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R. FORWARD.

Improvement in Propellers.

No. 122,823.

Patented Jan. 16, 1872.

Fig. 1.

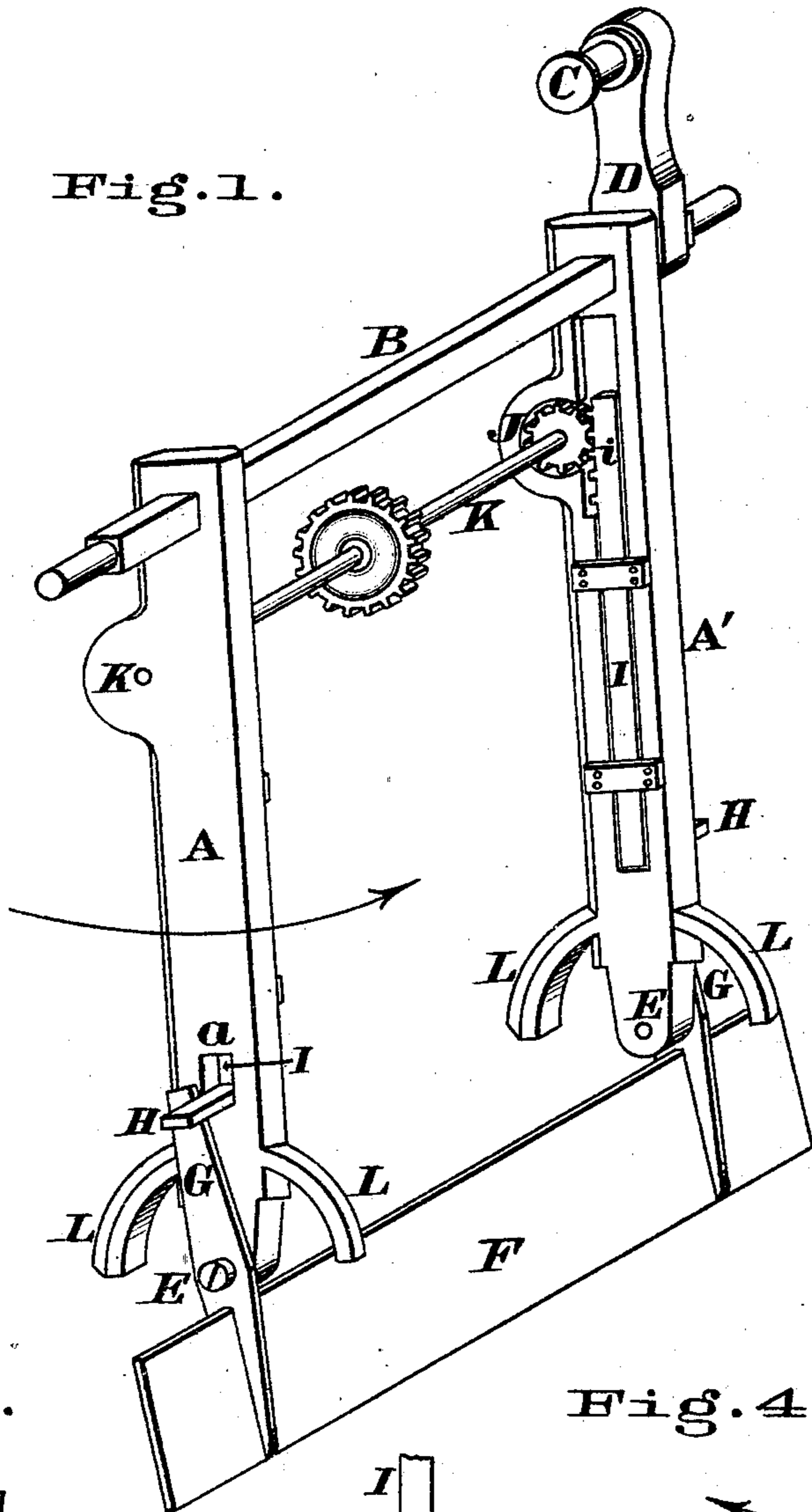


Fig. 2.

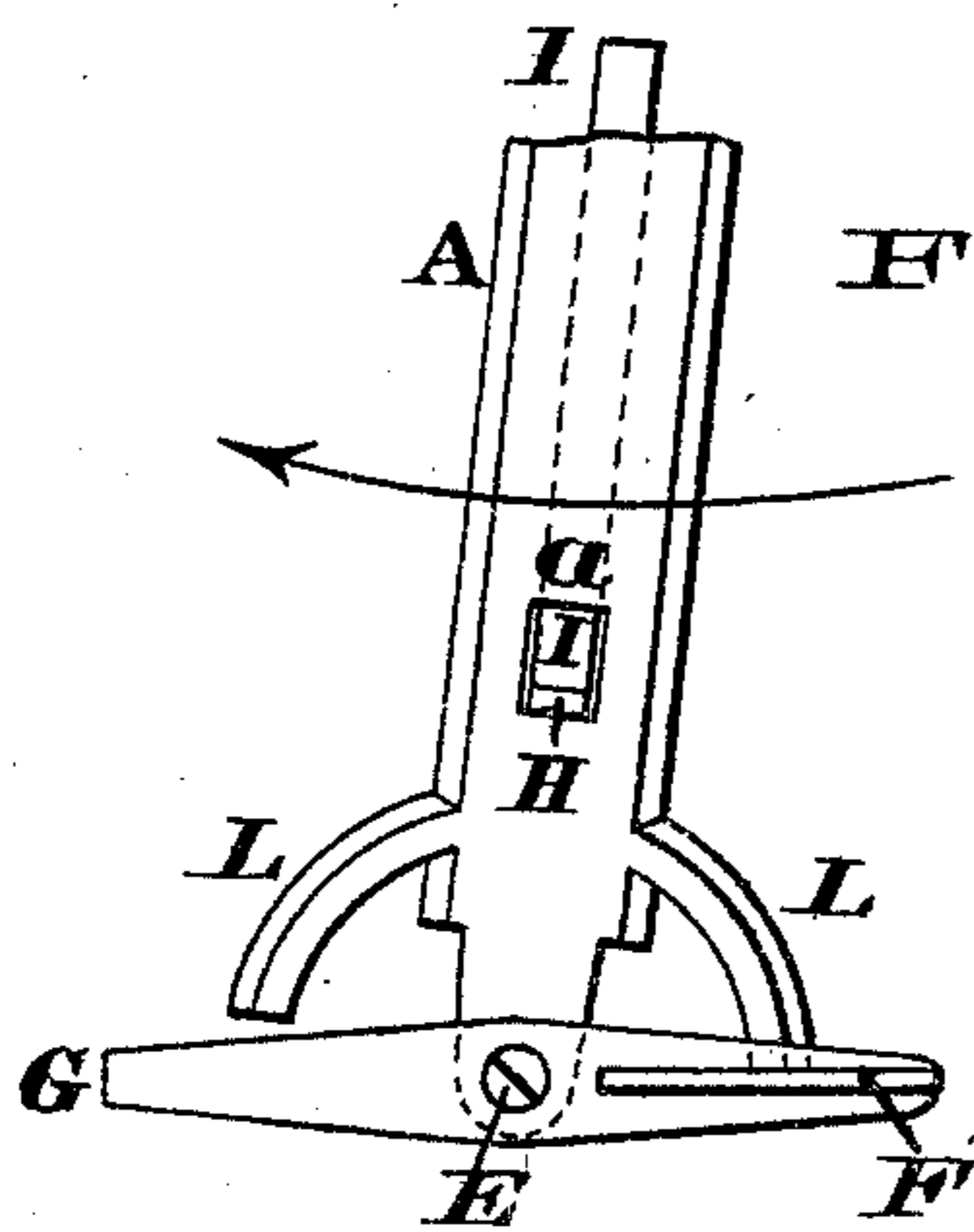


Fig. 3.

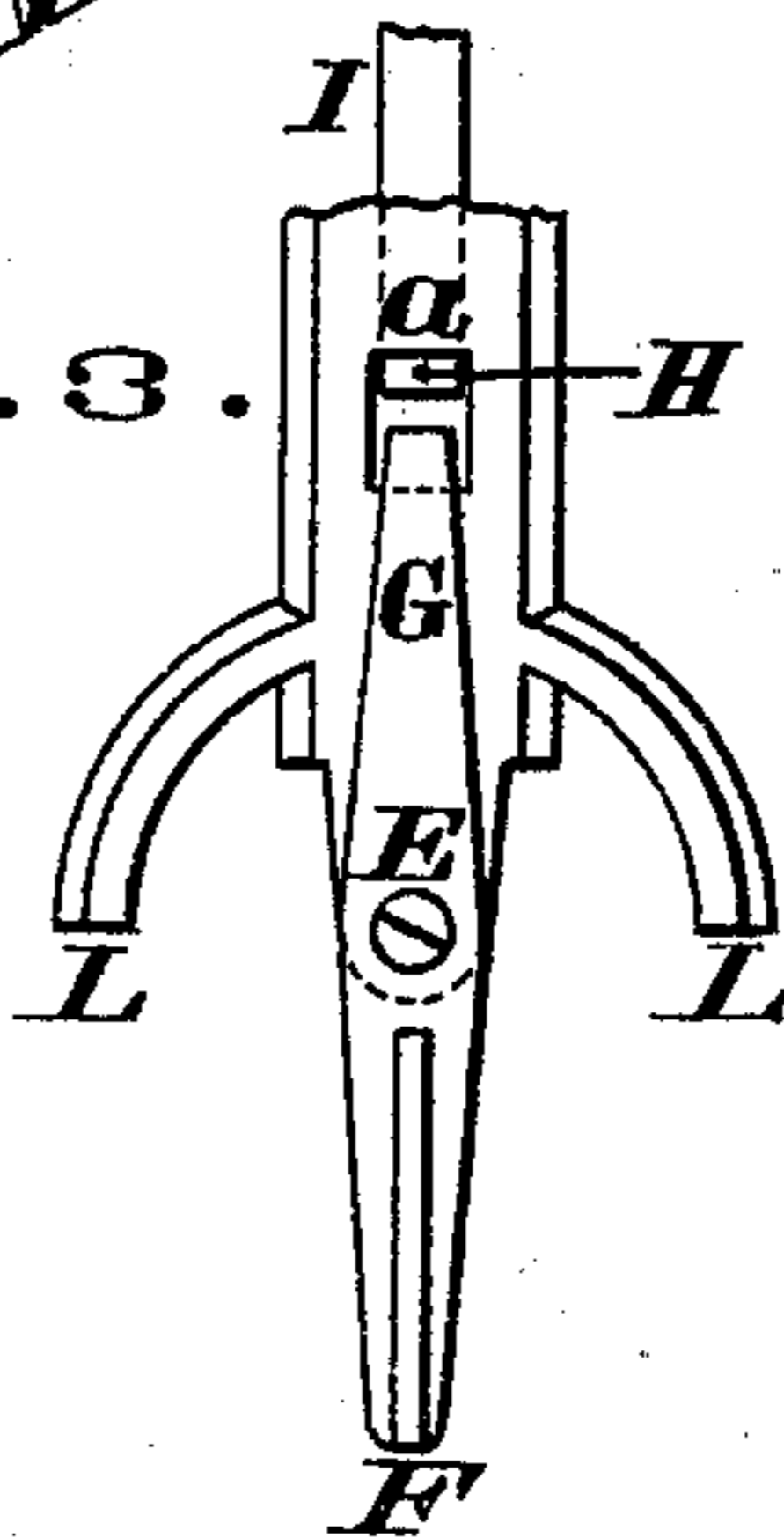
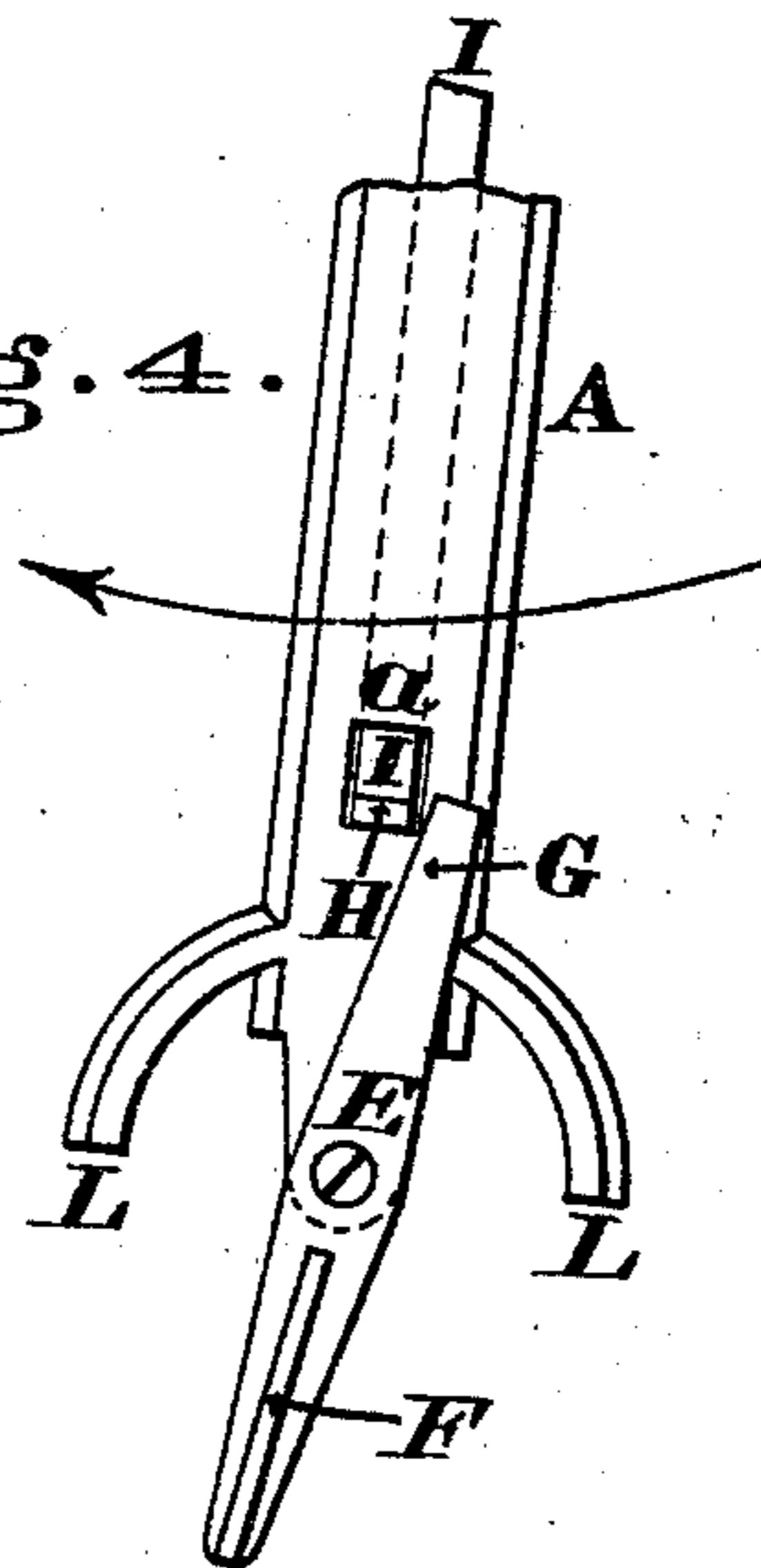


Fig. 4.



Attest.

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UNITED STATES PATENT OFFICE.

ROSS FORWARD, OF CINCINNATI, OHIO.

IMPROVEMENT IN PROPELLERS.

Specification forming part of Letters Patent No. 122,823, dated January 16, 1872.

Specification of certain Improvements in Marine Propellers invented by ROSS FORWARD, of Cincinnati, in the county of Hamilton and State of Ohio.

My invention relates to an improvement in the form and construction of hinged paddles for propelling steam-vessels, whereby the machinery for operating and reversing hinged paddles is so arranged as to be more easily and certainly operated and at the same time present less impediment to the vibration of the dependent levers to which the paddles are attached, and also whereby the paddles are prevented from overturning in rough water and becoming non-effective.

Figure 1 is a perspective view embodying the principal parts of my improvement and invention. Fig. 2 is a side elevation showing the position of paddle in its non-effective stroke. Fig. 3 represents the same with the stop raised for reversal. Fig. 4 shows the position of stop and paddle-shank after reversal.

A A' are arms suspended from a horizontal shaft or axis, B, so as in their quiescent condition to hang vertically at the side or stern of the boat or vessel, and when in operation to vibrate in a short arc about said vertical line as a bisecting radius. They may be impelled by an ordinary pitman connection of the steam-piston with a wrist, C, that projects from an upward prolongation of the arm or from a crank, D, affixed to the shaft B. Attached by hinges or pivots, E, to the lower extremities of the arms A A' is a blade or paddle, F, having one or more shanks, G, that engaging on one or the other side of stops H, that project from the arms, serve to hold the blade to a radial position in its backward or effective stroke while permitting it to assume a tangential position in its forward or non-effective stroke. The stops H are attached to slides I, which occupy the lower portion of slots or guides *a* in the arms, but which, with their said projections H, can be elevated by means of pinions J that engage in racks *i* on said slides. The pinions J may be mounted on a shaft, K, that revolves in the arms A A'. The essential elements of my improvement are the two sliding bars I I, one in each, of two pendent levers, A A', to which the paddles F are attached, operating simultaneously by

means of cogs *i* at the upper end and pinion-wheels J, connected by a shaft, K, passing from one lever to the other. These slides I move in a vertical groove, *a*, from near the center of motion of levers and above the pinion-wheel J to near the lower extremity of the levers at the point where it is desired to fix the paddle-stops H H. At this point they pass entirely through a perforation in the levers, and form the projections H H, which are used as stops for paddle-shanks G G. When the paddle is in motion and it is desired to reverse the effective stroke, the pinion-shaft K is turned by hand through means of a cord or crank attached to it or by cogs upon same, thrown in gear with the machinery which propels the boat. This lifts the slides and stops H I above the projecting shanks G of the paddle F, and as they return they pass the stops, which being then allowed to fall back into position, the shanks are caught in the return vibration upon the opposite side and the effective motion is reversed.

The advantage of this construction is that the pinion-shaft, in connection with the slides, allows the levers to be placed at further distance from each other, thus making a longer paddle and stronger attachments of it to the pendent-levers, while the pinion-shaft and cog-wheels, being at upper extremity of the levers, are entirely removed from contact with the water. The slides being in grooves present no impediment to the motion of pendent arms through the water except that made by the small stops or projections H H. By this arrangement the pendent levers can also be made of requisite strength by increasing the breadth, yet leaving them thin enough to present a narrow edge for resistance in the direction of their vibration in the water, the whole of the parts being made of best steel or iron.

In order to prevent the overturning of the paddle by the violence of waves or other causes, the lower portion of each arm is provided with two spurs or guards, L L, against which the paddle impinges in its non effective or horizontal position, they preventing the paddle from rising above this position.

What I claim as my invention and improvement is—

1. The vibrating pendent arms A A' termin-

ating in hinged paddles F, with shanks G, vertical rack-slides or bars I i, passing through perforations in the pendent arms and forming the projections or stops H H, upon which the shanks of the paddles impinge when making the effective stroke, for forward or backward motion, and pinion J, and pulley or cog-wheel on shaft K, for simultaneously raising said rack-bar and stops, all combined and arranged to operate substantially as described, for the purposes set forth.

2. In the described combination with vibrating arms A A' and hinged paddles F, I claim the checks or guards L, projecting from the said arms, in the manner set forth.

In testimony of which invention I hereunto set my hand.

ROSS FORWARD.

Witnesses:

GEO. H. KNIGHT,
JAMES H. LAYMAN.

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