No. 781,657. PATENTED FEB. 7, 1905.

C. J. JONES.

PROPELLER.

APPLICATION FILED JAN. 16, 1904.

2 SHEETS—SHEET 1.

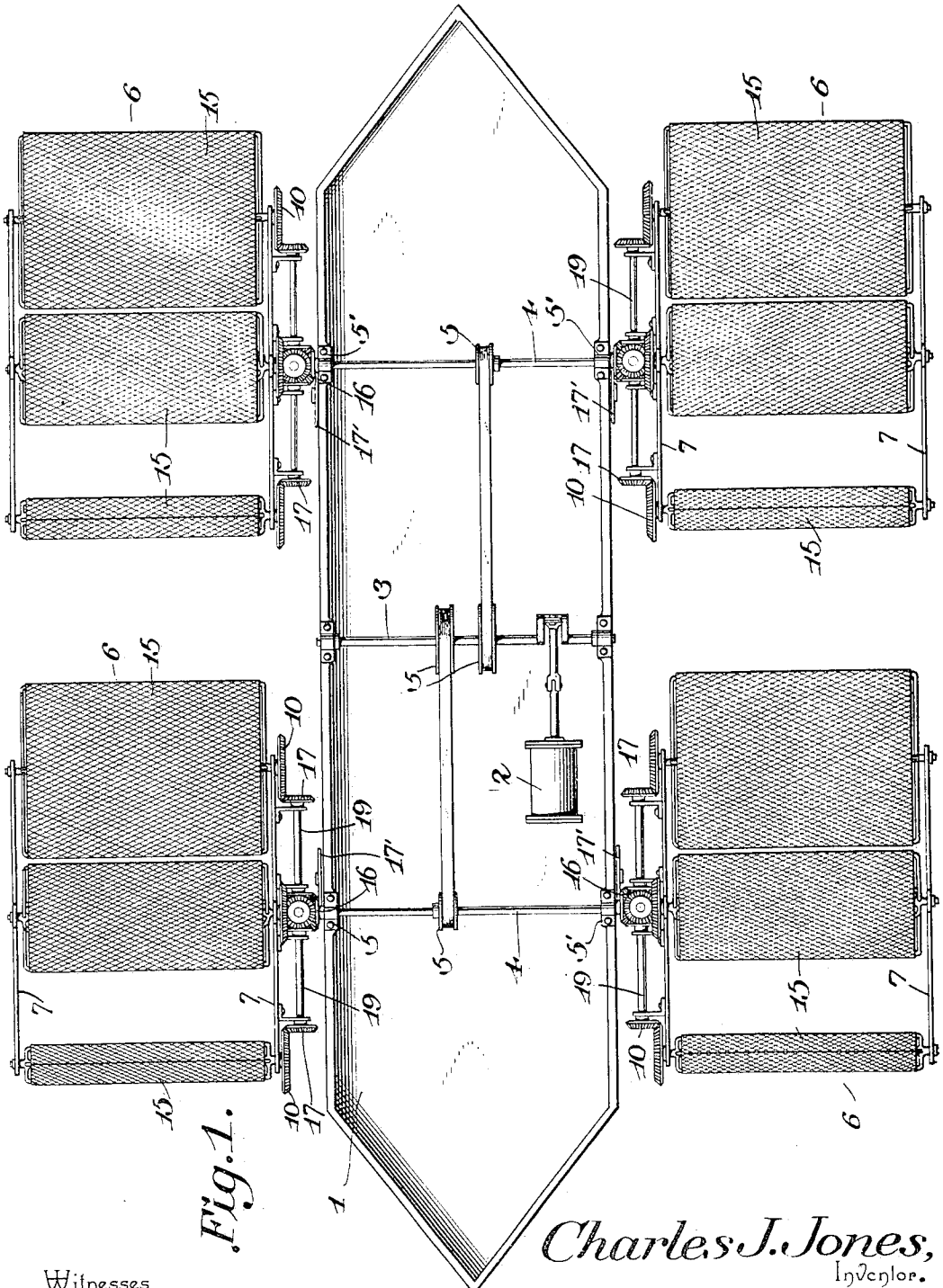


Fig. 1.

Witnesses

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2 SHEETS—SHEET 2.

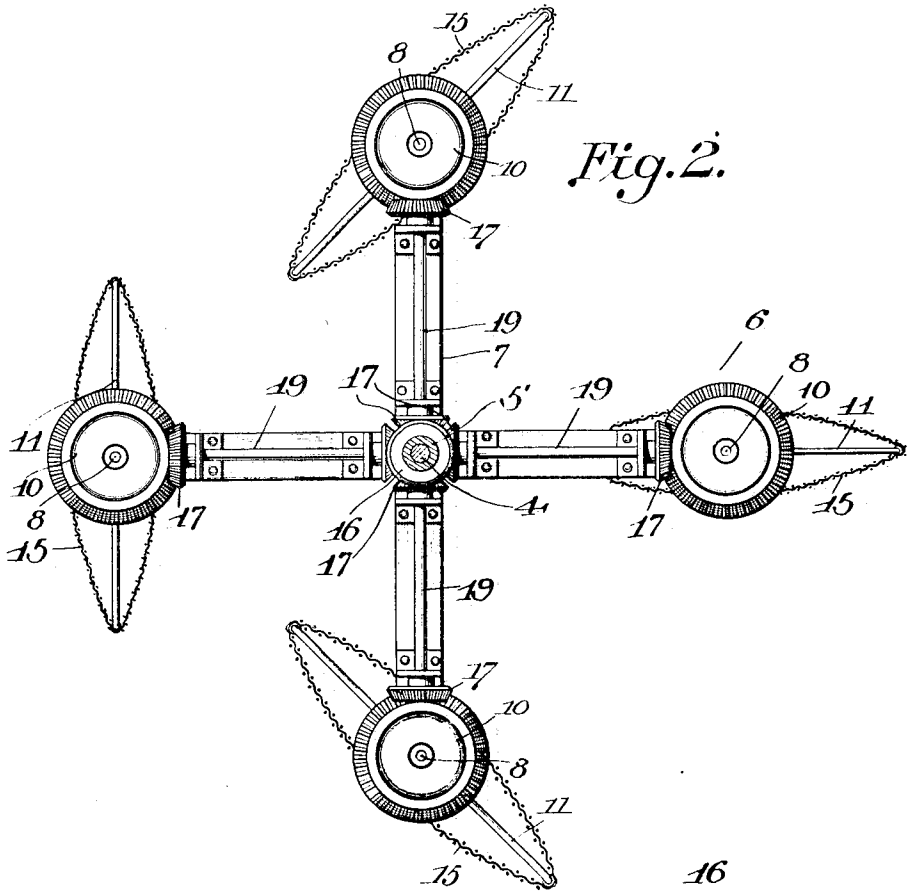
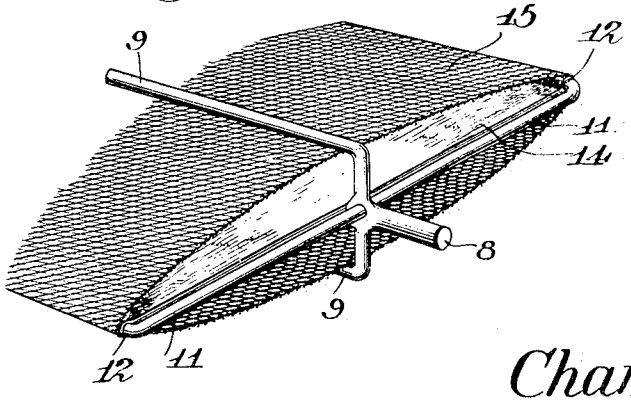



Fig. 2.

Fig. 3.



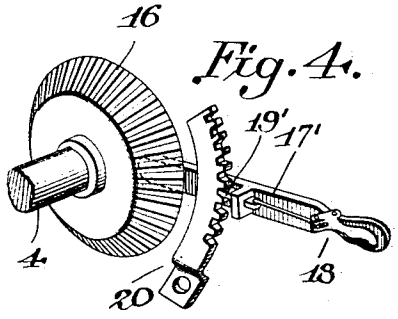




Fig. 4.

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No. 781,657. Patented February 7, 1905.

# UNITED STATES PATENT OFFICE.

CHARLES J. JONES, OF TOPEKA, KANSAS.

## PROPELLER.

SPECIFICATION forming part of Letters Patent No. 781,657, dated February 7, 1905.

Application filed January 16, 1904. Serial No. 189,340.

*To all whom it may concern:*

Be it known that I, CHARLES J. JONES, a citizen of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented a new and useful Propeller, of which the following is a specification.

This invention relates to improvements in propelling and elevating devices, and is especially adapted for use in connection with vehicles of all classes, including air-ships, boats, sleds, cars, and carrying-vehicles of all descriptions that are moved in or on any supporting medium.

The principal object of the invention is to provide a motor in which a plurality of movable blades are so arranged as to present their full surfaces for action against the air or other fluid during only a single portion of their movement, the blades feathering during the remaining part of their travel.

A further object of the invention is to provide a propeller of the feathering-blade type in which provision is made for adjusting the point at which the blade becomes active, so that, especially in the propulsion of air-ships, the operator may employ the blades for the purpose of directing the course of the ship either forward or backward or in an upward or downward direction.

A still further object of the invention is to provide a motor of the feathering-blade type in which the blades are so constructed as to bulge or form a pocket when thrust directly against the air or other fluid and during the remaining portion of the stroke be inactive and remain perfectly flat, so that the resistance to their passage through the air or other fluid will be minimized.

A further object of the invention is to provide a propelling-blade of such nature that when moved through a fluid or when propelled by such fluid it will bulge or form a pocket, so that the fluid will not have a tendency to escape at the edges of the blade or be deflected in the same manner as air is deflected from the vanes or blades of a propeller of the ordinary type.

A still further object of the invention is to provide a propelling-blade of an elastic material that will normally form a flat face, but which may be bulged in either direction when forced against the air or other fluid.

A still further object of the invention is to provide an elastic blade of the character noted with a reinforcing means which may support the blade in stretched condition and prevent rupture thereof when subjected to undue pressure.

A still further object of the invention is to provide a propelling means wherein a revoluble carrier is provided with a plurality of blades movable in an orbital path, the blades being revolved on their axes in a direction opposite to that in which the blade-carrier is rotated.

With these and other objects in view, as will hereinafter more fully appear, the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a plan view of a motor mechanism constructed in accordance with the invention. Fig. 2 is a detail sectional view of one of the propellers drawn to an enlarged scale. Fig. 3 is a detail perspective view of a portion of one of the propelling-blades. Fig. 4 is a similar view of the means for adjusting the active points of the propeller-blades.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In the drawings there is shown a vehicle 1, which in the present instance is merely typical, the vehicle being in the form of a boat, air-ship, or sled, car, carriage, or any other vehicle to be propelled or carried through the air or water or on roads, ice, or land, and in the case of air-ships this vehicle may be provided with a gas-field in order to assist in sustaining the weight of the parts.

At a convenient point in the vehicle is a motor 2, which may be of any suitable construction and in the present instance is indi-

cated by a cylinder that is connected to a shaft 3, from which power may be transmitted to one or more shafts 4 by suitable sprocket-wheels 5 and link belts or by belt-wheels or such other connections for the transmission of power, as may be desired, and it will be understood that the number of motors and the number of shafts may be multiplied in accordance with the size of the vehicle. The shafts 4 are shown as extending entirely across the vehicle, being held in suitable bearings 5', and each shaft carries one or more propellers 6, all of which are preferably of the same construction. On each shaft 4 are mounted radially-disposed arms or spiders 7, that are connected in pairs by means of shafts 8, arranged parallel to the shaft 4. Each shaft 8 is split in such manner as to form two spaced bars 9 for the greater portion of the length of the shaft, and at one end of each of said shafts is arranged a gear 10, which may be in the form of a belt-wheel, sprocket-wheel, spur-gear, or bevel-gear, a bevel-gear being shown in the present instance.

To each shaft 8 are secured a number of arms 11, that are connected by longitudinal bars 12, the whole forming a rectangular frame for the reception of a sheet 14, formed of any suitable elastic or semi-elastic material. The edges of this sheet are secured by stitching or other suitable fastenings to the arms of the rectangular frame, and when not exposed to direct pressure or when not thrust directly against the air, water, or other fluid the sheet will remain perfectly flat and may be moved edgewise through the fluid without any considerable resistance. When either face of the sheet is presented directly to the fluid, the sheet will stretch and bulge in concave form to form a pocket, from which the fluid cannot escape so readily as if the blade remained perfectly flat, and excessive bulging is prevented by means of curved nettings 15, formed of light wire or other suitable material and carried by the frame members and the bars 9. The nettings are of sufficient mesh to permit the free passage of the air; but when the elastic sheet is stretched to the limit of safety it will come in contact with the nettings and be reinforced thereby, so that there will be no danger of rupture in case the strain is excessive.

The bearing-sleeve 5' on the shaft 4 forms a support for a relatively stationary bevel-gear 16 of a diameter approximately equal to one-half the diameter of the bevel-gear 10, and these two bevel-gears are connected together by a pair of bevel-gears 17, mounted on a rigidly-disposed shaft 19, one of the shafts being carried by each of the arms 7 and the number of shafts being equal to the number of propeller-blades.

The gears are so proportioned that each complete revolution of the shaft 4 will cause a one-half revolution of each of the propeller-blades on its own axis, the result being that only at one point in the revolution of the shaft 4 and the orbital movement of the blades will such blades be presented directly against the air or other fluid and during the remaining portion of its travel will be feathered to a greater or less extent, so that the blades will remain inactive during the greater portion of the orbital movement. In Fig. 2 one of the blades at the right-hand side of the sheet is shown as active, while another blade at the left-hand side of the sheet is shown as inactive. The remaining blades are shown as partially active, and the position of the parts is such that when attached to an air-ship the blades will exercise a lifting tendency.

To the gear 16 is secured a lever 18, carrying a latch-bar 20, that may be operated to effect the locking of its bolt in any one of a series of notches 21, formed in a segment 22, and by adjusting the angular position of the relatively stationary gear 16 the point of effective movement of the propeller-blades may be varied in accordance with the circumstances, so that the operator may utilize the blades for propelling the vessel in either direction or if an air-ship for raising and lowering said air-ship.

It is obvious that the stationary gear may be separately adjusted and the effective positions of the blades of the different propellers altered in such manner as to aid in the steering of the vehicle in the same manner as twin screws are sometimes separately employed in assisting the steering of steam vessels. It will be further understood that the connecting means between the motor and the blade may be in the form of belts, gear-wheels, or any other form of mechanism used for the transmission of power.

Having thus described the invention, what is claimed is—

1. In a propelling device, a revoluble frame including a main shaft or arbor and a plurality of radially-disposed arms, pivotally-mounted blades carried by the arms, a gear mounted on the main shaft or arbor, an adjusting-lever secured to the gear and serving as a means for adjusting the same circumferentially of the shaft, and independent gearing connections between said gear and the blades.

2. The combination in a propeller, of a main shaft or arbor, a frame mounted for rotative movement thereon, and including a plurality of radially-disposed arms, blades pivotally mounted at the outer ends of the arms, bevel-gears secured to the blade-pivots, a relatively stationary bevel-gear mounted on the main shaft, a lever secured to said gear and serving as a means for adjusting the same circumferentially of the shaft, means for locking the lever in adjusted position, a plurality of shafts carried by the several arms on the frame, and bevel-gears secured to said shafts and forming connections between the relatively stationary gear and the blade-gears.

3. In a feathering propeller-blade, a frame, and a sheet of elastic material having its edge portions secured to the frame and tending to flatten to a position in the plane of the frame, the sheet being yieldable to form pockets in either direction when exposed to the action of a fluid.

4. A blade comprising a frame, and a sheet of elastic material secured within the frame and movable to form pockets in both directions, the inherent elasticity of the material serving to restore it to a flattened position in the plane of the frame when relieved from strain.

5. A blade comprising a frame, and a sheet of yieldable material, and a guard secured to the frame and disposed in curved form to permit limited yielding of the material to form a pocket.

6. In a propelling-blade, a rigid frame, a sheet of elastic material secured therein, and curved nettings carried by the frame and arranged on opposite sides of the sheet, the curvature of the nettings being sufficient to permit outward movement of the sheet in the formation of pockets.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES J. JONES.

Witnesses:
O. W. WHITMER,
CHARLES R. WHITMER.