

No. 704,375.

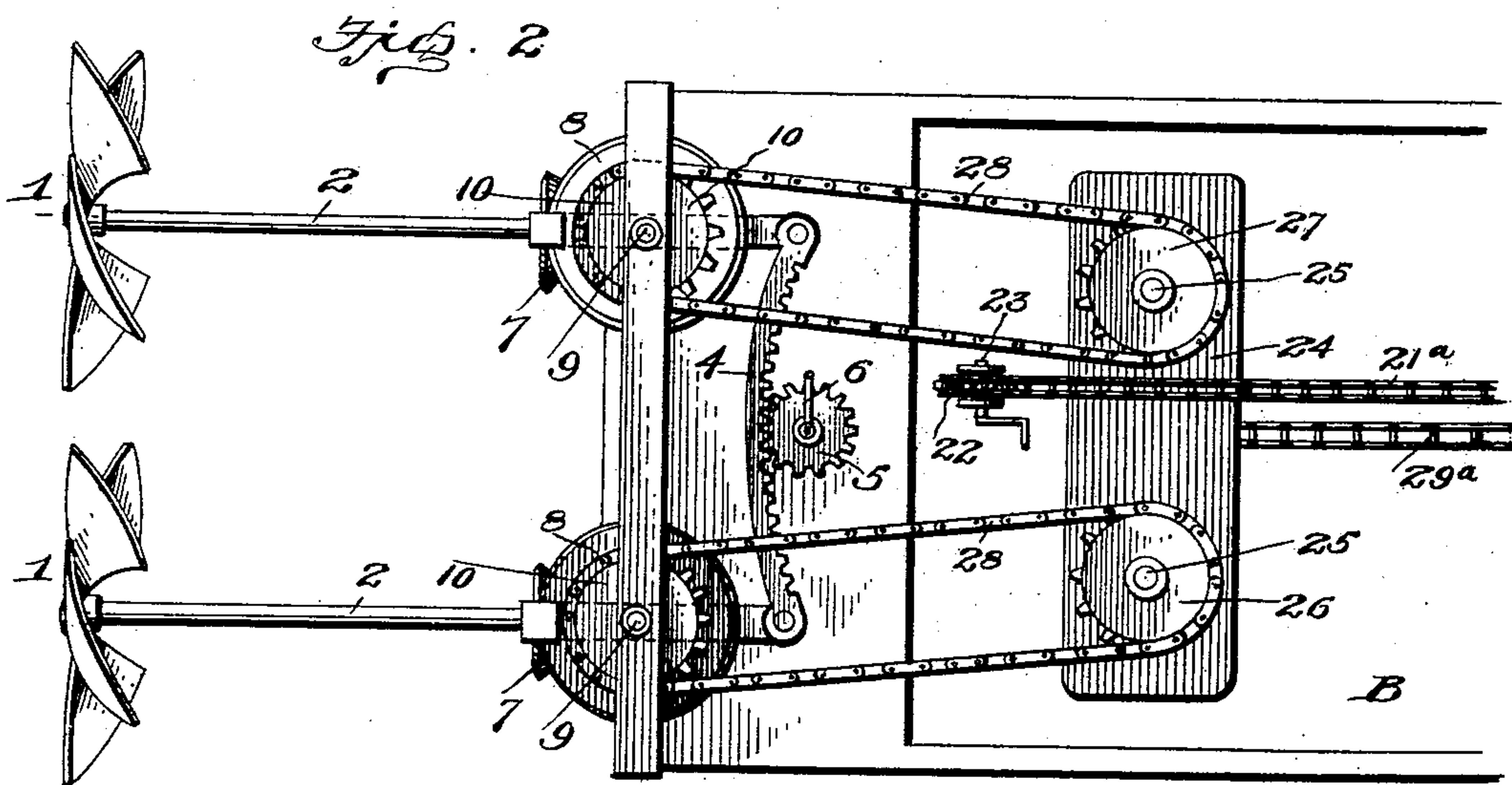
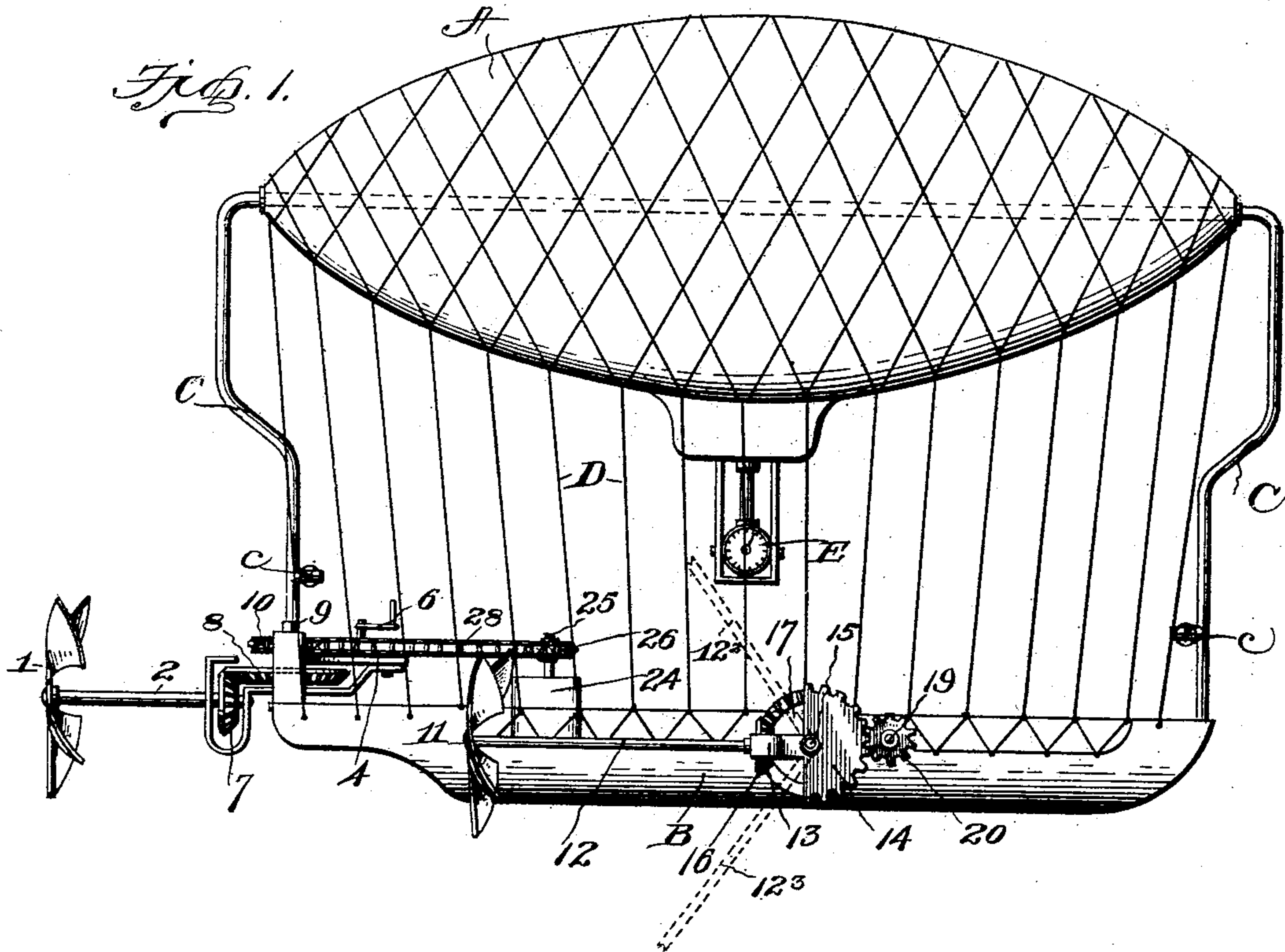
Patented July 8, 1902.

J. T. RICE.  
FLYING MACHINE.

(Application filed Feb. 21, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses  
*E. Hunt*  
*J. H. Wilson*

Inventor  
*Joel T. Rice*  
By *A. B. Wilson & Co.*  
Attorneys

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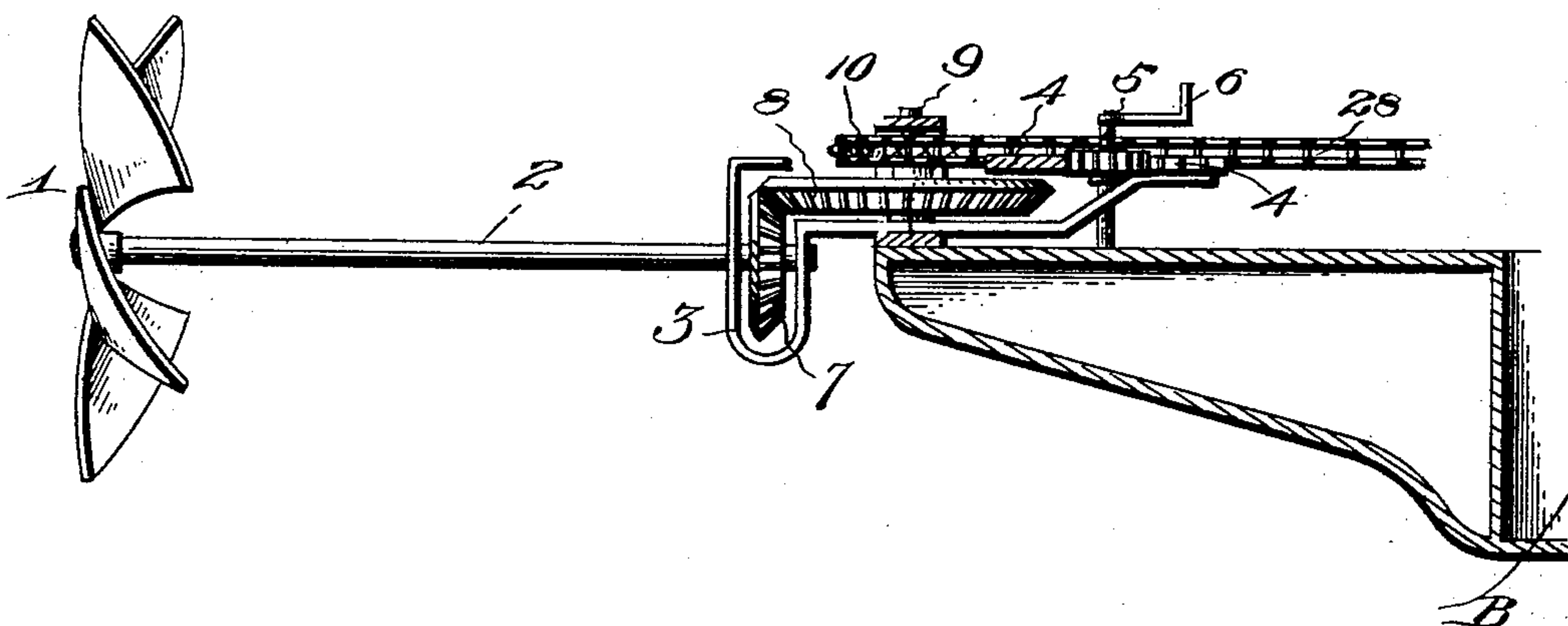
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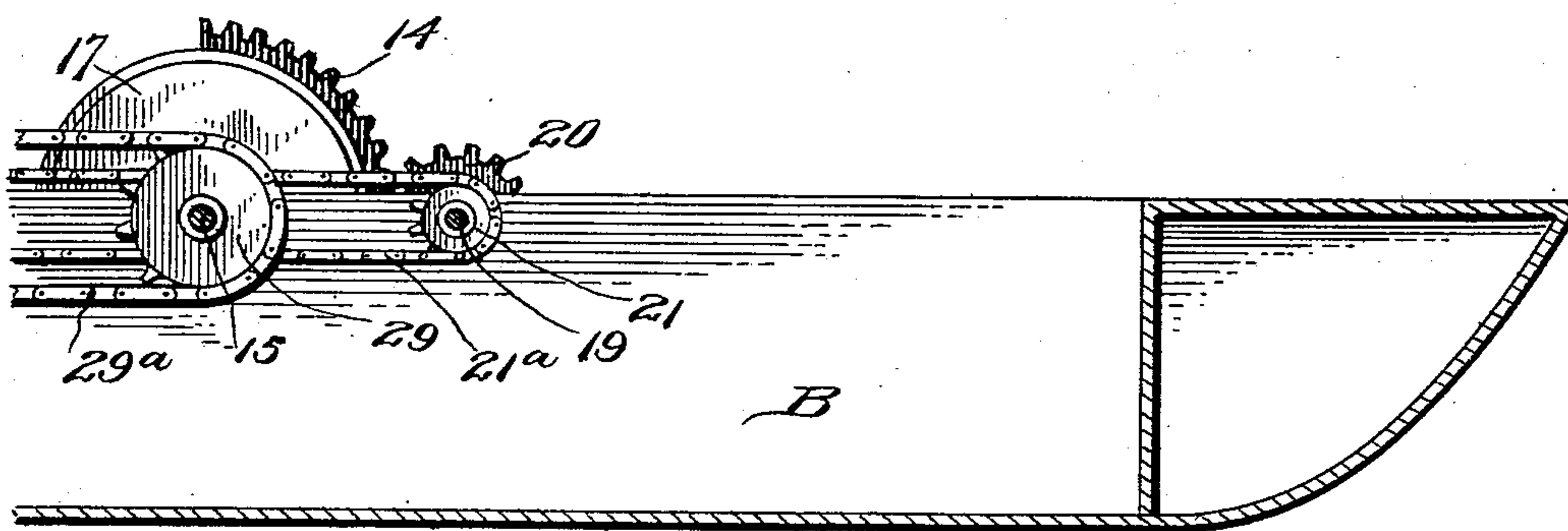
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*Fig. 3.*



*Fig. 4.*



Witnesses  
*Edw. T. Hunt.*  
*J. B. Wilson*

By

*Joel T. Rice*  
Inventor

*A. B. Wilson & Co.*

Attorneys



# UNITED STATES PATENT OFFICE.

JOEL TROUT RICE, OF HOT SPRINGS, ARKANSAS.

## FLYING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 704,375, dated July 8, 1902.

Application filed February 21, 1901. Serial No. 48,272. (No model.)

*To all whom it may concern:*

Be it known that I, JOEL TROUT RICE, a citizen of the United States, residing at Hot Springs, in the county of Garland and State of Arkansas, have invented certain new and useful Improvements in Flying-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to flying-machines.

The object of the invention is to improve the construction shown in the patent granted to me on July 5, 1898, No. 606,942, by simplifying the parts and providing a positive drive mechanism for the propellers.

With this and other minor objects in view the invention consists of certain novel features of construction, combination, and arrangement of parts, which will be hereinafter more fully described, and particularly set forth in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of a flying-machine embodying my invention. Fig. 2 is a plan view of the front portion of the car. Fig. 3 is a sectional elevation on line *xx* of Fig. 2, showing the propeller-blade and end mechanism for shifting the same laterally. Fig. 4 is a detail view of the side propeller-wheels and their shifting mechanism.

Referring now more particularly to the drawings, which form a part of this specification, A denotes a balloon of any desired shape, but in the present instance shown in turtle shape.

B denotes a car, and C denotes tubes connecting the ends of the car to the balloon. These tubes are preferably of aluminium and run through the balloon and are provided with valves *c* for charging them with a buoyant gas.

D denotes cables connected to the network of the balloon and to the car to support the latter.

E denotes the gas-gage, which extends from the balloon in such a position as to be easily observed by the occupants of the car.

The car is provided with two sets of propellers, as in my patent above referred to—a forward set and a side set. The forward set is numbered 1, and each propeller is fixed to

a shaft 2, journaled in a carrier 3, pivoted to the lower end of shaft 9 in the forward end of the car to swing in a horizontal plane. The carriers are bent upwardly and rearwardly at their rear portions, so as to form seats for the gear-wheels 8, whereby to give the same space and proper movement to mesh with the pinions 7 on the rear ends of the propeller-shafts 2. The rear ends of these carriers are pivotally connected to a curved rack-bar 4, which is shifted laterally by a pinion 5, having a crank or winch 6, thus moving the propeller-wheels laterally in unison in the same direction. Each propeller-shaft is provided with a pinion 7, which meshes with a gear-wheel 8, fixed to a shaft 9, journaled in the forward end of the car and provided with a sprocket-wheel 10. It will be observed by this construction that in the adjustment of the forward propellers in a horizontal plane their rotary motion or speed is not affected.

11 denotes the side propellers, each of which is fixed to a shaft 12, journaled in a bearing in a bent arm 13, formed on a segmental rack 14, mounted to turn upon a shaft 15, which extends across the car and is journaled thereto at a point at the rear of the propeller-wheels 11. This shaft 12 has fixed to it a pinion 16, which meshes with the gear-wheel 17, fixed to the shaft 15, so that when said shaft 15 is revolved the motion will be transmitted to the propeller 11. These propellers may be simultaneously adjusted to the shaft 15, so as to cause them to extend parallel with the propeller-wheels 1 when it is desired to forge ahead in a straight line, or if it be desired to ascend or descend they may be moved up or down in the arc of a half-circle, as shown in dotted lines 12<sup>2</sup> and 12<sup>3</sup>, any of these adjustments being made without interfering with the rotary movement of the propellers. To adjust the propellers 11, I journal the shaft 19 near the center of the machine and fix to its ends pinions 20, which mesh with the segmental racks 14. I provide the shaft 19 with a sprocket-wheel 21, which is connected by a sprocket-chain 21<sup>a</sup> to a sprocket-wheel 22 of an operating-shaft 23, journaled in the car within convenient reach of the attendant. By rotating the shaft 23 rotary motion is imparted to the shaft 19, and this motion is communicated to the segmental



rack 14, which causes the propellers 11 to be swung to the axis of the shaft 15 to raise or lower the same while they are being rotated.

To drive the two sets of propellers, I employ a motor 24, which is provided with driving-shafts 25. These shafts are provided with sprocket-wheels 26 and 27, which are connected with the sprocket-wheels 10 by sprocket-chains 28. The shaft 15 is provided with a sprocket-wheel 29, which is connected by a sprocket-chain 29<sup>a</sup> with a suitable driving-gear of the motor, thus transmitting the movement from the motor 24 to the shaft 15 to drive the side propellers. Suitable mechanism for throwing power on or off may be provided; but as the mechanism for accomplishing this result forms no part of the present invention and may be provided by any one skilled in the art I have not deemed it necessary either to show or specifically describe the same.

From the foregoing description, taken in connection with the accompanying drawings, the construction and mode of operation of my flying-machine will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion, and minor details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

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

1. In a flying-machine, the combination with a car having drive-shafts at opposite forward ends thereof, carriers pivoted to the shafts, gear and sprocket wheels fixed on the same shafts, propellers with shafts pivoted

to the carriers having pinions on the rear ends thereof meshing with the fixed gear-wheels, means connected to the sprocket-wheels and to a motor whereby to rotate the propeller-wheels, the rear ends of the carriers being bent upwardly and rearwardly and pivoted to opposite ends of a curved rack-bar, a pinion meshing with said rack-bar, and a crank-arm on said pinion so as to shift the propeller-wheels in unison in the same direction, substantially as specified.

2. In a flying-machine, the combination with a car having a rotating shaft extending transversely across the same and extending on opposite sides thereof, having on opposite ends gear-wheels, a segmental rack on said shaft with integral bent arms to form bearings, propeller-shafts with wheels mounted in the bearings of the arms, the rear ends of the propeller-shafts having bevel-gears inclosed within said bends of the arms and meshing with said gear-wheels, a sprocket-wheel secured on the first-mentioned rotating shaft, means connected to said sprocket-wheel and with suitable gearing of a motor, of a second transversely centrally arranged shaft provided with a sprocket-wheel, a pinion on said shaft meshing with said segmental rack, a sprocket-wheel with an operating crank-arm, a chain connected thereto and to the sprocket-wheel on the second transversely-arranged shaft, substantially as specified.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOEL TROUT RICE.

Witnesses:

JAMES M. ANDERSON,  
S. J. ERRICKSON.