

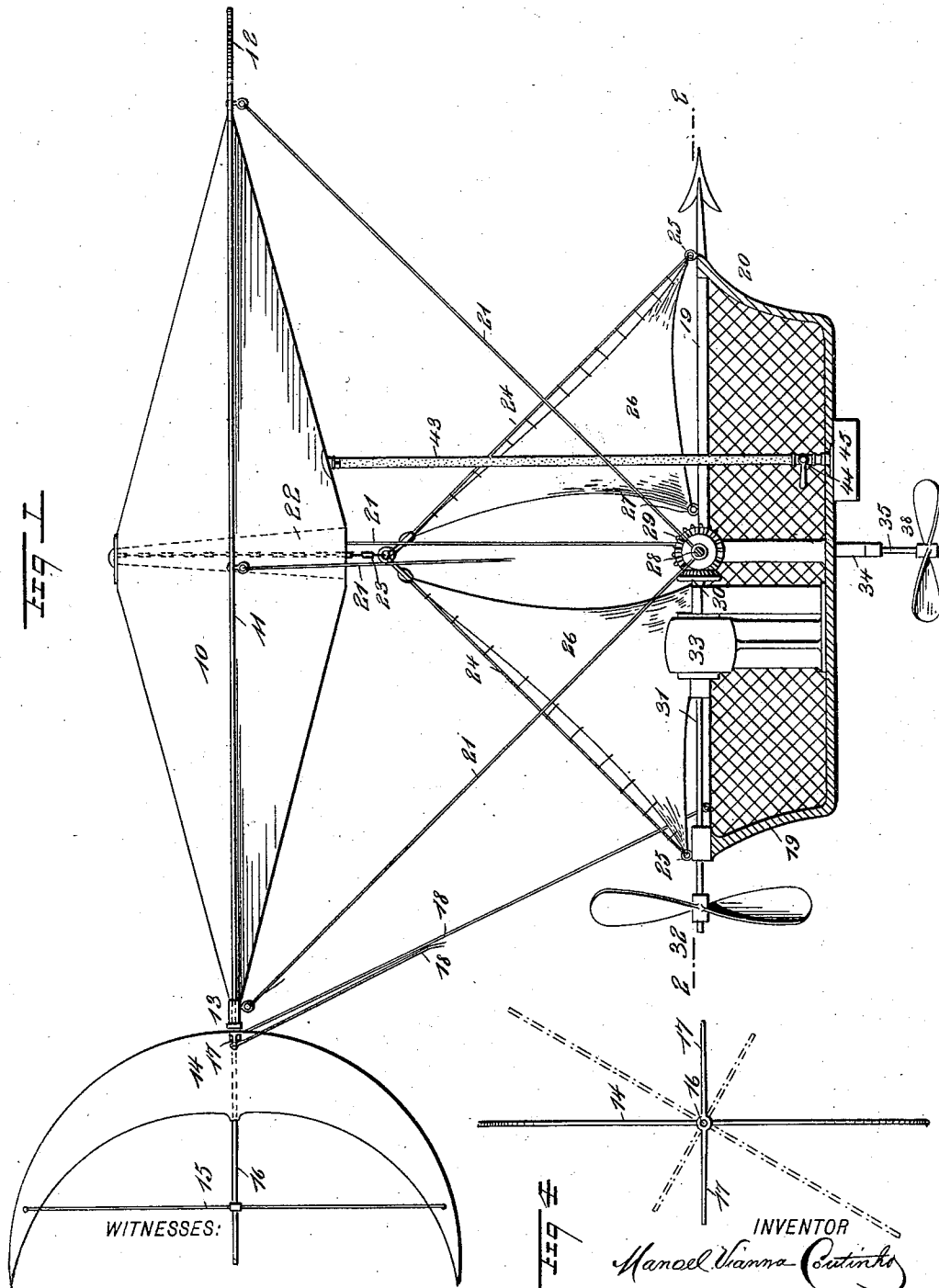
(No Model.)

3 Sheets—Sheet 1.

M. V. COUTINHO.
AEROSTAT.

No. 556,621.

Patented Mar. 17, 1896.



W. Walker
L. Sedgwick

INVENTOR
Manoel Vianna Coutinho

BY

M. V. Munn
ATTORNEYS.

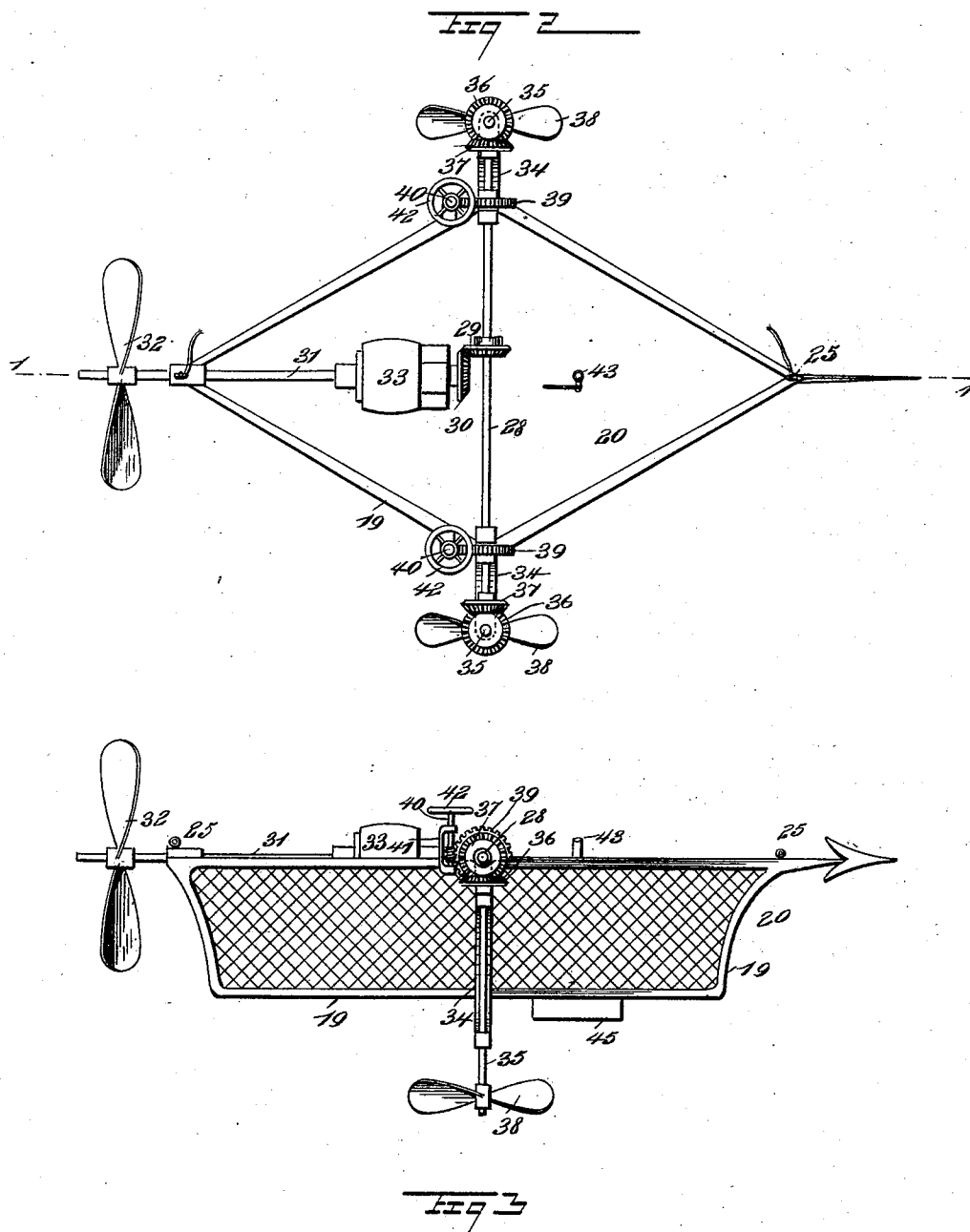
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WITNESSES:

H. Walker
H. Q. Hutchinson

INVENTOR

Manoel Vianna Coutinho

BY

Munn
ATTORNEYS.

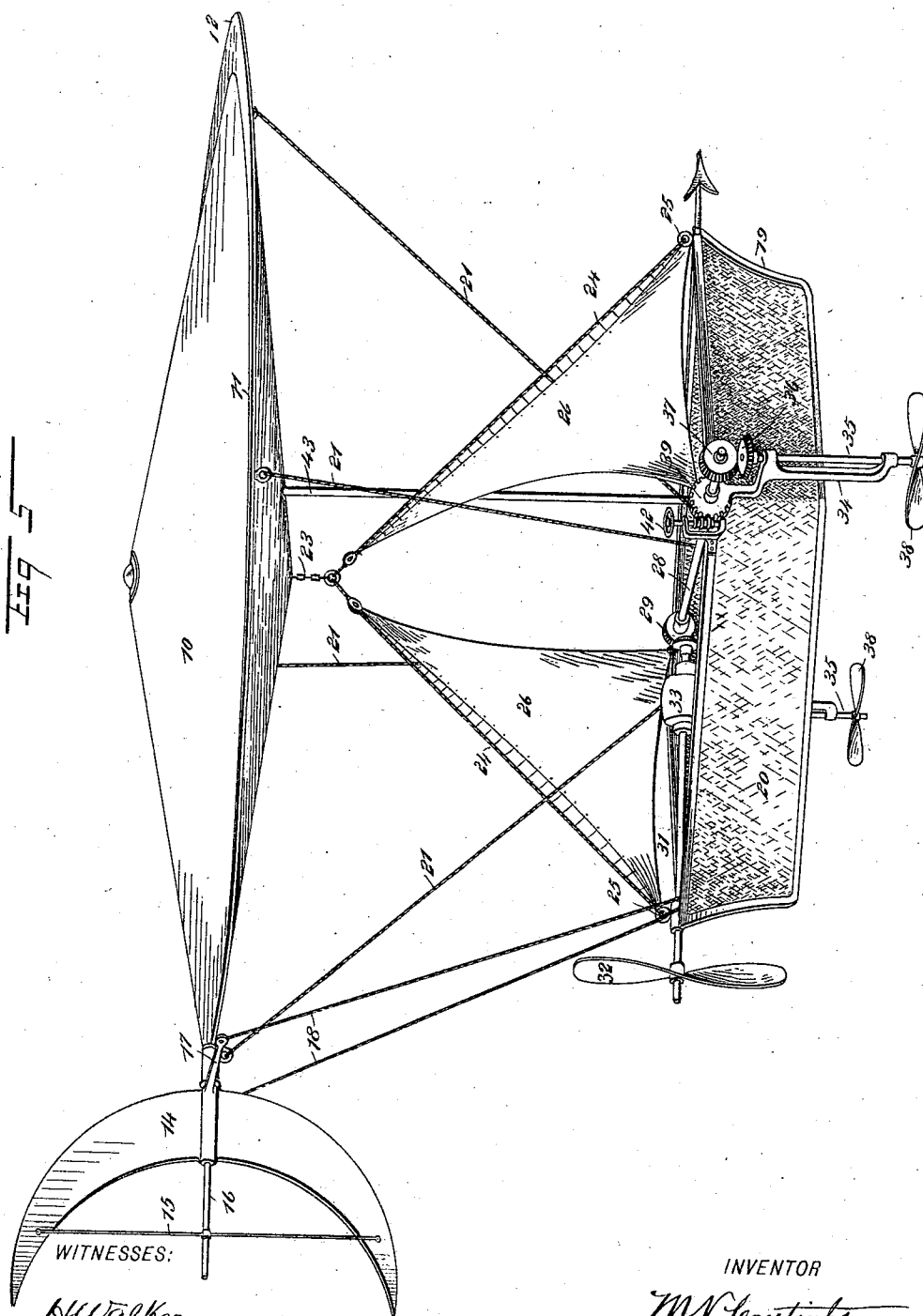
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M. V. COUTINHO.
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WITNESSES:

H. Walker
John Lotka

INVENTOR

M. V. Coutinho

BY

Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

MANOEL VIANNA COUTINHO, OF PARA, BRAZIL.

AEROSTAT.

SPECIFICATION forming part of Letters Patent No. 556,621, dated March 17, 1896.

Application filed October 5, 1894. Serial No. 524,969. (No model.)

To all whom it may concern:

Be it known that I, MANOEL VIANNA COUTINHO, a citizen of Brazil, residing at Para, Brazil, have invented a new and Improved Aerostat, of which the following is a full, clear, and exact description.

My invention relates to improvements in aerostats or air-ships; and the object of my invention is to produce an apparatus of this kind which may be successfully navigated in the air and which may be readily steered and also easily manipulated so as to give any desired deflection from the horizontal; and a further object of my invention is to produce a very substantial and compact vessel which may be safely operated and which has side propellers arranged to assist in forcing the ship either upward, downward, forward or backward or to steer it to port or starboard.

To these ends my invention consists of certain features of construction and combinations of parts, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a sectional elevation on the line 1 1 of Fig. 2 of my improved aerostat. Fig. 2 is a sectional plan on the line 2 2 of Fig. 1 and shows the shape of the car and the driving mechanism for it. Fig. 3 is a detail side elevation of the car. Fig. 4 is a detail end view of the rudder, and Fig. 5 is a perspective view of the entire apparatus.

The aerostat is provided with a balloon 10, which when filled with gas is capable of supporting the weight of the whole apparatus. The balloon is of elongated form and is thickest at the middle, so that its reduced ends facilitate progress in a forward or rearward direction. The balloon furthermore is pointed or tapered upward and downward at its center, as shown, for the purpose of facilitating its upward and downward movement. Thus the balloon may be said to consist of two elongated bodies united at their bases, the latter being approximately horizontal. The balloon is provided with a longitudinal side flange 11, which is projected forward at the bow, as shown at 12, so as to serve as a sort of aero-

plane, and at the rear end of the balloon is journaled, as shown at 13, a rudder 14, which is crescent-shaped and is strengthened by a cross-brace 15, which is also journaled on the essentially - horizontal pivot-shaft 16 of the rudder. The rudder is provided with side arms 17 projecting from opposite sides, and to these are secured cords 18 which extend down to the car 20 beneath, and by manipulating these cords the rudder may be oscillated and made to steer the balloon in a spiral manner.

The car 20 comprises a frame 19, which is of a general diamond shape, so that it may pass readily through the air, and a suitable netting to cover the frame. The car may, however, be made of any suitable material, and it is suspended from the balloon by cords 21 which are attached to the car and also to the balloon at the center and ends of the latter.

In the center of the balloon 10 is a conical sleeve 22, from which is suspended a chain 23, and to this are secured the upper ends of the halyards 24, which extend downward to rings 25 at the bow and stern of the car, and the halyards carry sails 26 which run on them in the ordinary way, the sails being at their inner ends fastened to rings 27, as shown in Fig. 1; but it will be understood that the sails may be rigged in the ordinary way without affecting the principle of the invention. These sails are adapted to be spread when the wind favors to assist in propelling the aerostat.

The car supports a transverse shaft 28 which is journaled in suitable bearings and projects outward from opposite sides of the car, this shaft being connected by beveled gears 29 and 30 with the driving-shaft 31 which extends longitudinally of the car turning in suitable bearings, and it projects from the stern and carries a propeller 32. The driving-shaft 31 is the armature-shaft of an electric motor 33 which serves to drive the machine; but any other suitable motor may be substituted for it. Where an electric motor is used, primary or storage batteries are employed to drive it, and these may be disposed in any convenient way in the car, or the car may be made with a hollow bottom to provide for storing the battery.

On the end portions of the counter-shaft 28 are swinging brackets 34 which extend at

right angles to the shaft, and these brackets carry shafts 35 which connect with the shaft 28 by beveled pinions 36 and 37, and the shafts 35 carry at their outer ends propellers 38.

5 The brackets 34, together with the shafts which they carry, are adapted to rotate on the shaft 28, so as to bring the propellers 38 to any desired angle in relation to the car, and to enable the brackets and side propellers to

10 be conveniently adjusted the brackets are provided with worm-wheels 39, which gear to worm-shafts 40 which are arranged vertically in brackets 41 on the sides of the car, the said worm-shafts being provided with hand-wheels

15 42, and by turning these shafts the brackets may be adjusted so as to hold them at the desired angle.

The air-sack of the balloon 10 is connected by an inflating-tube 43, which is controlled

20 by a valve 44, with a gas-receptacle 45 on the under side of the car, and by opening the valve the supply of gas in the balloon may be replenished.

From the foregoing description it will be seen

25 that the aerostat is self-sustaining and that it is adapted to be propelled forward by means of the sails and by the propeller 32, while the side propellers 38 hang in a vertical position from the shaft 28 and, rotating, the said propellers have a tendency to lift the aerostat

30 vertically in the air. By moving the brackets 34 and shafts 35 into a position parallel with the shaft 31 the propellers 38 may be

utilized to assist in driving the aerostat forward, or by turning the propellers 38 into a position above the shaft they may assist in drawing down the aerostat, and by throwing one forward and the other backward they may be used in steering the machine to port or starboard, as the case may be.

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

1. An aerostat comprising a balloon having the longitudinal side flange projected forward around the bow and serving as an aeroplane, the upper and lower body portions, each having its edge conforming to the contour of the side flanges and secured thereto and forming substantially two conical sections, the sleeve extended vertically in the central portion of the balloon, and a flexible connection in said sleeve to engage halyards, substantially as specified.

2. The combination, with the balloon and the car suspended therefrom, of a sleeve arranged in the center of the balloon, a chain suspended from the upper end of the sleeve, and halyards extending from the lower end of the chain to the bow and stern of the car, said halyards being adapted to carry sails, substantially as described.

MANOEL VIANNA COUTINHO.

Witnesses:

C. SEDGWICK,
A. M. MOLUX.