

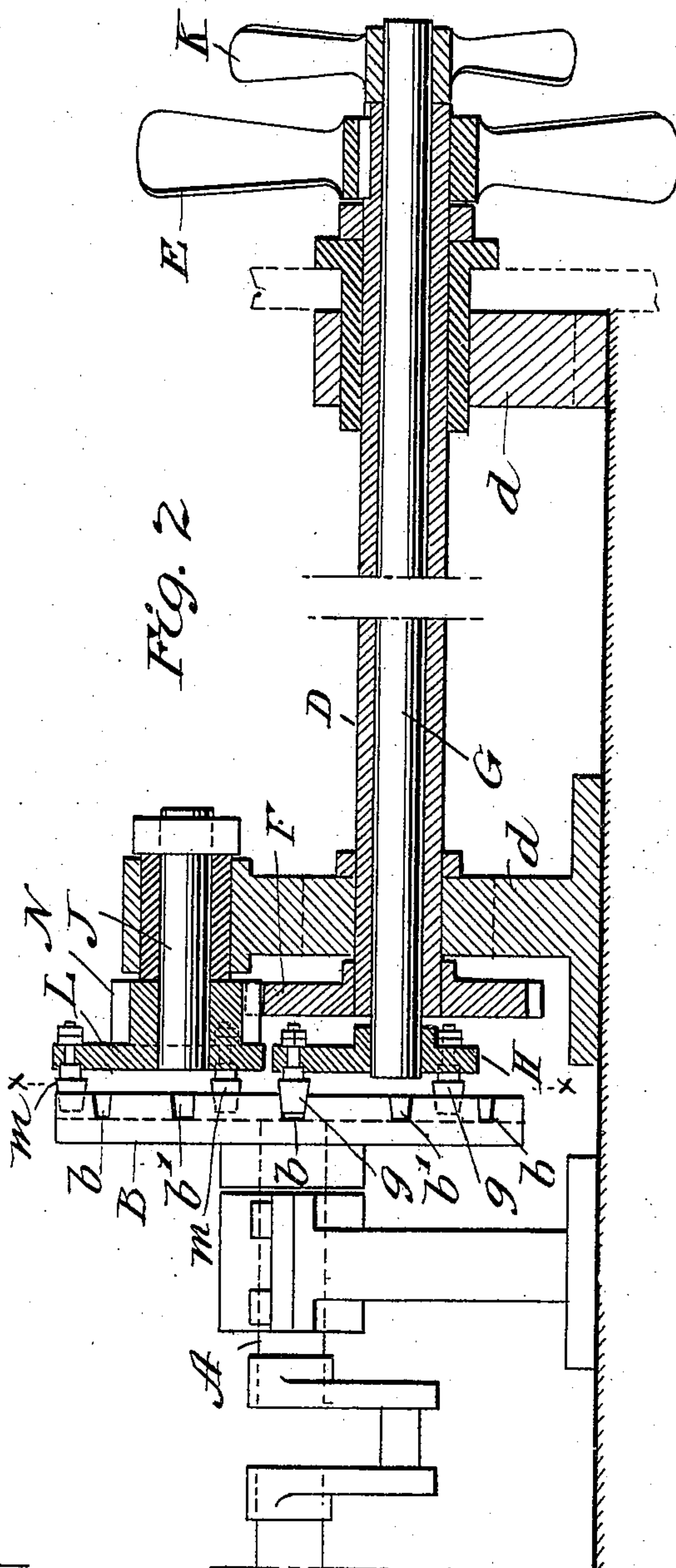
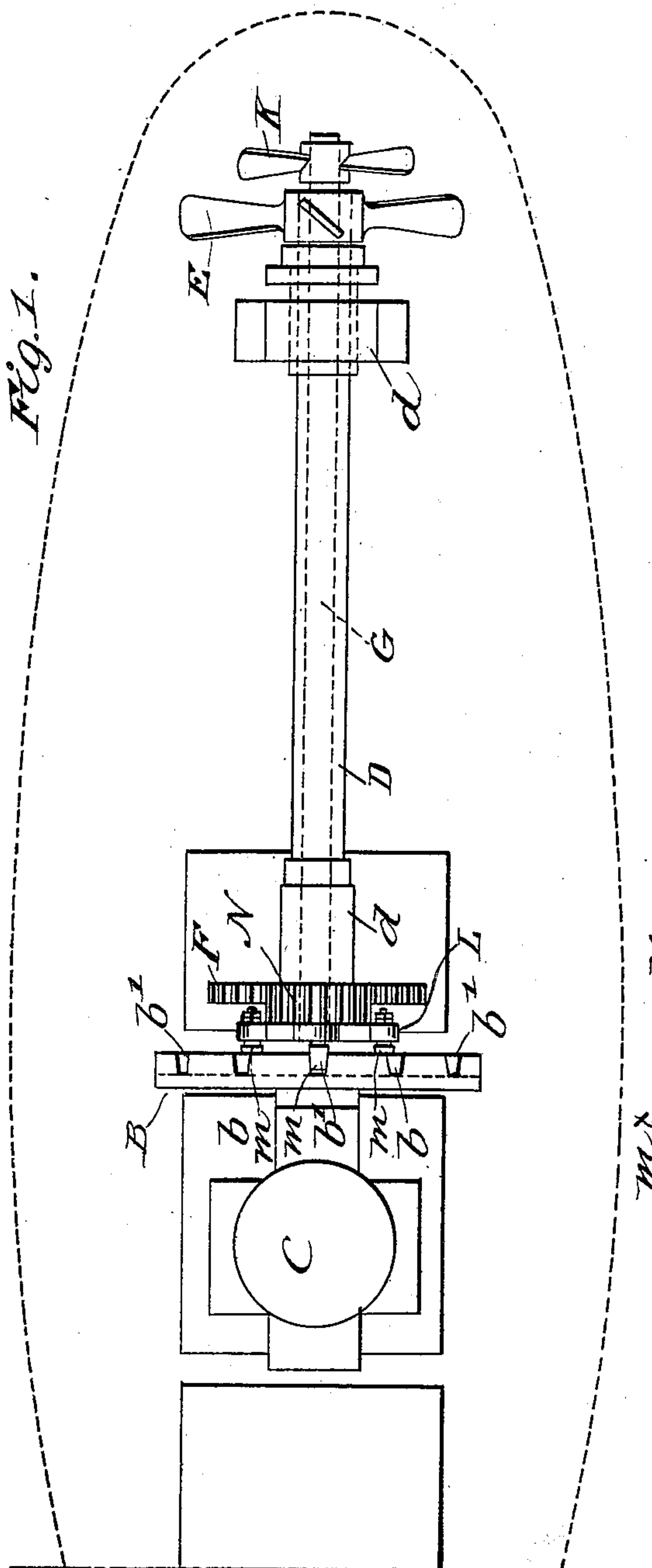
(No Model.)

2 Sheets—Sheet 1.

H. H. FEFEL.  
MEANS FOR PROPELLING VESSELS.

No. 599,125.

Patented Feb. 15, 1898.



WITNESSES:

Harry Bailey  
Wm. Reubman

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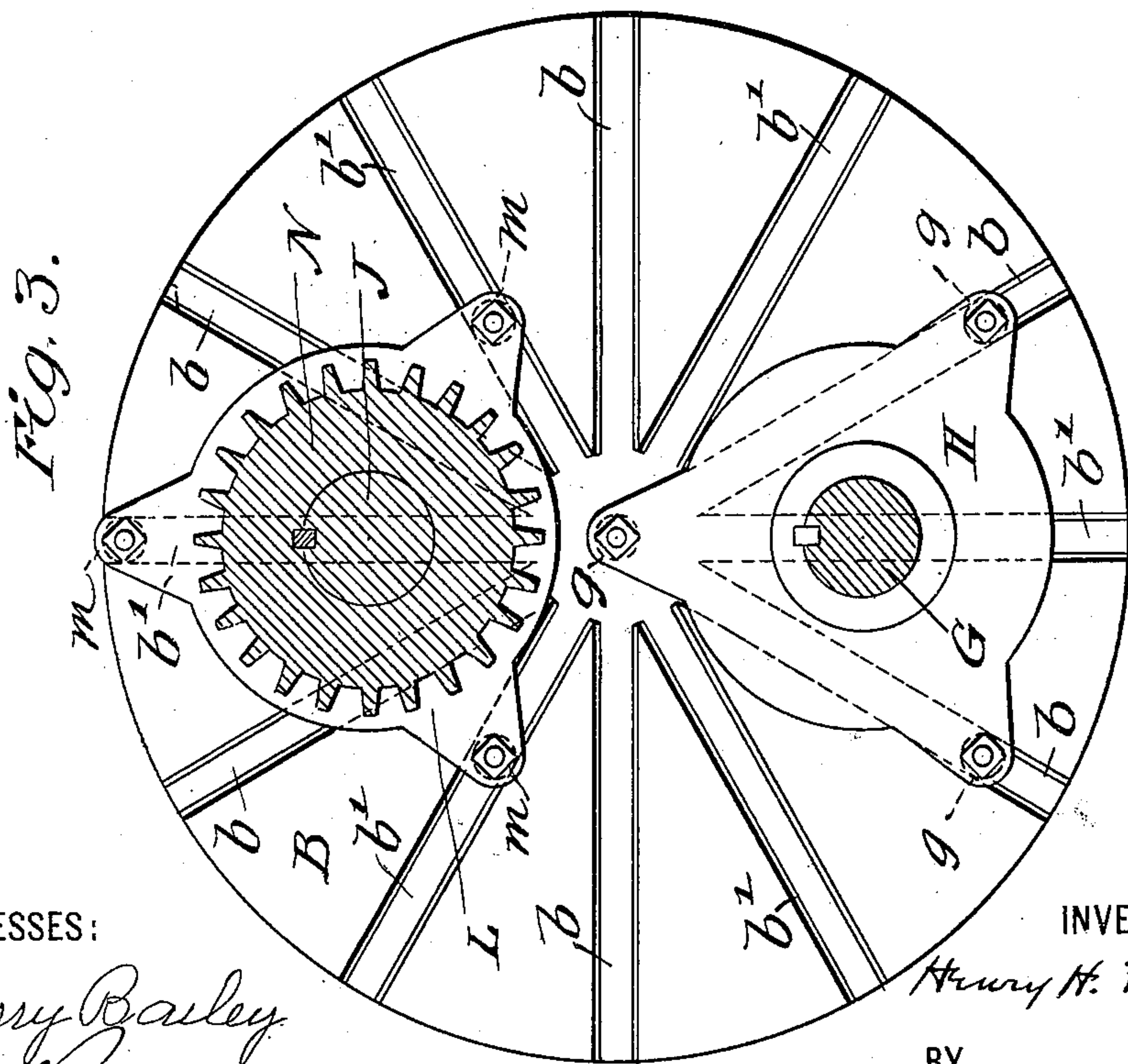
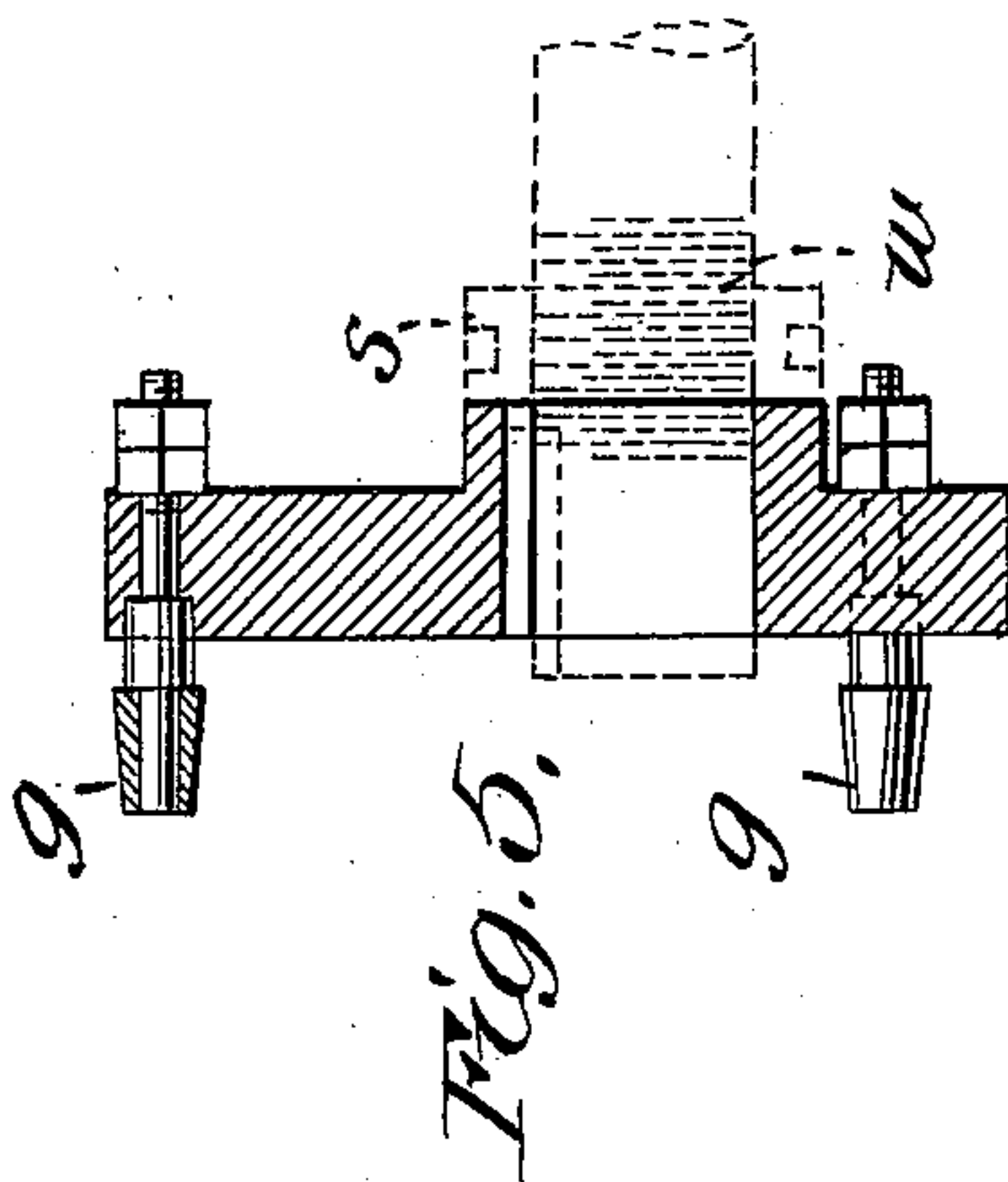
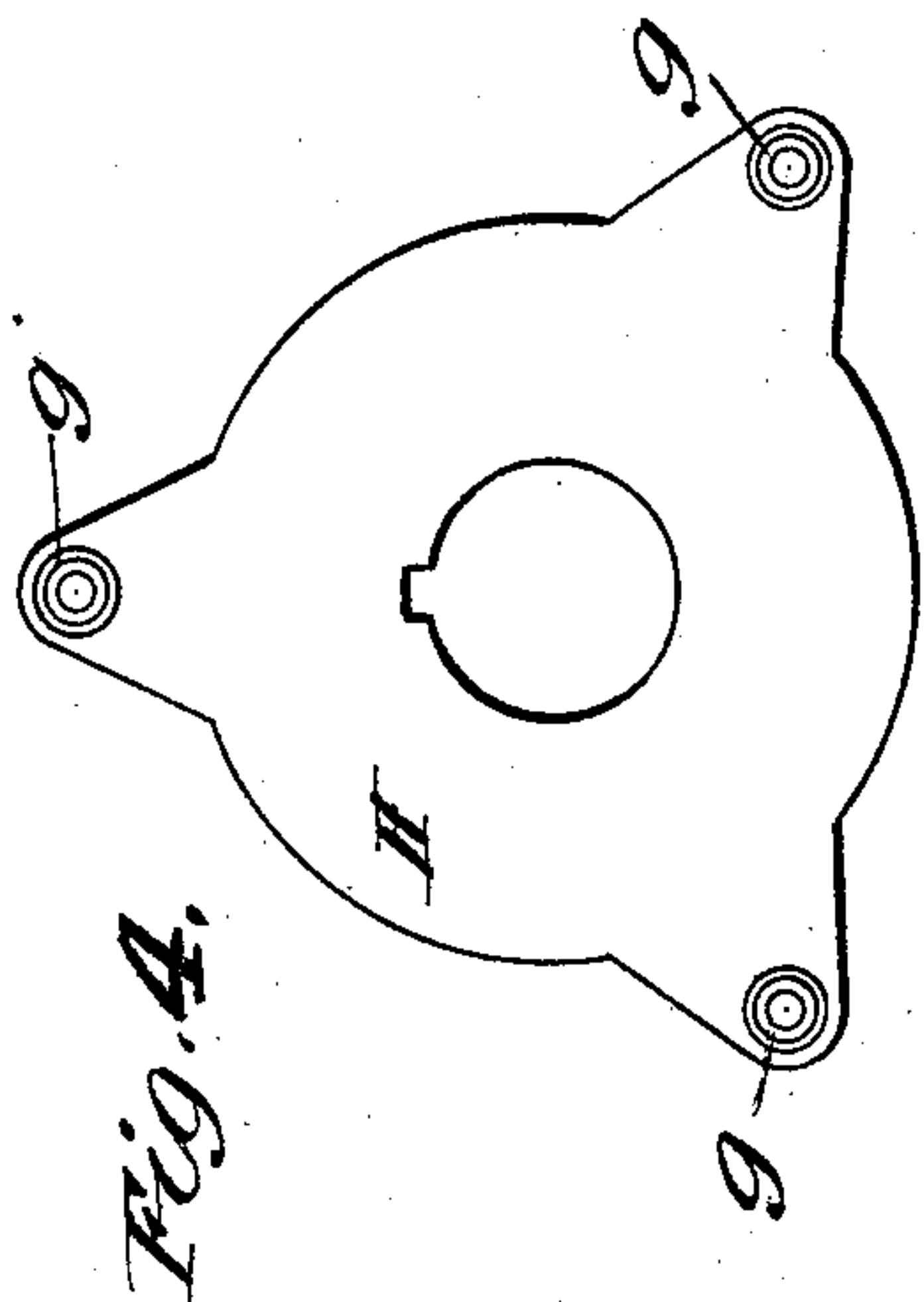
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WITNESSES:

*Harry Bailey*  
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# UNITED STATES PATENT OFFICE.

HENRY H. FEFEL, OF NEW YORK, N. Y.

## MEANS FOR PROPELLING VESSELS.

SPECIFICATION forming part of Letters Patent No. 599,125, dated February 15, 1898.

Application filed April 12, 1897. Serial No. 631,876. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY H. FEFEL, a citizen of the United States, and a resident of New York, in the county and State of New York, have invented certain new and useful Improvements in Means for Propelling Marine Vessels, of which the following is a specification.

The invention herein disclosed relates to means for propelling marine vessels.

I have observed that while the speed of boats driven by the screw-propeller is generally proportionate to the number of revolutions of the propeller in a given time such vessels lose rather than gain in speed when the propellers are revolved at a very high rate, the theory being that the extraordinary rapid rotation of the screw causes the formation of a cylinder or column of water, which being of about the diameter of the propeller and whirling therewith offers no purchase for the screw, and consequently retards the movement of the vessel.

The object of this invention is to provide a construction by which this objectionable feature may be avoided, whatever the rate of speed of the propeller, and, furthermore, to provide a simple and efficient means for transmitting the power from the motor to the propeller-shafts.

The invention therefore consists in the use of two screw-propellers of different diameters mounted one behind the other on concentric shafts, and means, more particularly described hereinafter, whereby the shafts are rotated, and a relative difference of speed between the two rotating shafts constantly maintained.

In the drawings, Figure 1 is a view showing my improved mechanism in plan, the dotted line indicating the outline of a boat to which the mechanism may be applied. Fig. 2 is an enlarged view, partly in section and partly in elevation, of the power-transmitting mechanism. Fig. 3 is a sectional view, still further enlarged, on the line *xx* of Fig. 2. Fig. 4 is a face view of one of the roller-carriers; and Fig. 5 is a sectional view of one of the roller-carriers, showing a means for adjusting the same.

A represents a horizontal shaft suitably mounted in bearings and having fixedly secured at one end thereof the disk or wheel B.

The shaft A is directly connected with a motor, (indicated at C,) which may be of any preferred type of steam, electric, or gas engine. One face of the disk B is provided, as shown, with a series of radial grooves or slots *b b' b b'*, the sides or walls thereof being slightly convergent.

A shaft D is mounted in bearings *d d*, extends to and through the stern of the vessel, and is provided at its outer end with a propeller E. The shaft D, as shown, is hollow and surrounds a second shaft G, which extends to and slightly beyond the end of the shaft D, where it also is provided with a screw-propeller, (indicated at K,) and preferably of smaller diameter than propeller E.

The shafts D and G are mounted in a line about midway the center and periphery of the disk B, and the inner end of the shaft G carries a series of tapered rollers *g g g*, mounted on studs on a suitable carrier H. The carrier stands adjacent the face of the disk B and the rollers project within the grooves or slots thereof. The drawings show a set of three rollers for the carrier H and twelve radial grooves in the disk B or two sets of six grooves each. The rollers *g g g* engage and are acted upon only by the set of grooves marked *b b b*.

Rotation of the shaft A and disk B causes the shaft G and propeller K to rotate at a speed double that of shaft A. This result, it is believed, is clearly understood and further explanation is deemed unnecessary.

Mounted on the short shaft J is a second carrier L, also provided with tapered rollers *m m m*, which engage and are operated by the set of radial grooves *b' b' b'*.

By providing a distinct set of grooves for the rollers of each of the carriers H and L the carriers may be set so as to have the rollers "mesh" in a manner similar to that of the teeth of gear-wheels. Thus but one roller at a time crosses the center of the disk B, and interference between the carriers is avoided. If but one-half the number of grooves were used, the carriers would lock.

A pinion N is formed integrally with or otherwise fixed to the carrier L and engages the gear-wheel F, secured to the inner end of the shaft D. The gear-wheel F being about double the size of pinion N, rotation of the disk B causes the hollow shaft D and propeller E



to rotate at a speed about equal to that of the shaft A.

By this construction many of the advantages common to "twin screws" as ordinarily used are attained and in addition great economy of space. Furthermore, while each of the two screws exerts a propelling force of high efficiency for the vessel their unequal size and unequal speed disturb the water in such manner as to effectually prevent the formation of a column or cylinder of water, with its attendant ill effects, as hereinbefore referred to.

It is desirable that some means be employed for adjusting the position of the carriers or the rollers with respect to the disk B. In Fig. 5 is shown one simple method of accomplishing this. The carrier is "feathered" on the shaft and abuts against a nut *s*, (shown in dotted line,) which turns on a threaded portion *w* of the shaft. By turning the nut the carrier may be forced toward the disk and the tapered rollers advanced farther into the grooves *b b'* to take up any unnecessary play that might exist between said grooves and tapered rollers. This method of adjustment may be applied to either carrier.

As the two shafts D and G rotate in opposite directions, the blades of the two screws should be set at opposite angles. It is so indicated in Figs. 1 and 2.

Having described my invention, I claim—

1. In boat-propelling mechanism the com-

bination of a motor, a disk driven thereby, a series of radial slots in said disk, a carrier provided with suitable rollers or projections engaging with each alternate slot in said disk, a second carrier provided with similar rollers or projections engaging each of the other slots in said disk, a pair of concentric shafts carrying propellers and suitable connections between said carriers and shafts whereby the shafts are driven substantially as described.

2. In boat-propelling mechanism the combination of a motor, a grooved disk driven thereby, a shaft G, having thereon a propeller and a suitable carrier provided with rollers or projections engaging the grooves in said disk, a second shaft parallel with the first and having thereon a suitable carrier provided with rollers or projections engaging the grooves in said disk, and also having a pinion thereon, and a hollow shaft or sleeve surrounding shaft G, provided with a propeller and having thereon a gear-wheel of suitable diameter engaging with the said pinion, whereby the propellers are operated at different speeds, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 5th day of April, 1897.

HENRY H. FEFEL.

Witnesses:

HARRY BAILEY,  
FRANK S. OBER.