F. ALLEN & F. A. GRATER.

CAPSTAN.

No. 351,241. Patented Oct. 19, 1886.

Fig. 1.

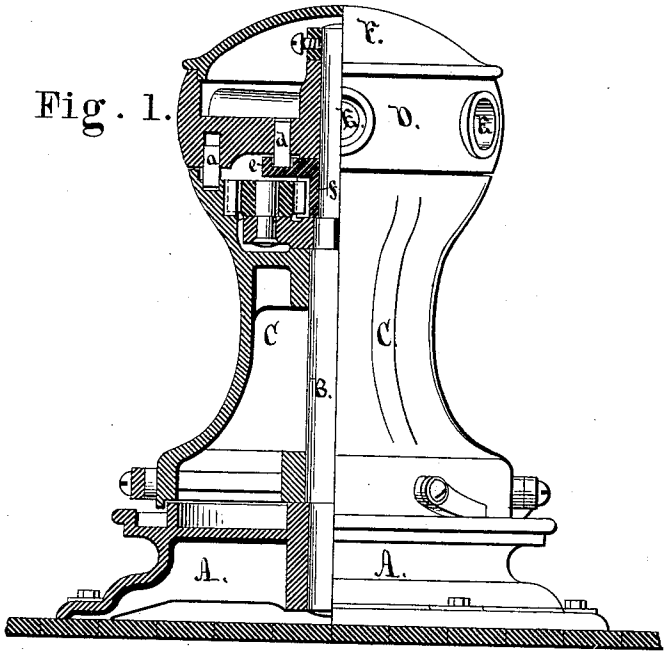


Fig. 2.

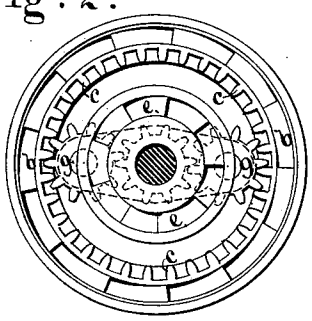


Fig. 3.

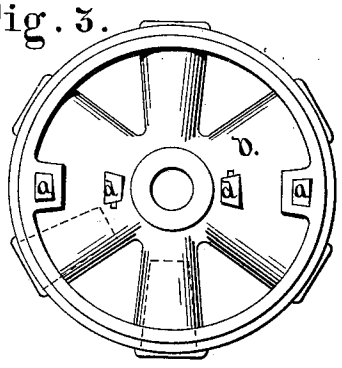


Fig. 4.



Fig. 5.

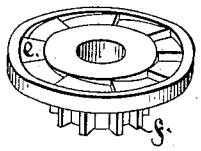
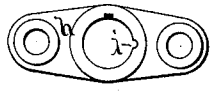


Fig. 6.



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UNITED STATES PATENT OFFICE.

FRANK ALLEN AND FRANK A. GRATER, OF PROVIDENCE, R. I., ASSIGNORS TO THE AMERICAN SHIP WINDLASS COMPANY, OF SAME PLACE.

CAPSTAN.

SPECIFICATION forming part of Letters Patent No. 351,241, dated October 19, 1886.

Application filed December 31, 1879.

To all whom it may concern:

Be it known that we, FRANK ALLEN and FRANK A. GRATER, both of the city and county of Providence, State of Rhode Island, have invented a new and useful Improvement in Capstans; and we hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to geared or power capstans, in which the capstan-barrel is driven either directly or through a compound gear by turning the capstan-head with the capstan-bars; and it consists in the peculiar arrangement of pawls and ratchets with the capstan-head, the capstan-barrel, and the compound gears, so that when the capstan-head is turning in one direction the barrel will turn with the capstan-head in the same direction, and when the capstan-head is turned in the opposite direction then the capstan-barrel will continue in the first direction with less speed, but with greater power, all of which will be more fully set forth hereinafter.

Figure 1 is a side elevation, partly in central vertical cross-section, of our improved capstan. Fig. 2 is a top plan view with the head removed, showing the upper end of the capstan-barrel, as also the compound gear. Fig. 3 is a bottom plan view of the capstan-head, showing the pawls secured in the same. Fig. 4 is a perspective view of one of the pawls. Fig. 5 is a perspective view of the central pinion provided with the ratchet-wheel, and Fig. 6 is a view of the bracket in which the idle-gears are supported.

The capstan on board of a ship has to be used for various purposes, in some of which it is important to exert the greatest possible power, while in others a rapid revolution of the barrel is required. If the anchor is to be hoisted, the slack of the chain must first be hauled in, and this should be done as quickly as possible; but when the anchor itself is reached and must be drawn from the earth a much greater power is required. To facilitate these operations various devices have heretofore been used, the most usual being a compound gear, in which a disk carrying idle-gears is arranged so as to be locked and unlocked, and thus the power increased. In all such devices locking blocks or keys had to be used. In stormy cold weather and a rough sea the locking and unlocking is an operation requiring strength and judgment, and in winter the blocks or keys, or the holes into which they are to be inserted, are liable to obstruction by ice. To avoid all this and to construct a capstan that can be operated either at a slow or fast speed with ordinary or increased power, and instantly changed from one to the other, as well as to protect all parts against rain, frost, and the waves, is the object of this invention.

In the drawings, A is the base of the capstan.

B is the central spindle, firmly secured to the base.

C is the capstan-barrel, provided with two bearings on the spindle B, around which it revolves.

D is the capstan-head, provided with the capstan-bar sockets E, the whole being covered with the cap F, made to fit tight on the capstan-head and protect the interior against rain and spray.

a a are two pawls fitting loosely into recesses made in the capstan-head. These pawls are solid square blocks, one end of which is beveled. They fit sufficiently loose into the recesses, and rest on the ratchet-gear *b* of the capstan-barrel, so that when the capstan-head is turning to the right, or with the sun, the pawls will engage with and rest against the square shoulders of the ratchet-teeth and will turn the barrel, while when the capstan-head is turning in the opposite direction the pawls *a a* will slide over the teeth, being raised by the beveled surface of the same. The capstan-barrel is also provided with the toothed rim *c*, so that the barrel may be driven by gears with increased power, and for that purpose the capstan-head is provided with another set of pawls, *d d*, near the center. These pawls are made and operate in the same manner as the pawls *a a;* but the pawls *d d* are beveled in the opposite direction from the pawls *a a*, and are placed so as to engage with the ratchet-gear *e*, forming part of the central pinion, *f*, so that when the capstan-head is turned to the left, or in the direction opposite to the direction in

which the sun moves, then the pawls *d d* will engage with the ratchet-wheel *e* and turn the same, and also the pinion *f*, which, through the idle or intermediate gears, *g g*, gearing into the pinion *f*, and into the toothed rim on the capstan-barrel, transmits the motion to the capstan-barrel, and thus turns the same in the same direction as before, but with diminished speed. The idle-gears *g g* are supported on the bracket *h*, which is firmly keyed to the spindle B.

All the parts are strong and simple in construction. The bearings of the barrel on the spindle are at and near the lower end of the spindle and on a line with the lateral strain. Great structural strength is thus secured. The several parts can be readily removed for cleaning and repairs, and all the bearings properly oiled by removing the cap F. The parts bearing against the spindle B are provided with oil-passages *i*, as shown in Fig. 6, so that when oil is poured on the upper end of the spindle B the same will pass gradually from one bearing to the other, thus lubricating all the bearings on the spindle B. In our improved capstan neither keys, blocks, nor locking-gears are required. It can be instantly converted from a simple capstan to a power-capstan without changing the direction of the capstan-barrel. When the capstan-bars are manned and it is found that the power exerted when moving the barrel directly is inadequate, by simply changing the direction in which the men move, the power exerted is increased threefold, and the capstan may be arranged so that the power is increased more or less than threefold by substituting a gear, *f*, of greater or less diameter than the one shown in the drawings.

The facility of instantly increasing the power without the loss of an instant of time is of great importance on board a ship, the safety of which frequently depends on the instant exertion of power in the capstan greater than the normal power.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

The base A and the spindle B, secured thereto, in combination with the barrel C, having the ratchet-gears *b e*, the toothed rim *c*, and the central pinion, *f*, and bearings on said spindle, and the recessed head D, having the sockets E, the pawls *a*, fitting into said recesses, the oppositely-disposed pawls *d*, engaging the ratchet *e*, the idle-gears *g*, gearing into the pinion *f*, and the cap F, as and for the purposes stated.

FRANK ALLEN.
FRANK A. GRATER.

Witnesses:
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