D. Knowlton,

Canstan.

№ 17,971. Patented Aug. 11, 1857.

Fig. 1.

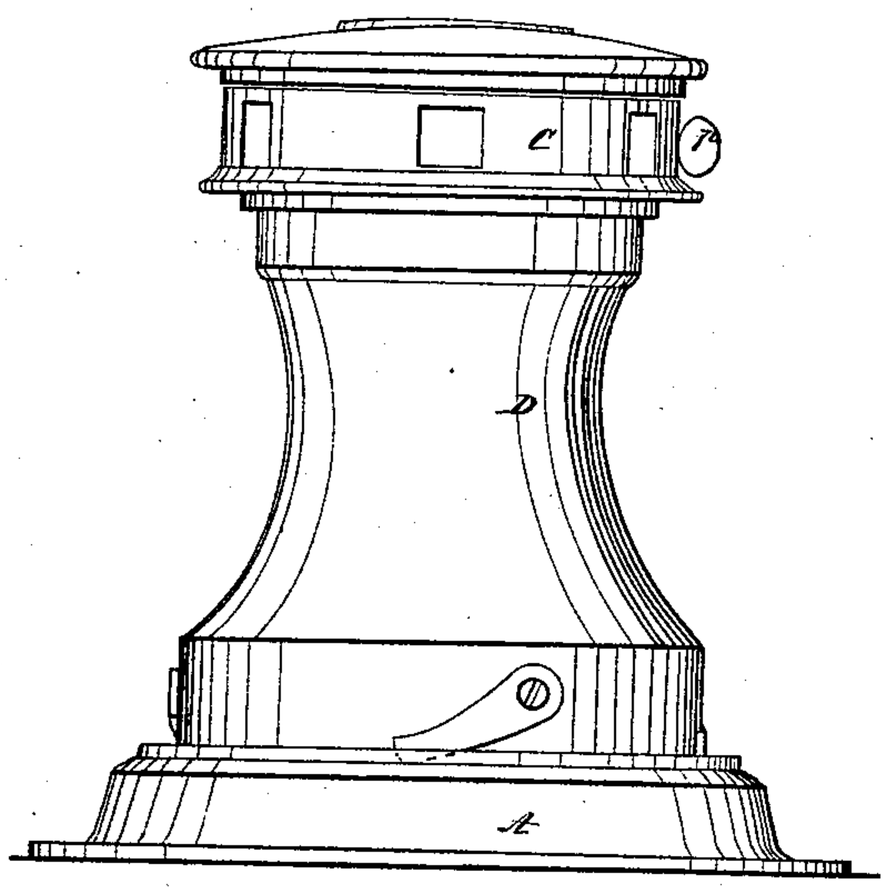


Fig. 2.

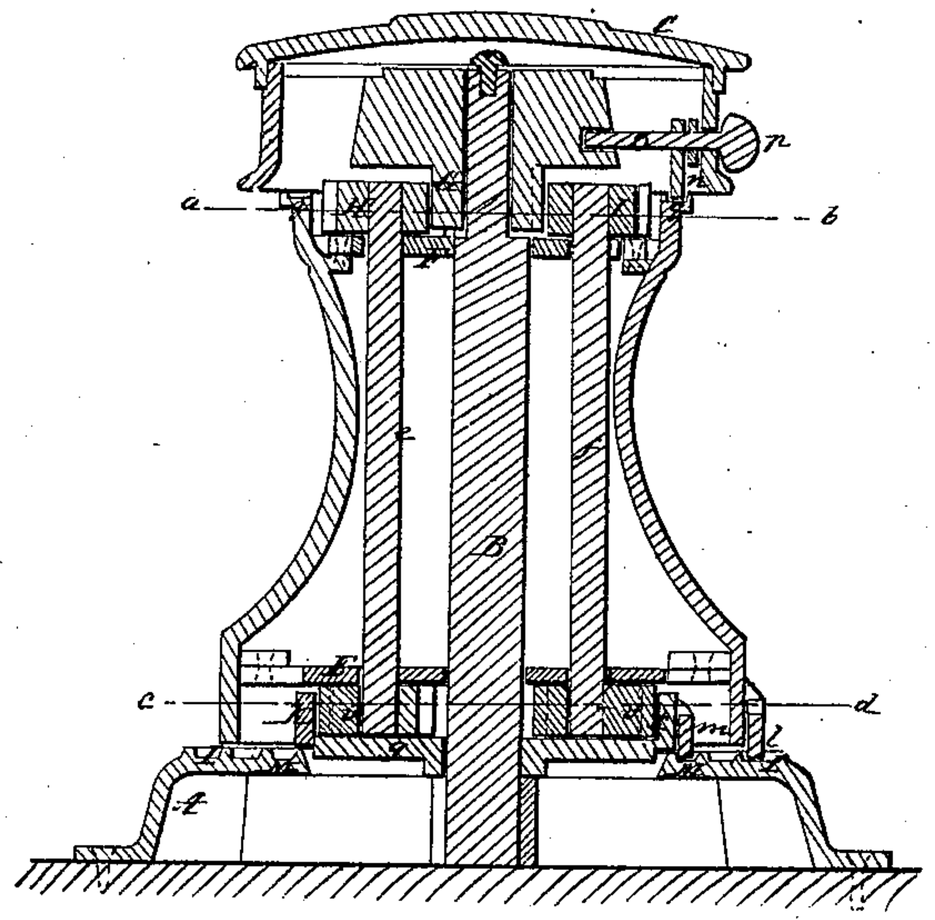


Fig. 3.

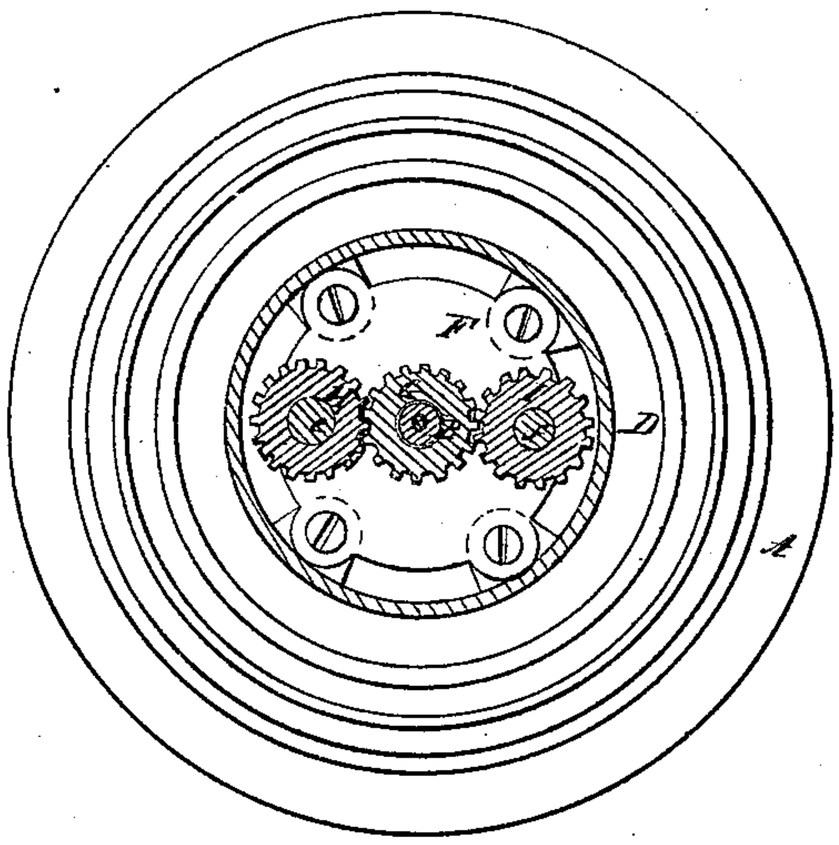
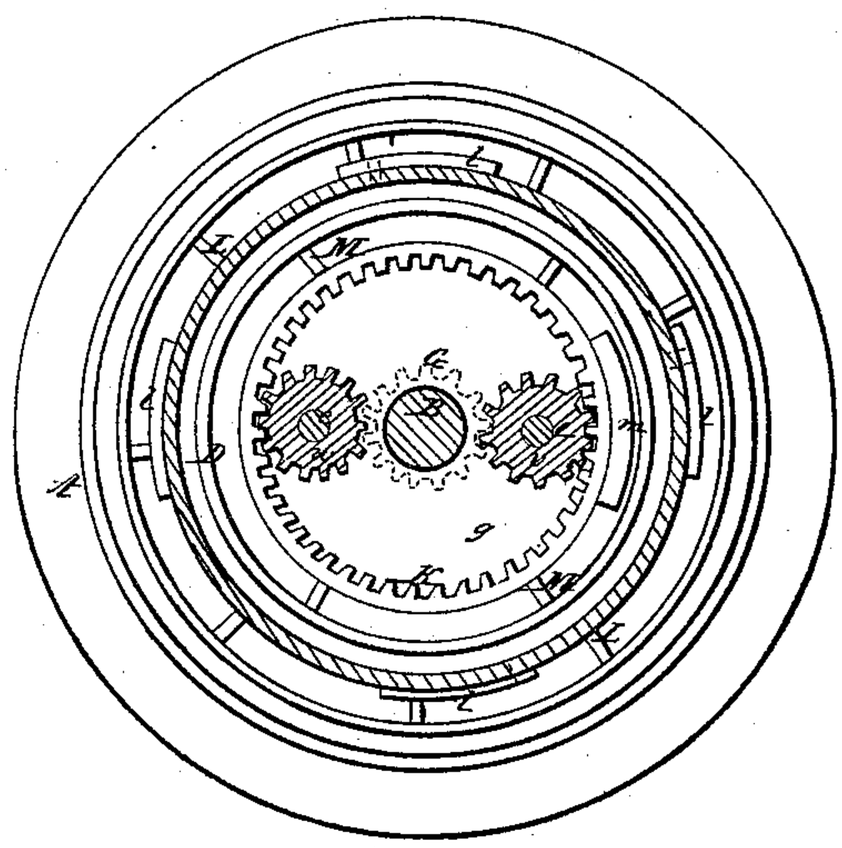


Fig. 4.



UNITED STATES PATENT OFFICE.

DAVID KNOWLTON, OF CAMDEN, MAINE.

SHIP'S CAPSTAN.

Specification of Letters Patent No. 17,971, dated August 11, 1857.

To all whom it may concern:

Be it known that I, DAVID KNOWLTON, of Camden, in the county of Waldo and State of Maine, have invented an Improved Capstan for the Use of Vessels; and I do hereby declare that the following description and the accompanying drawings fully describe the nature and operation of said capstan.

Figure 1, of the drawings represents a side elevation of a capstan having my improvement applied to it. Fig. 2, is a vertical, central and longitudinal section of it. Fig. 3, denotes a horizontal section taken on the line *a b*, of Fig. 2, and Fig. 4 a horizontal section taken on the line *c d*, of said Fig. 2.

A, in the drawings denotes the bottom plate, or base of the capstan, which is to be screwed down or properly fastened to the deck of the vessel.

B is a vertical shaft, fastened firmly into and rising from the center of the base A.

C, is the capstan head, made so as to rotate freely upon the top of the spindle B, and D, the barrel or case of the capstan.

Across the lower interior part of the barrel D, a bearing plate or "spider" E, extends, said plate being firmly fastened to the side of the barrel, and allowing the main spindle B, to pass loosely through it. Another and similar bearing plate F, extends across the upper part of the barrel, the spindle also extending loosely through said plate.

Attached to the under part of the capstan head or forming a part of it, is a pinion wheel G, whose teeth mesh into the teeth of two other and similar pinions H, I, placed on opposite sides of it, as seen in Figs. 2 and 3. These two gear pinions are fixed on the tops of two rotating shafts, *e*, *f*, running through the bearing plates E, F. On the bottoms of the shafts *e*, *f*, and just under the plate E, two other and similar gear pinions *u*, *v*, are fixed as seen in said Figs. 2 and 3. These two pinions mesh into the teeth of an internal gear K, rising from a plate *g*, made to turn freely on the spindle B.

L is a ratchet formed around the top of the capstan base A, suitable pawls, *l*, *l*, being fixed to the outside of the barrel, to work into said ratchet. Just outside of the internal gear ring *x*, and concentric thereto another ratchet M, is made on the base A, a pawl *m*, on the ring *x*, tripping at proper times into, or passing over the teeth of said ratchet. Another pawl *n*, turns on a shaft *o*, passing through one side of the capstan head C, said shaft having a turning head *p*, to turn said catch or pawl up from or down into a ratchet or stop notches *q*, *q*, on the top of the capstan body D.

My capstan is intended to be used as a "simple" capstan or as a "power" capstan, at pleasure, that is to say, it may be used where only a light power is to be exerted, or where a great force of power is necessary, or by the arrangement of gears, a very small force of men may perform the work of a much larger number, a longer time only, being necessary, for said performance.

The operation of the capstan is as follows. When we wish to use the capstan as a "power" capstan, the pawl *n*, is lifted (by its head *p*,) from contact with the top of the barrel (and power being applied to hand spikes inserted into the sockets *s*) the head C, is rotated. As the head turns its gear a pinion G rotates, such movement causing the rotation in an opposite direction, of the gears H, I, their shafts *e*, *f*, and the gear pinions *u*, *v*. As the pinions *u*, *v*, rotate, they mesh into the teeth of the internal gear K, causing it also to have a tendency in the same direction, but this it cannot do, as the pawl *n*, is caught or bears against one of the teeth of its ratchet M, and the consequence is that the gears *u*, *v*, themselves revolve around the shaft B, and carry the barrel with them, in the same direction in which the power is produced, or the head C turned.

The barrel D performs revolutions in proportion in number to those of the head C, in ratio as the gears *u v* and G, are proportioned in diameter to the diameter of the gear K; that is to say, if, as in this case, the diameter of the gear K, is about four times the diameter of the gears *u*, *v*, G, the barrel performs one revolution to four that the head performs. Now if we wish to use the capstan as a "simple" capstan, we have only to trip the pawl *p*, down into one of the notches on the top of the capstan barrel, and when we then turn the barrel head in the same direction as before, the head and barrel both turn together, and with the same speed, and the effect and operation is the same as with the common capstan. While so operating the gear work

will be situated as follows. The gears H, I, the shafts, *e*, *f*, and the gears *u v*, are all stationary as regards each other, (moving around the spindle B, as before) but the gear K, instead of being held fixed as before, is caused to revolve with and by said gears *u*, *v*. That is to say, the effect is the same as if all the parts were solid or cast together and moving around the center spindle B. This is an improvement which I believe has never been effected before, at least without displacement of some one or more of the gears, namely, to have the gear work of a power capstan, (when used as a simple capstan) entirely inoperative or stationary, with the exception of the revolution of the whole around the center shaft.

In the capstan of D. and G. Talcott patented March 4, 1856, (in which capstan much more machinery is used than in mine,) there is a combination of gears, similar to the combination used by me, the effect being also similar (though not so simple,) when the capstan is used as a power capstan, but when it is used as a simple capstan, the effect is different, and not so advantageous for this reason. The internal gear of said capstan is made stationary, and the upper central pinion revolves loosely on a shaft, so that when the barrel and head are rotated together for a simple capstan, all the gears have to rotate on their shafts, and a proportionate power has to be laid out to rotate them. By my method of making the upper gear fast to the head, and the lower internal gear loose, they all turn together, and without rotation on their shafts, all as before described.

I would remark that it is not necessary to use two opposite sets of gears and shafts, as described, as one set placed on one side of the main spindle will answer, but as it adds to the strength of the capstan, I generally prefer to use both sets.

My capstan, made as above described, is simple in its operation, not liable to get out of order, easily taken apart, very strong and very effective; by loosening a screw *r*, and removing the washer *s*, the head and barrel can be easily slipped from the spindle B, and as easily replaced. In some capstans, the main spindle is made to rotate, but with such, too much strain is produced on the spindle, and it is constantly liable to become loose or get out of order. By making my shaft first, and extending it up through the head of the capstan, I can make a capstan, which will bear a very great strain without injury.

I do not claim making a power capstan to operate by means of a combination of gears, ratchets, and pawls, but—

What I claim in my improved capstan, is—

The combination of the gear K, at the bottom of the capstan (when made and applied so as to be rotated or be made fast alternately as described,) with the gear or pinion G, attached to and revolving with the capstan head C, they being connected by gears and operating in manner and for the purpose as described.

In testimony whereof, I have hereto set my signature, this fifth day of January A. D. 1857.

DAVID KNOWLTON.

Witnesses:
A. D. TYLER,
HIRAM BASS.