2 Sheet. Sheet 1.

F. Kellsey,

Vibrating Propeller.

No. 9,366. Patented Nov. 2, 1852.

Witnesses.
Henry D. Smith
Jonathan Barney

Inventor.
Franklin Kellsey.

2 Sheets. Sheet 2.

F. Kellsey,

Vibrating Propeller.

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Fig: 5.

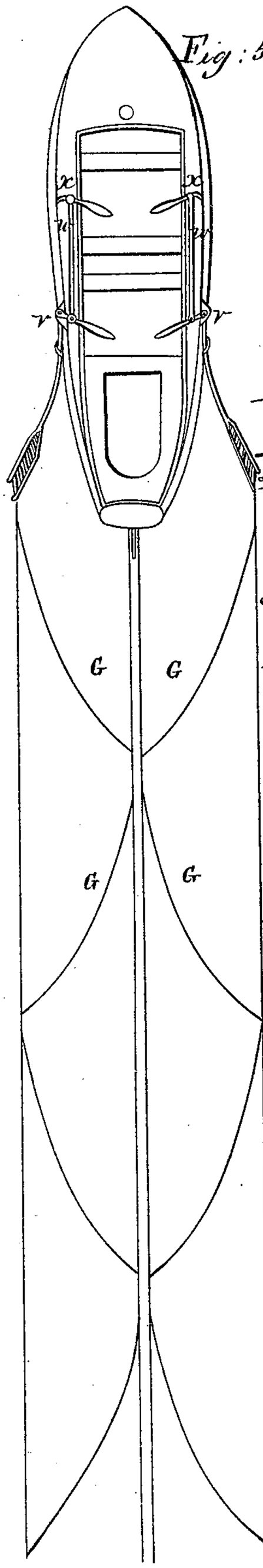

Fig: 6

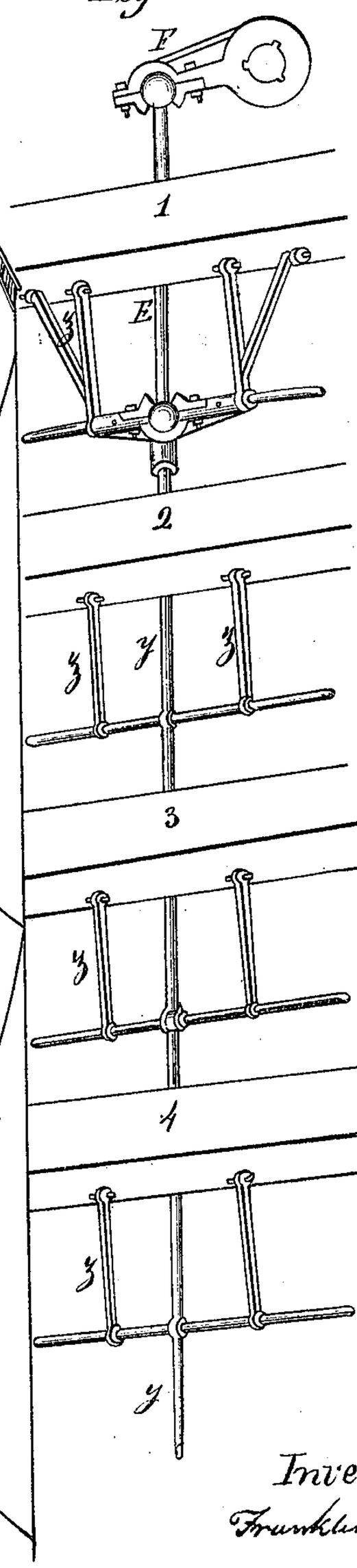

Fig: 7.

Witnesses.
Henry D. Smith
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Franklin Kellsey

UNITED STATES PATENT OFFICE.

FRANKLIN KELLSEY, OF MIDDLETOWN, CONNECTICUT.

IMPROVEMENT IN VIBRATING PROPELLERS.

Specification forming part of Letters Patent No. **9,366**, dated November 2, 1852.

To all whom it may concern:

Be it known that I, FRANKLIN KELLSEY, of Middletown, in the county of Middlesex and State of Connecticut, have invented a new and improved mode of propelling ships, vessels, and boats, applicable to steam, hand, or other power, to be used with sails or without sails, or with wheels or other application, or without the same, called the "Fish-Tail Propeller;" and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in the transposition of the propelling principles of the fish's tail into a form suitable, as herein described, to make a propeller applicable to steam or other power; or, more plainly to be understood, I dissect in principle the curve part of the fish's tail into inclined planes, and place them in a row in a horizontally-vibrating frame, with the planes secured by gudgeons or pivots at the ends on the side thereof, that they may vibrate in the frame that vibrates them, and regulated by check-pins located, as hereinafter described, to produce angles or inclinations of the planes as also propel alike, whether the motion be in or out from the vessel's sides.

These propellers are to be applied—one or more—at the stern or between two boats, or in the dead-wood forming a part of the keel near the bow and stern, and in this manner be made to propel alternately both ways, as in case of ferries, or to back the boat, as in case of coming alongside of the dock, &c.; also, they may be applied to operate under the counter near the stern, and the power taken through the bottom, as in the case of war vessels, as also in the case of merchant vessels or packets, they may be applied outside of the counter with engines and boilers on deck, or they may be multiplied along the sides of the vessel, and thereby increase the propelling force to any extent equal to the means of making and applying steam to operate the same. They may also be applied to be operated by hand-power to propel the largest ships or vessels, as also to propel small boats, &c.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

I construct my propeller of iron or other suitable material, as shown, Figure 1, in the accompanying drawing, (except the middle prong of the frame B, which is drawn at half-width in order to show the make of the gudgeons to the inclined planes,) as follows: A B, the main shaft and arm of propeller, with middle prong to be made with holes or boxes *d d* to receive the gudgeons on one end of each plane, the shaft A to be rounded, in order to ply in boxes constructed to receive it in its attachment to the vessel, and the prong B to be flattened and perforated, as above, to receive the gudgeons, as also to attach the two outer prongs C D by bolts, rivets, or otherwise at *f*, which are further secured by bolts *e e*. This—that is, A B C D *e e*—constitutes the frame of my propeller, which may be altered to five or more prongs, on similar plan, or reduced to two prongs, as the occasion may require. By vibrating this frame in a horizontal manner out and in from a vessel's sides I get an action on my inclined-planes that produces a propelling power—that is, the upper and lower prongs of my frame C D being also perforated or otherwise fitted to receive the gudgeons of the planes other than those that apply to the middle prong, it makes the fixtures whereby I insert the planes *b b b b*, &c., which would turn quite round were it not for the check-pins *c c c c*, &c., throughout the field of planes to prevent them, and thereby reduce their motions to angles or inclines suitable to propelling; and there being two check-pins or stops answering a similar purpose to each plane it effects the object of propelling whether the motion of the frame be out or in from the vessel's sides or at each vibration.

In order to time the velocities of my planes, that the planes at the extreme length of my frame shall not propel faster than the others, I graduate their angles as the velocities in the vibration of the frame—that is, I arrange my check-pins or stops in such a manner that the aftermost plane (otherwise termed "blade") is permitted to make a greater angle with the arm or frame to which it is attached than those which are forward of it, the angle decreasing in each plane in ratio as the decrease of the leverage of the arm or frame that vibrates them; or, more particularly, I place my stops to trim the angles of my foremost plane or blade in such a manner that the surface thereof shall be in a par-

allel line at the extent of each vibration with that of the body propelled, (or course of the vessel or boat,) and increase the angles of each after or following blade as the location thereof to make them compare as nearly as may be in propelling velocity with the first or foremost blade.

The drawings, Fig. 8, represents the principle on which I trim my planes or blades to act in unision in propelling; C C, the outlines of the upper prong of propeller; *b b b b b*, the upper ends of the planes or blades; *d d d d d d d d d d*, the check-pins, and *g g g g g* the upper gudgeons of the planes or blades; *f b*, the foremost blade; E, the position of each different blade or plane as compared with the line of propulsion at the end of the vibration, which line is represented by F F, and G is the position of the planes at the commencement of a second vibration.

My propeller, as in the drawings at a half-inch scale to the foot, is calculated for a one-hundred-horse twenty-eight-revolution engine, to propel fourteen miles per hour. By improving the engine in its application, as in the drawings next to be considered, the speed of propelling may be doubled, admit the model of the boat or vessel is rightly constructed to be propelled at a similar rate.

In applying the steam-engine, Fig. 2, the engine is made to be horizontal, and the cross-head *g* and the lever *h* is to work on the same plane. The lever at *a* is to be transversely attached to the shaft of the propeller at A at right angles with the line of propeller, as also at right angles with the working movement of the engine, or the engine at half-stroke, the engine to work without revolving a crank, the steam to be cut off at one-fourth, one-third, or one-half the stroke, in order not only to use the expansive force of the steam, but to reduce the strength thereof, that a full head let on in opposition and in connection with the increased power of resistance of the propeller at the end of the stroke will reverse the motion of the piston, and so on alternately, the same as if regulated by a crank; and as a further guard to prevent the piston *i* from striking the heads of the cylinder *k k* I apply a stop *l l* to the motion of the lever *h*, that connects the power of the engine with the propeller. As respects the further improvement of the engine applicable to this mode of conducting power and working its valves and force-pump, I place the eccentric *a* on the top of the lever *h* to be attached to the perpendicular shaft or shaft of propeller A. From thence I conduct the eccentric motion by rods *m m* to lever *n*, connected at right angles with lever *o*, on which is a ball-joint to favor the motion of the rod *p* in its application to the rock-shaft that works the valves, which are made similar to the common construction for a horizontal working engine. The levers *n o* are made to vibrate from the center *q*, which may be made a short perpendicular shaft, with gudgeons or otherwise suitable to the movement of the levers. The rod *r*, connected to the lever *h*, communicates the power to work the force-pump, which is of the common construction. In order to do away the friction caused by the weight of the propeller, which on the scale of a half-inch to the foot, made of iron, will weigh about twenty-five hundred pounds, I construct a friction-washer, Fig. 3, with balls to revolve on pins or bolts inserted in a circular frame, adapted to be applied to the shaft of the propeller as a common washer, being made to operate between the lower part of the lever *h*, applied to propeller and the circular plane *s*.

In applying the propeller to war-vessels, Fig. 4, I take the shaft of the propeller A through the bottom of the vessel at *t*, through a cylinder or pipe of suitable thickness to make a bearing for the propeller, and with a stuffing-box like that used to pack the piston-rod of a steam-engine on the upper end thereof to prevent leakage, this cylinder or pipe to be firmly secured on the inside of the vessel by flange and bolts or otherwise. There are two propellers applied to this strip, one on each side of the vessel. In order to barricade the chimney *u*, I make interlayers of thick sheet or boiler iron with wood and bolt them strongly together and secure them firmly around the chimney to the decks, the sheets arranged so as to receive the shot of the enemy upon the edges and open in a wedge-like manner.

In applying the propellers to a small boat, Fig. 5, I apply them to the outside of the boat *v v* in the same manner as a to merchant vessel or packet with the levers that give them motion, extending inboard and shaped to apply hand-power, with the thwarts arranged in the boat, so that two or more men facing each other can apply their power to each lever, and (as is the case in the drawings,) another set of men can be applied to the same propellers by connecting their levers *x x* by means of shackle-bars *w w*, and, again, another set of men can be applied with their levers by extending the length of the shackle-bars, and so on continually, according to the length of the boat.

In applying hand-power to the propellers to propel large vessels, Fig. 6, I suspend a connecting-rod *y y* to swing frames *z z z z*, attached to the deck-beams 1 2 3 4, the lower part of the frames being made as handles to apply the hands of eight or twelve men (more or less) to each frame, who stand up and work facing each other, in the act of propelling, which is effected by vibrating the rod fore and aft the vessel, the rod being connected by means of the ball-joints on shackle-bar E to lever F, the lever that works the propeller. In this manner five hundred men—equal to one hundred horse-power—can be applied to a propeller within the length of one hundred and seventy feet, or to two propellers, the power of one thousand men—equal to the

power of two hundred horses—can be applied to propel a ship, making a perfect application of hand-power to naval purposes, the machinery being placed in the hold below water-line, out of the way of shot. When this machinery is not in use, it is disconnected at one of the ball-joints and triced up to the deck-beams, out of the way. Hence it takes up very little room in the ship, except when in use. Again, the propellers being turned in under the counter next to the sides of the vessel there is little or no resistance to the sailing of the vessel.

The principle of propelling as the fish's tail, being as the straightening of a curve to that of a line with the body moved, and as it it requires more than one inclined plane to make a curve, as also the more numerous and less width, (otherwise less lever length of planes,) the less loss of power at the turn of the vibration.

Therefore what I claim as my invention, and desire to secure by Letters Patent, is—

The combination, in a field or row, of a multiplicity of inclined planes or sculls secured by gudgeons on one of the sides thereof in a frame vibrating horizontally, and the graduation of their propelling velocities by a similar multiplicity of check-pins or stops so adapted to the respective planes or sculls that in vibrating the same they may propel, as nearly as possible, in equal times, and thereby reduce the propelling principle of the tail of a fish, as nearly as may be, to mechanical purposes, substantially as above described, for the propelling of all kinds or classes of vessels or boats by the power of steam, or other power, and with or without sails, as occasion may require.

Dated at Middletown the 30th day of March, A. D. 1852.

FRANKLIN KELLSEY.

In presence of—
HENRY D. SMITH,
JONATHAN BARNES.