

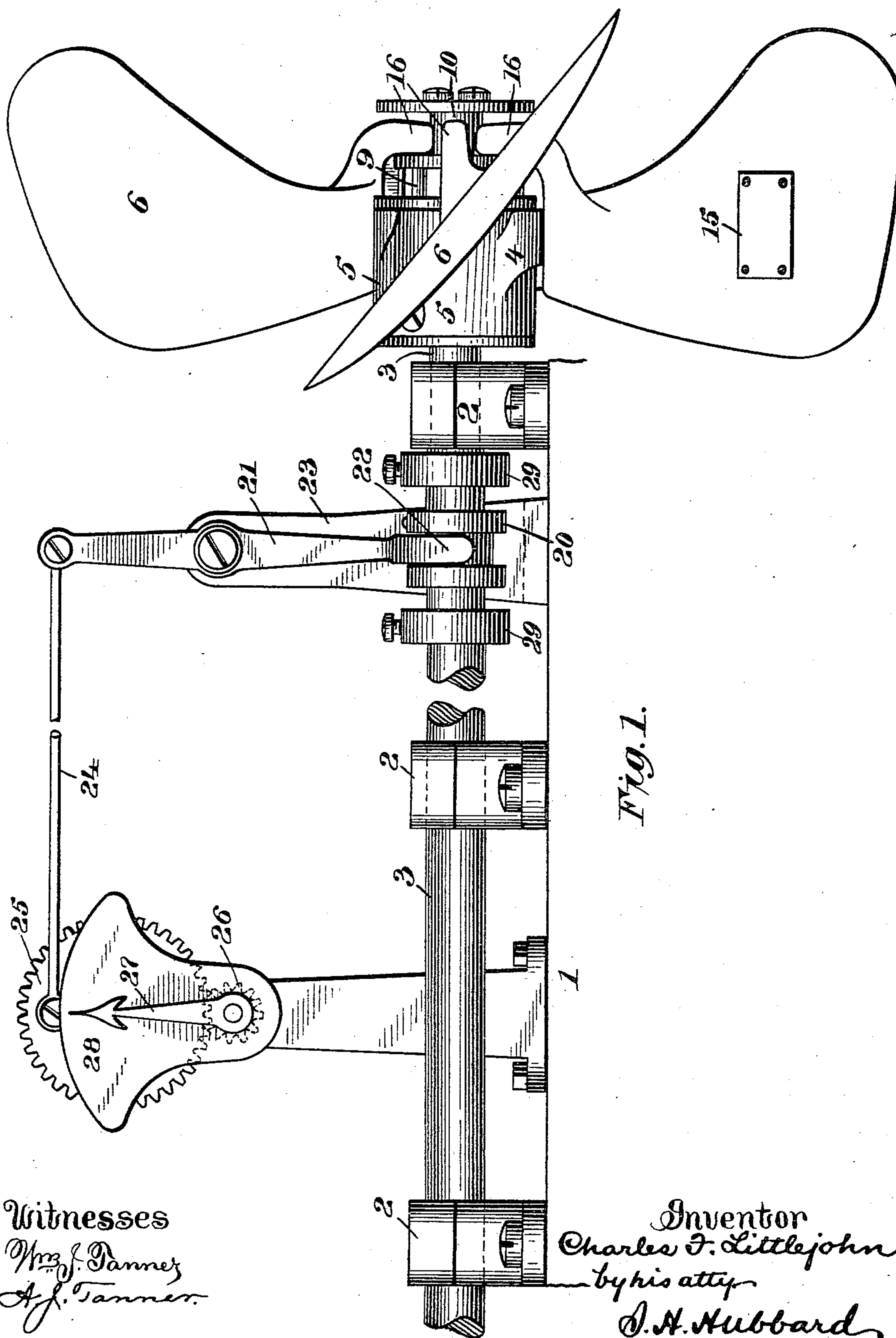
(No Model.)

3 Sheets—Sheet 1.

C. F. LITTLEJOHN.  
PROPELLER.

No. 457,513.

Patented Aug. 11, 1891.



Witnesses  
Wm. J. Tanner  
A. J. Tanner.

Inventor  
Charles F. Littlejohn  
by his atty  
J. H. Hubbard,

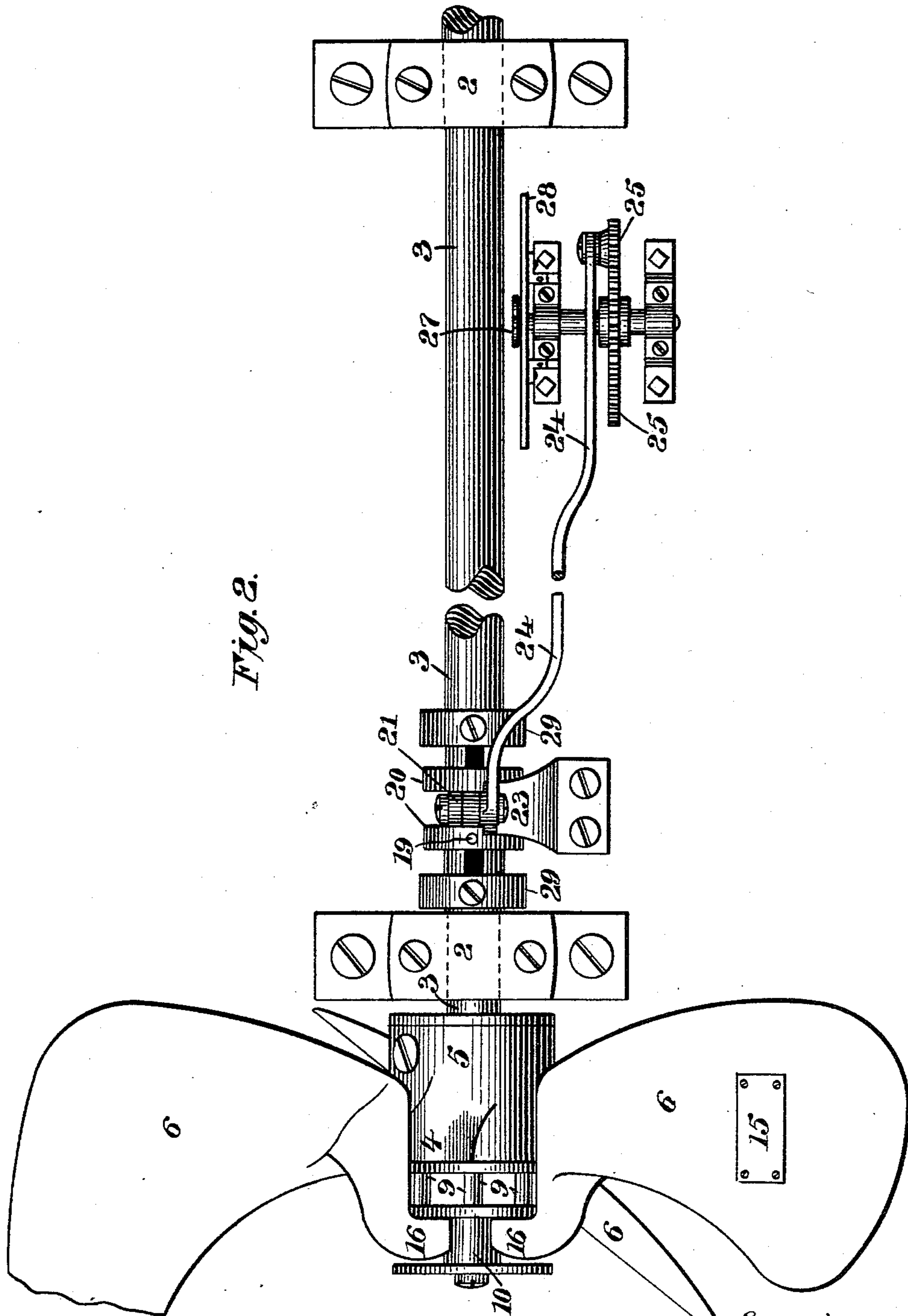
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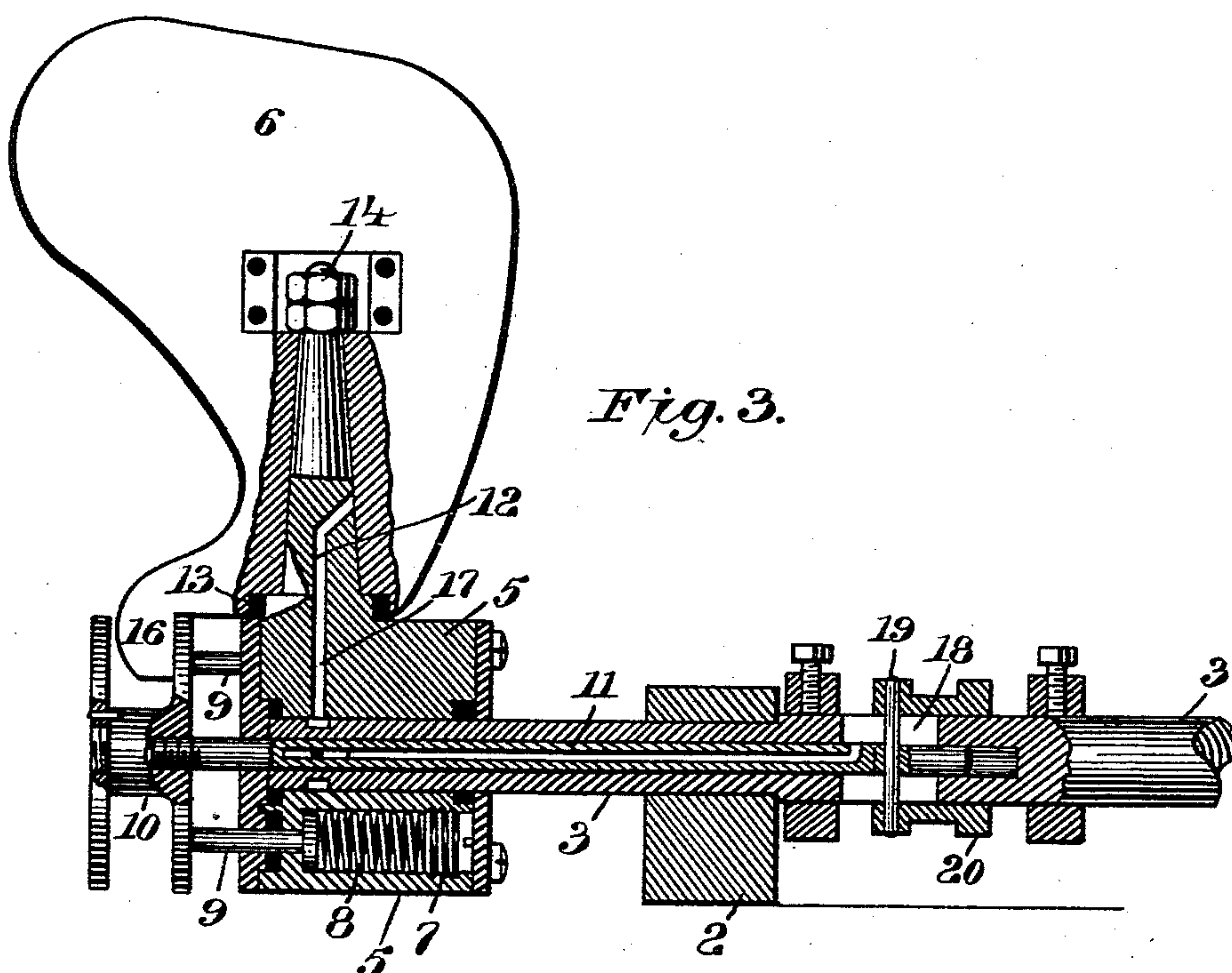
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# UNITED STATES PATENT OFFICE.

CHARLES F. LITTLEJOHN, OF BRIDGEPORT, CONNECTICUT.

## PROPELLER.

SPECIFICATION forming part of Letters Patent No. 457,513, dated August 11, 1891.

Application filed March 26, 1891. Serial No. 386,469. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES F. LITTLEJOHN, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Propellers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain novel and useful improvements in propeller-wheels, and has for its object to provide a wheel with blades so attached thereto and arranged in such manner that their pitch shall automatically vary with the resistance which they encounter.

Another object of my invention is to so inclose the moving parts that they shall not be exposed to the corrosive action of the water and shall be thoroughly lubricated at all times; and still another object of my invention is to connect an indicator located in the engine-room or other portion of the ship with the propeller in such manner that the degree of pitch at which said propeller is running may at all times be readily ascertained; and with these ends in view my invention consists in the construction and combination of elements hereinafter fully explained, and then recited in the claims.

In order that those skilled in the art to which my invention appertains may fully understand its construction and method of operation, I will describe the same in detail, reference being had to the accompanying drawings and the numerals marked thereon, which form a part of this specification.

Figure 1 is a side elevation; Fig. 2, a plan view; Fig. 3, a longitudinal vertical section.

In all the figures I have shown the shaft as shortened, and I have not shown any portions of the ship in connection with the mechanism, since my invention is designed to be applied in any ordinary manner.

1 represents the bed, upon which are supported certain bearings 2, to which the propeller-shaft 3 is journaled. The rearmost bearing may be located in or near the sternpost of the vessel. Upon the end of the shaft is mounted a hub 5, upon which the blades 6

are carried, as will be presently set forth. Said hub has formed therein longitudinal recesses or pockets 7, in each of which is located a compressible spiral spring 8. While the number is not absolutely essential, I prefer to provide one of these pockets and its contained spring for each blade. The rear portion of the shaft 3 is hollow and contains a rod 11, upon whose outer end is borne an annularly-grooved head 10, movable toward and away from the face of the hub. This head carries a series of pistons or plungers 9, which project into the pockets 7, and are normally forced outwardly in said pockets to their limit of movement, as shown at Fig. 3. These pistons, however, may simply abut against the inner face of the head instead of being attached thereto, if such construction should be found desirable. Each of the blades 6 is provided with a bearing, by means of which it is mounted upon a radial axis 12, secured upon the hub. A stuffing-box 13 protects the bearing against the entrance of water, and in like manner each of the joints where exposed to the action of the water are provided with a suitable packing or stuffing box whose details need not be set forth. While the blade and its axis may be held in proper relative position by any desired means, the construction shown at Fig. 3—namely, a transverse opening in the blade, a pair of nuts 14, and cover-plates 15—forms a convenient device for this purpose. Near its inner end each blade is provided with a curved arm or crank 16, which projects into the annular grooved portion of the head 10. The rod 11 is preferably centrally bored, as shown at Fig. 3, to permit of the introduction of oil, which latter, through feeding-tubes, such as 17, arranged within the hub, is conducted to the various bearings. Upon the periphery of the hub are formed or secured abutments or stops 4, against which the lower portions of the blades rest when at their sharpest pitch or normal position. The operation of this part of my invention is as follows: The blades are arranged to have a normal pitch of, say, forty degrees, which is maintained by the outward action of the springs 7, except when the screw in revolving encounters great resistance. Such resistance—as, for instance, when the vessel is heavily loaded—causes the blades to turn



upon their axes and assume a finer pitch, the arms 16 at this time bearing strongly against and compressing the spring-actuated parts. It will of course be understood without further description that the extent of this compression, and therefore the pitch of the blade, will be in direct proportion to the resistance encountered. It therefore follows that a uniform rate of rotation of the shaft may be maintained whether the vessel is running light or heavily loaded and whether the weather be fair or stormy.

I will now describe the second portion of my invention—namely, the indicator—by means of which the pitch of the screw may at all times be ascertained. The shaft 3 is slotted, as at 18, at some point within the body of the vessel, and pin 19 connects the rod 11 with a longitudinally-sliding collar 20, which is arranged around the shaft, and will be moved thereon by the movements of the rod 11 in its seat within the shaft. This construction is shown at Fig. 3.

21 is a lever having a yoke 22 which takes into the groove in the collar. This lever is fulcrumed to a suitable standard or post 23, and its upper end, by means of a suitable connecting-rod 24, operates a gear 25, arranged in some convenient place within the vessel. This gear turns a pinion 26, whose shaft bears a hand or pointer 27, beneath which is arranged a suitable dial or graduated scale 28, whose divisions may represent degrees of deflection of the blades or pounds of resistance. 29 are stop-collars provided with fastening-screws. These are arranged around the shaft 3 at either side of the collar 20. According to their position relative to said collar they may limit the variation of pitch due to the rotation of the several blades or they may be arranged closely against the collar 20, so as to hold the blades as against any rotation upon their axes. The operation of these devices may be readily understood from the drawings, since the pointer will be operated over its dial precisely in proportion to the degree to which the blades have departed from their normal pitch.

In regard to the first portion of my invention, I do not wish to be limited to the precise details of construction which I have herein shown and described, since these may be widely varied without departing from the spirit and aim of my invention. Likewise, with regard to the indicator, I do not desire to confine myself to the combination of elements shown, since any equivalent devices

serving to connect the blades with a suitable pointer and scale I deem to be within the terms of my invention.

I claim—

1. In a propeller, the combination, with the main shaft, of a hub borne upon the end thereof, a series of blades pivoted to said hub and provided with cranked arms, and springs carried by said hub and having operative engagement with said cranked arms, substantially as described.

2. The combination, with the shaft, of the hub carried thereon and provided with radial axes, of the blades having sockets mounted on said axes, springs arranged within the hub, and curved cranked arms carried by the blades and adapted to engage and compress the springs, substantially as described.

3. The combination, with the shaft, of the hub carrying the partially-rotative blades and provided with pockets adapted to contain the springs, of the head beyond the end of the hub, a longitudinally-sliding rod seated within the shaft, pistons carried by said head and extending into the hub to engage the springs, and the means of engagement between the head and blades.

4. The combination, with a propeller having blades capable of partial rotation on their axes for the alteration of the pitch, of an indicator or dial and pointer arranged within the vessel, and means, as described, interposed between the blades and the indicator, whereby the movements of the former are shown upon the latter.

5. The combination, with the main shaft, of the hub, the blades mounted on said hub, springs against which said blades may operate, a longitudinally-movable rod seated within the main shaft and having connection with the springs, and an indicator or pointer connected with and under control of said rod, substantially as described.

6. The combination, with the main shaft and hub, of the partially-rotative blades, the spring-actuated head connected with said blades, the collar 20 and lever 21, connected with and movable by said head, and the dial-pointer and dial located within the vessel and connected with the lever 21, substantially as specified.

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

CHARLES F. LITTLEJOHN.

Witnesses:

S. H. HUBBARD,

M. C. HINCHCLIFFE.