

H. L. CALL.

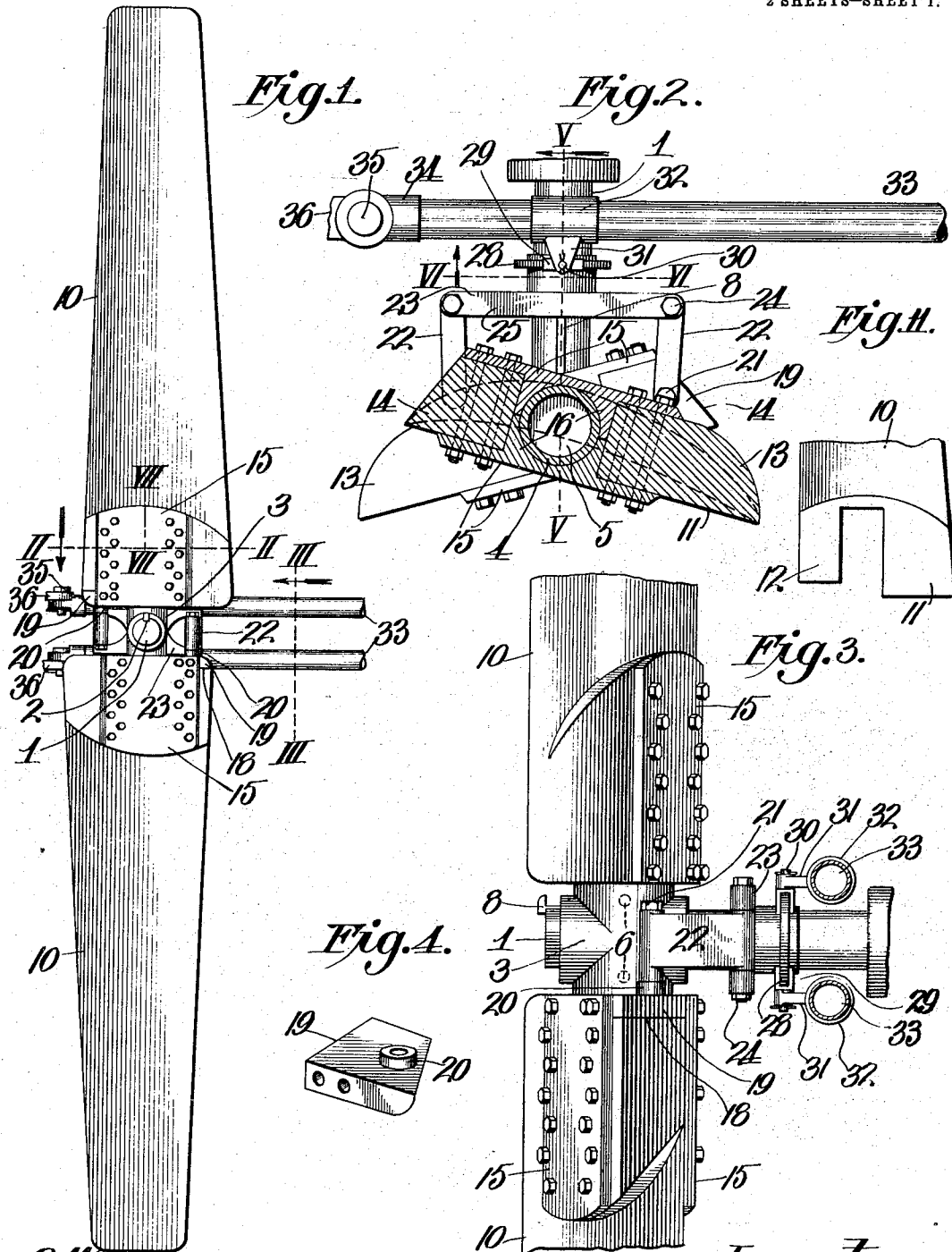
PROPELLER.

APPLICATION FILED MAY 4, 1910.

1,014,619.

Patented Jan. 9, 1912.

2 SHEETS—SHEET 1.



Witnesses
Frank R. Glor
H. C. Rodgers

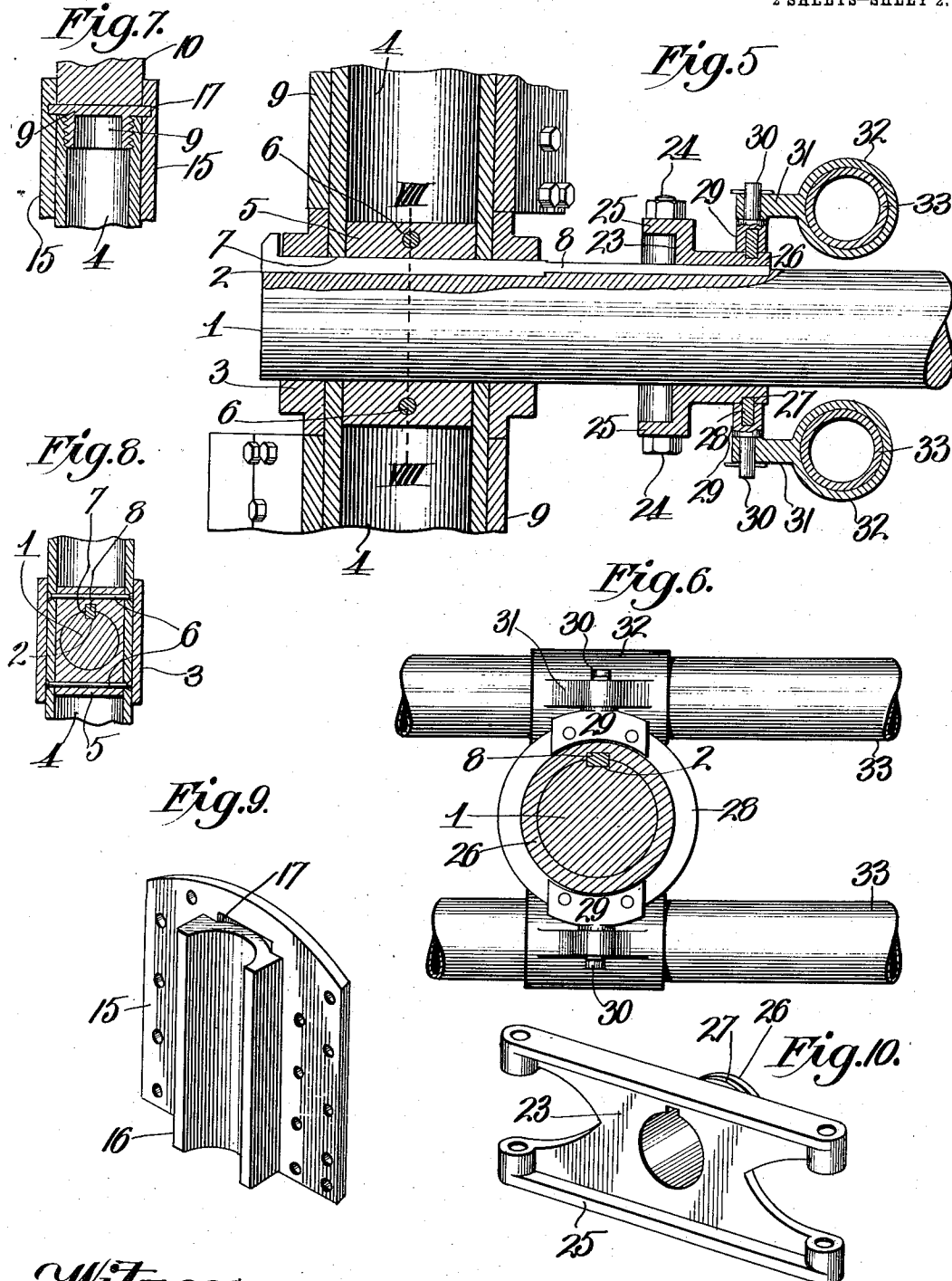
Inventor
H. L. Call
By George F. Thorpe Atty.

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UNITED STATES PATENT OFFICE.

HENRY LAURENS CALL, OF GIRARD, KANSAS.

PROPELLER.

1,014,619.

Specification of Letters Patent.

Patented Jan. 9, 1912.

Application filed May 4, 1910. Serial No. 559,411.

To all whom it may concern:

Be it known that I, HENRY L. CALL, a citizen of the United States, residing at Girard, in the county of Crawford and State of Kansas, have invented certain new and useful Improvements in Propellers, of which the following is a specification.

This invention relates to propellers and my object is to produce a propeller in which the blades are capable of being adjusted to different angles to vary the power developed or of being reversed so as to tend to impel an object in a forward or rearward direction.

A further object is to produce a propeller of the character outlined provided with a controlling lever through which the adjustment or reversal of the blades may be effected either while the propeller is in operation or at rest.

Another object is to produce a propeller of the character outlined embodying the desirable features of simplicity, strength and durability.

With these general objects in view and others as hereinafter appear, the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which—

Figure 1, is a face view of a propeller embodying my invention, the shaft of the same appearing in end view and the controlling lever in side view. Fig. 2, is an enlarged horizontal section on the line II—II of Fig. 1. Fig. 3, is a vertical section on the line III—III of Fig. 1. Fig. 4, is a perspective view of one of the plates carried by each blade of the propeller through which connection is made for changing the angle of the blades with respect to each other. Fig. 5, is a section on the line V—V of Fig. 2 but on a larger scale than the latter. Fig. 6, is a section on the line VI—VI of Fig. 2, on the same scale as Fig. 5. Fig. 7, is an enlarged section on the line VII—VII of Fig. 1. Fig. 8, is a section on the line VIII—VIII of Fig. 5 on a smaller scale. Fig. 9, is a perspective view of one of the adjustable clamp plates with which each blade is equipped. Fig. 10, is a perspective of the slidable cross-head for transmitting movement of the lever to the blades. Fig. 11, is a view of the inner end of one of the blades on the same scale as Fig. 1.

In the said drawings where like reference characters indicate corresponding parts in all the figures, 1 is a shaft adapted to be suitably driven, provided with a longitudinal keyway 2, and mounted upon the shaft is a fourway coupling 3, through which extends a cylindrical tube 4 containing a plug 5, rivets or equivalent fastening devices 6 securing the plug rigidly in the tube. The plug and tube are formed with a transverse opening in which the shaft fits snugly and are also formed with a keyway 7 to receive the key 8, fitting in the keyway 2, and rigidly securing the coupling and tube 4 to the shaft, and secured in the ends of tube 4 are caps 9, the head of the same being of greater diameter than the tube as shown in Fig. 7.

10 indicates the propeller blades of which there are two at diametrically opposite sides of the shaft, said blades tapering toward their outer ends. At their inner ends the blades are bifurcated to produce arms 11 and 12, the latter of which are somewhat shorter than the former for a purpose which hereinafter appears. The outer edge of arm 11, is preferably rounded as at 13, and the corresponding edge of arm 12 is beveled by preference as at 14, the last-named edge constituting the front or cutting edge of the blade. The rounded and beveled portions of the blade by preference extend nearly the full length of the bifurcation thereof and from such point the blade is preferably of the cross sectional form indicated by dotted lines Fig. 2, though it is to be understood that the cross sectional form of the blade forms no part of the invention.

Bridging the bifurcation at the opposite sides of the blades and bolted thereto are plates 15, provided with extended bearings 16 projecting into the bifurcations and pivotally embracing the tube 4, the plates at the outer ends of the bearings being recessed as at 17, see Figs. 7 and 9, to receive the heads of the caps 9 which caps by being thus interlocked with the blades prevent the latter from moving outward by centrifugal force when the propeller is in operation. The plates 15 extend by preference, to the inner ends of arms 11 of the blades and therefore project inwardly beyond the companion arms 12, and with the ends of said arms constitute pockets wherein are bolted plates 19, provided at their inner sides with threaded bosses 20, en-

gaged by pivot bolts 21 extending parallel with the tube 4, which form pivots by which the blades are adjusted in setting them at different angles or adjusting them to reversed position, and pivoted to said bolts

are links 22 which project into the bifurcated ends of the cross-head 23 secured upon the shaft by key 8.

The cross head is stiffened by marginal flanges 25 disposed apart a sufficient distance to fit over the inner end of the coupling 3, when the blades of the propeller are reversed as hereinafter referred to, and is formed with a sleeve extension 26 to give it a substantial bearing on the shaft, said extension being provided with an annular groove 27 in which is journaled a ring 28, to which are riveted above and below its center, brackets 29 equipped with trunnions 30, pivotally engaged by lugs 31, projecting outwardly from sleeves 32, slidably mounted on parallel rods 33 equipped at their rear ends with couplings 34 mounted on hinge pins 35 carried by a support 36, which support is adapted to form a part of an aeroplane or other machine equipped with the propeller, the rods 33 constituting a lever by which the cross-head may be slid upon the shaft toward or from the propeller for the purpose of effecting a pivotal adjustment of the blades upon the pivot tube 4, which adjustment if sufficiently extensive will result in reversing the positions of the blades, that is to say will cause the blade shown in section to converge forwardly with respect to the lever instead of diverging forwardly with respect to the same and the blade shown in elevation to diverge forwardly with respect to the lever instead of extending convergently forward with respect to the same, it being noted that when the flanges 25 of the cross head attain positions between the coupling 3 and the blades as hereinbefore referred to, the limit of the reverse movement of the blades has been attained, such position of the cross head and that shown in Fig. 5, representing the extremes of the adjustment of the cross head.

In operation the propeller operates in the customary manner and without imposing any material strain on the links and hence lateral pull or push on the lever and the blades may be easily and quickly adjusted by the proper manipulation of the lever.

For aeronautical use, the propeller will of course never be reversed to effect retrograde movement of the vessel of which it forms a part except when such vessel is upon the ground and of course it will be of infrequent use then. By reversing the propeller the vessel may be backed or its speed upon the ground after alighting may be checked, and in alighting after a flight, such reversal will tend to almost instantly arrest the vessel. It thus constitutes an efficient brake

under certain conditions as well as enables the operator before a flight to readily and easily back the vessel if desired.

From the above description it will be apparent that I have produced a propeller embodying the features of advantage enumerated as desirable in the statement of the object of the invention and I wish it to be understood that I do not desire to be restricted to the exact details of construction shown and described as obvious modifications will suggest themselves to one skilled in the art.

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

1. A propeller, comprising a pair of oppositely projecting blades bifurcated at their inner ends, means extending longitudinally of the blades and projecting into said bifurcations and plates secured to the blades and bridging said bifurcations and provided with longitudinally extending bearings projecting into said bifurcations and pivotally embracing said means.

2. A propeller comprising a pair of oppositely projecting blades having longitudinally extending bifurcations at their inner ends providing a pair of arms at the inner end of each blade, one arm of each being shorter than the other, means projecting into the bifurcations of the blades, plates secured to the blades and bridging said bifurcations and projecting inwardly beyond the said short arms of the blades and provided with bearings projecting into the bifurcations of the latter, and plates secured to the first-named plates and fitting against the inner ends of the short arms of the blades.

3. A propeller comprising a pair of oppositely projecting blades having their inner ends longitudinally bifurcated to provide a pair of arms at the inner end of each blade, one of which arms is shorter than the other, means projecting into said bifurcations of the blades, a pair of plates secured to opposite sides of each blade, and bridging the bifurcation thereof and projecting inwardly beyond the short arm thereof and provided with longitudinally extending bearings projecting into said bifurcation and pivotally embracing said means and plates secured to and between the first-named plates of each blade and bearing against the inner end of the short arm of the same.

4. A propeller, comprising a pair of oppositely projecting blades, a tube extending longitudinally of and forming a pivotal support for the blades, and circular heads rigid with and of greater diameter than said tube at the ends of the same and pivotally interlocked with the blades to prevent outward movement thereof.

5. A propeller, comprising a pair of oppositely projecting blades, a tube extending longitudinally of the blades, circular heads at the outer ends of said tubes and of greater diameter than the same, and plates secured to the blades and provided with longitudinally extending bearings pivotally embracing said tube and with segmental recesses pivotally interlocked with the heads of said tube to prevent outward movement of the blades.

6. A propeller comprising a pair of oppositely projecting blades bifurcated at their inner ends, a tube extending longitudinally of the blades and occupying said bifurcations, circular heads at the outer ends of said tubes and of greater diameter than the same, and plates secured to the blades and bridging said bifurcations and provided with longitudinally extending bearings projecting into said bifurcations and pivotally embracing the tube inward of said heads; said plates also having segmental recesses pivotally receiving the heads of the tubes.

7. A propeller, comprising a pair of oppositely projecting blades having longitudinally extending bifurcations at their inner ends providing a pair of arms at the inner end of each blade, one arm of each being shorter than the other, a tube projecting into the bifurcations of the blades, plates secured to the blades and bridging said bifurcations and projecting inwardly beyond the said short arms of the blades, and provided with bearings projecting into the bifurcations of the latter and means for preventing outward movement of the blades, and plates secured to the first-named plates and fitting against the inner ends of the short arms of the blades.

8. A propeller, comprising a pair of oppositely projecting blades having their inner ends longitudinally bifurcated to provide a pair of arms at the inner end of each blade, one of which arms is shorter than the other, a tube projecting into said bifurcations of the blades, a pair of plates secured to opposite sides of each blade and bridging the bifurcations thereof and projecting

inwardly beyond the short arm thereof and provided with longitudinally extending bearings projecting into said bifurcations and pivotally embracing said tube, means for preventing outward movement of said blade, and plates secured to and between the first-named plates of each blade and bearing against the inner end of the short arm of the same.

9. A propeller comprising a cross shaped coupling, a tube extending through said coupling, a pair of oppositely projecting blades pivotally mounted on the opposite ends of said tube and extending in the same radial direction, and means for preventing endwise movement of the blades.

10. A propeller, comprising a cross-shaped coupling, a tube extending through said coupling, a pair of oppositely projecting blades pivotally mounted on the opposite ends of said tube and extending in the same radial direction, means for preventing endwise movement of the blades, and a plug secured in said tube; said tube and plug having a cylindrical opening forming a part of the passage of the cross shaped coupling and extending at an angle to the passage thereof through which the tube extends.

11. A propeller comprising a cross-shaped coupling, a tube extending through said coupling, a pair of oppositely projecting blades pivotally mounted on the opposite ends of said tube and extending in the same radial direction, a plug secured in said tube; said tube and plug having a cylindrical opening forming a part of the passage of the cross-shaped coupling and extending at an angle to the passage thereof through which the tube extends, a pair of circular caps secured in the outer ends of the tube and pivotally interlocked with the blades to prevent endwise movement thereof on the tube.

In testimony whereof I affix my signature, in the presence of two witnesses.

HENRY LAURENS CALL.

Witnesses:

HELEN C. RODGERS,
G. Y. THORPE.