

E. POLLAK.
 FLYING MACHINE.
 APPLICATION FILED DEC. 8, 1909.

1,049,315.

Patented Dec. 31, 1912.

2 SHEETS—SHEET 1.

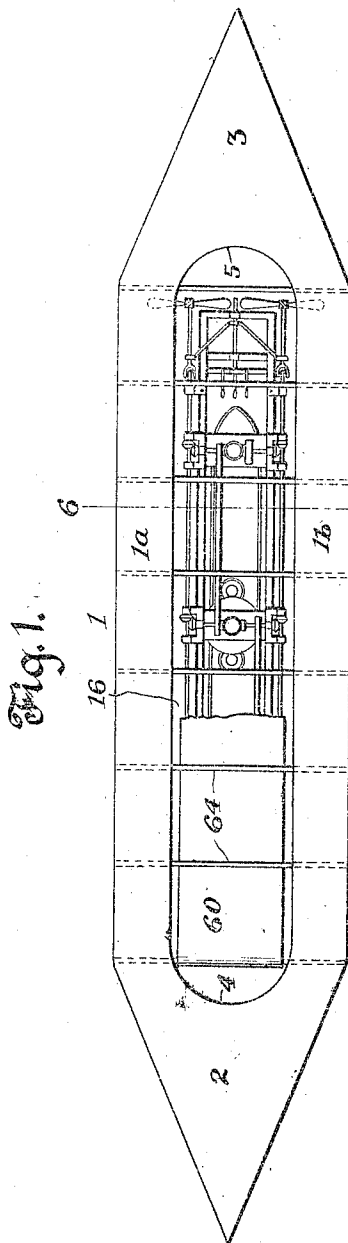


Fig. 1.

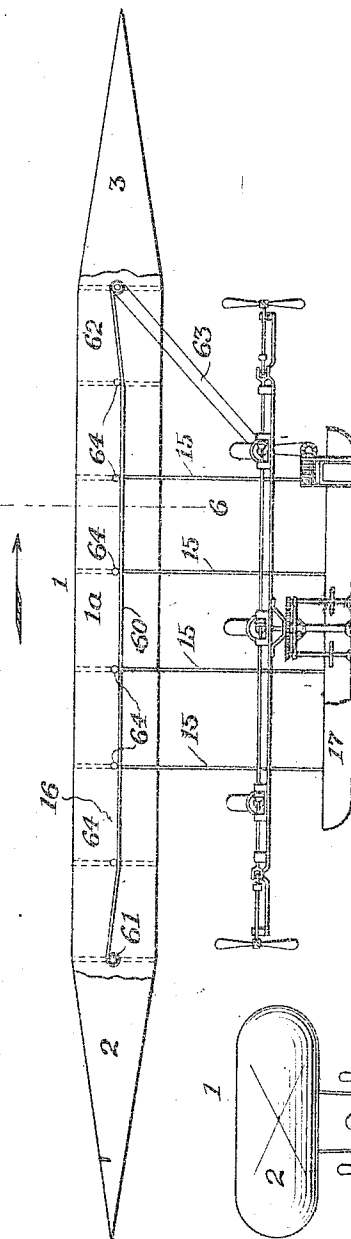


Fig. 2.

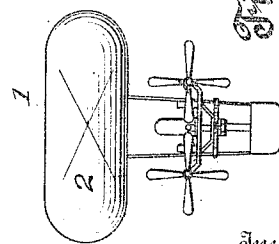


Fig. 3.

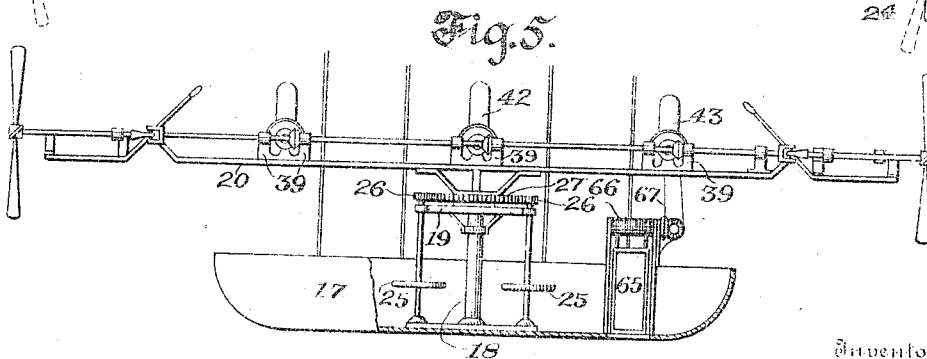
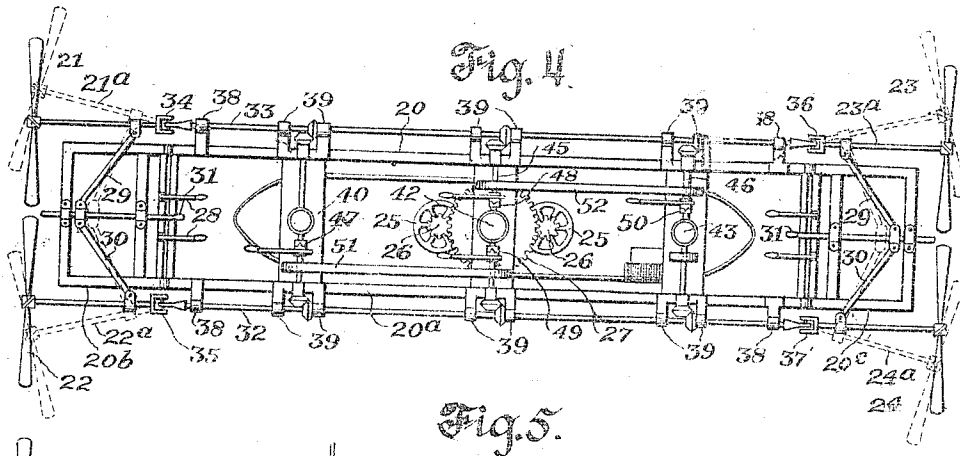
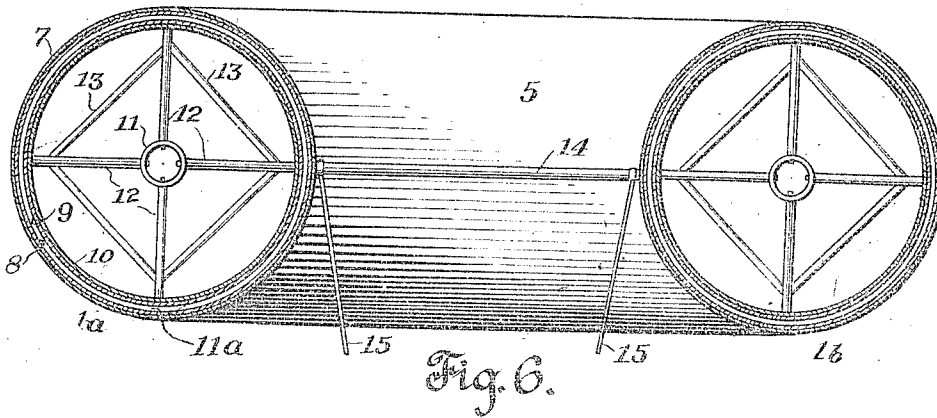
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2 SHEETS-SHEET 2.



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UNITED STATES PATENT OFFICE.

ELI POLLAK, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF ONE-HALF TO
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FLYING-MACHINE.

1,049,315.

Specification of Letters Patent.

Patented Dec. 31, 1912.

Application filed December 8, 1909. Serial No. 532,022.

To all whom it may concern:

Be it known that I, ELI POLLAK, a citizen of the United States, residing at Washington, in the District of Columbia, have
5 invented certain new and useful Improvements in Flying-Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to aeronautics and
10 has for its object the provision of safe and efficient apparatus for passenger and freight aerostation.

Briefly stated, the invention comprises the following features: a combination gas bag and aeroplane; one or more boats supported
15 beneath the bag or body; and a set of propellers driven interchangeably by a plurality of motors, and mounted in a frame in such manner as to be readily shifted with
20 respect to the boat and bag, universal joints permitting each or all of the propellers to be thrown to any desired angle for steering purposes, ascending or descending.

Referring to the accompanying drawings,
25 Figure 1 is a top plan view of the complete machine, with the gas bag on a much reduced scale; Fig. 2 is a side view of the same partly in section; Fig. 3 is an end
view; Fig. 4 is a plan view of the boat or
30 car and the driving mechanism, on an enlarged scale; Fig. 5 is a side view of the same; and Fig. 6 is a detail transverse section on the line 6-6 of Figs. 1 and 2, looking
in the direction of the arrow.

Referring to the drawings, and particularly to Figs. 1 and 2, 1 is the gas bag or
body, by which flotation is secured. This is
made in elongated form with pointed ends
2 and 3, and a divided body composed of two
40 substantially cylindrical members 1^a and 1^b.

The details of construction are indicated in Fig. 6, which is a section through the two
members of the body looking toward the
curved inner face of the point or head 3.

The body is formed of aluminum; and for a
45 many passenger or freight carrying machine requiring a large lifting factor, it would necessarily be of very much greater size relatively to the car and machinery than
50 is indicated in the drawings, and it will be understood that the scale adopted in these drawings is a matter of necessity and not
choice, being due to the limitation in size
prescribed by the Patent Office rules. It is
55 unnecessary for me to give dimensions, or

specify the amount of displacement required to carry the machine and any stated
additional weight, but I wish to make clear
that I have the advantage of not depending
upon flotation alone by displacement of air, 60
since my aeroplane feature enables me to drive up or down, or glide on a wind, even
when my gas has partly escaped or contracted by reason of low temperature. The
gas bag can also be made smaller than in 65
those built by Zeppelin and others, if desired.

In a large body, I use a double skin 7 and
10 of aluminum sheets one-eighth inch in thickness, and a double lining or packing of
70 asbestos, 8 and 9, separated by the frame rings 11^a. Other materials than asbestos may be employed for the lining, and I wish
particularly to say that the entire body may
be divided up into compartments, as indicated 75
by the dotted lines in Figs. 1 and 2, with a common feed tube passing lengthwise
through all the compartments for filling or inflating the same. The opening of
the feed tube, as well as the openings in the 80
ends 2 and 3 are conveniently located for access from beneath, and I provide a gas
generator or carbureter in the car or boat
for supplying fresh gas from hydrocarbon
liquids as occasion demands. In addition to 85
the pressure of gas, I maintain the shape and rigidity of the body by means of a series
of interior rings, frames or braces 11, 11^a, 12, 13, shown in full lines in Fig. 6 and in
dotted lines in Figs. 1 and 2. These also 90
may be of aluminum, or of other material.

A jack stay or rib 14 is carried around
the inner opening 16 of the body, that is to
say the central space between the two members 1^a and 1^b. From this are suspended 95
rods 15 in a double parallel set carrying the
boat or car 17, in which is centrally located
a pillar 18 carrying a turn table 19 in which
is journaled the propeller frame 20, carrying
the propellers 21, 22, 23 and 24. The 100
entire frame may be turned by means of
hand wheels 25 operating pinions 26 meshing
with a central gear wheel 27 secured to the
frame 20. I provide two hand wheels, 105
as in a machine of any size there should be
more than one man at the wheel, since the
air pressures to be overcome will be large
and at times the steering difficult.

The frame 20 consists of three parts, the
central portion 20^a and two hinged end 110

members 20^b and 20^c, these carrying the propellers, and by their vertical swing serving to raise and lower the same for purposes of ascension, descension, etc. Each end frame 20^b or 20^c also carries levers 28 by which it may be adjusted, and a sliding toggle link connection 29 and 30 with the spindles 21^a, 22^a, and 23^a and 24^a of the respective propellers. These spindles are manipulated as to their lateral angle by means of levers or slide bars 31, shown single but which in practice I prefer to make double, that is to say one lever or bar for each of the links 29 and 30 so as to permit separate adjustment of the propellers.

To permit the required movement of the propellers their spindles are connected to the main driving shafts 32 and 33 by means of universal joints 34, 35, 36 and 37. The driving shafts are journaled in lateral bearings 38 and 39 carried on the frame, and secured transversely across the frame between the bearings 39 are platforms 40 carrying the engine units 41, 42 and 43. These are preferably internal combustion hydrocarbon engines, and each drives a transverse shaft 44, 45 or 46, through a clutch mechanism 47, 48, 49 or 50. The shaft 44 is connected to the shaft 45 by a belt or chain 51, and the shaft 45 is similarly connected to the shaft 46 by a belt or chain 52, these belts or equivalent chains running over wheels keyed onto the respective shafts outside of the clutches. Both ends of each shaft are provided with miter gears by which power is communicated to the main shafts 32 and 33. Thus a uniform and balance of power delivered to all the propellers is maintained at all times and it should be observed that by disconnecting any clutch, the engine is thrown off on both sides, so that the engine is not run cold as a dead weight on the live engine or engines. This is the purpose of having two clutches on the shaft 45. The clutches are shown as controlled by hand levers and as already stated the swinging propeller frames 20^b and 20^c are controlled by hand levers. To manipulate the various levers, the engineer or his assistant must pass along the frame 20, between the several platforms. If desired however I can connect all these various levers by means of chains, wires, or other transmitting media, to controlling devices accessible from the boat or car.

In order to provide the aeroplane feature I arrange a specially treated sheet of fabric 60 adapted in length and width to cover the opening 16 between the side members 1^a and 1^b, and supported when extended by passing under the cross braces 64. If necessary a duplicate set of braces can be provided beneath the curtain to prevent sagging, but in use the air pressure will be all from beneath. This curtain is normally,

when not in use, furled by rolling it on a drum or cross roller 61 at one end of the space 16, and is extended or set by means of a corresponding roller at the other end, indicated at 62, driven by a belt 63 or other suitable means from the engine or a crank above the car, or frame 20. Suitable sheets or extending ropes pass over roller 62 and under braces 64 to the leech of the curtain when furled for purposes of setting, and side ropes or stays are also provided in practice. It will be noted that the under side of the body when the curtain is extended, is concave for the best gliding effect, the side members 1^a and 1^b being parts of the working surface of the plane.

In Fig. 2 I have shown a convenient form of lift for passenger and material hoist. It is my purpose to maintain my airship comfortably afloat, and it is my theory that in commercial navigation of the air, the same principle of constant flotation should obtain as in marine navigation. The question of effecting landings and of taking on and off petrol or gasoline as well as passengers and freight, is not rendered easy of solution. It will be noted that the swinging ends of my frame and the controlling levers for the fore and aft propeller shafts enable the navigator to bring his craft to a standstill and maintain it against varying air currents in its own tendency to rise, in such a fixed position over any desired landing stage, that the lift or hoist can be operated with ease and certainty. For passengers, guy ropes will probably be found essential, and some form of stays to prevent undue swinging, and in the form shown the lift is operated by the end engine 43, through the medium of a drum belted through suitable gearing to said engine.

I am aware that many changes may be made in non-essential features of this invention without departing from the scope and purview thereof, and I wish it distinctly understood that I now contemplate all such non-essential changes as fairly falling within the scope of the appended claims.

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

1. A flying machine comprising two extended longitudinal substantially cylindrical bodies connected at their ends to form an elongated integral rigid gas bag or envelop having a width greater than its depth, with a longitudinal open space, and a boat or car hung from horizontal common supporting members extending across said space, and lying beneath the same so as to maintain the greater axes of the side members horizontal, and driving mechanism carried on the said boat.

2. A flying machine comprising an integral rigid elongated gas bag having a width

greater than its depth, and formed of two substantially cylindrical parallel tubular side members, hollow pointed rigid end members bridged across and forming common terminals for the side members, frame rods extending across the side members, integral braces for each side member; and a car or boat hung from said frame rods beneath the central opening between the side members, and driving mechanism carried on the boat.

3. A flying machine comprising an elongated integral rigid gas bag or envelop having a width greater than its depth, with a central elongated opening, closed tubular side members, horizontal transverse connecting rods extending from one side member to the other, pointed end members, a car or boat hung on said connecting rods beneath the open space so as to maintain the parallel side bodies in the same horizontal plane, driving mechanism carried on the boat, and a flexible and longitudinally extensible curtain adapted to be stretched beneath said transverse rods from one end to the other of the opening in the gas bag to form an aeroplane with a hollow or concave under surface.

4. In a flying machine, a rigid integral gas bag or envelop shaped to form an aeroplane and comprising parallel tubular side members, hollow pointed end members each connected to both side members and having its interior gas chamber connected with the chambers in said side members, connecting rods extending across between the side members substantially on a line with their horizontal axes; a plane member extended along said rods so as to form an interior plane between the side members, and a boat or car suspended from said rods, with driving

mechanism for the machine mounted on said car.

5. A flying machine comprising an integral rigid elongated gas bag or envelop having a width greater than its depth, with a central elongated opening and closed parallel tubular side members, pointed hollow rigid end members, connecting the side members, transverse brace rods between the side members, a car or boat hung beneath the central opening on said brace rods so as to maintain the parallel side members in the same horizontal plane, and driving mechanism carried on the boat comprising a frame, longitudinal shafts journaled on the frame, a driving engine in the boat, and propellers on the ends of the shafts.

6. A flying machine comprising an integral rigid elongated gas bag or envelop having a width greater than its depth, with a central elongated opening and closed parallel tubular side members, hollow pointed rigid end members connected across the side members at both ends, transverse brace rods between the side rods, a car or boat hung beneath the central opening on said brace rods so as to maintain the parallel side bodies in the same horizontal plane, and driving mechanism carried on the boat comprising a frame, longitudinal shafts journaled on the frame, a driving engine in the boat, jointed end sections for the shafts, propellers thereon; and means to move said end sections for steering purposes.

In testimony whereof I affix my signature in presence of two witnesses.

ELI POLLAK.

Witnesses:

CHARLES LOWELL HOWARD,
JAMES H. MARR.