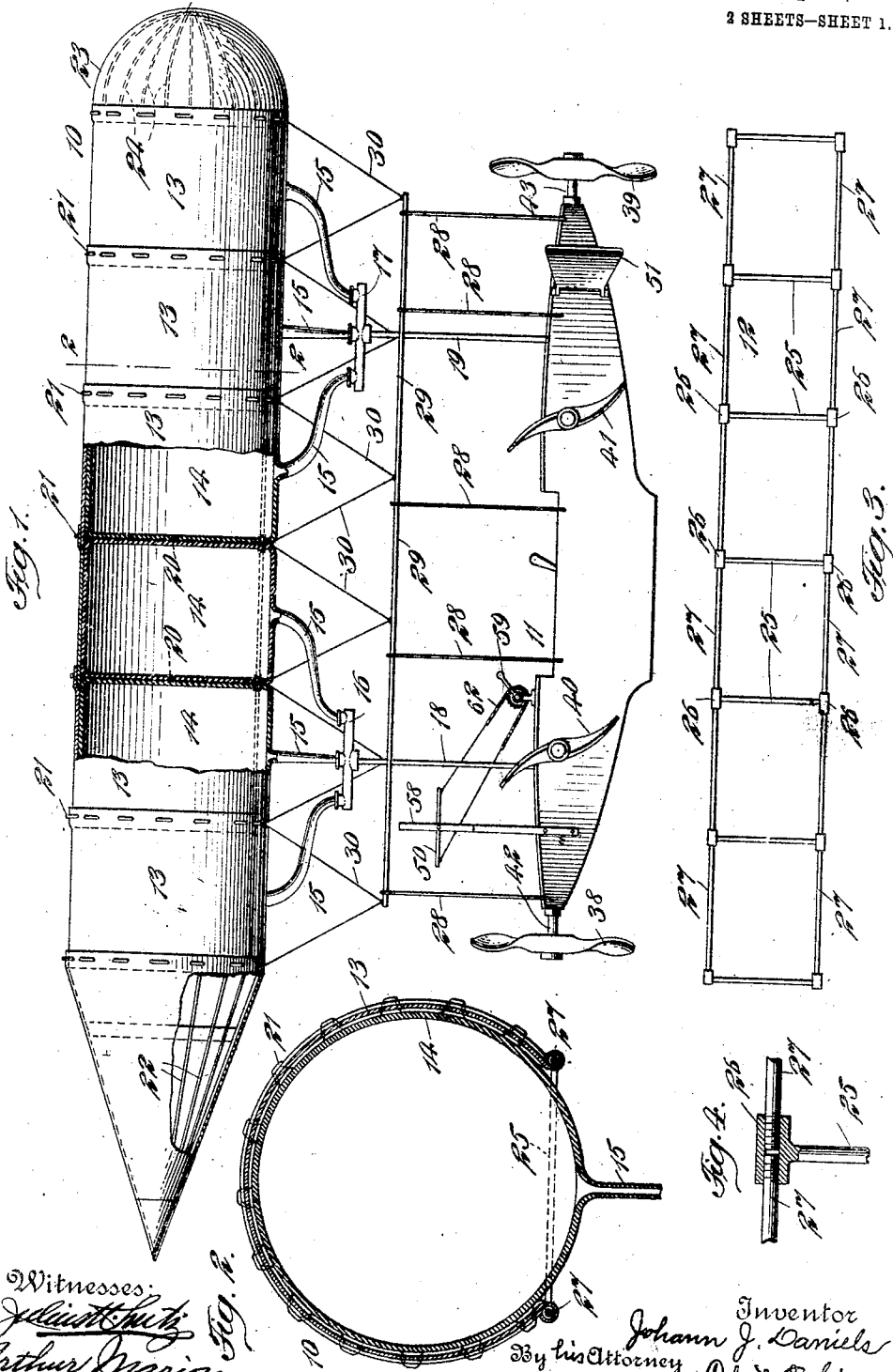


1,037,450.

Patented Sept. 3, 1912.

2 SHEETS—SHEET 1.



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By his Attorney
Chas. C. Lee

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2 SHEETS—SHEET 2.

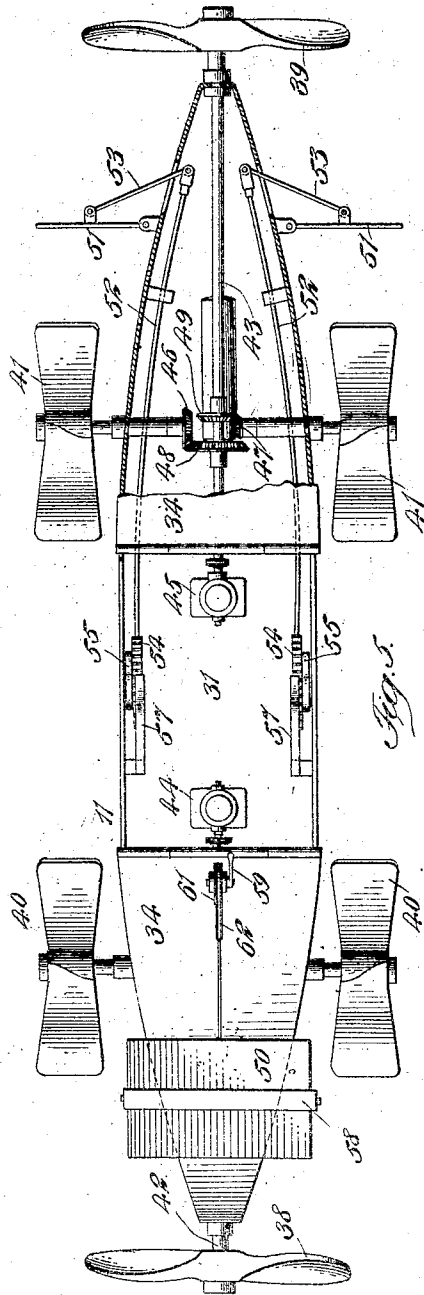


Fig. 5.

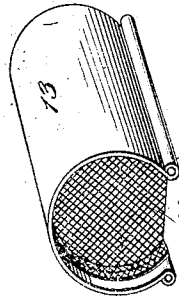


Fig. 7.

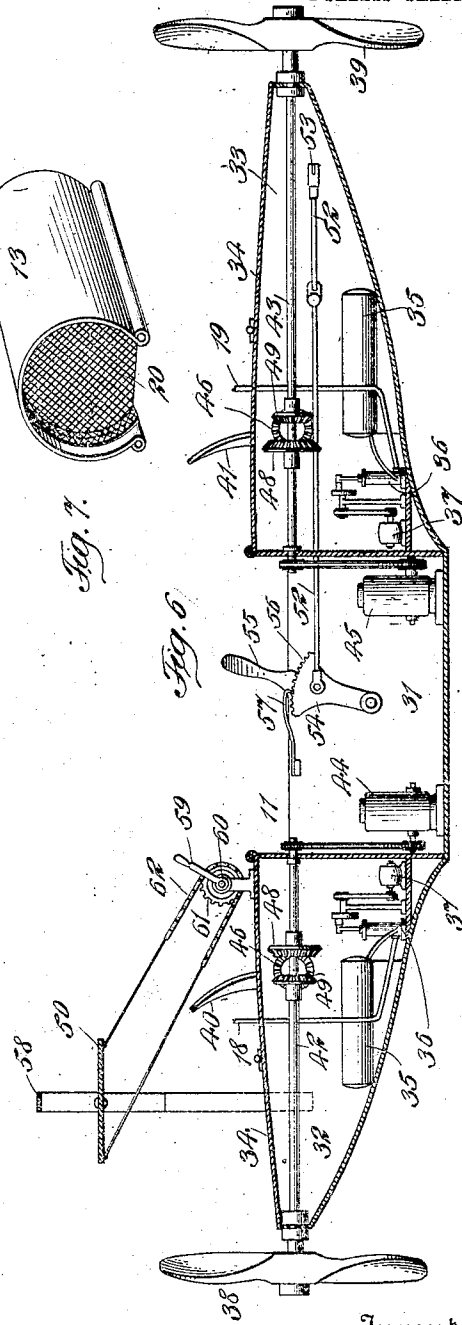


Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHANN J. DANIELS, OF NEW ROCHELLE, NEW YORK.

AIRSHIP.

1,037,450.

Specification of Letters Patent.

Patented Sept. 3, 1912.

Application filed July 5, 1910. Serial No. 570,281.

To all whom it may concern:

Be it known that I, JOHANN J. DANIELS, a subject of Germany, and a resident of New Rochelle, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Airships, of which the following is a specification.

The invention relates to improvements in air-ships, and it consists in the novel features and combinations of parts hereinafter described, and particularly pointed out in the claims.

I present my invention herein as embodied in a dirigible air-ship comprising a balloon portion and a lower or ship-portion proper, each of said parts being of special construction and arrangement and suitably connected together.

The balloon portion of the ship is of elongated outline and comprises an outer inclosing sectional part, preferably made of canvas, secured to a rigid horizontal frame and a series of rubber gas-bags inclosed by the sections of said canvas covering and adapted to be charged with gas or inflated by means of pumps or compressors carried by the lower or ship-portion, on which will be provided motors for driving the compressors and tanks holding compressed gas for the supply of said gas-bags. The pumps or compressors are of usual commercial construction and I provide at least two thereof, one being for use in connection with, say, the forward half of the series of gas-bags and the other for use in connection with the rear half of the series of gas-bags, so that I may inflate or deflate to a more or less extent either the said front-half or the rear-half of the series of gas-bags according to whether I may desire to affect the horizontality of the ship or cause it to ascend or descend or remain horizontal.

The lower or carrying portion of the ship is provided with propellers at each end, side propelling air-wheels at the sides of each end, motors for driving either or both sets of said wheels and propellers, with the gas-pumps or compressors, manually operative steering vanes at the sides of the rear portion of the ship and a forward manually

operative vane for aiding in the ascent or descent of the ship.

The invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which:

Figure 1 is a side elevation, partly in section, of a dirigible air-ship embodying my invention; Fig. 2 is an enlarged vertical transverse section through the balloon portion of the same about on the dotted line 2--2 of Fig. 1; Fig. 3 is a detached top view of the sectional frame to which the exterior covering of the balloon portion of the ship is secured; Fig. 4 is a sectional view of a detail of said frame; Fig. 5 is a top view of the lower or carrying portion of the air-ship; the balloon parts being omitted; Fig. 6 is a vertical longitudinal section of the same, and Fig. 7 is a detached perspective view of one of the cover-sections of the balloon.

In the drawings, 10 designates the balloon portion and 11 the carrying-portion or ship proper.

The balloon part comprises a general sectional base frame 12, an outer inclosing canvas covering composed of sections 13 corded together at their adjacent vertical edges and at their lower edges secured to the sides of the frame 12, and a series of gas-bags 14, each of the latter being preferably inclosed, except at its lower part, by a canvas section 13 and having a tubular or pipe portion 15 through which the bag may be inflated or deflated, to such extent as may be required, at will. The front series of bags 14 have their pipes 15 connected with a header 16, and the rear series of bags 14 have their pipes 15 connected with a header 17 (Fig. 1). The headers 16 and 17 are respectively connected with pipes 18, 19, through which the gas may be delivered to said headers and the gas-bags connected therewith or withdrawn therefrom, at will, as may be required, as hereinafter explained. The covering sections 13 correspond with each other and each is open at its lower side between the sides of the frame 12, and each section 13 is entirely open at one end, while at its other end it is

provided with a diaphragm 20 of ribbed or lattice work serving as a partition between adjacent gas-bags 14. The sections 13 are connected together in series by the lacing cords 21, and as many of the sections 13 and gas-bags 14 will be used as may be necessary or desirable in accordance with the size of the ship and the duties to be performed. The forward end 21 of the balloon portion 10 is pointed or conical and preferably formed of canvas and corded or laced to the adjoining section 13, said end being hollow and not containing a gas-bag but having ribs 22 hinged at their forward ends and capable of being closed together after the nature of the ribs of an umbrella. When the canvas covering portion of the balloon is not on the air-ship it may be collapsed or folded into compact space and at such time the ribs 22 may fold together so that the conical end 21 may occupy as little space as possible. The rear end 23 of the balloon portion 10 is preferably semi-spherical and formed of canvas mounted on ribs 24 which may collapse together when desired. When the canvas balloon covering is in position on the ship and the gas-bags 14 are inflated, the expansion of the sections 13 adjacent to the ends 21, 23 will cause the ribs 22, 24 to open outwardly and maintain the conical form of the forward end 21 and semi-spherical form of the rear end 23.

The frame 12 is formed of a series of transverse bars 25 having couplings 26 on their ends and longitudinal rods 27 screwed into said couplings and connecting said bars in series. By adding bars 25 and rods 27 the frame 12 may be made as long as desired. My purpose is to provide one pair of side rods 27 for each canvas section 13, and in the construction I have shown as many canvas sections 13 and pairs of rods 27 as the size of the ship may require.

To the lower or ship-portion 11 are secured rigid standards 28 connected at their upper ends by a frame 29, to which, by means of a cable or rope 30 or the like, the frame 12 is secured, the upper or balloon part 10 and the lower or ship part 11 being thereby secured together.

The open spaces between the bars 25 of the frame 12 permit the introduction of the gas-bags 14 to within the sections 13 of the canvas balloon covering and the ready removal of any of said bags that may become damaged.

An important feature of the invention is that the side-bars 27 of the frame 12 hold the canvas sections 13 open at their lower sides and that said frame is below the transverse center of said sections and less in width than the diameter of said sections, since with this construction the gas-bags 14 cannot when inflated slip downwardly from

the sections 13 and said sections should the bags 14 become damaged or deflated while the ship is above the earth, will, due to their being held open by the frame 12, operate as a parachute to prevent the violent descent of the ship.

The lower or ship portion 11 is in the general outline of a boat, being somewhat pointed at each end and at its bottom inclining upwardly at each end to facilitate the elevation of the ship and its passage through the air. At the middle of the ship is an open space 31 for the operator and passengers and some of the machinery or mechanism required for the operation of the propellers, air wheels and steering apparatus. At the ends of the ship are compartments or chambers 32, 33, respectively, covered over by hinged deck sections 34 of any suitable character and containing the apparatus for inflating and deflating the gas-bags 14, such apparatus consisting in each of said compartments of a tank 35 of compressed gas, a double-acting pump or compressor 36 and a motor 37 for operating the pump or compressor 36. The pump or compressor 36 is of usual commercial construction, and the front pump or compressor 36 is connected by the pipe 18 with the header 16 for the front set of gas-bags 14, while the rear pump or compressor 36 is connected by the pipe 19 with the header 17 for the rear set of gas-bags 14. The pumps or compressors 36 are independently operable by the motors 37, and each is utilized for delivering the gas from a tank 35 to its set of bags 14 or returning the gas from said set of bags to said tank, according as it may be desired to inflate or deflate said bags. There is nothing separately new in either the pump 36 or tank 35, but in accordance with my invention I provide two separate pumps and tanks connected with separate sets of the gas-bags 14, and this is highly desirable since thereby I am enabled to fill both sets of gas-bags uniformly or inflate one set of bags to a greater degree than the other set of bags or deflate one set of bags while not deflating the other set of bags, according to the manipulations or handling desired for the ship, such as causing the ship to travel horizontally or to ascend or descend.

The means for propelling the ship comprise front and rear propellers 38, 39, which may be used together or separately, and front and rear pairs of air-wheels 40, 41, which may be used separately or simultaneously. The propellers 38, 39 are secured on longitudinal shafts 42, 43 which are independently driven from the motors or engines 44, 45 located in the middle space 31, and the pairs of air-wheels are driven from the shafts 42, 43 through the gear-wheels 46, 47 on the shafts of said air-wheels and the intermeshing gear-wheels 48, 49 on the

said shafts 42, 43. When both engines or motors 44, 45 are in operation both propellers 38, 39 and both pairs of air-wheels 40, 41 will be actuated, and obviously when only one engine or motor is in operation only one propeller and one pair of air-wheels will be set in motion.

The means for steering the ship comprise a forward horizontal vane 50 and rear vertical side vanes 51, the vanes 51 being hinged on vertical axes at the sides of the rear portion of the ship, as shown in Figs. 1 and 5, and each being independently operable by means of a pitman rod 52 and link 53. The link 53 for each steering vane 51 is pivotally secured to the back of the vane and thence extends inwardly through a slot in the side of the ship and is pivotally connected with the rear end of the pitman rod 52, which extends frontwardly and is pivotally connected with a pivoted segment 54 located within the space 31 of the ship and close to the side thereof, as represented in Fig. 5. The segment 54 is supplied with a handle 55 and a series of teeth 56 to be engaged by a spring dog 57, for holding the segment with sufficient firmness in any position which may be given to it by the operator. When the handle 55 of a segment 54 is pushed forwardly the rod 52 connected with the segment will be pulled forwardly and through its link 53 which will be carried against the front end of the slot through which it passes in the side of the ship, turn the vane 51 connected therewith rearwardly, and when the segment 54 is turned rearwardly it will push the rod 52 rearwardly, and through the link 53 which will then be carried against the rear end of the said slot turn the vane 51 frontwardly to afford increased resistance to the air. The vanes 51 and their connections at each side of the ship are duplicates of one another, and each may be independently operated so as to obtain the best results in steering the ship, it sometimes being necessary to turn one vane forwardly and the other vane rearwardly in order to attain certain results.

The forward vane 50 is mounted above the forward portion of the ship within a bar-frame 58 defining an open outline, said vane 50 being mounted to turn on a horizontal axis within said frame 58 and being suitably positioned above the deck of the ship so as not to exclude the passage of air through the frame 58 when the vane 50 is turned into vertical line therewith. The vane 50 affects, according to its inclination, the ascent or descent of the ship under well-known practice, and said vane will be operated from a handle 59 connected with the end of a short shaft 60 upon which is secured a sprocket wheel 61, which sprocket wheel receives a chain 62 connected at its ends with the front and rear edges of the

vane 50. The sprocket wheel 61 and handle 59 are mounted upon the deck of the ship in close relation to the space 31 so that the operator may readily reach the handle 59 and set the vane 50 as may be required.

The invention will be understood from the foregoing description without extended further detailed explanation.

The balloon portion of the ship is in sections and may be lengthened by the addition of more sections or reduced in length by the removal of some of the sections, as may be required, the size of the balloon depending upon the size of the ship and the weight to be carried. I contemplate forming the balloon with an excess of sections 13 and gas-bags 14 so that should one or more of the gas-bags become damaged in use, there will be enough gas-bags left in the balloon for safely carrying the ship. I have already explained that with the use of two compressors or pumps 36 I may vary the quantity of gas at either end of the balloon, giving the forward end of the balloon an excess of gas during an ascent and the rear end of the balloon an excess of the gas when it is desired to descend.

What I claim as my invention and desire to secure by Letters-Patent, is:

1. An air-ship, a horizontally elongated balloon connected with the same comprising a plurality of transverse inflatable gas-bags and a canvas retaining covering therefor which is open at its lower side to permit the admission thereto and withdrawal therefrom of said bags when they are in a deflated condition, a frame for keeping the lower side of said covering permanently open and having a width which is less than the main horizontal transverse diameter of said bags and covering when the same are in inflated condition, whereby said covering and frame may effectually retain the gas bags when they are inflated and said covering serve as an effectual parachute in case of necessity, and means on the ship for variably inflating and deflating said bags; substantially as set forth.

2. An air-ship, a horizontally elongated balloon connected with the same comprising a series of inflatable gas-bags and a canvas retaining covering therefor which is open at its lower side to permit the admission thereto and withdrawal therefrom of said bags, means for keeping the lower side of said covering permanently open so that said covering may serve as a parachute in case of necessity, and means on the ship for inflating and deflating said bags, said covering being in sections detachably connected together at their vertical edges, with each section inclosing a gas-bag, combined with independent gas-compressors on said ship and means connecting the same with independent gas-bags, so as to inflate or deflate to a va-

riable extent the front and rear bags; substantially as set forth.

3. An air-ship, an elongated horizontal frame 12 comprising side and cross-bars supporting the ship, and a horizontally elongated balloon connected with said frame, said balloon comprising a series of inflatable gas-bags and a retaining covering therefor which is open at its lower side and at its lower side edges secured to said frame, whereby said covering may serve as a parachute in case of necessity, combined with independent gas-compressors on said ship and means connecting the same with independent gas-bags, so as to inflate or deflate to a variable extent the front and rear bags, said frame 12 having a width which is less than the main horizontal diameter of said bags and covering when the same are in inflated condition; substantially as set forth.

4. An air-ship, an elongated horizontal frame 12 comprising side and cross-bars supporting the ship, and a horizontally elongated

balloon connected with said frame comprising a series of inflatable gas-bags and a retaining covering therefor which is open at its lower side and composed of sections 13 secured at their lower side edges to said frame and at their vertical edges to one another, with each section inclosing a gas-bag and having at one end a diaphragm to separate adjacent gas-bags, said frame 12 having a width which is less than the main horizontal diameter of said bags and covering when the same are in inflated condition, combined with means on the ship for inflating and deflating said bags; substantially as set forth.

Signed at New York city, in the county of New York and State of New York, this 2nd day of July A. D. 1910.

JOHANN J. DANIELS.

Witnesses:

CHAS. C. GILL,
ARTHUR MARION.