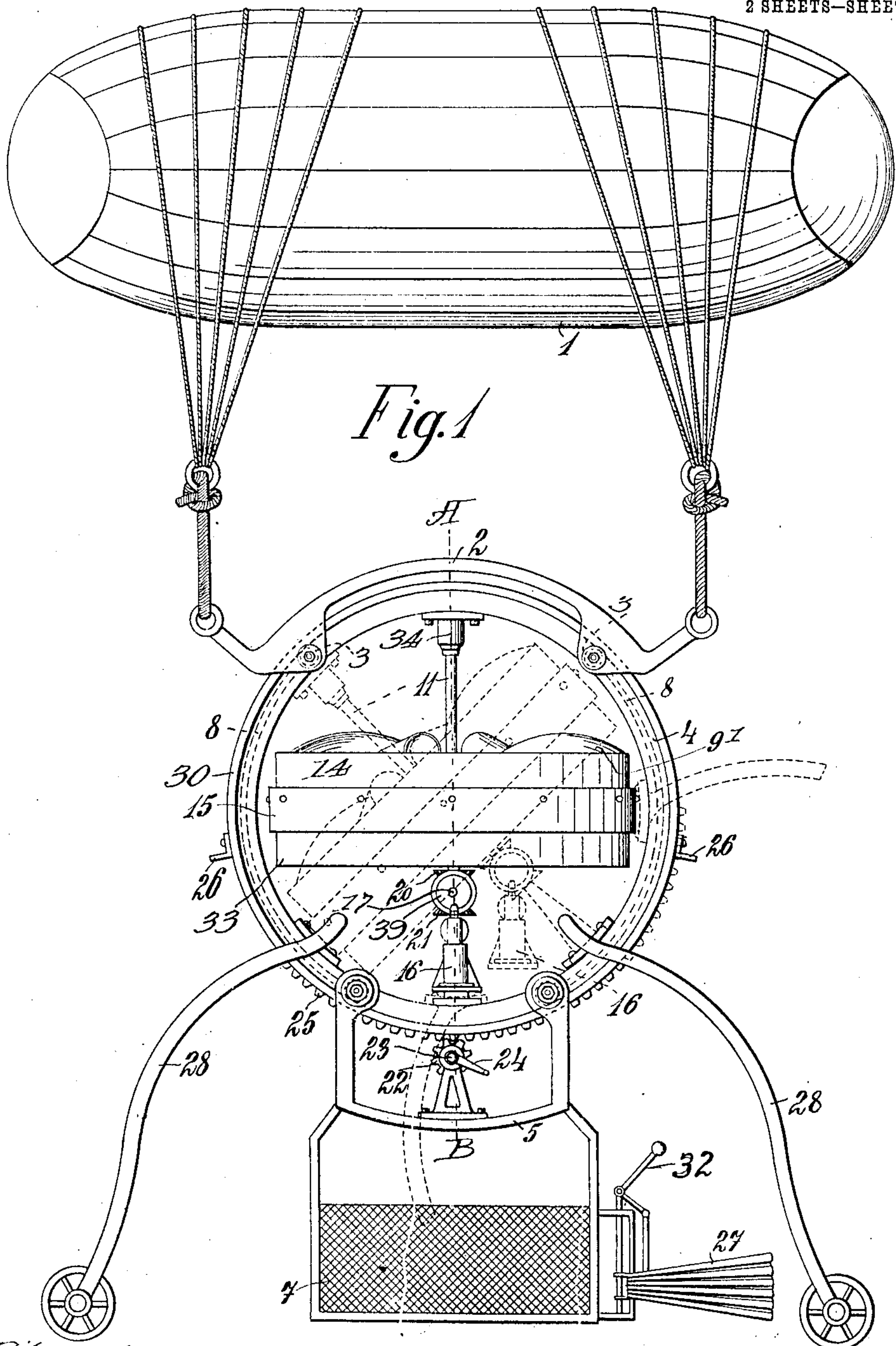


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 SELF PROPELLED AIR SHIP.  
 APPLICATION FILED AUG. 16, 1907.

906,559.

Patented Dec. 15, 1908.

2 SHEETS—SHEET 1.



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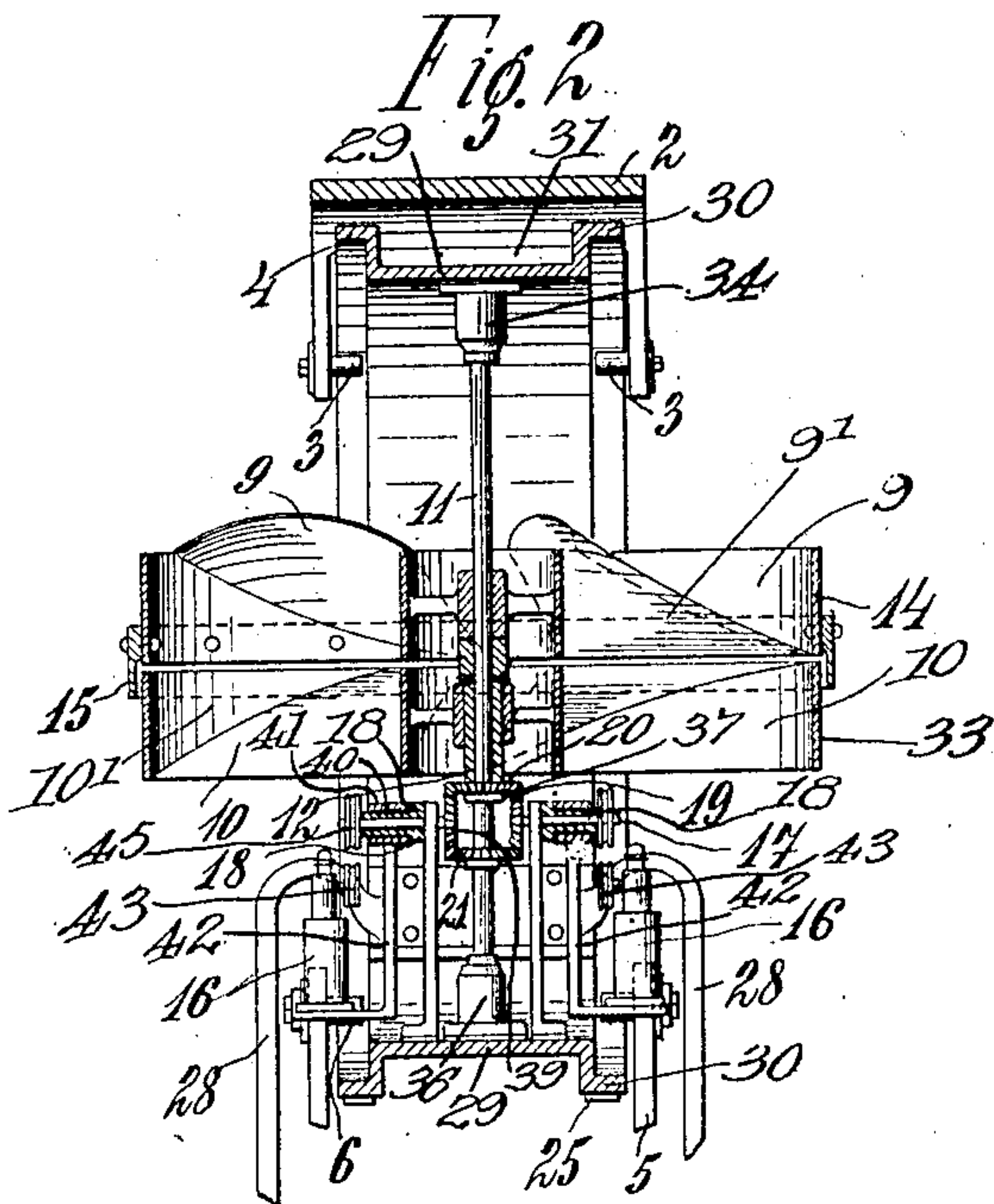


Fig. 3

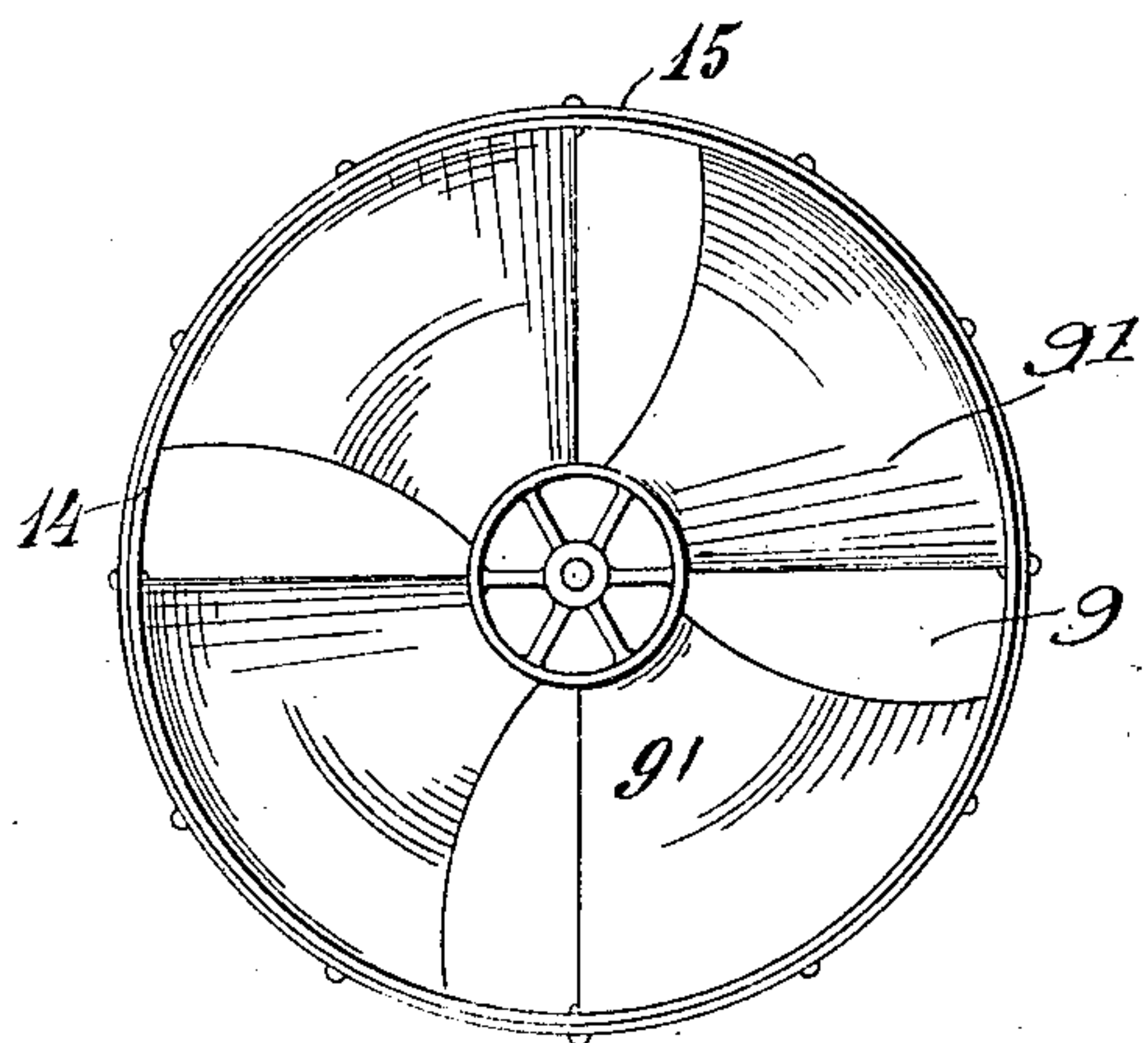
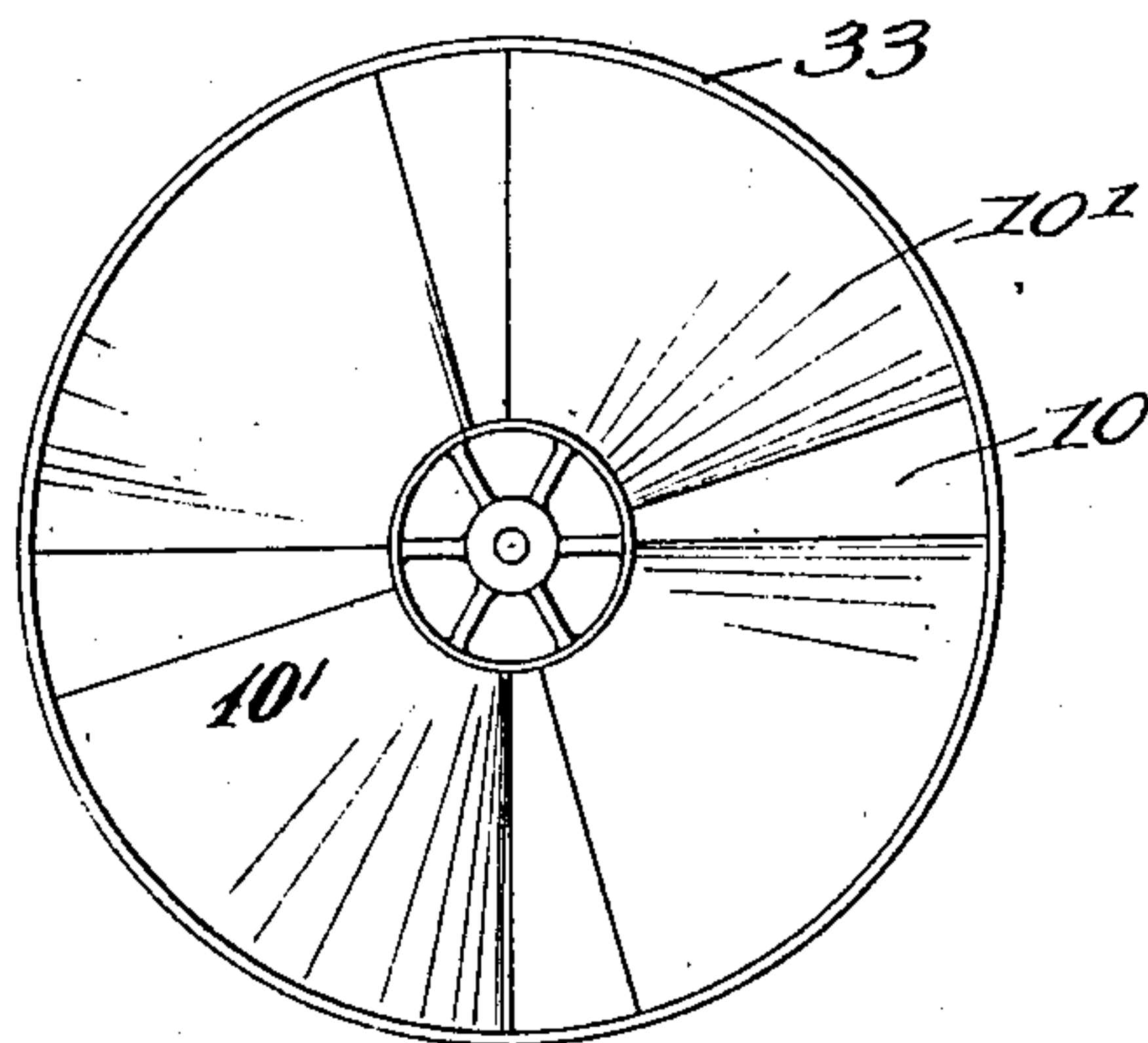


Fig. 4



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# UNITED STATES PATENT OFFICE.

GEORG PUM, OF VIENNA, AUSTRIA-HUNGARY.

## SELF-PROPELLED AIR-SHIP.

No. 906,559.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed August 16, 1907. Serial No. 388,833.

*To all whom it may concern:*

Be it known that I, GEORG PUM, merchant, subject of the Emperor of Austria-Hungary, and residing at Vienna, in the Empire of Austria-Hungary, having invented certain new and useful Improvements in Self-Propelled Air-Ships, do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to improvements in air ships of the self propelled type and is adapted for use either with or without a balloon.

The invention relates more particularly to the propelling mechanism and one of its objects is to provide such mechanism which, if used in connection with a balloon, will not only assist in maintaining and reaching the desired altitude but will in addition propel the ship in the desired forward direction.

One of the special features of this invention consists in a propelling mechanism which is adjustable and which if adjusted for the purpose of obtaining a forward movement will serve in such adjustment to also assist in the maintenance of the ship at the desired altitude.

Another of the principal features consists in the provision of a frame which is adjustably suspended from a balloon whereby the frame may be adjusted to the desired angle and wherein a basket or car is supported from said means and is maintained in its normal position irrespective of the position of the frame.

Other features of my invention will be more fully set forth in connection with the accompanying drawings and will be more particularly ascertained and pointed out in and by the appended claims.

In the drawings: Figure 1 is a view in side elevation illustrating an air ship embodying the main features of my invention. Fig. 2 is a sectional view on line A—B of Fig. 1. Fig. 3 is a plan view of one of the propellers. Fig. 4 is a plan view of another propeller.

Like characters of reference designate similar parts throughout the different figures of the drawings.

The invention is illustrated in the specific embodiment shown in connection with a balloon although it will be understood that a balloon is not essential to a full realization of the advantages of the invention.

As shown the balloon is designated at 1 and there is suspended therefrom a support

which as shown comprises a yoke 2 connected with the balloon by flexible means in the form of cords or ropes as illustrated.

A frame is indicated at 4 and conveniently said frame is shown in the form of a ring which is movably mounted upon the support 2. Said frame 4 has a cross section which as shown comprises a body portion 29 which is bent to form lateral supporting flanges 30. In order to obtain the requisite adjustment of the frame 4 with respect to the yoke 2 the latter is provided with rollers 3 adapted to engage said flanges 30 and support the frame by such engagement in a manner clearly shown in Fig. 2. Said flanges 30 extend throughout the circumference of the frame 4 and also serve as a support for a car or cage 7. As illustrated in Fig. 2 it will be seen that said car or cage is provided with a yoke 5 having rollers not shown engaging said flanges 30 and serving by such engagement to support said car and permit relative movement of the frame 4 with respect thereto. In order to prevent such relative movement of the frame from displacing the car 7 from its normal or desired position means are provided for connecting said car which means are preferably secured to the yoke 2. As shown said means consists of cables or ropes 8 connected with the yoke 5 in any desirable manner at one end and at their other ends with the yoke 2. Conveniently said cables or ropes 8 are disposed within the channel or way 31 formed by said bed flanges 30 although this disposition of the cables is not essential.

It will be seen from the foregoing that in combination with the balloon and the basket or cage 7 there is provided a frame which is movably interposed between said balloon and basket to support the latter from the former and that means are provided for preventing displacement of the basket from its normal position. Means are provided for adjusting the frame 4 relatively to the balloon and basket and as shown said means is disposed in a manner to be accessible to the occupant of the basket. In the specific embodiment shown a rack 25 is formed on each of the flanges 30 and said rack as shown in Fig. 1 extends throughout a portion of the periphery of said ring 4. Upon the basket support 5 there is revolvably mounted a shaft 23 carrying gears 22 adapted to mesh with said racks 25 as clearly shown in Fig. 1 and on the outer end of said shaft is mounted a



crank 24 which serves when turned by the occupant of the car to effect rotation of the ring 4 by reason of its movable mountings or connections with the yokes or supports 2 and

5 5. In order to limit the adjusting movement of the frame 4 means are provided, preferably in the form of stops 26 which are adapted for engagement with the gears 22.

In order to facilitate the flight of the ship  
10 when the same is being started from a position of rest near the ground revoluble supports are provided and as shown said supports are in the form of legs 28 which are connected with the frame 4 and are provided  
15 with wheels adapted to engage the ground or other surface supporting the ship prior to flight. These supports maintain the cars 7 out of engagement with the ground and in cases where the ascent is preceded by a slight  
20 lateral movement of the ship these supports prevent the car from dragging along the surface and avoid the resultant retarding influence of such action.

A rudder is provided and as shown is  
25 mounted upon the car 7 and consists of an extensible or bellows-like structure 27. A rudder controlling device is indicated at 32 and is disposed in a manner to be accessible to the occupant of the car.

30 The propelling means for assisting in obtaining an ascending flight and which also maintains the ship at the desired altitude and impels it in a forward direction consists as shown of superposed propeller wheels 9 and  
35 10 which wheels are preferably arranged in parallel relation and in co-axial alinement with respect to each other. Desirably said wheels are equal in diameter and the upper wheel 9 has four blades 9' which are trough  
40 shaped and which are disposed at a greater angle than the blades 10' of wheel 10. Said wheels are rotated in opposite directions and wheel 9 generates a downwardly directed current of air which is engaged by the blades  
45 of wheel 10 with the result that the velocity of the air current is increased, thereby correspondingly increasing the ascending impelling action. The result of this construction in practice has made it possible to materially  
50 reduce the size of the balloon employed thereby not only reducing first cost but rendering the ship more wieldy and easily managed. In order to prevent lateral escape of the air from the propeller wheels and to insure an efficient action of the wheel 10 upon  
55 the air current generated by wheel 9 means are provided in the form of a band 14 which surrounds the blades of the wheel 9. Said band insures the formation of a downwardly  
60 directed column or shaft of air toward wheel 10. Desirably wheel 10 is also provided with a band which is indicated at 33 and which prevents lateral escape of the air until after said wheel 10 has acted thereon. Means are  
65 also provided for preventing lateral escape of

air from the space between said wheels and as shown said means consists of a band 15 which is conveniently secured to the band 14 of wheel 9 and which overhangs the band 33 of wheel 10. By confining the air to the area  
70 through which the blades of the wheels rotate the action is concentrated upon a limited volume of air which arrangement makes it possible to obtain a displacement of air at a much greater velocity than if the air were  
75 permitted to escape laterally.

One manner of mounting the wheels 9 and 10 is shown in the drawings and consists of two shafts one of which is conveniently in the form of a sleeve. Shaft 11 is mounted at its  
80 upper end in a bearing 34 in the frame 4. At its lower end said shaft 11 is mounted in a bearing 36. Wheel 9 is mounted on shaft 11 and wheel 10 is mounted on sleeve 12. On the lower end of sleeve 12 is mounted a gear  
85 20 and on the lower end of shaft 11 there is mounted a gear 21. A collar 37 is fixed to shaft 11 and serves to maintain sleeve 12 at a definite longitudinal position on the shaft 11. Wheels 19 and 39 are provided and are dis-  
90 posed in a manner to coöperate, or if gears are employed, to mesh with wheels 20 and 21. Preferably gears 20 and 21 are of the same size as are also the gears 19 and 39 whereby rotation of the latter will serve to  
95 rotate the former at an equal speed thereby driving the wheels 9 and 10 at the same speed. It will be seen that the disposition of the gears is such that when power is applied to gears 19 and 39 to rotate the same in  
100 one direction the wheels 9 and 10 will be rotated in opposite directions. Gears 19 and 39 are mounted upon shafts 17 and said shafts are journaled in bearings 18, as shown in Fig. 2, and said bearings are rigidly secured to the  
105 frame 4. Each shaft 17 is desirably driven from a prime mover and as shown said prime movers are indicated at 16 and are pendently supported in driving connection with the shafts 17 so that said prime movers will at all  
110 times occupy a vertical position and be maintained in driving connection irrespective of the position to which the frame 4 is adjusted as will readily be seen by reference to Figs. 1 and 2. To this end the bearings 18 are pro-  
115 vided with extensions 40 on which are loosely mounted hubs 41 to which brackets 42 are secured. Said prime movers 16 are mounted on said brackets 42 and are provided with driving wheels 43 which may be connected  
120 by belts to wheels 45 on shafts 17.

I claim:

1. An air ship comprising in combination, a balloon, an annular frame provided with flanges, a roller connection between said  
125 balloon and the flanges of said frame, superposed propeller wheels, a shaft for each propeller wheel, and means for imparting rotary motion to said propellers.

2. An air ship comprising in combination, 130



a balloon, an annular frame of U-shaped cross section provided with flanges, a support provided with rollers on which said flanges are mounted and which support is  
5 connected with the balloon, said annular frame being provided with gear teeth on its lower portion and a basket supported by said frame and provided with pinions meshing with said teeth and means for rotating said  
10 pinions for changing the position of said frame.

3. An air ship comprising in combination, a balloon, a support suspended therefrom and provided with rollers, an annular frame  
15 mounted on said rollers, a basket provided with a support having rollers engaging said frame, and ropes connecting said basket with said first mentioned support.

4. An air ship comprising in combination,  
20 a balloon, a frame suspended from said balloon, a basket suspended from said frame, propellers mounted in said frame, means for changing the position of said propellers with respect to the balloon, and means preventing  
25 displacement of the basket with respect to the balloon.

5. An air ship comprising in combination, two propellers, aligned shafts for said propellers, a band for each propeller preventing  
30 lateral escape of air therefrom, and a band secured to one of said propellers to close the space between the same.

6. An air ship comprising in combination, an adjustably suspended annular frame,  
35 prime movers pivotally mounted in said frame, horizontal shafts in driving connection with said prime movers, and propellers in driving connection with said shafts.

7. An air ship provided with propelling  
40 means comprising two propeller wheels arranged in co-acting relation and spaced apart from each other, both of said wheels being provided with means preventing lateral escape of air, means preventing lateral escape  
45 of air from the space between said wheels, and means for operating said wheels.

8. An airship provided with propelling means comprising a plurality of propeller wheels arranged in co-acting relation and  
50 spaced apart from each other and provided with means preventing lateral escape of air, means mounted on one of said wheels for preventing lateral escape of air between the same and the adjacent wheel, and means for  
55 operating said wheels.

9. An airship provided with propelling means, mechanism for changing the position of said means, a prime mover in driving connection with said means, and a pivotal  
60 mounting for said prime mover whereby the position of said means may be changed with-

out changing the position of said prime mover.

10. An airship provided with propelling means, comprising in combination, an ad- 65 justable frame, means for adjusting said frame, a plurality of propeller wheels, shafts for said propeller wheels, and a pivotally mounted prime mover mounted on said frame and in driving connection with said 70 wheels.

11. An airship provided with propelling means comprising in combination, an ad- justable frame, means for adjusting said frame, a plurality of propeller wheels mount- 75 ed on said frame, shafts for said wheels arranged in co-axial relation, and a prime mover pivotally mounted on said frame and in driving engagement with said shafts.

12. An airship comprising in combination, 80 a balloon, propelling mechanism movably suspended therefrom, and a car movably connected with said propelling mechanism.

13. An airship comprising in combination, a balloon, a frame movably suspended there- 85 from, a car movably suspended from said frame, and means for maintaining said car in prescribed relation with respect to said balloon.

14. An airship provided with movably 90 mounted propelling means, mechanism for moving said means, a car movably mounted on said means, and devices preventing displacement of said car upon movement of said propelling means. 95

15. An airship provided with movably mounted propelling means, mechanism for moving said means, a car movably mounted on said means and carrying said mechanism.

16. An airship comprising in combination, 100 a balloon, propelling means movably suspended therefrom, a car movably mounted on said propelling means, mechanism carried by said car for varying the position of said means, and devices limiting movement 105 of said means.

17. An airship comprising in combination, a balloon, propelling means movably suspended therefrom, a car movably mounted on said propelling means, mechanism carried 110 by said car for moving said propelling means, devices limiting movement of said propelling means, and means for maintaining said car in prescribed relation with respect to said balloon. 115

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

GEORG PUM.

Witnesses:

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ROBT. W. HEINGARTNER.