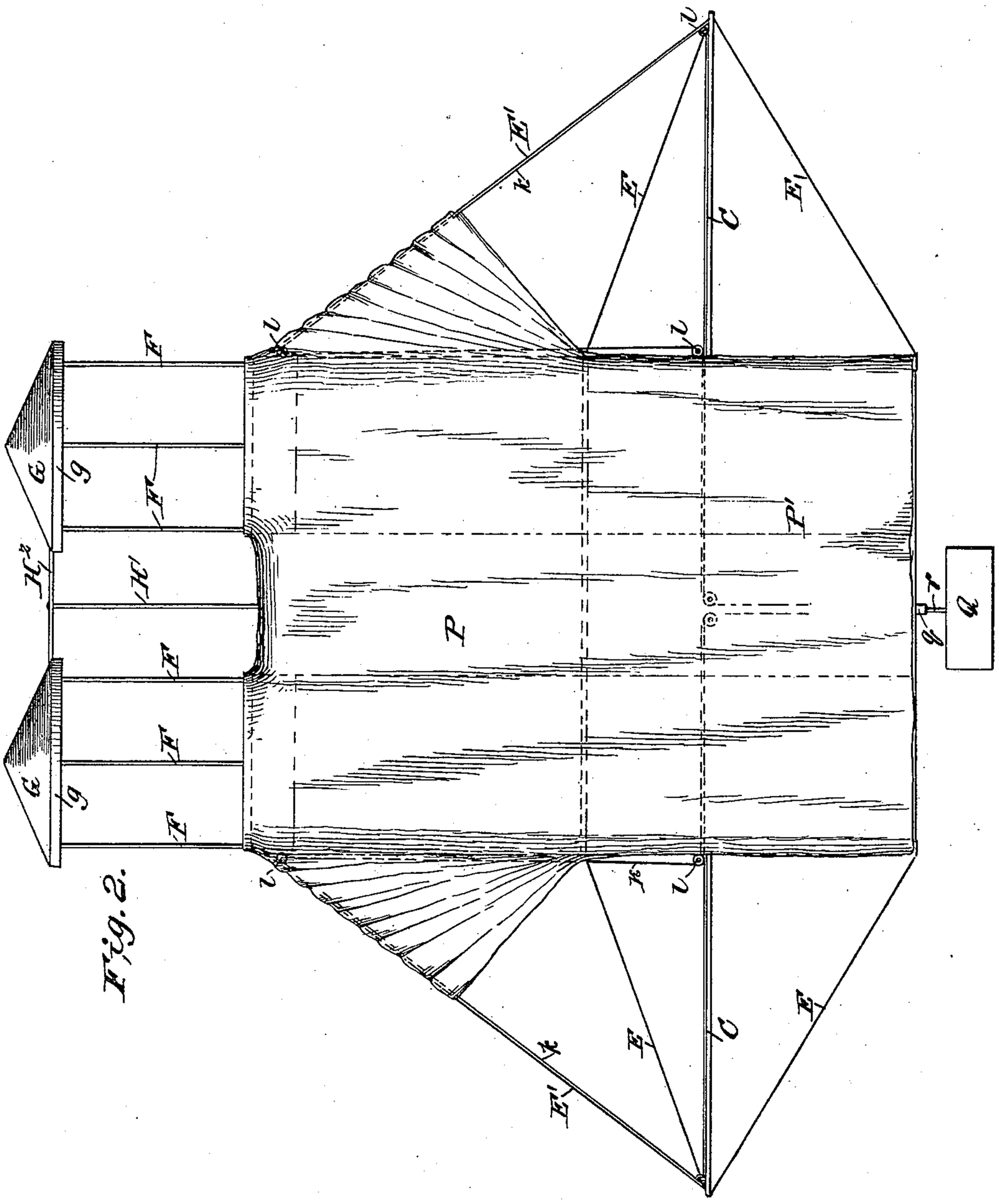

Fig. 2.

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Fig. 3.

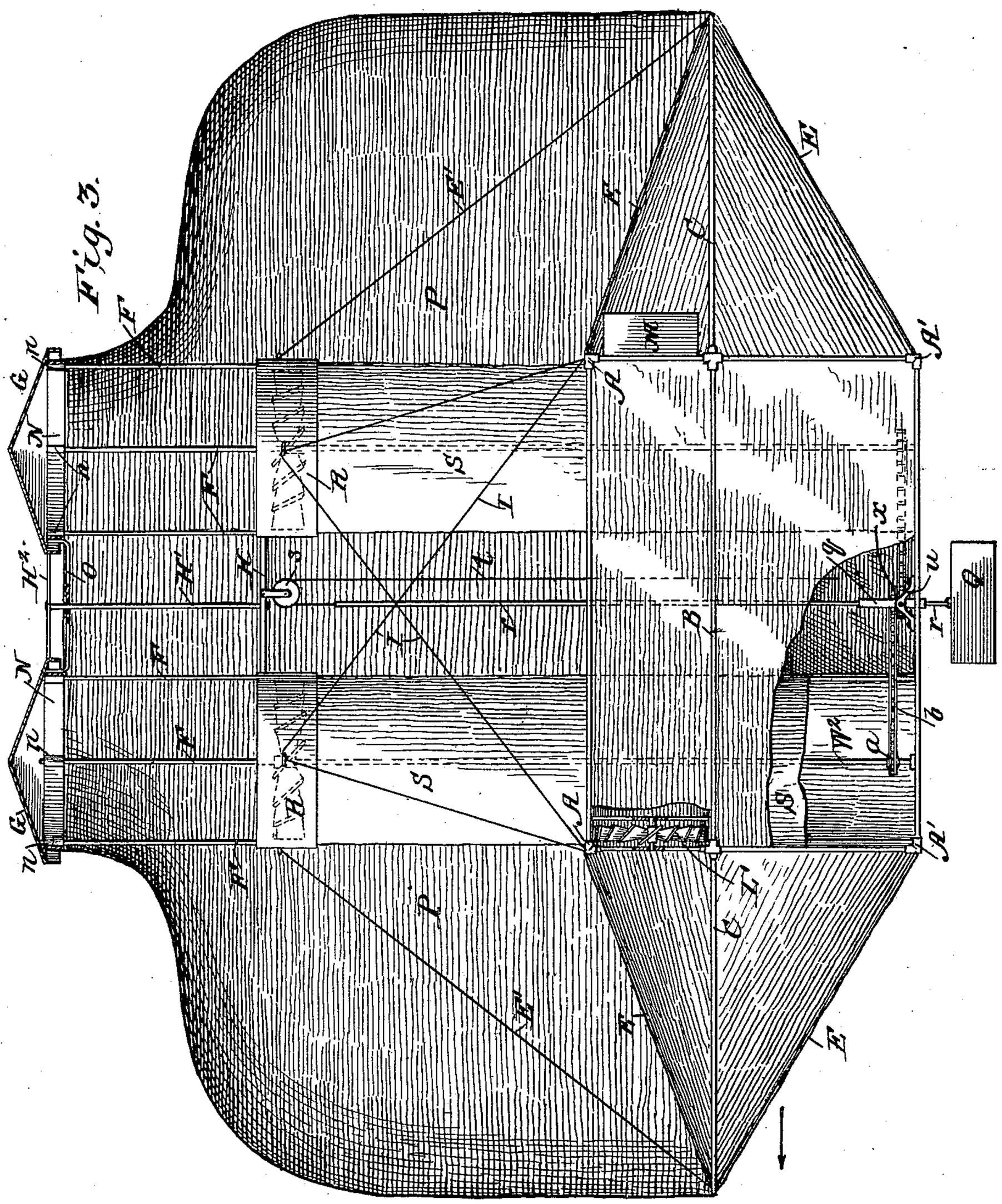

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Fig. 4.

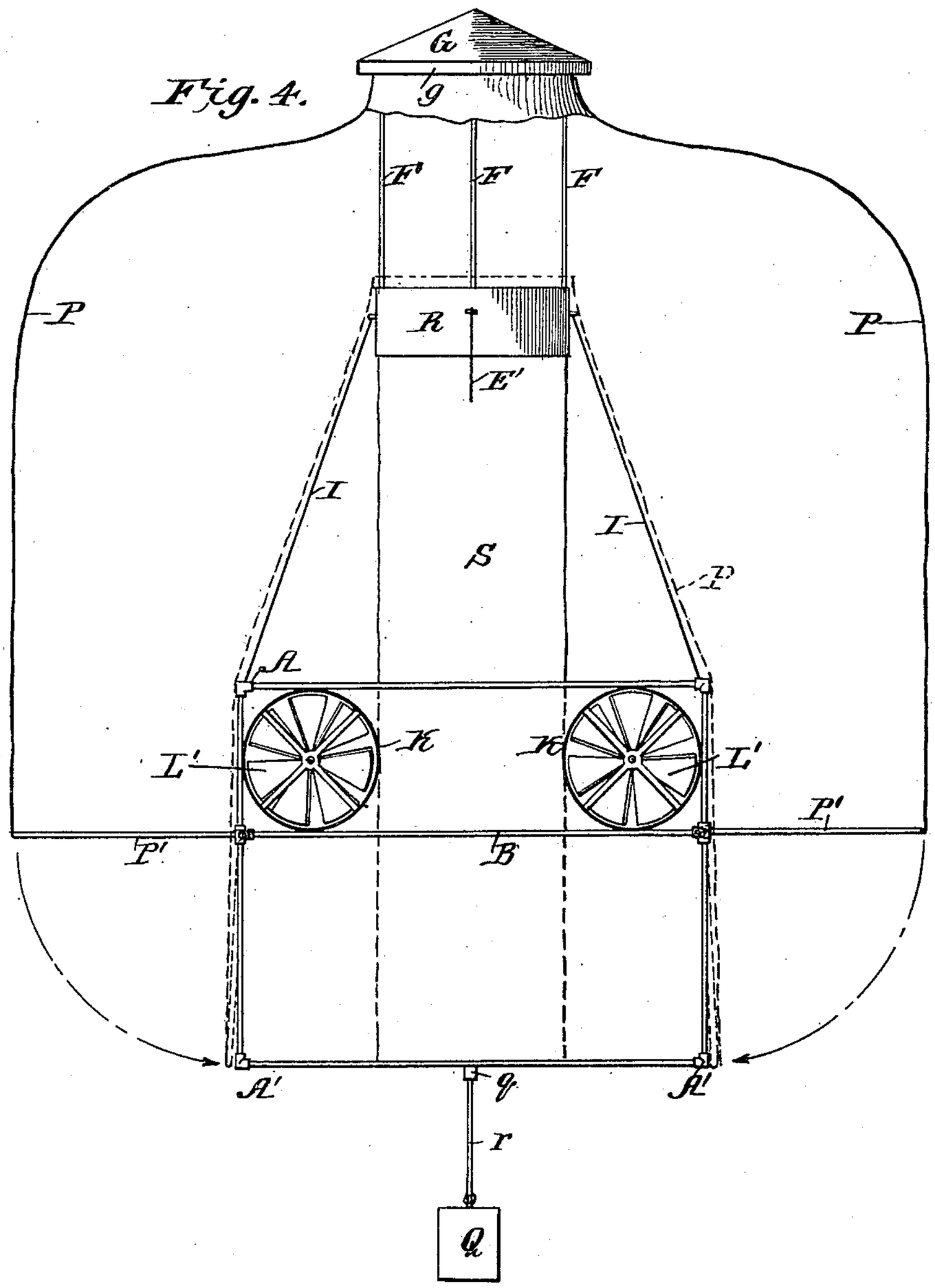

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Fig. 5.

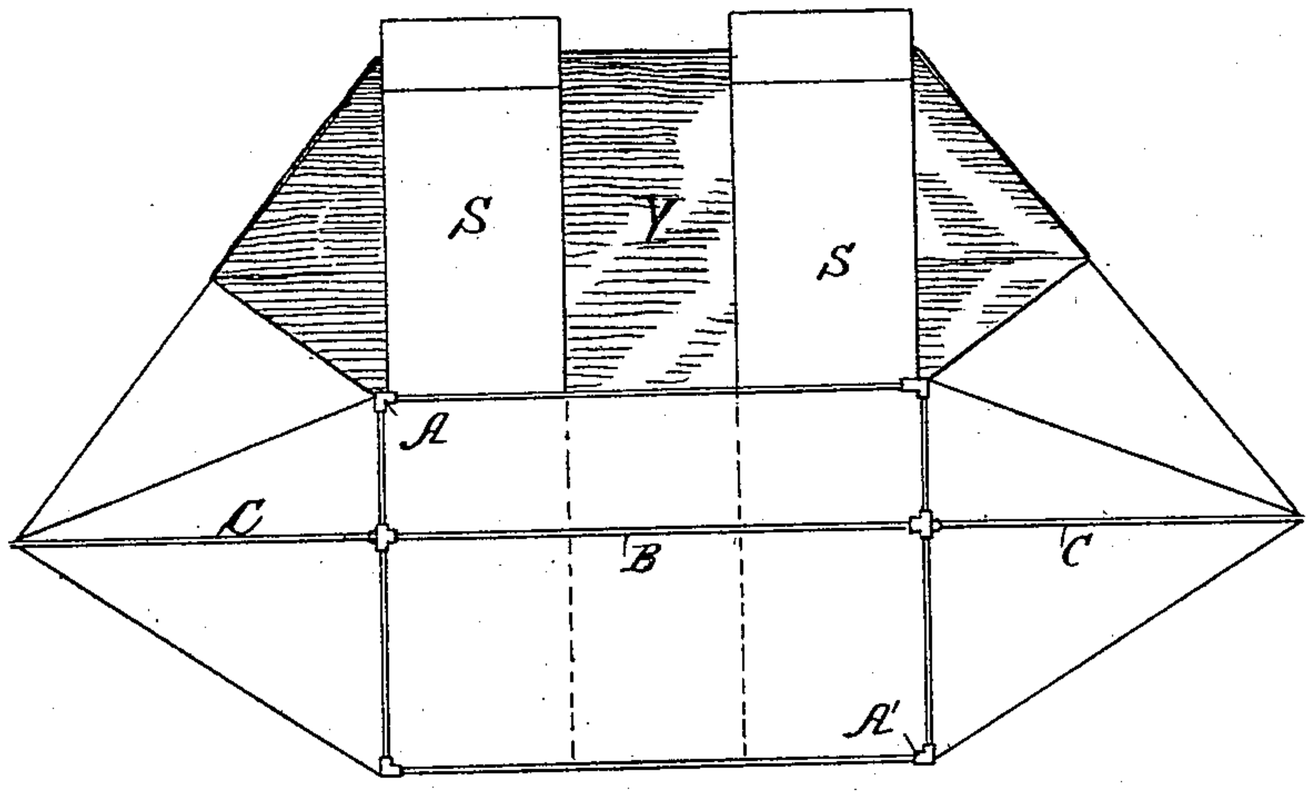


Fig. 6.

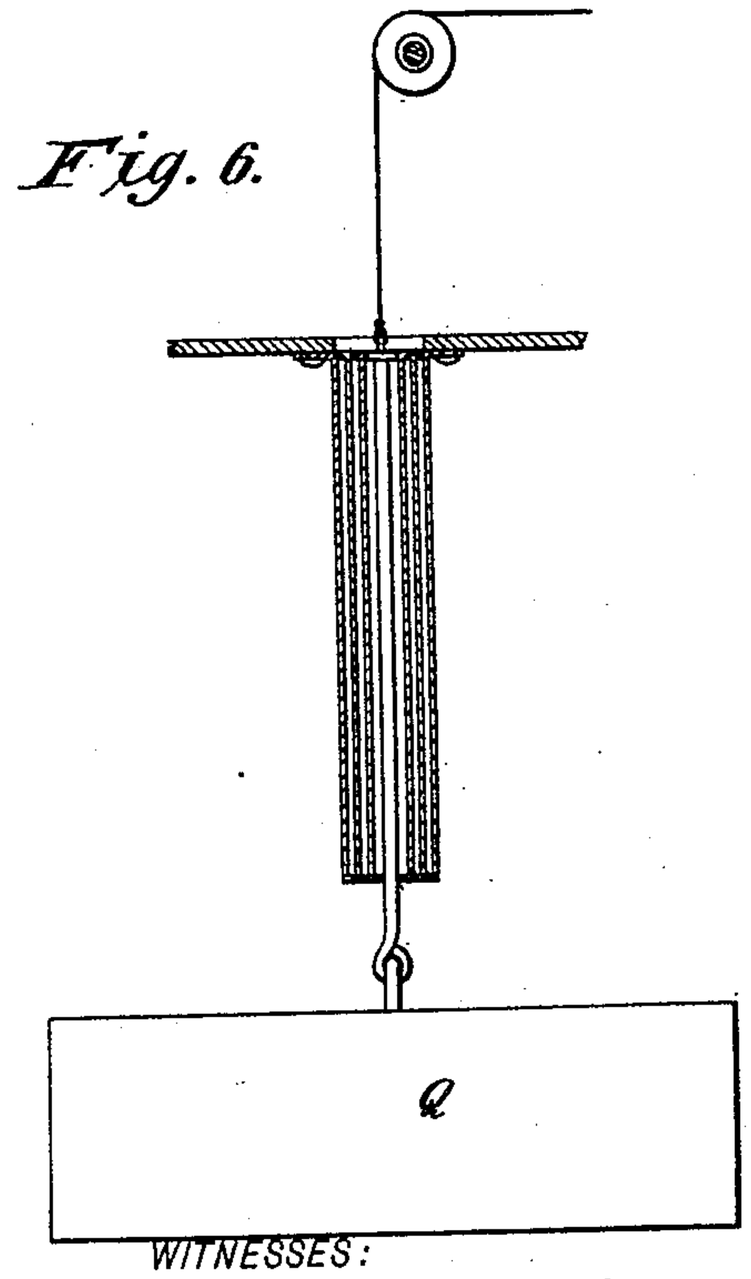
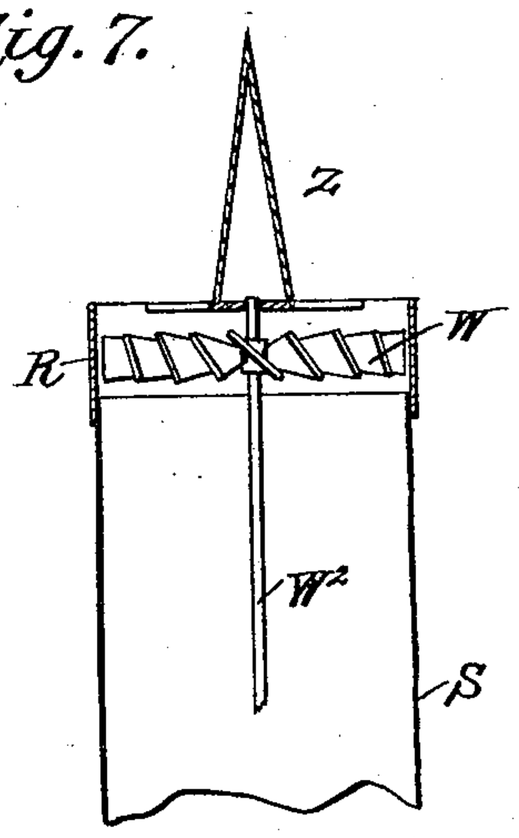


Fig. 7.



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UNITED STATES PATENT OFFICE.

JAMES C. WALKER, OF WACO, TEXAS.

AIR-SHIP.

SPECIFICATION forming part of Letters Patent No. 467,069, dated January 12, 1892.

Application filed June 12, 1891. Serial No. 396,044. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. WALKER, residing at Waco, in the county of McLennan and State of Texas, have invented a new and useful Improvement in Air-Ships, of which the following is a specification.

The object of my invention is to provide an improved form of air-ship for navigating the air; and it consists in the peculiar construction and arrangement of parts for raising the ship, propelling it through the air, directing its movements, and providing for its safe and easy descent, as will be hereinafter fully described.

Figure 1 is a perspective view of the outer frame-work of the ship with its main parachute removed. Fig. 2 is a side elevation of the air-ship complete with parachute attached and adjusted for sailing. Fig. 3 is a side view, partly in section, showing the main parachute inflated for descending. Fig. 4 is an end elevation, partly in section, showing the parachute inflated for descending. Fig. 5 is a modification of the main frame in side elevation, showing a buoyant gas-chamber. Fig. 6 is a modification, shown in vertical section, of the ballast-adjusting device; and Fig. 7 is a detail of the lifting-wheel.

Referring to Fig. 1, A A A′ A′ represent a rectangular frame-work of metal tubes, made two stories high, with an upper floor laid upon intermediate supports B B and a lower floor at A′ A′. From the floor-level B there projects at each end a tapering prow-shaped frame C, made of metal tubes, whose outer ends are stayed by wire cables D D, extending to the lower floor A′, and by wire cables E E, extending to the upper corners of the frame, and by a wire cable E′, extending to one of the stacks of the lifting-wheels. S S are these stacks. They each have four strong tubular standards F, which extend from the lower floor A′ A′ up to a permanently-attached conical sheet-metal cap G, having a pendent flange *g* at its outer edge. About the middle of these standards is fixed a sheet-metal ring R, which is stayed to the frame-work below by the wire cables I and E′. From this ring R to the frame-work A′ A′ below the standards F are surrounded by canvas sleeves or cylinders, as shown at S. Within the rings R there is fixed the spider-frame or radial arms J, having a central hub portion or journal-bearing, in which revolves the vertical rotating drive-shaft W^2, carrying within the ring R the lifting-wheel W, made of very light construction and after the form of a windmill wheel or propeller. These driving-shafts W^2 extend down to the lower floor of the ship, where they are provided with suitable gears connecting with the motive power. As shown, there are chain-wheels *a* on the shafts W^2, connected by chain belts *b* to a central double driving-wheel *x*, which may represent any suitable engine. The wheels W in the stacks serve the purpose of lifting the air-ship when set in motion, their direction of revolution and inclination of the blades of the wheel being such as to draw the air downwardly into the stack from the open space above with a suction effect and compressing effect in the stacks below.

To brace the stacks the rings R R are connected by a horizontal cross-bar H and horizontal wire cables h^2, and the caps G G are connected by another cross-bar H^2, which two bars are connected by a vertical rod H′.

I will now describe the means for enabling the ship to travel horizontally in the air. In the upper compartment of the main frame there are arranged two horizontal canvas cylinders K, one on each side of the stacks S. At the forward end of each of these cylinders there is a sheet-metal collar L, in which is arranged a propeller-wheel L′, revolving about a horizontal axis, Figs. 3 and 4. This is connected to the prime motor through any suitable train or gear, and these wheels act at the prow of the ship by suction and compression of air in the cylinders. At the rear end of these horizontal cylinders K are rudders M, hinged about a vertical axis in a metal ring or band, by which the direction of travel is controlled. These rudders are worked by suitable cords or chains in the usual way.

I will now describe the means for enabling the ship to descend with safety.

Over the whole of the upper portion of the ship is arranged a canvas parachute P, which is shown folded or out of use in Fig. 2 and inflated for descent in Figs. 3 and 4. This parachute is shaped somewhat like an umbrella, but has in its upper portion two slid-

ing collars N N, which have guide eyes or sleeves *n*, that embrace the vertical standards F of the stacks. These collars slide from a position immediately beneath the top caps G in Fig. 3 to the position shown in Fig. 2, in which said collars rest upon the stationary rings R of the stacks. When the parachute is in the position shown in Fig. 2, the space above the lifting-wheels is open, so that the lifting-wheels can exercise their lifting effect upon the air above. When in this position, the front and rear edges of the parachute are reefed upon the cable E′, so as to be out of the way of the action of the wheels within the horizontal cylinders K. For the purpose of hoisting these edges of the parachute the latter are attached to cords *k*, running around pulleys *l* to the interior of the ship. Similar cords and pulleys may be employed for positively pulling the parachute up or down on its guide-standards F and H′ in case it should not act freely. At the sides of the parachute are arranged folding frames P′, which are hinged to the main frame (see Fig. 4) and rise to a horizontal position when the parachute is inflated for descent and drop to a position parallel with the sides of the ship, as shown by dotted lines, when the ship is in flight.

In order to hold the ship steady, I provide a suspended ballast Q, (see Fig. 3,) which is rigidly attached to a long rod *r*, and which in turn is attached to a rope or chain *t*, passing around a pulley *s*. By means of this rope and pulley the ballast Q may be lowered to any desired position below the ship to hold the latter steady in its flight. Where the rod *r* passes through the bottom of the ship it is contained and guided within a tube *q*, which is hung by trunnions in a frame *u*, so that said guide-tube *q* may be tilted or rocked in a vertical longitudinal plane. The object of this is to cant the ship up or down so as to cause it to move forward and ascend or descend in an inclined path. Thus if the tube *q* be tilted so as to throw the ballast Q to the rear the bow of the ship will cant upwardly, and vice versa. As a modification of this construction instead of using the long stiff rod *r*, I may use a telescopic tube for connecting with the ballast, as shown in Fig. 6, in which the ballast is maintained by a suspending-rope passing up within the telescopic sections, and which rope when wound up causes the telescopic sections to slide one within the other, and when let down permit the telescopic sections to form a stiff tube. The object in having the ballast connected to the ship by a stiff rod or tube is to cause its position to have a reflex action on the ship for canting it up or down, it being obvious that if the ballast were flexibly suspended it could not have such influence upon the ship. This ballast may be connected by guy-ropes to the bow and stern of the ship and adjusted as to position by these ropes. To supplement the lifting effect of the lift-wheels W, I may construct the ship with a tight gas-chamber Y, as shown in Fig. 5, which is designed to be filled with hydrogen or other light gas, and is designed to have the buoyant effect of a balloon. I propose, also, to place centrally above each lift-wheel W a cone Z, (see Fig. 7,) which causes the air to pass to the outer periphery of the wheel, where it has the greatest speed and lifting effect. This cone also prevents the regurgitation of air upwardly through the center of the wheel.

In building my ship I propose to use a light tubular construction of material, so as to secure the greatest strength consistent with a minimum weight, and where metal parts are required I shall use aluminum or very light steel, canvas, wood, and compressed paper supplying the principal constituents of the other parts of the structure. Any suitable motor may be employed which furnishes high power with little weight. The latter, however, forms no part of my present invention. The ends and sides of the cabin of the ship may be covered with canvas, woven wire, or wicker-work of wood.

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

1. The combination, in an air-ship, of the stationary vertical cylinders S S, opening entirely through the ship and provided with lifting wind-wheels in their upper ends, the horizontal frame-work having pointed ends, and horizontal cylinders arranged therein and provided with propeller wind-wheels, substantially as shown and described.

2. The combination, in an air-ship, of a stationary vertical stack extending from top to bottom of the ship and formed of a rigid collar R at the top and canvas sides S below, and a suction wind-wheel W, arranged in bearings in the rigid collar, substantially as shown and described.

3. The combination, in an air-ship, of a vertical stack consisting of upper cap G, standards F F, a rigid collar R, attached to the standards and provided with a wind-wheel, and a canvas body portion S, substantially as shown and described.

4. The combination, with the vertical stacks having wind-wheels in them, the two horizontal cylinders having wind-wheels in them, the rectangular frame A B A′, the end sections C C, and the guy-cables D E E′ I, substantially as shown and described.

5. The combination, with an air-ship, of a suspended ballast and a bar or tube connecting the same adjustably but stiffly to the ship, substantially as shown and described.

6. The combination, with an air-ship, of a suspended ballast, a relatively stiff connection for the same to the ship, and a guide through which said connection passes, the said guide being made adjustable as to inclination, substantially as shown and described.

7. The combination, in an air-ship, of one

or more vertical stacks, each closed around its lower portions, open about its upper portion, and provided with a terminal cap at the top, and a parachute encompassing the ship and having a collar playing over the upper or open part of the stack, so as to inclose the stack or open it accordingly as the parachute is inflated or collapsed, substantially as shown and described.

8. The parachute P, having a collar N, with guide eyes or sleeves *n*, in combination with the stack having terminal cap G at the top, standards F F, and ring R, with the wind-wheel, substantially as shown and described.

9. The combination, with the vertically-adjustable parachute and the main frame of the air-ship, of the side frame P′, hinged to the main frame and attached to the lower edge of the parachute, substantially as shown and described.

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Witnesses:
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