J. Emerson,

Windlass.

No. 37,194 Patented Dec 16, 1862.

Fig. 1.

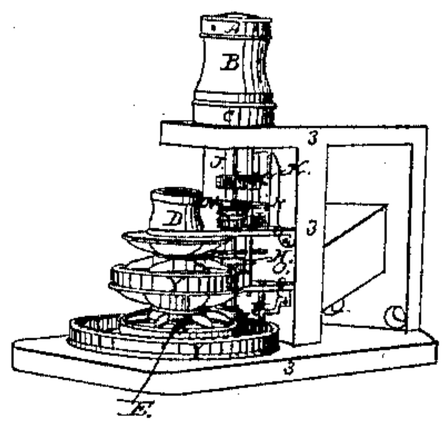


Fig. 4.

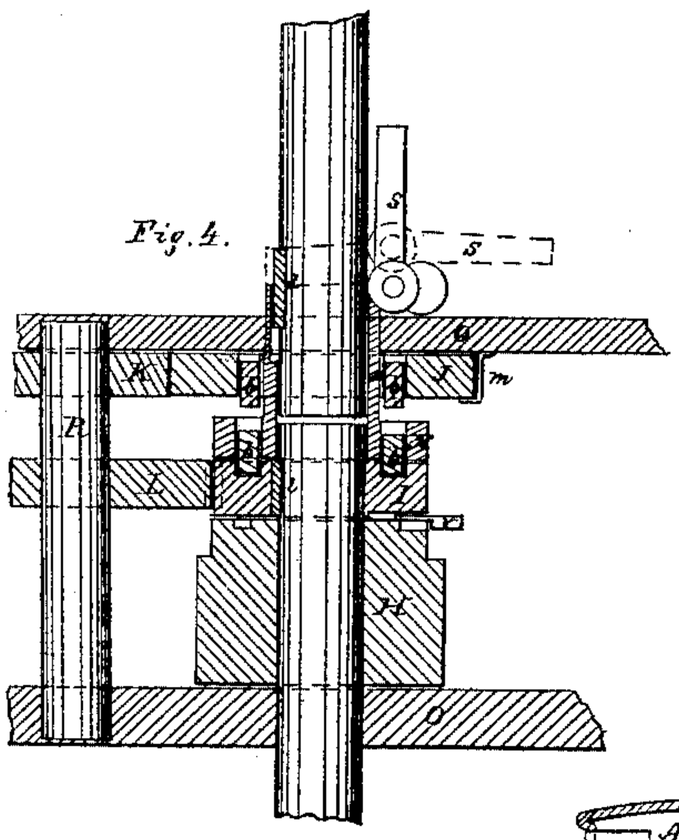
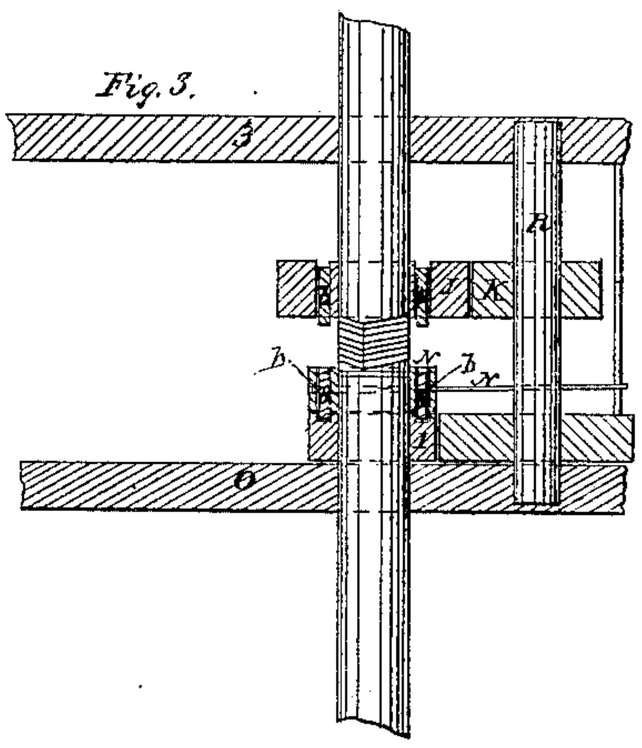


Fig. 3.



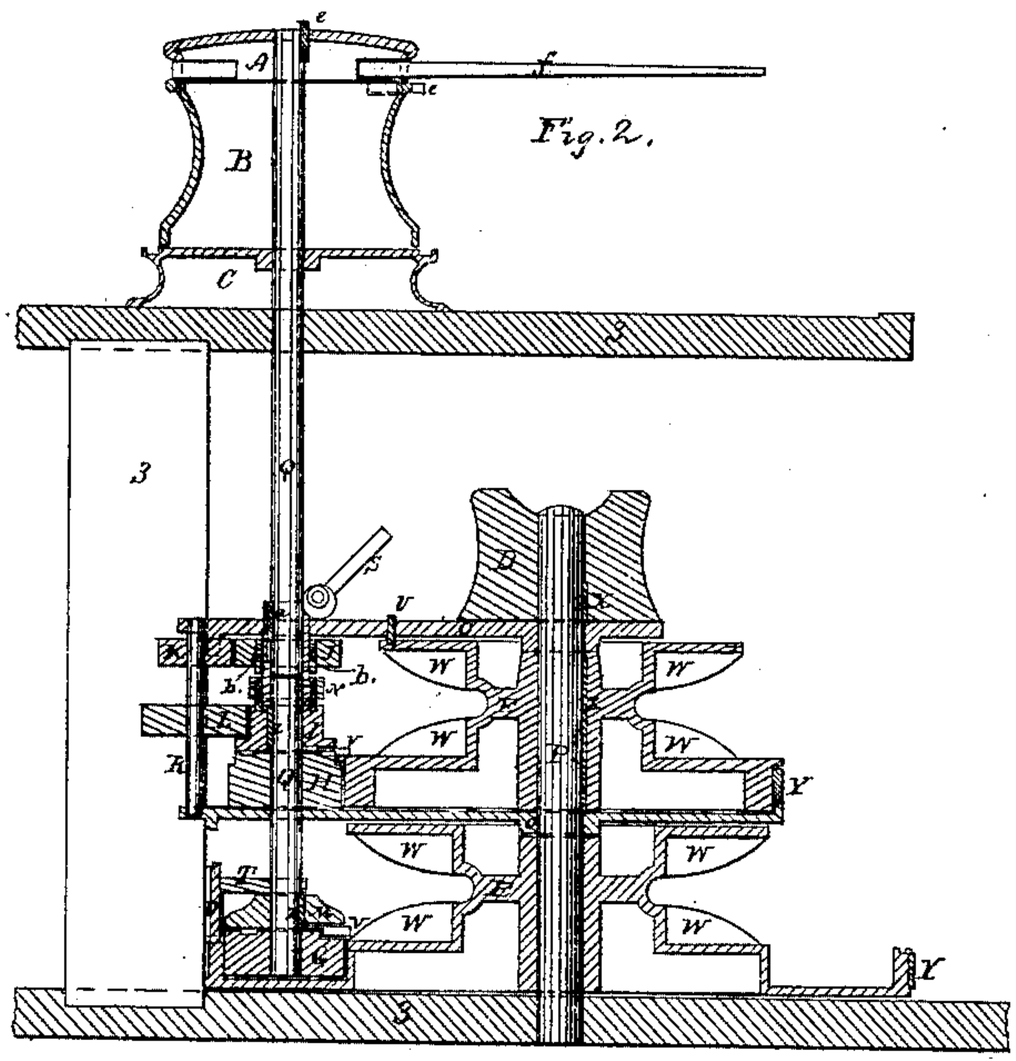


Fig. 2.

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UNITED STATES PATENT OFFICE.

JAMES EMERSON, OF MANCHESTER, NEW HAMPSHIRE, ASSIGNOR TO WILLIAM P. HUNT, OF DORCHESTER, MASSACHUSETTS.

IMPROVED SHIP'S WINDLASS.

Specification forming part of Letters Patent No. **37,194**, dated December 16, 1862.

To all whom it may concern:

Be it known that I, JAMES EMERSON, of Manchester, in the county of Hillsborough and State of New Hampshire, have invented a new and Improved Ship's Windlass; and I do hereby declare the following to be a full, clear, and exact description of the same.

The same letters refer to corresponding parts in all the figures of the drawings accompanying the specification.

The nature of my invention consists in making the windlass in such form that it can be made lighter, stronger, and less liable to get out of order than iron windlasses heretofore made, the form being such that it may be put together at the manufactory.

Figure 1 is a photographic view of the windlass as it stands in the bows of a ship. Fig. 2 is a side view of the windlass split through the center fore and aft, and is a correct working draft on a scale of one inch to the foot. 3 3 3 represent the frame or bows of the ship in which the windlass is placed. Fig. 4 represents the clutch and small gears on a larger scale and plainer than shown in Figs. 1 and 2. Fig. 5 shows the clutch and small gears as arranged and shown in Fig. 1.

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

Commencing with the main shaft P, the lower end of which works in a bearing in the deck of the ship, as shown in Fig. 2, on this shaft is first placed the lower grab E, above that the iron frame O, then the upper grab E, then the top frame O, and above that the head D. This head and the upper grab are secured to the shaft by the keys X X. The lower grab is larger than the upper one, and is loose on the shaft. On the lower part of it, near its greatest circumference, there are teeth cast. These teeth point inward, forming what is called an "internal gear." Between the point of the teeth and the outer end of the horns that hold the chain there is an annular recess the depth of the teeth of the internal gear. In this recess the pinion G works, as shown, Fig. 2. The teeth on the outside of this pinion mesh into the teeth of the internal gear of the grab. Consequently, when the pinion is turned to the right it revolves the grab the same way. The upper grab is about two-thirds the size of the lower one. On its greatest circumference teeth are cast, pointing outward, forming the common external gear. Into this gear the teeth of pinion H work, moving or rotating the grab in a contrary direction to its own, thus turning the upper grab to the left while the lower one is turning to the right, for the purpose of heaving in both chains of a ship at the same time. The pinions G and H are both loose on shaft Q, but are clutched to it, when necessary, by the sliding keys V V, which are secured in the hub M and small gear N, the hub and gear being secured to the shaft Q by the keys Z Z. The bolts or pawls U U drop into ratchets cast near the circumference of the grabs E E, and are to prevent heavy strains on the gears from backlash when heaving in chain; also to hold the grabs while riding at anchor. T is a bearing for the lower end of shaft Q. It also has a vertical recess in which the lower bolt or pawl U works. The frames O are iron, and are to secure the top part of the shaft P. The lower one is cast with a flange on the upper side, the circumference of which is a little greater than that of the upper grab, and it comes up a little over the teeth of the grab. This, with the projecting flange cast on the grab above the teeth, forms a recess for the friction-band Y, as shown in Fig. 2. The forward part of the frames O make a bearing for the shaft R. The grabs are made with an annular grooved recess, with radial flanges for holding the chains, similar to those shown in William P. Green's English patent of 1837. There should be six pairs of flanges in the lower grab to five pairs in the upper, to make up for difference of speed of the two grabs. The grabs are controlled, when paying out chain, by the friction-bands, one end of which is firmly secured to the bit forward of the windlass, while the other end is operated by lever or screw, as may be considered best. The head D is for heavy strains with rope or hawser. The shaft Q is made in two pieces, the lower part of which runs up a few inches into the lower part of the clutch N, in which it fits loosely. On the lower end of this shaft is the pinion-gear G and hub M, for operating the lower grab. Above the lower frame O on this shaft is placed the pinion H, for working the upper grab. Above this pinion is then placed the small gear I, which is secured to the shaft

Q by the key Z. In a hub on the bottom of gear I is secured the sliding clutch or key V, which works or slides into recesses in the top of pinion H, for the purpose of securing the said pinion to the shaft when necessary, as shown in Fig. 2. In the top of gear I there are four recesses to receive the bolts or pawls *b b* in clutch N, which is placed on the upper end of the lower piece of shaft Q, immediately above gear I; then, when the clutch is turned until the pawls *b b* are over the recesses in the gear I, the pawls will drop into them, clutching the lower part of the shaft and clutch together. This clutch is made with a long neck, that runs up through the gear J and top frame O. The gear J is loose on the neck of the clutch, but in it there are two bolts or pawls, *b b*, which drop into recesses in the top of the clutch N, operating precisely as those in clutch N in connection with the gear I. When the clutch N is clutched to the gear I, there is a space between the clutch and under side of gear J, so that the pawls *b b* in the said gear do not act. Raise the clutch up to the bottom of the gear J, and the pawls will clutch the said gear, and the space will be between clutch N and gear I, so as to disconnect them. The upper piece of shaft Q goes up through the forecastle-deck high enough to answer for a capstan-spindle. The lower end of the shaft goes into the clutch N loosely, but is prevented from turning in the same by a long key, on which the clutch N slides up or down. The clutch N is raised or lowered by the cam S, as shown in Fig. 2. The gear J is held in place by the hook *m*. This gear is the driver, and when clutched to the shaft by raising the clutch N it drives the gear K, which drives or turns gear L, gears K and L being both keyed to the shaft R. The gear L drives the gear I, which is keyed to the lower piece of shaft Q. By this combination of gears with the clutch N the lower part of the shaft moves at double the speed of the top part. For light work this is important. Another important advantage is gained by having the shaft Q in two parts, which is that it allows the windlass to be made without regard to height of forecastle-deck—a height difficult to get until the ship is nearly finished. As all or nearly all the work is on the lower shaft, all that is necessary is to make the upper piece of the shaft long enough, then cut it to the length required. Above the forecastle is a common capstan; C, the base, B, the body, and A, the head, which is separate from the body. When desiring to work the windlass, put the key *e* in the top of the head, as shown in Fig. 2. When desiring to use the capstan, put the same key in the side of the head, as shown by dotted lines.

Operation: The starboard-chain is put onto the lower grab, and goes about three-fourths around it, then drops off and runs down into the chain-locker on the port side. The port-chain goes around the upper grab in the same way and goes into the locker on the starboard side. When desiring to heave in chain—for instance, the starboard one—clutch the pinion G to the shaft Q by the sliding clutch V in the hub M, put the pin *e* in the head of the capstan, as shown. If the strain is heavy, clutch the two parts of shaft Q together by lowering the clutch N onto gear I, then heave away. If the strain is light, raise clutch N up against gear J, which will rotate the grab with double speed, and of course with corresponding loss of power. The port-chain is hove in by clutching pinion H to the shaft, as above described, or both may be worked together. When coming to anchor, take up the slack of the friction-bands, raise the pawls U U, then let the anchor go from the "cat-head," and check as required. Be sure that the sliding keys V V are out of the pinions before letting the anchor go. When riding, put the pawls U U into the ratchets of the grabs; at the same time nipper firmly with the friction-bands.

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

1. Placing the two grabs E E on one vertical shaft and causing them to revolve in reverse directions, for the purpose of heaving in the two chains of a ship at the same time, substantially as described.

2. The arrangement of the small gears I J K L and the clutch N, in connection with the two chain-grabs on the vertical shaft P, for the purpose described, when arranged substantially as described.

3. The separation of the shaft Q, thus making it in two pieces, in order to allow nearly all of the working parts to be secured to the lower piece, for the purpose named, and substantially as described.

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Witnesses:
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