(No Model.)

J. B. HALL.

PROPELLING POWER.

No. 478,962. Patented July 12, 1892.

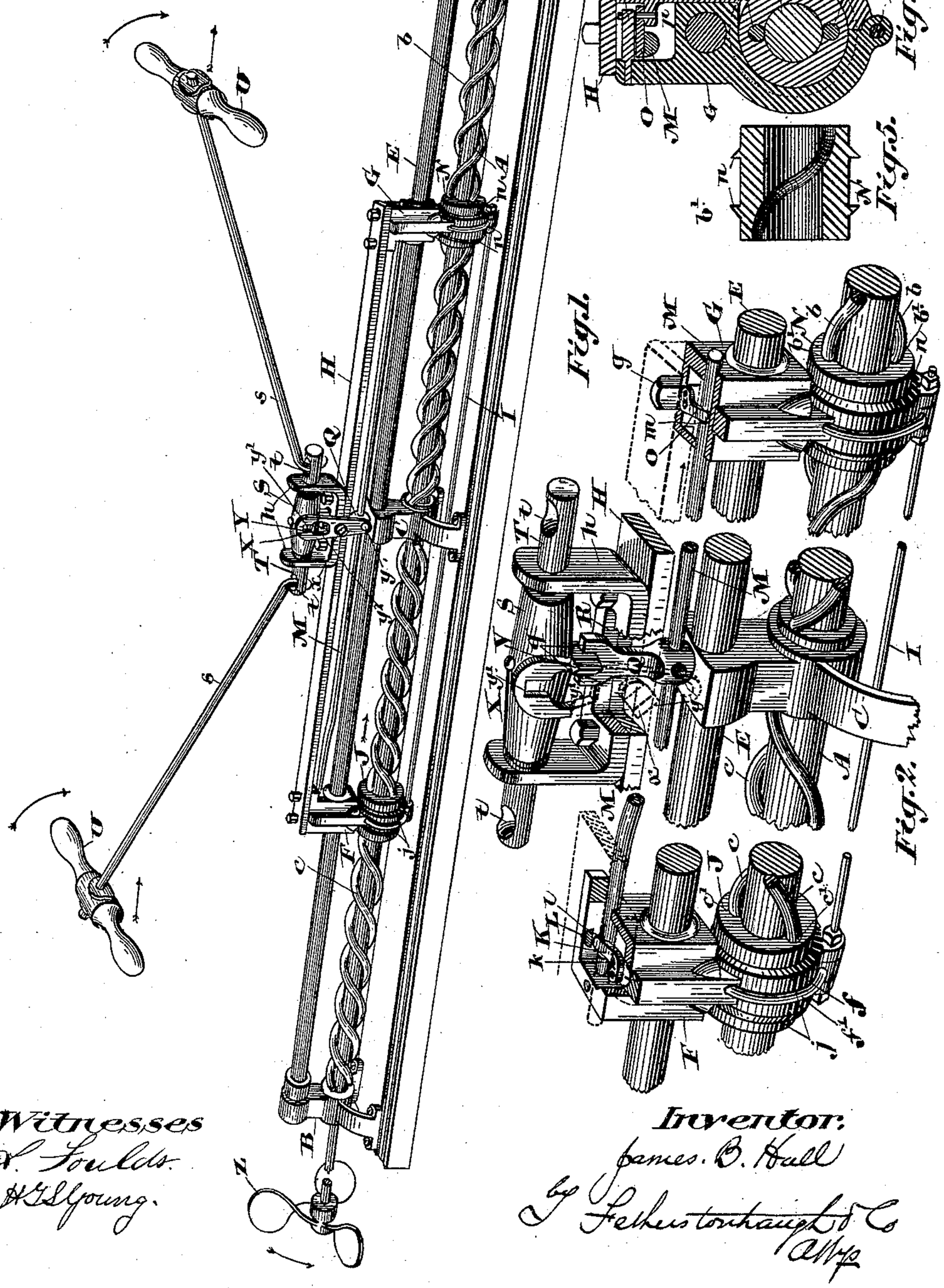

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Witnesses
A. Foulds.
H. G. Young.

Inventor:
James B. Hall
by Fetherstonhaugh & Co
Attys

UNITED STATES PATENT OFFICE.

JAMES BOOMER HALL, OF TORONTO, CANADA, ASSIGNOR OF ONE-FOURTH TO MAURICE MAJOR VARDEN, OF SAME PLACE.

PROPELLING-POWER.

SPECIFICATION forming part of Letters Patent No. 478,962, dated July 12, 1892.

Application filed April 8, 1892. Serial No. 428,345. (No model.)

To all whom it may concern:

Be it known that I, JAMES BOOMER HALL, machinist, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Propelling-Powers, of which the following is a specification.

My invention relates to improvements in propelling-powers; and the object of the invention is to design a propelling-motor to be utilized more particularly for propelling boats, whereby an ordinary propelling screw or wheel may be given a rotary motion through a reciprocating motion derived from the occupant or occupants of the boat, and with a minimum amount of friction in converting the reciprocating into the rotary motion; and it consists, essentially, of a spirally-threaded shaft journaled in suitable standards, the said shaft having a right-hand spiral formed or secured to it from the center to one end and a left-hand spiral formed or secured to it from the center to the other end, two internally and spirally threaded sleeves being provided, one for and correspondingly threaded for its respective end to co-operate with the right and left hand threaded portions of the shaft, so that when one sleeve is brought along its portion of the shaft so as to rotate it in one direction the other sleeve rotates with the shaft as it moves along it, but when this latter sleeve is brought along its portion of the shaft in the opposite direction it is held stationary from revolving and continues to rotate the shaft in the same direction, while the other sleeve rotates with the shaft, and, further, in providing a simple means whereby the motion of the shaft may be reversed instantaneously, the whole being arranged and constructed in detail, as hereinafter more particularly explained.

Figure 1 is a perspective view of my improved propelling-power. Fig. 2 is an enlarged perspective view partially in section and intermediately broken away, so as to show the parts designed for reversing the motion of the shaft. Fig. 3 is a cross-section through one of the sleeves and its retaining-block and friction-clutch. Fig. 4 is a detail of the sleeve. Fig. 5 is a longitudinal cross-section of the sleeve.

In the drawings like letters of reference indicate corresponding parts in each figure.

A is the main driving-shaft, which is journaled in the standards B, C, and D. From the standard C to the standard D, I secure or form on the shaft A a right-hand spiral *b*, preferably circular in cross-section. On the shaft A, from the standard C to the standard B, I secure or form a left-hand spiral *c*.

E is a guiding and supporting rod extending through the top of the standards B, C, and D.

F and G are retaining-blocks, which are connected together at the top of the bar H and at the bottom by the connecting-rod I. Within the block F and designed to operate or to be operated by the spiral *c* on the shaft A is the cylindrical sleeve J, which has flanges *j* formed on each side of the lower or ring portion *f* of the retaining-block F. The sleeve J has spiral groove *c'* cut in it to correspond with the spirals *c* formed on the shaft A.

f' is a friction-clutch which forms practically one-half of the retaining-block and is hinged at the bottom of the retaining-block on the connecting-rod I. The lower portion of the friction-clutch is concentric with the sleeve and held in position by the bell-crank K, pivoted on the pin *k*, secured on the end of the block L. One end of the bell-crank K is pivoted to a lug forming part of the inner end of the upper portion of the friction-clutch *f*, while the long arm of the bell-crank K extends into a notch made in the rod M. The rod M extends through the retaining-block F to and through the retaining-block G, and has another notch *m* cut in it inside the retaining-block G. The retaining-block G has also a friction-clutch *g* pivoted at its bottom end on the rod I and has its lower portion concentric with the cylindrical sleeve N. The sleeve N also has flanges *n* to prevent it from moving laterally in the retaining-block G, and has internal spiral threads *b'* cut in it to correspond to the spirals *b*. The upper end of the friction-clutch *g* is held in position by the bell-crank O, which is pivoted on the block P, the long arm of the bell-crank O extending into the notch *m* in the rod M and the short end being pivoted on a lug *p* at the upper end of the friction-clutch *g*.

Q is a standard secured in the center of the rod M and extending upwardly through a slot R, made through the bar H and bracket *h*. The upper end of the standard Q has two jaws *q* formed on it, as shown.

S is a sleeve secured on the spindle T between the uprights of the bracket *h*, the outer ends of the spindle T having holes *t* cut in it to receive the hooked end of the rods *s*, to the outer ends of which the handles U are attached.

V is a block, which is secured to the center of the sleeve S. The outer ends of the block are V-shaped, as shown.

X is a lever pivoted at *x* and connected at the bottom by the pin *y* to the standard Q.

Y is a slot made in the upper portion of the lever X. The upper portion *y'* of the slot Y is made narrow, while the lower portion y^2 is made much broader, as shown.

It will be noticed that on one end of the shaft A, I secure a balance-wheel A', and at the other end of the shaft, which is shown broken away, I secure a screw or propelling wheel Z.

Having now described the principal parts of my invention in detail, I shall now proceed to describe the means whereby the rotation of the shaft is effected, and the means whereby such rotation is reversed.

When it is desired to rotate the shaft in the direction indicated by arrow, the handles U are held horizontal, so as to hold the spindle T and the block V beneath the sleeve S between the jaws *q*, formed at the upper end of the standard Q, secured in the center of the rod M, as hereinbefore described.

In Fig. 1 the mechanism is shown in the middle of a stroke. By pulling and pushing on the handles U in the direction indicated by arrow it will be seen that the block V, which is now located between the jaws *q* of the standard Q, will push the rod M in the direction indicated by arrow, so as to throw the long arms of the bell-cranks K and O in the same direction. The bell-crank K will be tilted on its pivot, so as to bring the friction-clutch *f* firmly against the sleeve J, so as to hold it one with the retaining-block, or, in other words, to prevent the sleeve J from revolving. The bell-crank O, however, will be tilted on its pivot, so as to throw the friction-clutch *g* away from the sleeve N, thereby giving the sleeve N perfect freedom to revolve. Consequently when the handles U are pulled in the direction indicated by arrow the sleeve J will remain one with the retaining-block F and will rotate the shaft A in the direction indicated by arrow as it is drawn along the shaft in the direction indicated by arrow. The sleeve N, however, will be caused to revolve in its bearings by the right-hand spiral *b* when moving in the direction indicated by arrow. When, however, the handles are pushed and pulled in the opposite direction to that indicated by arrow, the bell-crank O will be tilted on its pivot, so as to throw the long arm in the opposite direction to that indicated by arrow, so that the friction-clutch *g* will be brought against the sleeve N and held one with the retaining-block G, or, in other words, prevented from revolving. The bell-crank K will be tilted on its pivot, so as to bring the long arm in the opposite direction, and thereby throw the friction-clutch *f* away from the sleeve J, which will consequently turn loosely in its bearings and have no effect whatever on the shaft A. It will now be seen that the sleeve N as it reciprocates in the opposite direction from that indicated by arrow will be the means of rotating it, or, it may be said, continuing the shaft in the same direction by acting on the right-hand spiral *b* of the shaft A.

It will now be understood that upon the handles U being pushed and pulled in the direction indicated by arrow again the sleeve J will act upon the left-hand spiral, so as to continue the rotation of the shaft in the same direction, and that by pushing and pulling the handles in the opposite direction again the sleeve N will act upon the right-hand spiral of the shaft A, so as to rotate it in the same direction, and so on, thereby forming the means for the continual rotation of the shaft in the same direction.

Should it be desired to have the shaft rotate in the opposite direction to that indicated by arrow—as, for instance, when it is desired to back the boat—it will be merely necessary to turn the handles U around to the perpendicular in the direction indicated by arrow, and thereby bring the block V around and into the narrow upper portion *y'* of the slot Y.

It will now be seen by pushing and pulling on the handles U in the direction indicated by arrow that the lever X will be tilted on its pivot, and being connected at the bottom at *y* to the standard Q the rod M will be thrown in the opposite direction to that indicated by arrow, so that the bell-crank O will be tilted on its pivot, and thereby bring the friction-clutch *g* firmly against the sleeve N, which will now remain one with the retaining-block G. Consequently as the sleeve N is one with the retaining-block G and acting on the right-hand spiral *b* of the shaft A, instead of the sleeve J being one with the retaining-block F and acting on the left-hand spiral, as before described, it will be seen that the shaft A will be caused to rotate in the opposite direction to that indicated by arrow.

When the handles U are pushed and pulled in the opposite direction, the lever X will be tilted on its pivot, so as to draw the rod M in the direction indicated by arrow, and thereby tilt the bell-crank on its pivot, so as to draw the friction-clutch *f* against the sleeve J, and thereby hold it one with the retaining-block F. The sleeve J will now be acting on the left-hand spiral and will cause the shaft A to rotate in the opposite direction to that indicated by arrow. As the sleeves N and J act upon the right and left hand spirals *b* and *c*,

respectively, it will be seen that the rotation of the shaft A may be continued as long as the handles U are held perpendicular and the block V retained in the narrow upper portion *y'* of the slot Y of the lever X. As soon, however, as the sleeve S is turned around by the handles U being brought to the horizontal and the block V thrown between the jaws *q* of the standard Q, the sleeves N and J will have the same effect upon the shaft as before stated—that is to say, will rotate it in the direction indicated by arrow.

From this description it will be seen that a very effective means of changing the reciprocating into the rotary motion of the shaft A is provided, and one which, on account of the easy sweep of the spirals, reduces the amount of friction caused by the reciprocating motion of the sleeves to a minimum.

In making my propelling-power it is intended that the shaft A and guiding-rods E are to be made hollow, so that when used for propelling a row-boat it will be comparatively light and not materially add to the weight of the boat. It will also be seen that the rotation of the shaft may be reversed instantaneously in the manner stated and without the slightest danger of any of the working parts getting out of order or failing to act on the propeller in changing the direction of rotation.

When my propelling-power is at rest and the pressure from the handles removed, it will be seen that the sleeves will be held loosely in their respective retaining-blocks, so that the shaft A will revolve freely in the retaining-blocks. Consequently when the occupant or operator removes his hands from the handles U the shaft will continue to revolve loosely in the retaining-blocks F and G until the momentum or pressure upon the wheel will cause the shaft to stop. This is a very important point, as it will be seen that the retaining-blocks F and G, connected by the bar H and rod I, and the handles U, connected to the sleeves, as described, will not move backward and forward and be an inconvenience to the occupant or operator in the boat, but will remain perfectly stationary, the shaft and sleeves alone being the only moving parts in the machine when the handles are released by the operator.

Although I show in the drawings the right and left hand spiral of thread of practical circular cross-section, it will of course be understood that I might provide a flat bar twisted from the center to each end into right and left hand spirals of equal pitch. It will also be understood that friction-rollers might be provided and journaled in the sleeves, so as to lessen the friction of the side of the spirals on the corresponding threads formed in the sleeves during the reciprocal movement of the sleeves; but as these friction-rollers are common expedients I do not show them.

What I claim as my invention is—

1. As a propelling-power, the shaft supported in suitable standards and having a propelling-wheel secured on its end, a right-hand spiral formed on the shaft from the center to one end, and a left-hand spiral formed on the shaft from the center to the opposite end, in combination with a sleeve correspondingly internally threaded and designed to act on the right-hand spiral, and a sleeve correspondingly internally threaded and designed to act on the left-hand spiral, and means for holding one sleeve solid, so as to rotate the shaft by means of one spiral, and further means in holding the other sleeve loose so that it may rotate with the shaft while the other sleeve is being pulled along the shaft in order to rotate it, substantially as and for the purpose specified.

2. The shaft A, supported in the standards B, C, and D and having the right-hand spiral *b* formed from the center to the one end of the shaft and a left-hand spiral formed from the center to the other end of the shaft, and a propelling-wheel Z, secured on one end of the shaft, in combination with the sleeve N, located on the right-hand spiral portion of the shaft correspondingly internally threaded to the right-hand spiral supported in the retaining-block G and designed to be held solid with the same by the friction-clutch *g*, and the sleeve J, located on the left-hand spiral portion of the shaft correspondingly internally threaded to the left-hand spiral supported in the retaining-block F and designed to be held solid with the same by the friction-clutch *f*, and means whereby each sleeve may be held alternately in its retaining-block, so as to rotate the shaft or to revolve loosely with it, as and for the purpose specified.

3. The shaft A, supported in the standards B, C, and D and having the right-hand spiral *b* formed from the center to the one end of the shaft and a left-hand spiral formed from the center to the other end of the shaft, and a propelling-wheel Z, secured on one end of the shaft, in combination with the sleeve N, held in the retaining-block G upon the right-hand spiral portion of the shaft, and the sleeve J, held in the retaining-block F upon the left-hand spiral portion of the shaft, the said retaining-blocks being connected together by the bar H and rod I, as and for the purpose specified.

4. The shaft A, supported in the standards B, C, and D and having the right-hand spiral *b* formed from the center to the one end of the shaft and a left-hand spiral formed from the center to the other end of the shaft, and a propelling-wheel Z, secured on one end of the shaft, in combination with the retaining-blocks F and G, connected together by the bar H and rod I, the sleeves N and J, having bearings in the retaining-blocks F and G, respectively, and the friction-clutches *f* and *g*, hinged on the rod I at the lower portion of the retaining-blocks F and G, connected at the top por-

tion by the bell-cranks O and K, respectively, to the rod M, which is operated as and for the purpose specified.

5. The shaft A, supported in the standards B, C, and D and having the right-hand spiral *b* formed from the center to the one end of the shaft and a left-hand spiral formed from the center to the other end of the shaft, and a propelling-wheel Z, secured on one end of the shaft, in combination with the retaining-blocks F and G, connected together by the bar H and rod I, the sleeves N and J, having bearings in the retaining-blocks F and G, respectively, and the friction-clutches *f* and *g*, hinged on the rod I at the lower portion of the retaining-blocks F and G, connected at the top portion by the bell-cranks O and K, respectively, to the rod M, upon which is secured the standard Q, having jaws *q*, between which is inserted the block V, secured to the sleeve S on the spindle T, which is supported in the bracket *h* and is slightly adjustable by the handles U, connected to the outer ends by the rod S, as and for the purpose specified.

6. The shaft A, supported in the standards B, C, and D and having the right-hand spiral *b* formed from the center to the one end of the shaft and a left-hand spiral formed from the center to the other end of the shaft, and a propelling-wheel Z, secured on one end of the shaft, in combination with the retaining-blocks F and G, connected together by the bar H and rod I, the sleeves N and J, having bearings in the retaining-blocks F and G, respectively, and the friction-clutches *f* and *g*, hinged on the rod I at the lower portion of the retaining-blocks F and G and connected at the top portion by the bell-cranks O and K, respectively, to the rod M, upon which is secured the standard Q, the lever X, pivoted at *x*, connected to the standard Q at *y*, and the block V, designed to be brought to fit within the narrow upper portion *y'* of the slot Y by turning the handles U to the perpendicular, as and for the purpose specified.

JAMES BOOMER HALL.

Witnesses:
BLANCHE BOYD,
LEONARD FOULDS.