

(No Model.)

2 Sheets—Sheet 2.

T. LEIBBRAND.
AERIAL NAVIGATION.

No. 600,878.

Patented Mar. 22, 1898.

FIG. 3

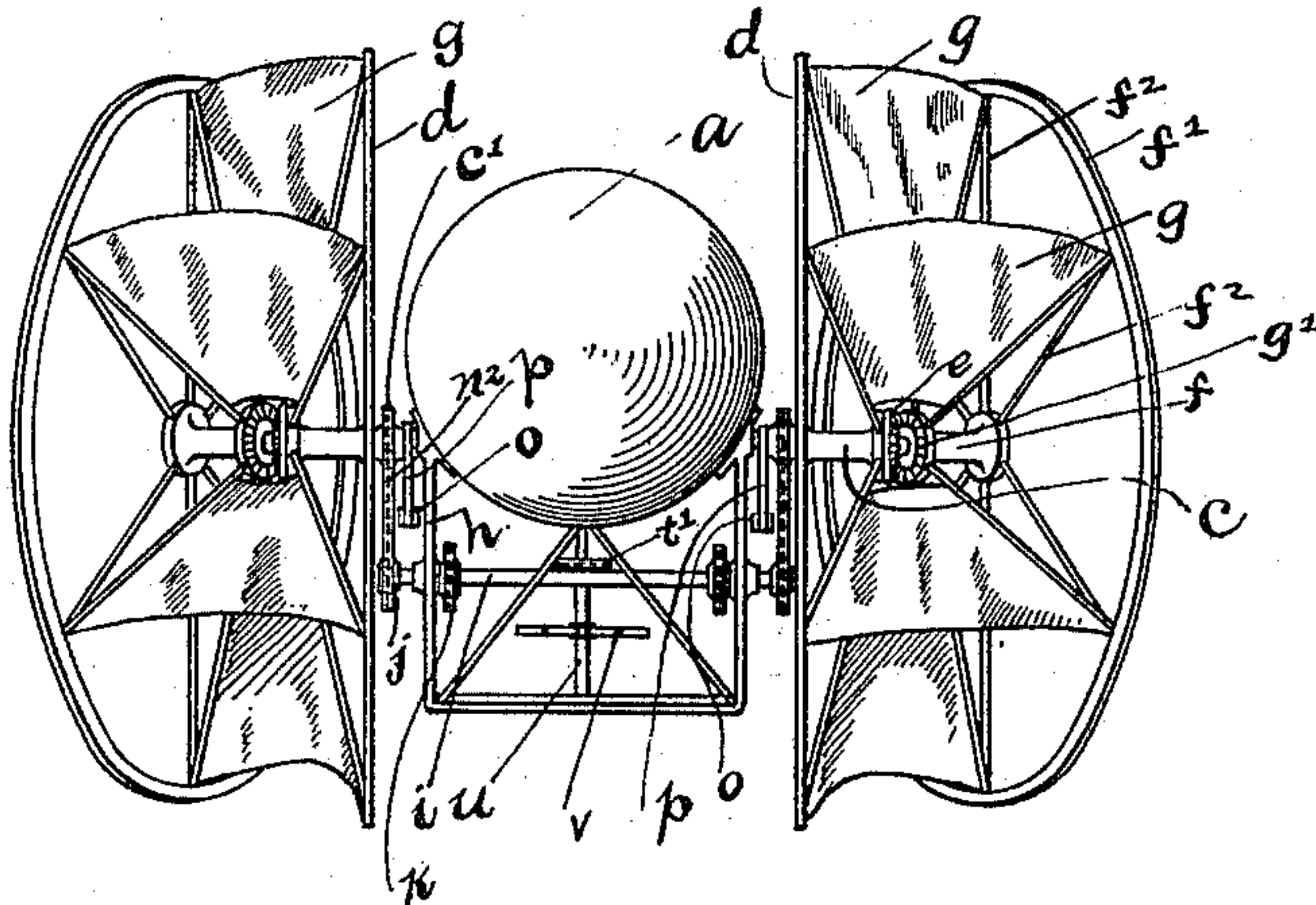


FIG. 4

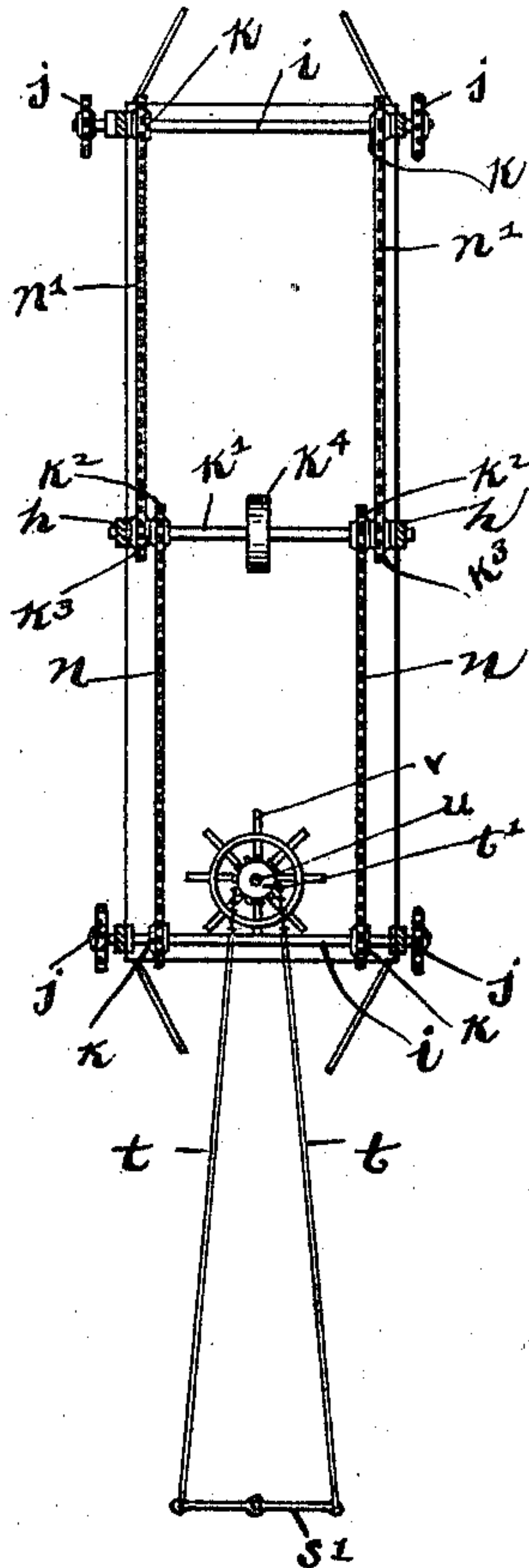
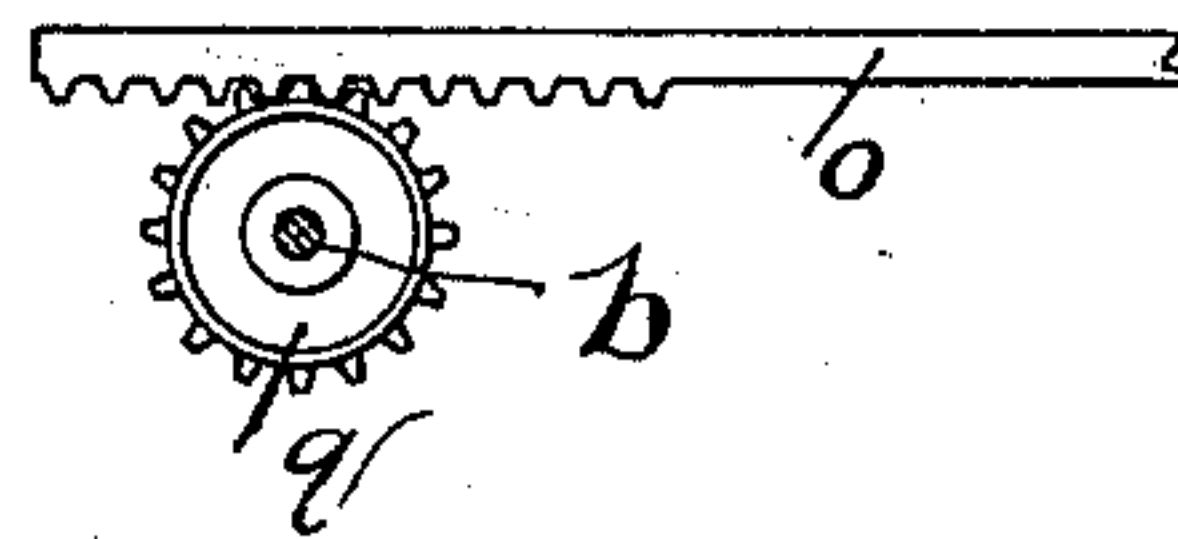


FIG.5



WITNESSES:

J. H. Frank
A. L. Phelps

INVENTOR

Theodore Leibbrand

BY

CC Shepherd
ATTORNEY

UNITED STATES PATENT OFFICE.

THEODORE LEIBBRAND, OF COLUMBUS, OHIO.

AERIAL NAVIGATION.

SPECIFICATION forming part of Letters Patent No. 600,878, dated March 22, 1898.

Application filed June 3, 1897. Serial No. 639,219. (No model.)

To all whom it may concern:

Be it known that I, THEODORE LEIBBRAND, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Aerial Vessels, of which the following is a specification.

My invention relates to the improvement of aerial vessels; and the objects of my invention are to provide a vessel of this class of improved construction and arrangement of parts, to provide my improved vessel with superior means for imparting motion thereto in the desired direction, and to produce other improvements in the details of construction which will be more fully pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of my improved aerial vessel, the propelling-wheels being shown in traveling positions. Fig. 2 is a side elevation of the same, showing the device as supported upon the ground. Fig. 3 is an end view. Fig. 4 is a plan view in detail of the power-transmitting and rudder-operating mechanism; and Fig. 5 is a transverse section of one of the shafts, showing a modification in the manner of adjusting the position of the angle-gears.

Similar letters refer to similar parts throughout the several views.

In the construction of my improved airship or aerial vessel I provide a cylindrical body *a*, of aluminium or other suitable material, the ends of said body being preferably cone-shaped, as shown. Extending transversely through the body *a* on each side of the center of the length thereof are shafts *b*, the latter being journaled in suitable air-tight boxings in said body. As shown in the drawings, each of the shafts *b* extends outward a short distance beyond the sides of the body *a* at right angles with the latter and has its end portions bent to form terminations *b'*, which are at an angle with the portions *b*. Upon the straight outwardly-projecting portions of each of the shafts *b* are loosely mounted hubs or sleeves *c*, the inner end of each of which carries a small sprocket-wheel *c'*. Adjacent to and on the outer side of each of the sprocket-wheels *c'* each of said hubs car-

ries a comparatively large wing-wheel *d*, the radially-arranged spokes *d'* of which are inclined outward and have their inner ends secured to the outer end of the hub *b*. On the outer end of the hub *b* is carried a beveled gear-wheel *e*.

f represents an outer hub which is loosely mounted upon each of the angular portions *b'* of the shafts *b*, this hub *f* carrying on its outer end portion a wheel *f'* of slightly less diameter than the wheel *d*, the spokes *f''* of said wheel *f'* being inclined inwardly and secured to the inner end of the hub *f* on the outer side of a beveled gear-wheel *g'*, which is carried on the inner end of said hub and which gears angularly with the wheel *e*. Between the diverging spokes *d'* and *f''* of each pair is secured an angular wing or web of canvas or other suitable material *g*.

Suspended from the under side of the body *a* by suitable supports or hangers *h* is a suitable form of car or carriage body *h'*. Journaled between each end pair of supports *h* and extending beneath the car-body is a transverse shaft *i*, each of these shafts *i* carrying near their outer end portions sprocket-wheels *k* and upon their extremities sprocket-wheels *j*. Journaled between the central downwardly-extending hangers *h* is a central transverse shaft *k'*, on each of the outer end portions of which are mounted sprocket-wheels *k''* and *k'''*. Upon the center of the length of the shaft *k'* is mounted a belt-wheel *k''''*. The wheels *k* of the rear shaft *i* are connected with the wheels *k''* of the central shaft *k'* by means of endless chains *n*, while the wheels *k'''* of said central shaft and wheels *k* of the forward shaft *i* are connected by endless chains *n'*. The wheels *j* on the extremities of the shafts *i* are connected with the shaft-wheels *c'* directly above by means of chains *n''*.

o represents horizontal rack-bars, one of which is arranged in the direction of the body *a* on each side thereof and on the inner sides of the central hangers *h*. The extremities of these rack-bars are secured to the lower ends of short downwardly-extending arms *p*, which are rigidly connected with the shafts *b*. Journaled on the inner side of each of the central hanger-arms *h* is a pinion-wheel *p'*, which engages, as shown in Fig. 2 of the drawings, with the teeth of the adjoining

rack *o*. This pinion-wheel is adapted to be rotated by a crank p^2 or by other suitable means.

As shown in Fig. 5 of the drawings, I may substitute for each of the shaft-arms *p* a gear-wheel *q*, with the teeth of which the rack-bar *o* may engage, as shown in said figure.

Journalled to the rear end of the body *a* and to brace-arms *r*, which extend from said body, is the inner and vertical portion of a suitable steering-blade or rudder *s*. The lower portion of the steering-blade or rudder is connected to the central portion of a transverse operating-arm *s'*, the outer ends of which have jointly connected therewith the outer ends of rods *t*, the inner end portions of said rods being connected by a chain *t'*. This chain *t'* passes about a small sprocket-wheel mounted upon a vertical steering-shaft *u*, which is suitably journalled in the rear end portion of the car *h'*. This steering-shaft also carries thereon a spoked steering-wheel *v* of the usual form.

In utilizing my invention the body *a* is preferably inflated with gas or its equivalent. Through a suitable motor or other source of power motion is transmitted to the belt-wheel k^4 , thence through the shaft *k'* and its sprocket-wheels to the chains *n* and *n'* and shafts *i*. Through the chains n^2 rotary motion is communicated to the wheel *d*, and through the angular gear connection described a corresponding motion is imparted to the wheel *f'*. Owing to the angular positions of said wheels *d* and *f'*, it is obvious that a rotation of said wheels such as described must result in the webs *g* spreading and presenting a substantial flat surface to the atmosphere when said webs are between those portions of the wheels *d* and *f'* which are the most separated. It is obvious that these webs will, however, have taken a substantially folded form when between the converging portions of the wheels. It will thus be seen that in case the shafts are in the position indicated in Fig. 1 of the drawings, with the angular portions thereof inclined rearwardly, the rotation of the web-carrying wheels must result in said webs spreading or extending in the forward portions thereof and in imparting, in conjunction with the gas-filled body, a consequent lifting power to the vessel. It is obvious, however, that by moving the rack-bars *o*, and thus changing the positions of the shafts *b*, the wings or webs

may be made to spread at such stages of the revolutions of the wheel as to cause a forward or other desired movement of the vessel.

It is obvious that the steering-blade or rudder may be moved to the desired angle by directing the vessel in its course by the proper rotation of the steering-wheel *v*.

From the construction and operation which I have described it will be observed that improved means are provided for imparting the desired movement to the vessel and that improved means are provided for regulating such movements. It will be observed that the construction of my improved aerial vessel is simple and that its parts are of such arrangement and form as to decrease the tendency toward the same getting out of order or becoming unmanageable.

It is obvious that the construction of the propelling-wheels and their angular wings may be adapted for use in transmitting power from the force of the wind, said propelling-wheels being employed in conjunction with other well-known mechanism, such as windmills, &c.

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

1. In an aerial vessel, the combination with the inflated body *a* and shafts *b* projecting therefrom, said shafts *b* having angular terminations, of outer and inner wheels mounted respectively upon the angular and straight portions of said shafts, an angle-gear connection between each pair of said wheels and flexible wings or webs connecting the spokes of said wheels and means for imparting rotary motion to the latter, substantially as and for the purpose specified.

2. In an aerial vessel, the combination with the inflated body *a*, transverse shafts *b* having angular terminations, of outer and inner wheels *f'* and *d* loosely mounted respectively on the angular and straight portions of said shafts, an angle-gear connection between said wheels, flexible wings or webs *g* connecting said wheels at intervals as described, means for imparting a rotary motion to said wheels and means for rotating said shafts or retaining the same in fixed positions, substantially as and for the purpose specified.

THEODORE LEIBBRAND.

In presence of—

A. L. PHELPS,
W. L. MORROW.