

No. 666,266.

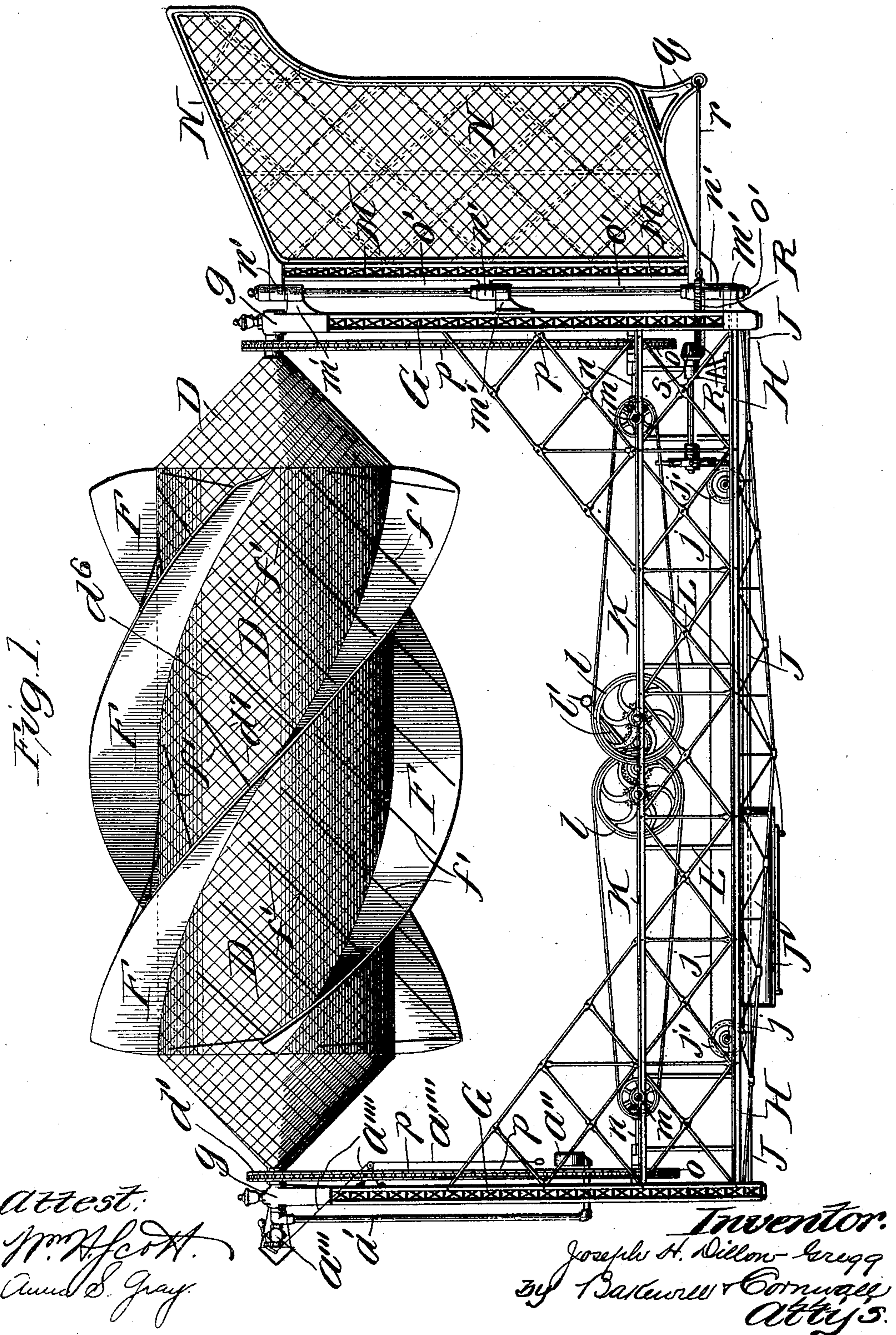
Patented Jan. 22, 1901.

J. H. DILLON-GREGG.
MACHINE FOR AERIAL NAVIGATION.

(Application filed May 1, 1899.)

(No Model.)

3 Sheets—Sheet 1.



Attest:

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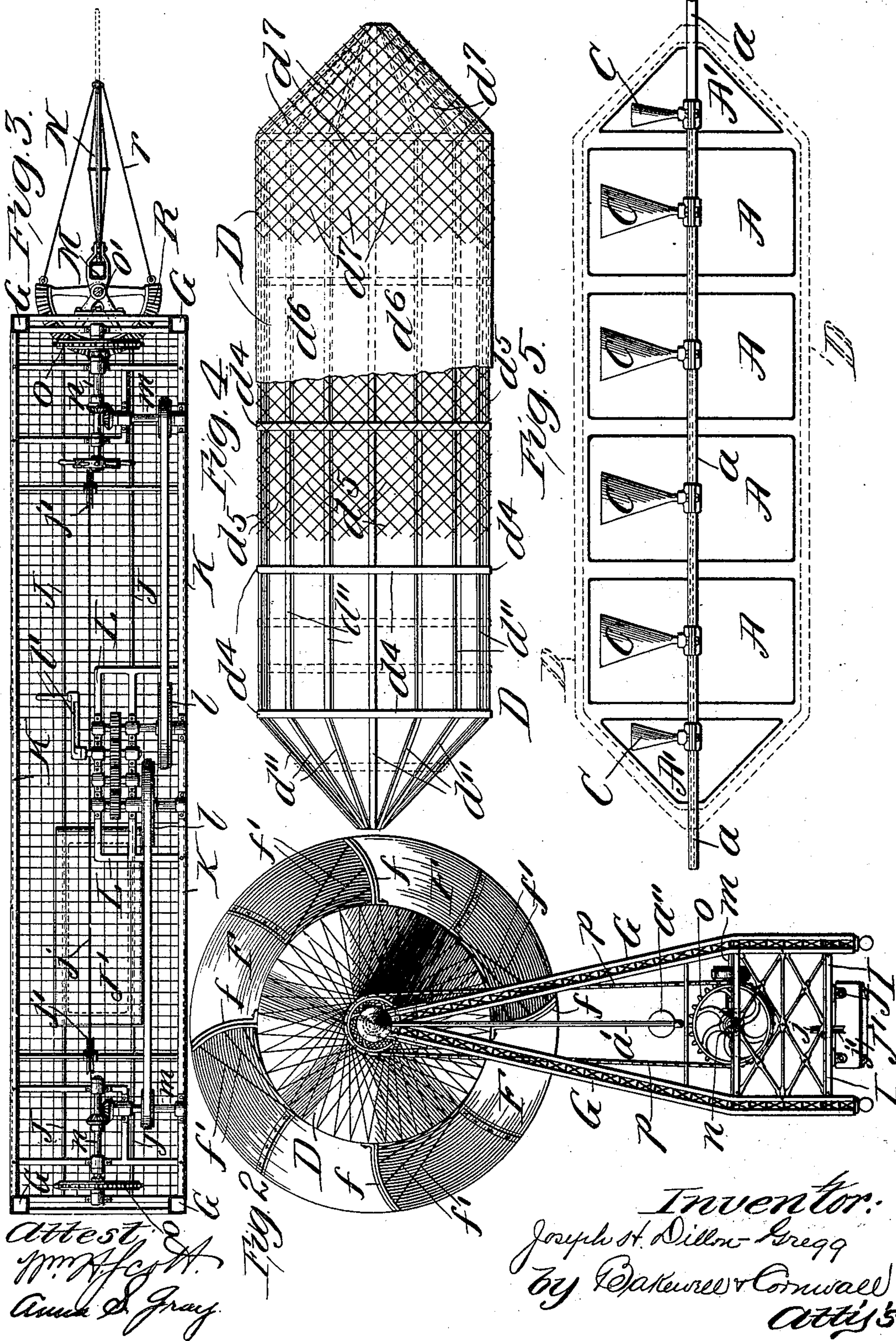
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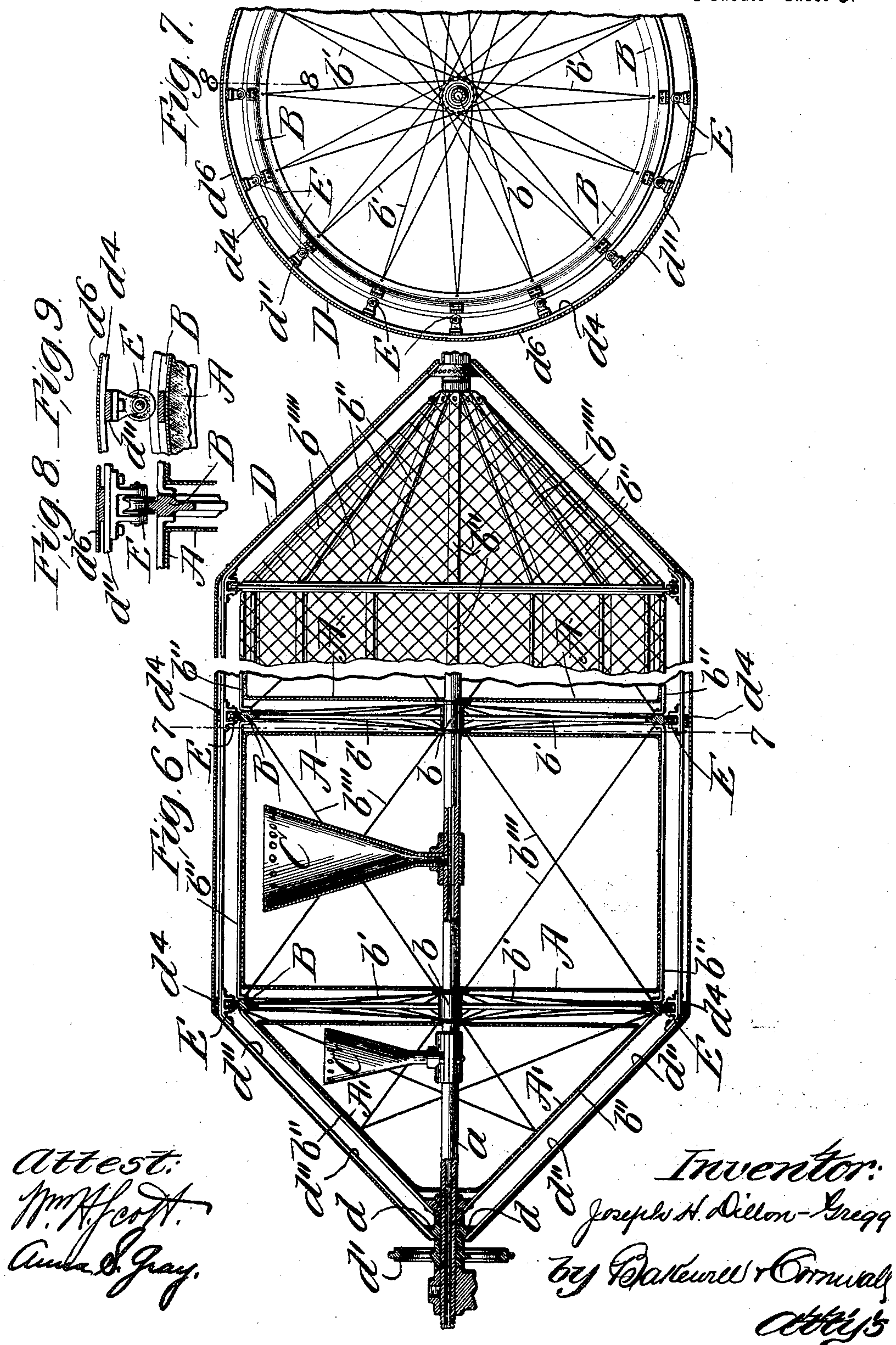


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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

JOSEPH H. DILLON-GREGG, OF ST. LOUIS, MISSOURI.

MACHINE FOR AERIAL NAVIGATION.

SPECIFICATION forming part of Letters Patent No. 666,266, dated January 22, 1901.

Application filed May 1, 1899. Serial No. 715,179. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH H. DILLON-GREGG, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Machines for Aerial Navigation, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a machine designed particularly for aerial navigation, the object being to construct a machine of the character described which will be suspended in space from a gas-reservoir, such machine being capable of propulsion and being provided with a vane or rudder acting as a steering apparatus to guide the machine in its flight.

With this object in view my invention consists in a framework of light material, such as aluminium and willow or bamboo, said frame being suspended from the axis of the reservoir, which reservoir is preferably cylindrical in shape and provided with tapered ends, means being arranged to rotate the casing of said reservoir on its axis, so that the flights carried on its external periphery will act to propel the machine through the air. Incident to the construction of this reservoir are roller-bearings interposed between the same and its outer shell or casing, thereby reducing the friction of the movement of said outer shell or casing to a minimum. The reservoir is also divided into a number of compartments, each connecting with the hollow axle, whereby the contents thereof may escape at the will of the operator when it is desired to have the machine descend in the case of an emergency.

Another feature resides in the construction of the steering apparatus and its associate parts, and finally the invention consists in the construction, arrangement, and combination of the several parts, all as will hereinafter be described and afterward pointed out in the claims.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevational view of my improved machine for aerial navigation. Fig.

2 is a front elevational view of the same. Fig. 3 is a top plan view with the gas-reservoir removed. Fig. 4 is a detail view of the framing for the gas-reservoir. Fig. 5 is a diagrammatic view showing the manner of dividing the reservoir into separate compartments. Fig. 6 is an enlarged sectional view through said reservoir, the same being broken away in its length. Fig. 7 is a cross-sectional view on line 7 7, Fig. 6. Fig. 8 is an enlarged sectional view on line 8 8, Fig. 7; and Fig. 9 is an enlarged cross-sectional view, partly in end elevation, of the roller shown in Fig. 8.

Similar characters refer to similar parts throughout the several views.

In the drawings, *a* indicates a hollow shaft or axle, upon which are arranged hubs *b* at proper distances apart, said hubs having spokes *b'* attached to them, which spokes support a track-ring *B*. These track-rings are connected together by longitudinally-disposed braces or slats *b''*, while diagonal braces *b'''* extend from the hub of one track-ring to the next adjacent track-ring to firmly hold said track-rings in their designed position. Between these track-rings and their supports are arranged inflatable bags *A*, which encircle the hollow shaft and which are punctured by the diagonal brace-rods *b'''*, the openings for said hollow shaft and said diagonal brace-rods being wrapped or suitably cemented to make air-tight joints. When these compartment-bags *A* are inflated, they rest against the spokes of the track-ring and the slats *b''*, and in order to offer an additional support a netting *b''''* encircles the slats, as shown to the right in Fig. 6, for the purpose of assisting in confining said bags to their designed limits. The ends of the reservoir as an entirety are preferably constructed by inclining the brace-rods *b'* and conforming the end compartment-bags *A'* to the shape thereof, so that such ends are tapered.

C indicates funnels communicating with the opening in the hollow shaft at their smaller ends, their larger ends opening into several compartments near the upper end thereof.

In inflating the reservoir as an entirety gas is introduced through the hollow shaft and escapes through the funnels *C* into the several compartments until the required lightness of the machine is attained. In thus

charging the reservoir the device is preferably anchored to the ground until such time as it is desired to rise, when the anchor-ropes are cast off. A pipe a' leads from the end of the hollow shaft and has a pressure-gage a'' arranged on its lower end, (see Fig. 1,) while a valve a''' is arranged in said pipe, which valve may, as shown, be provided with a weight to act as a safety-valve, and said valve also may have a cord or chain a'''' connected to it by which the same may be opened at the will of the operator.

d indicates hubs loosely mounted on the hollow axle and near each end thereof, said hubs carrying sprocket-wheels d' and having also attached to them brace-rods or slats d'' . These braces are inclined and run parallel with the braces b'' and at proper points are encircled by bands d^4 .

E indicates rollers which are secured to the braces or slats of the outer shell, which rollers bear against or engage with the track-rings B heretofore described. As shown in Fig. 4, the braces or slats d'' and the encircling bands are surrounded by a netting d^5 , over which is stretched a fabric, preferably oiled silk d^6 , while an outer netting d^7 is arranged over said silk. This fabric between this netting practically forms a skin over the outer casing, which I have marked D as an entirety, which outer casing is rotatably mounted on the hollow shaft.

F indicates spirally-arranged blades or flights on the external periphery of the rotatable casing D , said blades being preferably curved, as shown in Fig. 2, and suitably braced by knees f and brace-rods f' .

G indicates standards or risers whose upper ends converge toward each other and are connected to a bearing g , which is mounted on the ends of the hollow axle a . These standards form the front and back posts of a car or framework which is suspended from the axle of the reservoir. At the lower ends of the posts G are arranged suitable beams H , which connect the posts and properly space them, while cross-beams I , interposed between the posts, perform a similar function. These beams support a netting which serves as a flooring for the car. Under this flooring are arranged guide-rods J , on which is mounted a sliding weight J' , said weight being connected to a cord j , which passes over sheaves j' , suitably mounted on a shaft journaled in the beams H . By proper manipulation weight J can be moved longitudinally of the car to act as ballast whenever desired. Weight J is preferably in the form of a hollow box, on the lowest side of which is arranged a sliding door or other suitable device, and the contents to give weight to the box being granular, such as sand, can be discharged at the will of the operator when desired. Above and parallel with the floor-beams H are rails K , which are supported by suitable posts on the floor-beams, and rigidity is given to the structure by diagonal braces which, near the

ends of the "hand-rails," as I will call them, extend above said hand-rails and are connected to the end posts G .

L indicates a frame suitably supported in the car about midway the length thereof, which frame serves to support shafts carrying pinions for driving pulleys l , belted to a pulley on shafts m , in turn driving shafts n by miter-gearing, which shafts n carry sprocket-wheels o , arranged beneath the sprockets d' , respectively, and adapted to drive said sprockets d' through chains p .

Both ends of the shell D are designed to be driven in the same direction through the gearing just described, which gearing may be connected to power-driven motors or may be manually operated through the medium of a crank l' . (Shown in Figs. 1 and 3.) Secured to the rear post G are bearings m' , arranged on suitable cross-pieces between the posts, which bearings coöperate with and support bearings n' , extending from a rudder-post M . A rod o' extends through these bearings and acts as a pivot-point for the rudder.

N indicates the rudder-frame, which is suitably braced by internal braces, in which frame is mounted a suitable fabric, preferably in the form of oiled silk, on each side of which is arranged a netting to act as a support for said fabric.

q indicates an extension depending from the lower outer end of the rudder or vane, said extension having an eye, in which are secured rods r , connected at their other ends to a segment R , secured to the lower end of the shaft o' . A beveled pinion s , arranged on a shaft journaled in suitable bearings, meshes with the segment R , the shaft of said beveled pinion carrying a hand-wheel at its other end by which the same may be rotated, so as to operate the rudder or vane, and I arrange the same at any desired angle, depending upon which direction it is desired to turn the machine.

In operation enough gas is admitted into the reservoir to give the machine sufficient buoyancy, so that preferably it will clear the ground, after which the operator either by assuming a proper position himself or by arranging the sliding weight tilts or places the machine in an inclined position, so that in rising the machine will be propelled forwardly and upwardly upon the rotation of the flights.

In traveling in a horizontal line the machine is placed in substantially a horizontal plane and the flights rotated. In descending the weight is placed, or the operator places himself in advance of the center line of gravity, so as to depress the nose of the machine, whereby when the flights are rotated the machine will gradually descend toward the earth at an angle. The angle of the rudder determines the course of flight, and the inclination of the machine with respect to a horizontal plane when moving in one direction or the other determines the ascent or descent.

I am aware that many minor changes in the

construction, arrangement, and combination of several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

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

1. The combination with a shaft, of a gas-reservoir mounted thereon, track-rings supported by said shaft, a rotatable outer shell carrying propelling-blades and supported by said track-rings, and a carriage supported by said shaft, substantially as described.

2. The combination with a shaft, of track-rings supported thereby, a compartment gas-reservoir, the compartments of which are mounted on the shaft and interposed between said rings, a rotatable shell carrying propelling-blades and supported by said rings, and a carriage supported by said shaft, substantially as described.

3. The combination with a shaft, of track-rings fixed thereon at suitable distances apart, gas-reservoir compartments arranged between said rings, a rotary propelling means for rotating the same, braces between said rings for confining said reservoir-compartments in position, and a carriage supported by said shaft, substantially as described.

4. The combination with a shaft, of track-rings supported thereon at different points, a rotary propelling-shell mounted on said rings, means for rotating the same, gas-reservoir compartments arranged around said shaft and between said rings, braces between said rings for supporting said reservoir-compartments, a netting cooperating with said braces for supporting said reservoir-compartments, and a carriage supported by said shaft, substantially as described.

5. The combination with a shaft, of track-rings supported thereon at different points, a rotary propelling-shell supported by said rings, means for rotating the same, gas-reservoir compartments arranged around said shaft and between said rings, braces between said rings for supporting said reservoir-compartments, a netting cooperating with said braces for supporting said reservoir-compartments, diagonal braces *b'''* for bracing said track-rings, and a carriage supported by said shaft, substantially as described.

6. The combination with a gas-reservoir, of a shaft on which the same is mounted, a rotatable shell inclosing said reservoir, means for rotating the shell, spirally-arranged flights on said shell, and a carriage supported by said shaft, substantially as described.

7. The combination with a shaft, of a gas-reservoir arranged thereon, track-rings carried by said shaft, an outer shell inclosing said reservoir and supported by said track-rings, spirally-arranged flights on said outer shell, means for rotating said shell independ-

ently of the reservoir, and a carriage supported from said gas-reservoir, substantially as described.

8. The combination with a shaft, of a gas-reservoir arranged thereon, track-rings mounted on said shaft, an outer shell inclosing said reservoir and supported by said track-rings, spirally-arranged flights on said outer shell, and means for rotating said outer shell independently of the gas-reservoir, said means being located at each end of the shaft to engage each end of said shell, substantially as described.

9. The combination with a shaft, of a gas-reservoir concentric therewith and supported thereby, the ends of said reservoir being tapered, a shell inclosing said reservoir and rotatably supported from said shaft, means for rotating said shell about said gas-reservoir, propelling-flights secured to said shell, posts suspended from the ends of said shaft, and a platform arranged between the lower ends of said posts, substantially as described.

10. The combination with a shaft, of a gas-reservoir arranged thereon, a rotary shell inclosing said reservoir, spirally-arranged flights on said shell, a carriage suspended from said shaft, and means on said carriage for rotating said shell about said gas-reservoir, substantially as described.

11. The combination with a shaft, of a gas-reservoir arranged thereon, a rotary shell inclosing said reservoir, spirally-arranged flights on said shell, a carriage suspended from said shaft, means in said carriage for rotating said shell and its flights about said gas-reservoir, and a rudder or vane on said carriage, substantially as described.

12. The combination with a shaft, of a gas-reservoir arranged thereon, a rotary shell inclosing said reservoir, spirally-arranged flights on said rotary shell, a carriage suspended from said shaft, a sliding weight arranged on said carriage, means in said carriage for rotating said rotary shell and its flights about said gas-reservoir, and a rudder or vane on said carriage, substantially as described.

13. The combination with a car having standards at opposite ends, a shaft connecting the standards, a gas-reservoir supported by said shaft, a rotatable shell surrounding said reservoir and rotatable on said shaft independently of said reservoir, flights on said shell, means in the car and connections therefrom to said shell for rotating the same, substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 29th day of April, 1899.

JOSEPH H. DILLON-GREGG.

Witnesses:

F. R. CORNWALL,
ANNA S. GRAY.