

C. A. KUENZEL.

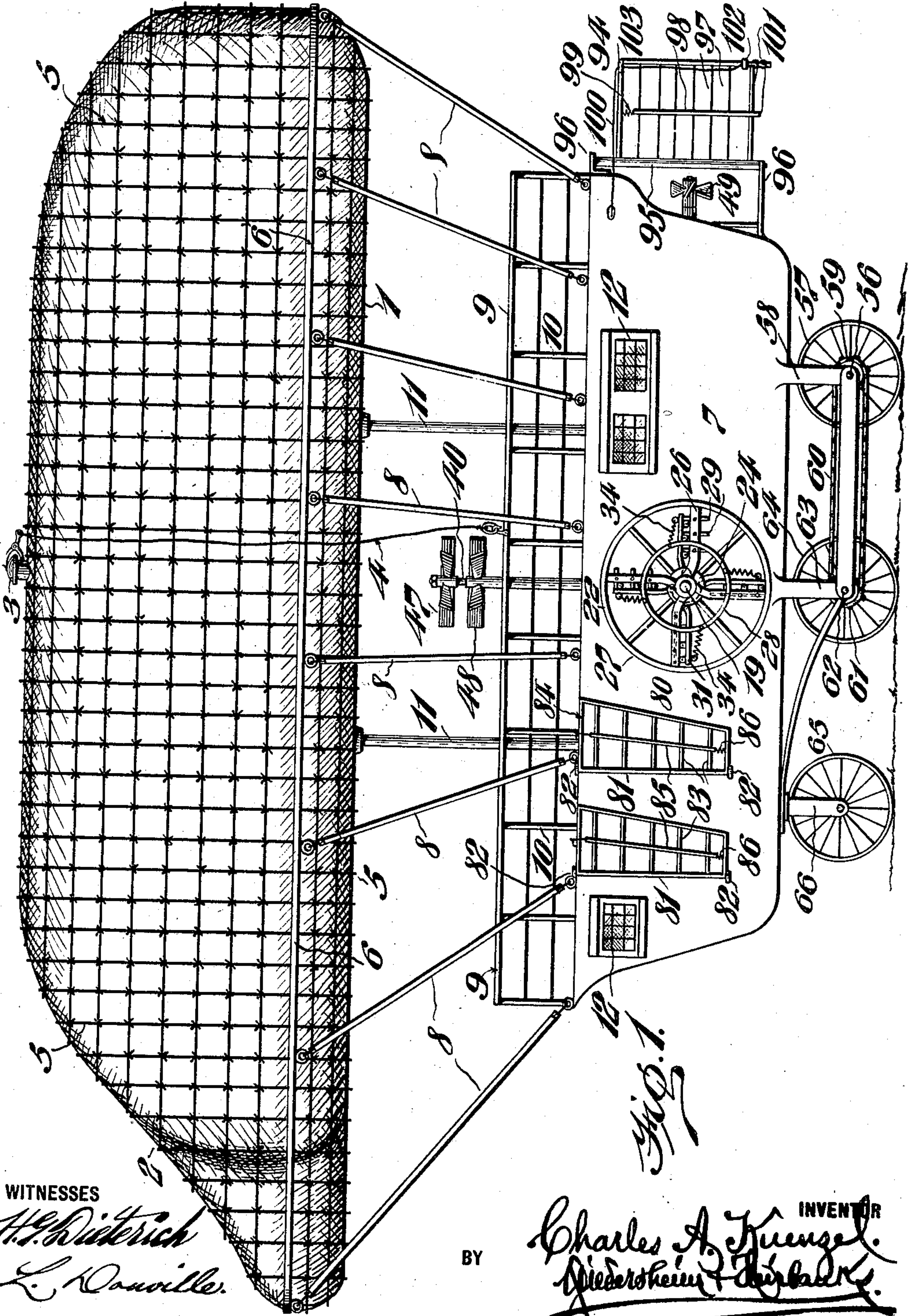
AIRSHIP.

APPLICATION FILED APR. 21, 1910.

Patented Mar. 14, 1911.

6 SHEETS-SHEET 1.

986,579.



WITNESSES

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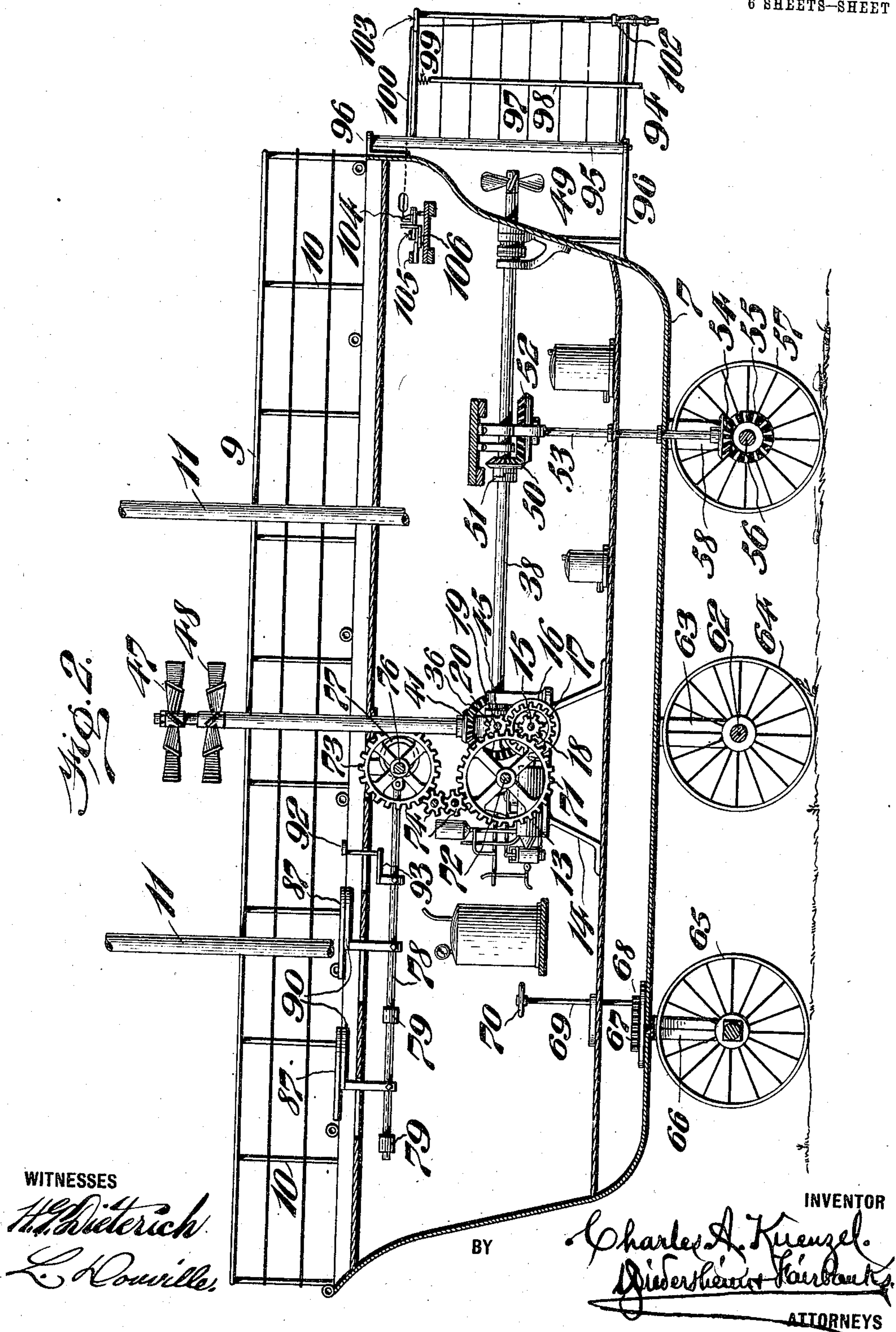


AIRSHIP.

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6 SHEETS—SHEET 2.

986,579.



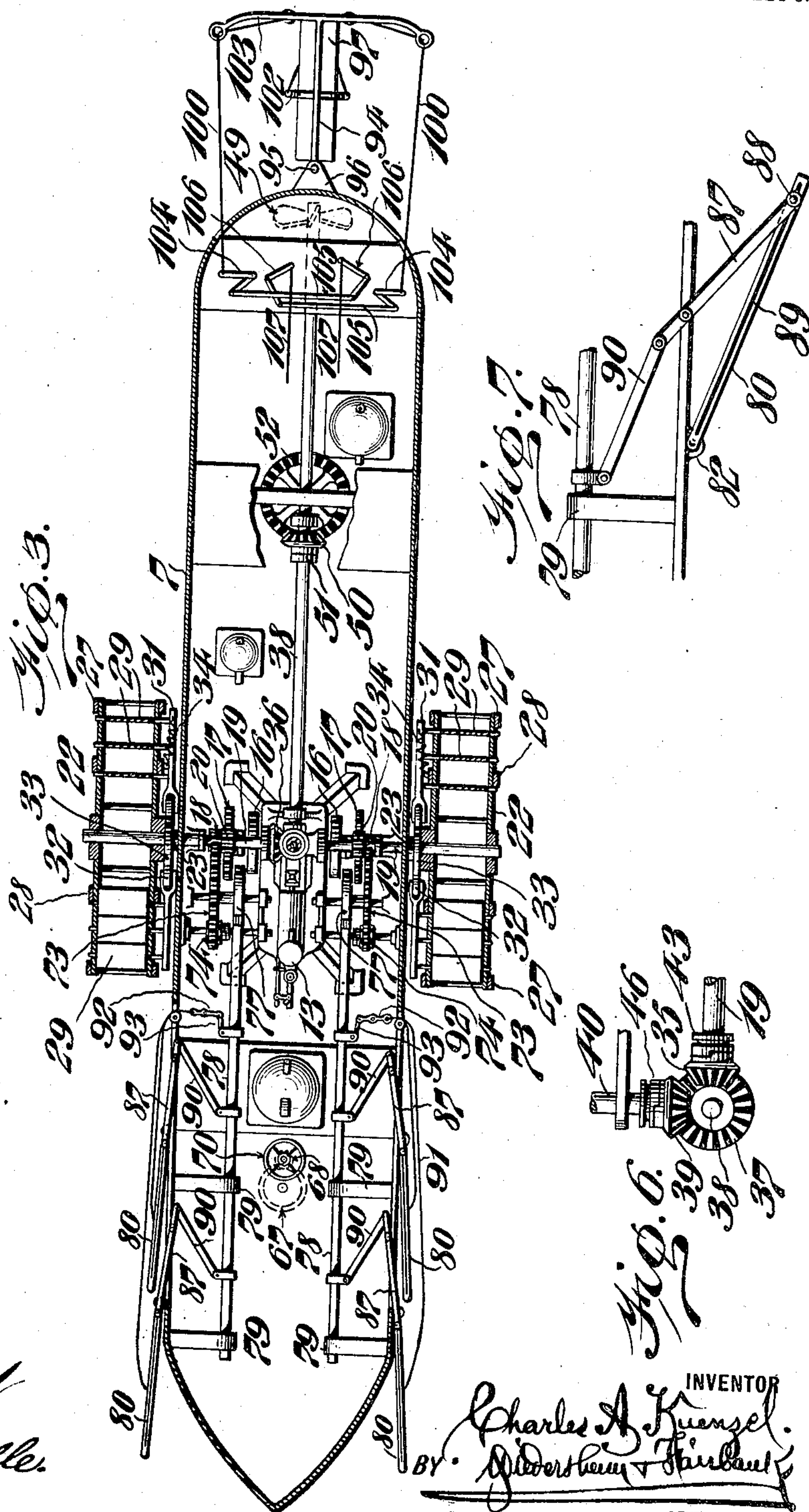
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APPLICATION FILED APR. 21, 1910.

Patented Mar. 14, 1911.

6 SHEETS—SHEET 3.



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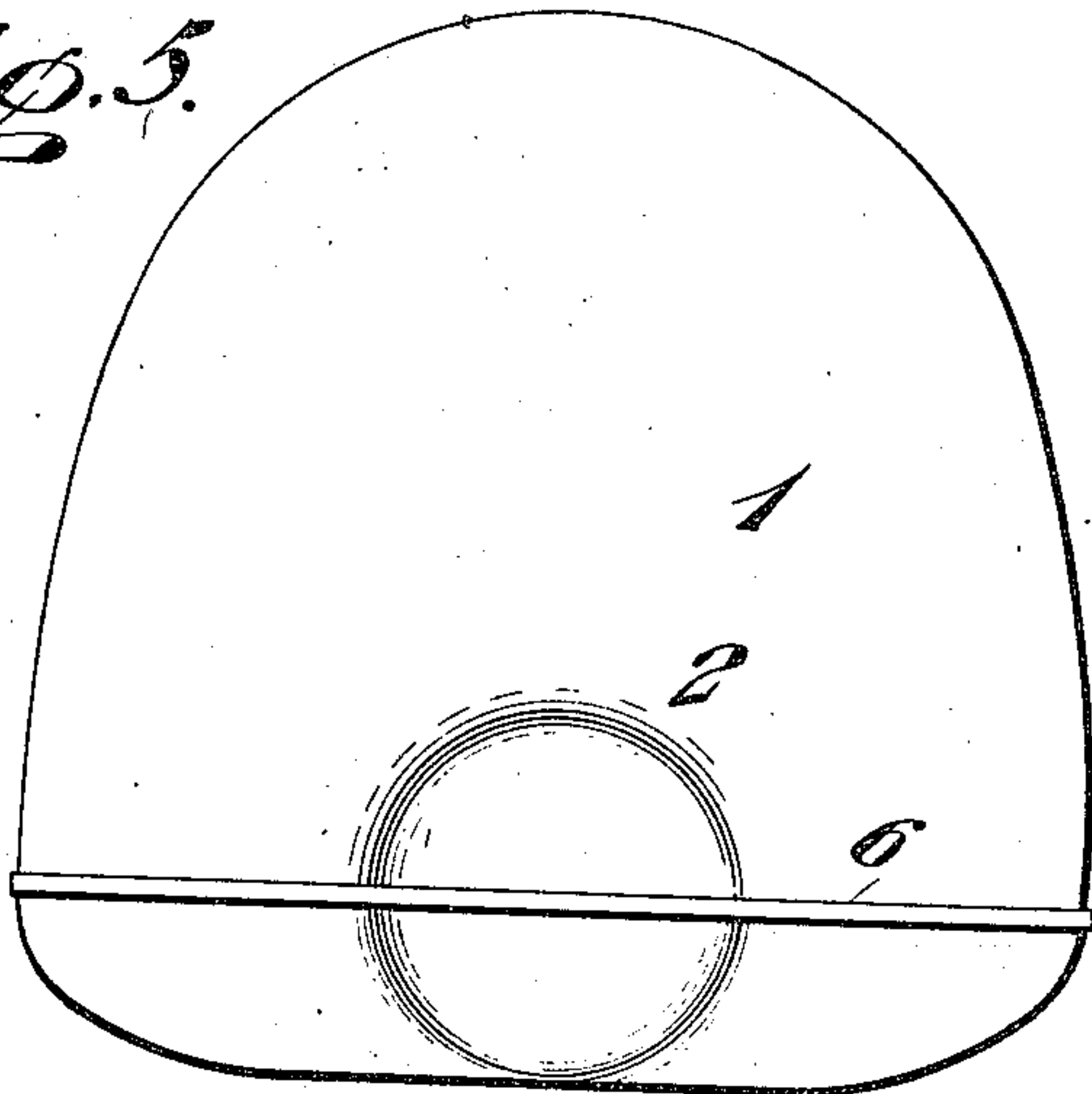
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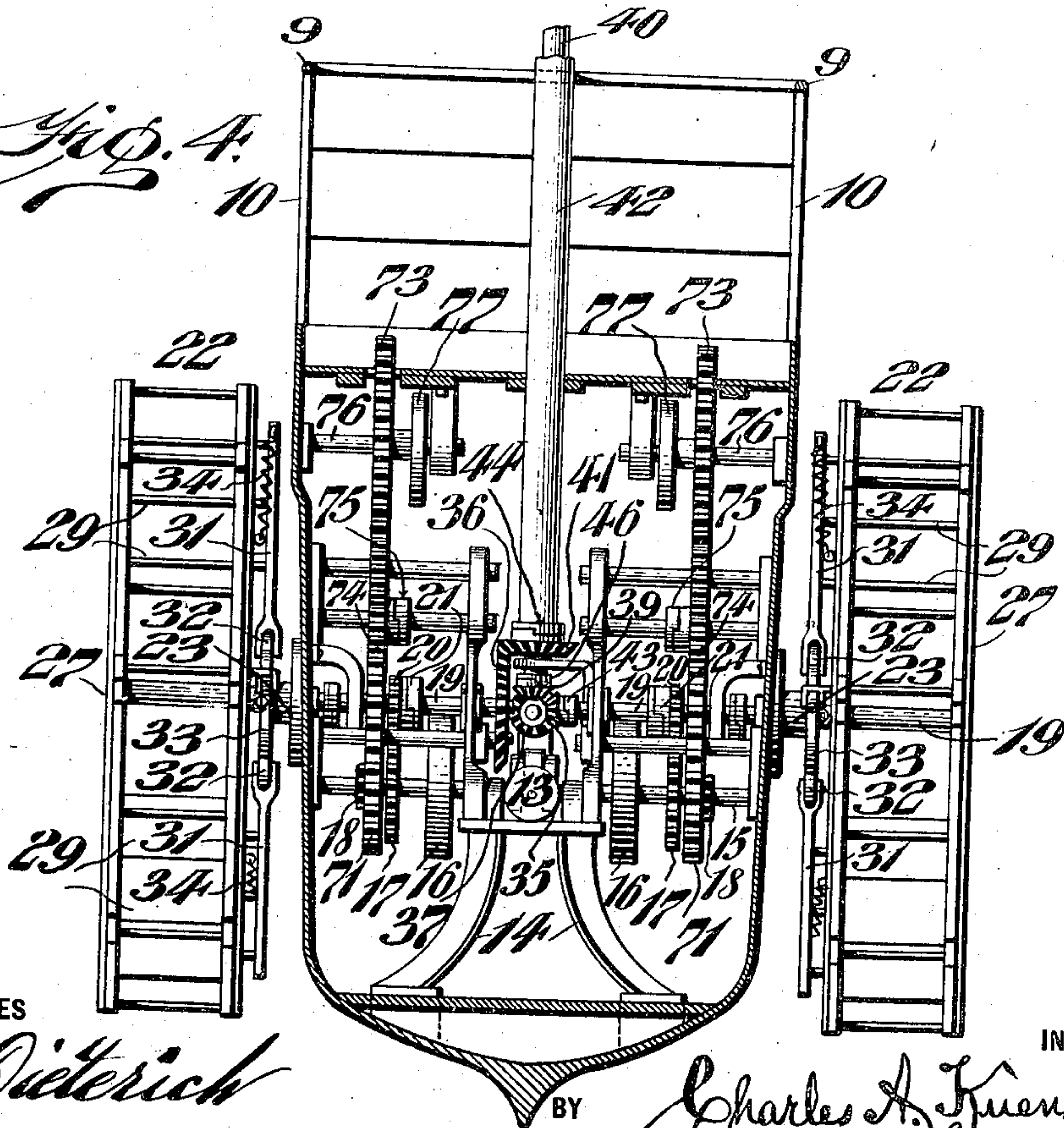
6 SHEETS—SHEET 4.

986,579.

*Fig. 5.*



*Fig. 4.*



WITNESSES

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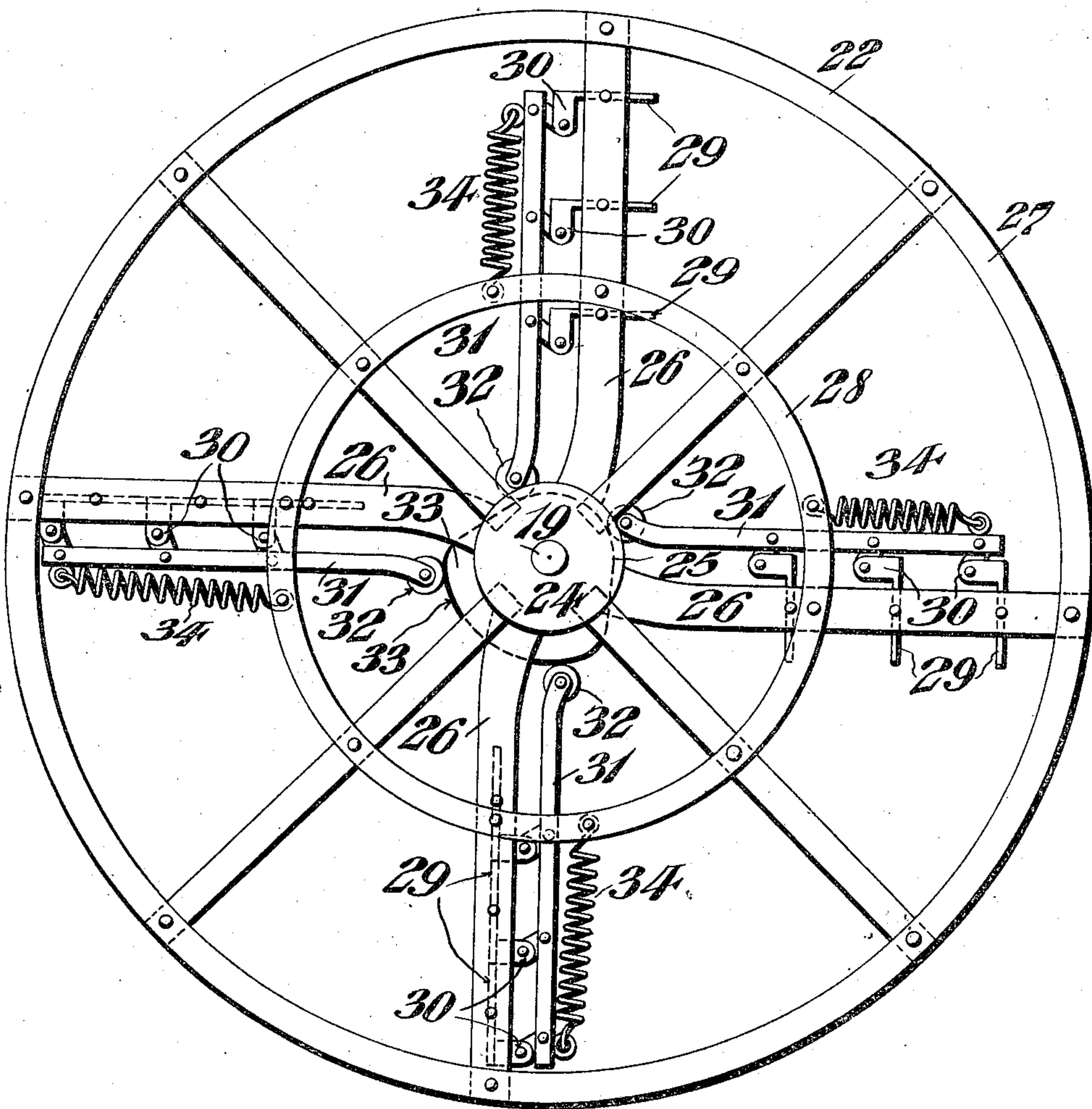
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6 SHEETS—SHEET 5.

*Fig. 8.*



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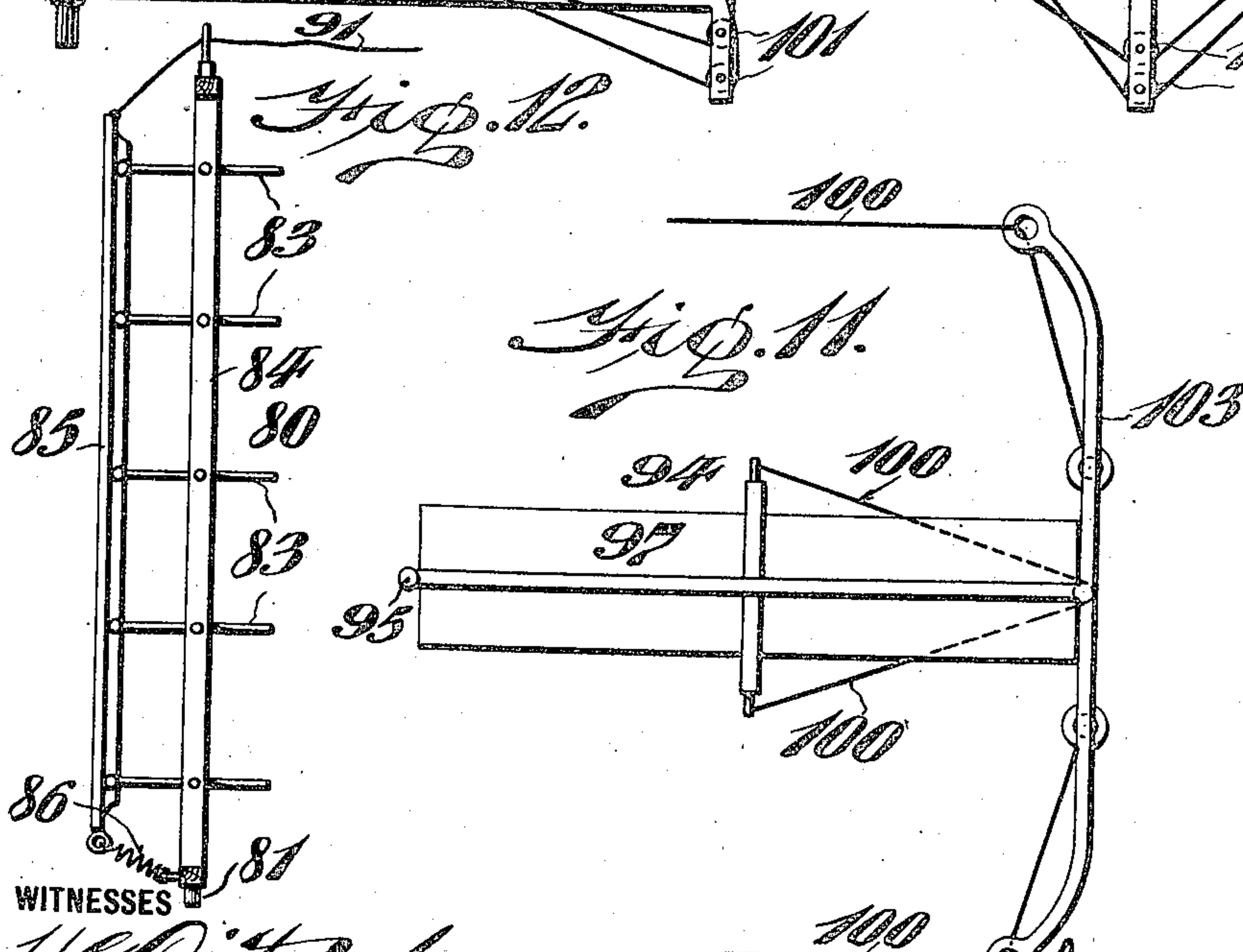
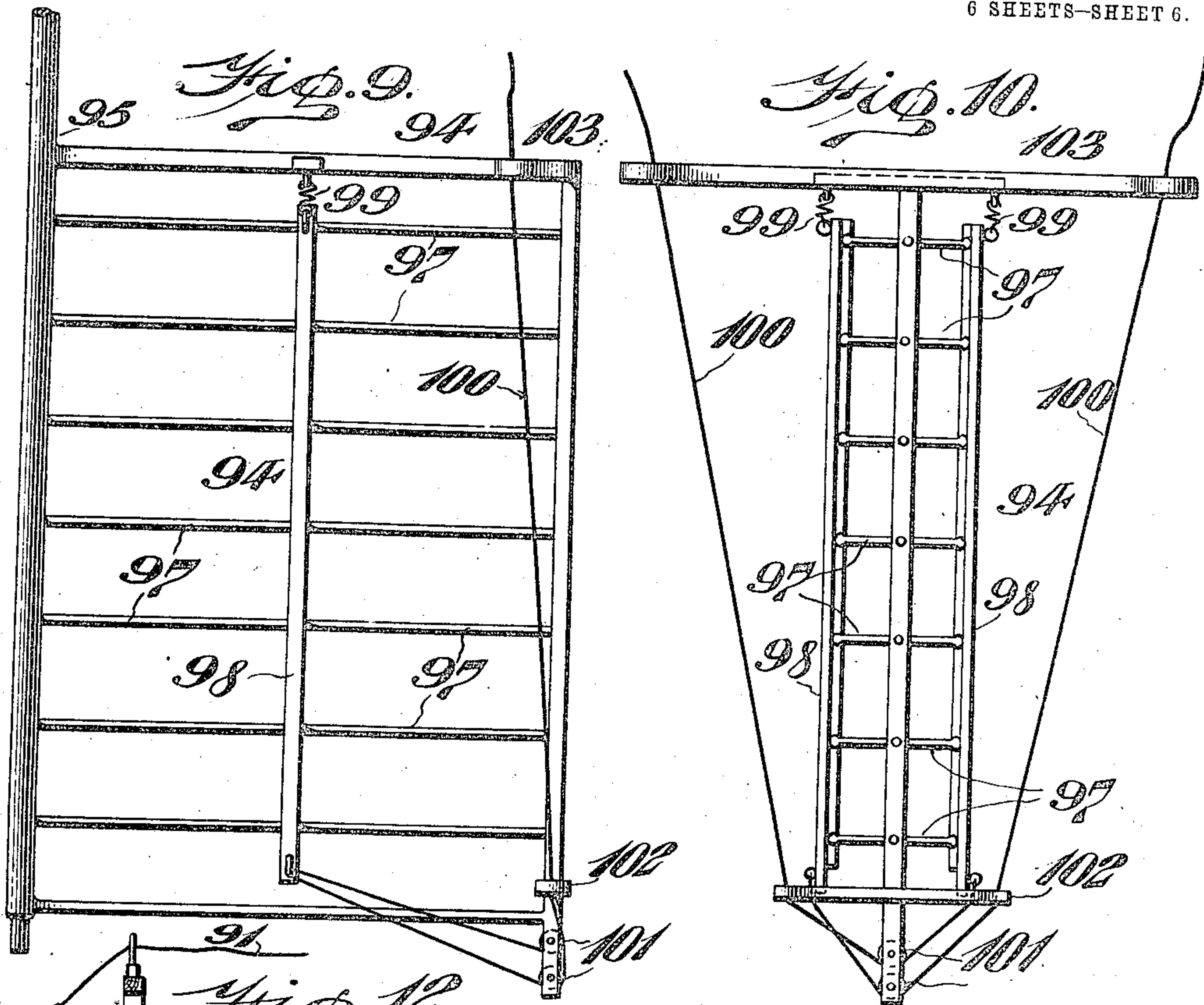
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APPLICATION FILED APR. 21, 1910.

986,579.

Patented Mar. 14, 1911.

6 SHEETS—SHEET 6.



WITNESSES

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# UNITED STATES PATENT OFFICE.

CHARLES A. KUENZEL, OF BUENA VISTA, COLORADO.

## AIRSHIP.

986,579.

Specification of Letters Patent.

Patented Mar. 14, 1911.

Application filed April 21, 1910. Serial No. 556,800.

*To all whom it may concern:*

Be it known that I, CHARLES A. KUENZEL, a citizen of the United States, residing at Buena Vista, in the county of Chaffee, State of Colorado, have invented a new and useful Airship, of which the following is a specification.

My invention consists of a dirigible balloon or air ship constructed to be capable of movement in the air, on water, or on land.

It also consists of improved means for propelling the ship.

It also consists of improved means for guiding and steering the ship.

It further consists of improved details of construction and arrangement of the several instrumentalities for operating the ship.

For the purpose of explaining my invention, the accompanying drawing illustrates a satisfactory reduction of the same to practice, but the important instrumentalities thereof may be varied, and so it is to be understood that the invention is not limited to the specific arrangement and organization shown and described.

Figure 1 represents a side elevation of an air ship embodying my invention. Fig. 2 represents a longitudinal vertical section of the hull thereof. Fig. 3 represents a longitudinal horizontal section of the hull. Fig. 4 represents a transverse vertical section of the hull. Fig. 5 represents a front end view of the gas bag. Fig. 6 represents a detail view of the gearing for the longitudinal propeller shaft, one side propeller shaft, and the solid vertical shaft. Fig. 7 represents a detail view of the actuating mechanism for one of the propelling and steering sails. Fig. 8 represents a side view of one of the propelling wheels. Fig. 9 represents a side view of the rudder. Fig. 10 represents an end view of the rudder. Fig. 11 represents a top view of the rudder. Fig. 12 represents an edge view of a propelling sail.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings:—1 designates the gas bag which is considerably longer than wide, and has a downwardly sloping and forwardly tapering front end 2, somewhat in the shape of a dolphin or whale, which shape will admit of such bag cleaving the air when propelled, with but slight resistance to its progress. The top of the gas bag is rounded to facilitate its ascent, while the bottom of the same is broad and flat to

retard descent, as clearly seen in Fig. 5, having a partial parachute function.

A relief valve 3 is provided at the top of the gas bag, and has a suitable cord 4, for operating it. The gas bag is inclosed in a net 5 of cord, and a band 6 surrounds the gas bag at its longest axis and has the net secured to it. The hull 7 of the ship is suspended from the band around the gas bag by means of ropes 8, or cords or chains. The hull has a railing 9, supported by suitable stanchions 10, surrounding the upper deck. Tubes 11 extend from the bottom of the gas bag into the hull to serve for gas communication from suitable reservoirs or generators in the hull into the bag, or for withdrawing gas from the bag and compressing or condensing and storing the same for future use. The hull has suitable port holes or windows 12 to admit air and light into the interior of the same.

An engine 13 preferably of the internal combustion type is mounted within the hull upon a suitable bed frame 14, and said engine drives a power shaft 15 transversely journaled in the bed frame and having fly wheels 16, two large cog wheels 17, and two smaller cog wheels 18 secured upon it, one of each pair of said wheels being at each side of the engine and its crank. Two shaft sections 19 are transversely journaled above and parallel with the drive shaft, and have pinions 20 mounted upon them and provided with suitable clutch devices 21, whereby the pinions may be engaged with or disengaged from the shaft sections. Propeller wheels 22 are secured upon the outer ends of these shaft sections, which ends project through suitable boxes 23, in the sides of the hull. Said wheels consist each of a hub 24, having flanges 25 to which pairs of registering spokes 26 are secured to project radially, and each set of spokes is connected by an outer rim 27, and a bracing rim 28, at about the middle of the spokes. Vanes 29 are pivoted by pintles at the middles of their side edges between pairs of registering spokes and have lugs 30 projecting from near their edges, which lugs are pivotally connected to rods 31 having radial play upon the inner side of the wheel. Said rods have rollers 32 at their inner ends, which rollers travel upon a cam 33, secured upon the side of the hull, and having a bulge covering about one third of its periphery and projecting forward and downward as seen in Fig. 8.



Springs 34 connected to the rods and to the bracing rim serve to draw the rods inward and to thus keep the rollers bearing against the cam. When the rods are moved inward, the vanes are tilted to present their edges in the direction of rotation of the wheel, and when the rods are pushed outward by the cam bulge, the vanes are tilted to present a solid surface against the direction of rotation of the wheel, so as to act against the resistance of the medium (air or water) through which the hull is propelled. On their upward and upper forward movement, the vanes offer no resistance, presenting edgewise, while on their downward and lower rearward movement they oppose resistance of the air or water, presenting their faces to the same.

Bevel gears, 35 and 36 are mounted upon the inner ends of the propeller shaft sections, and one 35 of these gears meshes with a bevel gear 37, upon the end of a shaft 38, longitudinally journaled in bearings in the hull. Said latter gear meshes with a bevel gear 39, upon the lower end of a shaft 40, vertically journaled to project upward through the upper deck. A bevel gear 41 upon the lower end of a tubular shaft 42 meshes with the bevel gear 36, and said tubular shaft surrounds the solid vertical shaft. Suitable clutch devices 43, 44, 45 and 46 are respectively provided for connecting or disconnecting the bevel gears 35, 41, 37 and 39 with or from their respective shafts. Screw propellers or helicopters 47 and 48 are respectively secured to the upper ends of the solid shaft and its surrounding tubular shaft, and each propeller will, when revolved, serve to raise or depress the ship without changing the gas volume in the gas bag. The longitudinal shaft 38 extends rearward and through the stern of the ship, and a screw propeller 49 is mounted upon this projecting end and serves to propel the hull when the hull is supported on water. A bevel gear 50 is mounted upon the longitudinal propeller shaft, and has a clutch device 51 for throwing it into or out of engagement with the shaft, and said bevel gear meshes with a bevel gear 52 upon the upper end of a vertically journaled shaft 53, the lower end of which shaft projects through the bottom of the hull and has a bevel gear 54 secured upon its lower end to mesh with a bevel gear 55, secured upon a drive axle 56, having wheels 57 and journaled beneath the hull in boxes 58. Said axle carries a sprocket wheel 59, around which passes a sprocket chain 60, which passes around another sprocket wheel 61, upon a drive axle 62, journaled in boxes 63, and having wheels 64. A wheel 65 sufficient for slight steering is journaled in a fork 66, pivoted under the front end of the hull and having a cog wheel 67 upon the upper end

of its pivot post, with which cog wheel, a pinion 68 upon an upright shaft 69 meshes. and said shaft has a hand wheel 70, by means of which the steering device is manipulated. The hull may thus be supported, propelled, and guided upon land by means of the above described drive wheels and steering wheel. When the hull is on land or water, the gas bag may be deflated and suitably stowed away on the upper deck or in the hold. The small cog wheels 18 upon the drive shaft mesh with two cog wheels 71, upon two transverse shaft sections 72, and each of said wheels is geared to a cog wheel 73, through two pinions 74. One set of said pinions 74 have suitable clutch devices 75 for throwing said wheels into or out of engagement with their shaft. Each of the cog wheels 73 is secured upon a transverse shaft section 76 upon which is secured a cam or eccentric 77, to which a rod 78 is connected to be reciprocated. These rods are supported in guides 79, parallel to the sides of the hull.

Propelling sails 80 are pivoted with their vertical posts or pintles 81, in brackets 82 upon the sides of the hull, and each sail has vanes 83 horizontally pivoted in its frame 84 and pivotally connected at their edges to a vertical rod 85, to the lower end of which is secured a spring 86, also secured to the lower end of the frame to draw the rod down and thus tilt the vanes into a vertical position, presenting their plane faces to the motion of the wings.

Levers 87 are pivoted in the sides of the hull and have pins 88 at the ends of their long arms, engaging longitudinal grooves 89, in the upper edges of the sail frames. Connecting rods 90 are pivotally connected to the short arms of the levers and to the longitudinally sliding rods 78, so that the levers may be rocked by the reciprocation of the rods, and the sails swing forward and back by the levers. Cords 91 are secured to the upper ends of the rods rocking the vanes, so as to pull against the springs for the latter and tilt the vanes in a plane at right angles to the face of the sail to present edgewise when the sail is swung forward and these cords are secured to levers 92, fulcrumed in the hull and connected to the longitudinally reciprocating said actuating rods by connecting rods 93, so that the vanes will be pulled closed by the springs when said actuating rods are moved forward, and the cords are slackened, and will be tilted edgewise when the actuating rods are in their foremost positions, so as to allow the sails to swing forward as the rods slide back, without offering any resistance to their movement or to the forward movement of the ship.

The rudder 94 consists of a rectangular frame having a pivot post 95 turning in



brackets 96, upon the stern of the hull. Vanes 97 are horizontally pivoted by pintles upon the middles of their end edges in the vertical sides of the rudder frame, and tilting rods 98 are pivotally connected to the edges of said vanes to rock the same when moved vertically. Springs 99 are attached to the upper ends of these tilting rods and to the upper end of the rudder frame to exert an upward pull upon the rods, and said springs balance each other so as to cause the vanes to tilt into horizontal position at right angles to the face of the rudder. Tiller ropes 100 are secured to the lower ends of the rods and pass around pulleys 101 in the lower end of the frame, through eyes in the ends of a lower yoke 102 transversely secured at the lower end of the rudder frame, and through eyes in the ends of an upper yoke 103, at the upper end of the rudder frame and thence into the hull. When either tiller rope is pulled it will close the vanes and pull the rudder to one side, the latter presenting a solid surface when moved and held, and release of the pull will allow the vanes to swing edgewise so as to admit of the rudder swinging back without resistance. If it is desired to move the rudder in unison and connected with the side sails, the tiller ropes are attached to one arm each of two bell cranks 104, the other arms of which are connected by means of connecting rods 105 to one arm, each of two bell cranks 106, to the other arms of which are secured cords or ropes 107, the forward ends of which are respectively secured to the wing actuating rods 78. When one of said rods moves forward to actuate a wing on that side, to move the ship in the opposite direction, the rudder will be tilted to steer the hull in such directions. The side sails or wings may act as steering means as well as propelling means, and the ship is movable and dirigible in the air, on water, or on land, owing to its several propelling and steering devices.

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

1. In an air ship, a body or hull having means for supporting it in the air, propelling blades having frames pivoted at one side edge to the opposite sides of the body and each having a longitudinal groove in

its end, levers fulcrumed in the sides of the body and having pins at their ends engaging the said grooves, rods having means for reciprocating them, and connecting rods pivotally connected to said rods and to the levers.

2. In an air ship, a body or hull having means for supporting it in the air, propelling blades having frames pivoted at one side edge on opposite sides of the body and each having a longitudinal groove in its end, vanes pivoted in the sail frames to rock or feather to present their edges or faces, levers fulcrumed in the sides of the body and having pins at their outer ends engaging the said grooves, rods guided to slide longitudinally in the body, means for reciprocating said rods, connecting rods pivotally connected to said rods and levers, and means connected to the reciprocating rods and to the feathering vanes to present the same edgewise on forward movement and facing on rearward movement.

3. In an air ship, a body or hull having means for supporting it in the air, propelling blades having frames pivoted at one side edge on opposite sides of the body, vanes pivoted in the sail frames at the middles of their ends, a rod pivotally connected to one edge of each vane, a spring connected to said rod to longitudinally move it to tilt the vanes to present edgewise, reciprocating rods in the hull connected to oscillate the sails, and flexible connections attached to said reciprocating rods and to the vane actuating rods to pull against the action of the springs.

4. In an air ship, a rudder consisting of a rectangular frame, one side of which forms the rudder post or pintle, vanes pivoted at their ends in the side pieces of the frame, rods pivotally connected to the opposite edges of the vanes to tilt the same, springs connected to the ends of said rods to longitudinally move them, a transverse yoke on the upper end piece of the frame, a transverse yoke on the lower end piece of the frame, and tiller ropes secured to the rods to pull against the springs and guided on the frame and through eyes in the yokes.

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Witnesses:

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CHAS. HERRLE.