2 Sheets—Sheet 1.

W. J. ALRICH.

CAPSTAN.

No. 182,740. Patented Oct. 3, 1876.

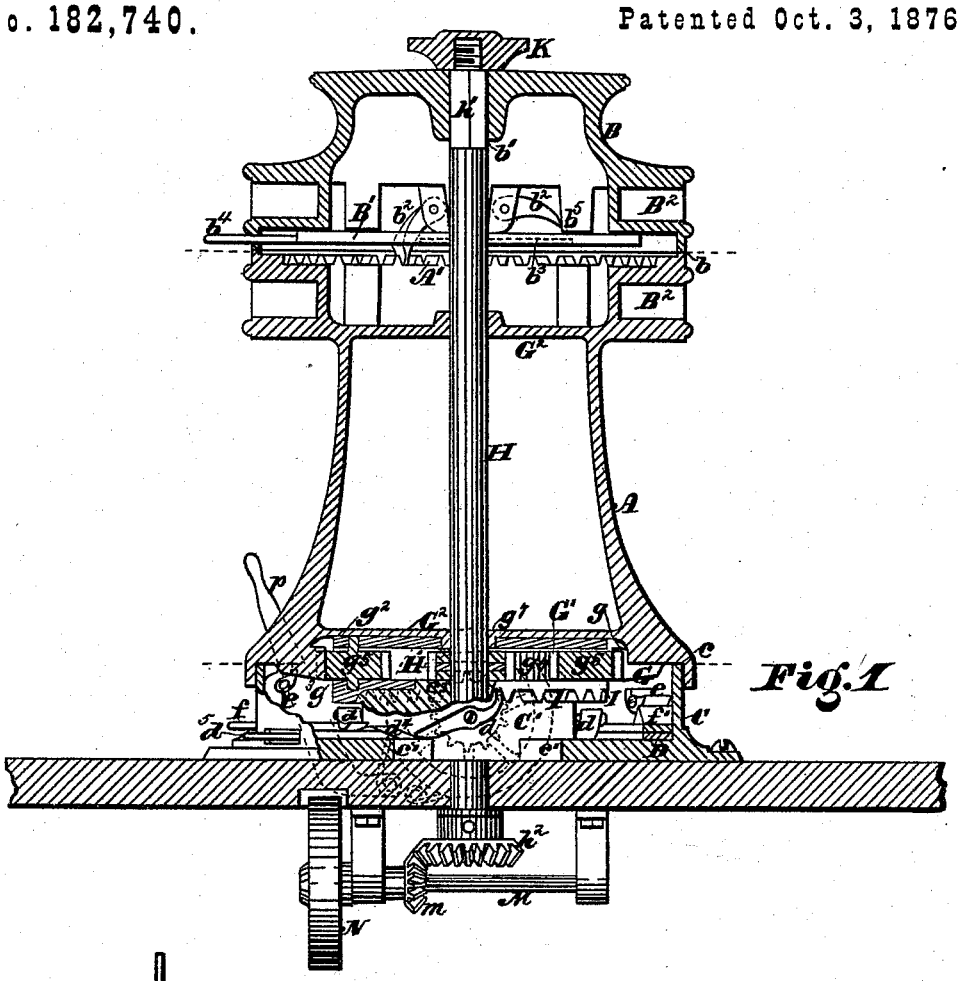

Fig. 1

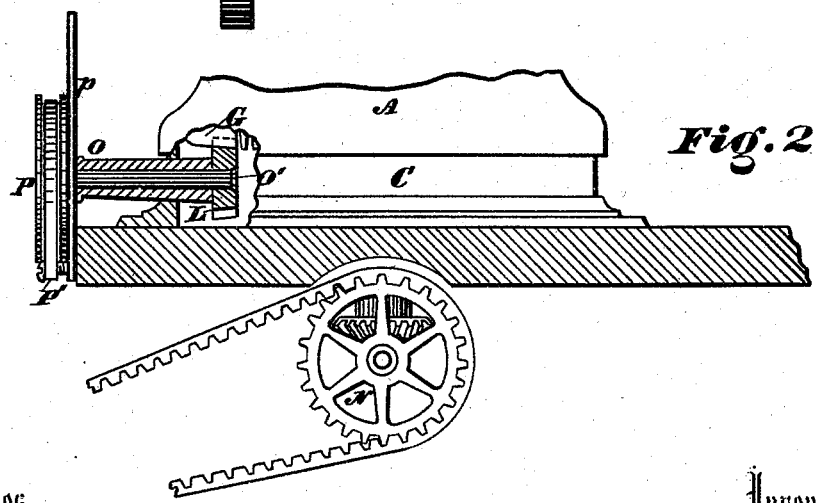

Fig. 2

Witnesses

Saml. J. Van Pelt
Jos. B. Connolly

Inventor

William J. Alrich,
By Connolly Bros, Attorneys

2 Sheets—Sheet 2.

W. J. ALRICH.

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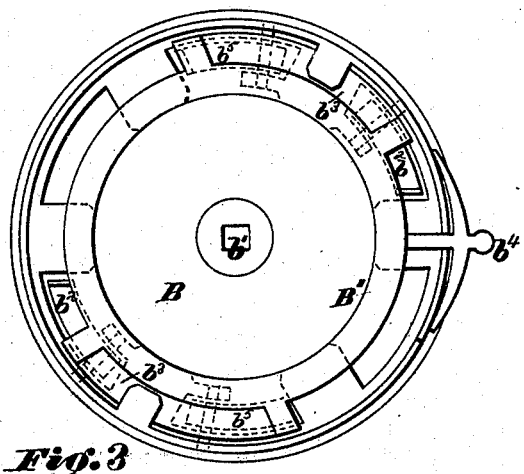

Fig. 3

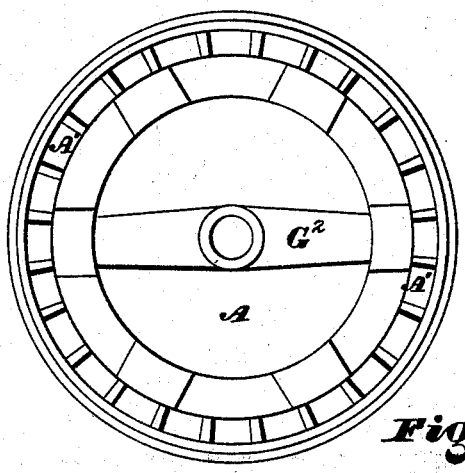

Fig. 4

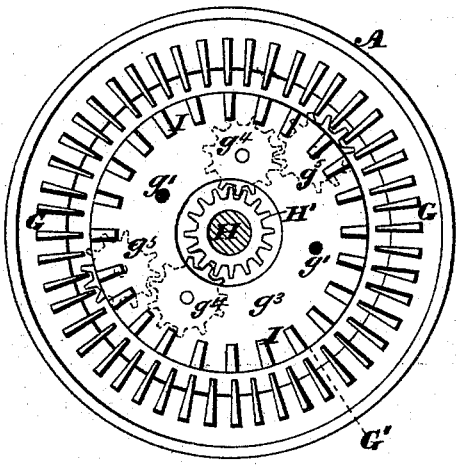

Fig. 5

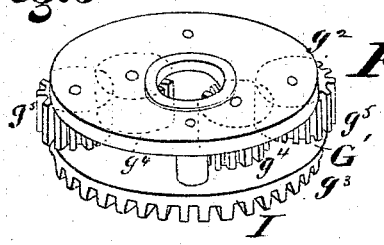

Fig. 7

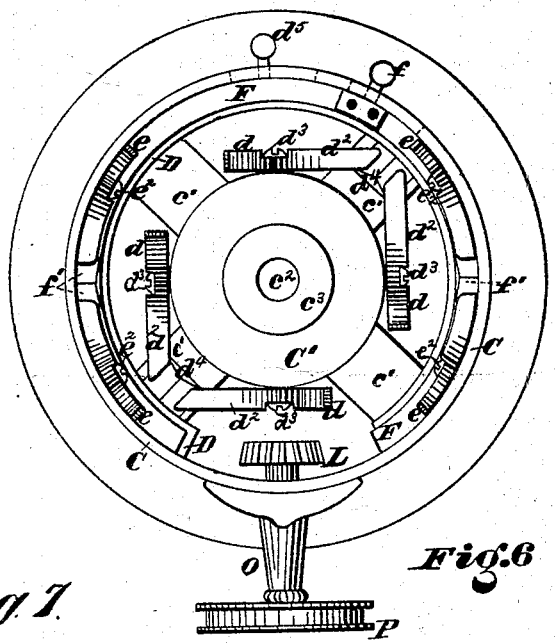

Fig. 6

Witnesses

Jos. P. Connolly

Saml. J. Van Hoevenberg

Inventor

William J. Alrich

By Connolly Bros., Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM J. ALRICH, OF ELKTON, MARYLAND.

IMPROVEMENT IN CAPSTANS.

Specification forming part of Letters Patent No. **182,740**, dated October 3, 1876; application filed July 11, 1876.

To all whom it may concern:

Be it known that I, WM. J. ALRICH, of Elkton, in the county of Cecil and State of Maryland, have invented certain new and useful Improvements in Capstans; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a transverse vertical section of my invention. Fig. 2 is a broken elevation partly in section. Fig. 3 is an inverted plan of the upper section of the capstan. Fig. 4 is a plan of the main section of the capstan. Fig. 5 is an inverted plan of the main section of the capstan. Fig. 6 is a plan of the base, the sections of the capstan being removed, showing the pawls and shifting-rings. Fig. 7 is a perspective view of a detached portion of the capstan mechanism.

The object of my invention is to provide a double-turreted capstan, the turrets or sections thereof being constructed and arranged to produce simple, separate, and compound motions.

My improvement consists in the peculiar construction and combination of parts, as hereinafter more fully set forth.

Referring to the accompanying drawing, A represents the main capstan, and B another capstan, turreted and revolving upon the capstan A, the faces of their flanges meeting, as shown. The main capstan A, upon which the capstan B is sustained, is supported and revolves upon the flange *c* of the annular block C, which is secured to the deck of a vessel, as shown.

c^1 c^1 c^1 c^1 are arms which connect the block C with a central hub, C′, having the aperture c^2 and projecting ring c^3. *d d d d* are gravity-pawls pivoted to the hub C′ at d^3 d^3 d^3 d^3. D is a ring which rests upon the arms c^1 c^1 c^1 c^1, having the knob d^5, which forms a handle for shifting said ring, and being also provided with the double-faced inclined blocks d^4 d^4, upon which the weighted ends d^2 d^2 of the pawls *d d* rest, as shown.

The ring D being actuated, by pushing the knob d^5, which projects through a slot in the block C, either to the right or to the left, depresses two of the pawls *d d*, while the others are elevated by reason of their weighted ends d^2 d^2 falling down the inclined faces of the cams d^4 d^4 as the latter recede.

e e e e are pawls similar in construction to those already described, and pivoted to the annular block C at e^2 e^2 e^2 e^2. F is another ring resting on the ring D, or it may be separated therefrom by means of a projecting flange extending from the block C. This ring F is provided with a knob or pusher, *f*, which projects through a slot in the block C, and inclined blocks *f′ f′*, which depress the pawls *e e e e* in the same manner as the ring D does the pawls *d d*.

The lower face of the capstan A is provided with a circular rack, G, the teeth of which project from and extend up the sides of the capstan A, as shown at *g*. Into this rack the pawls *e e* mesh and determine the direction of the revolution of the capstan.

G^1 is a wheel composed of two plates, g^2 and g^3, united by posts g^1, between which revolve the idle-wheels g^4 g^5, which engage with the teeth of the rack G. I is another circular rack formed on the under side of the plate g^3, into which the pawls *d d d d* mesh, controlling the directing of the revolution of the wheel G^1 about the shaft H.

The plate g^3 has a central opening for receiving the annular shoulder c^3 on the hub C′, said plate resting upon the latter so as to obtain a broad bearing. A similar opening in the plate g^2 receives the hub g^7 on the cross-piece G^2 attached to the capstan A, for the same purpose.

H is a shaft, having the square neck h^1 near its upper extremity. Said shaft passes through the bearings G^2 G^2 in the capstan A, and, if desired, through the deck of the vessel, and is connected to the gear-wheel h^2 for purposes hereafter described.

H′ is a gear-wheel firmly secured to the shaft H, and meshing with the followers g^4. The capstan B is formed with a central square opening, b^1, which receives the square neck h^1 of the shaft H, and revolves with said shaft.

b^2 b^2 are pawls pivoted, as shown, within the capstan B, and meshing with the teeth A′ formed on the upper face of the capstan A,

thus controlling the direction of the revolution of the capstan B when moved independently of the capstan A.

The pawls b^2 b^2 are operated by means of the ring B^1, having the knob b^4 and flanges b^3 b^3, upon which the pawls rest when they are raised from the rack A′. By pushing the knob b^4 to the right or to the left, the flanges b^3 b^3 are drawn from under two of said pawls, allowing them to drop and mesh with the teeth A′ at the same time the remaining two pawls b^2 b^2 are caused to slide up on said flanges, and are held in position, as shown at b^5.

B^2 B^2 are apertures for receiving the capstan-bars, and K is a nut on the end of the shaft H, for holding the capstans in position.

Operation: When the knobs b^4, d^5, and f are pushed over to the extreme left of the slots through which they project, as shown in Fig. 1, and the bars be then inserted in the apertures in the capstan A, both the latter and the capstan B will be moved together from left to right; or, if the latter be held, the former may be moved in said direction by itself. If the bars be inserted in the capstan B it may be moved to the left independently of the capstan A, which can then be moved to the right, if desired. If power be applied to the capstan A, its revolution will be from left to right, and this movement, being communicated to the followers g^4 g^5, revolves the shaft H; but the wheel G^1, being locked by the pawls d d, the capstan A carries the said wheel and shaft H with it, the latter, in turn, carrying the capstan B by reason of it being fastened to the square shoulder h^1. This motion of both capstans revolving in the same direction at the same time I call simple motion. If power be now applied to the capstan B, and the latter revolved from left to right, it carries with it the capstan A by reason of the pawls b^2 b^2 engaging with the rack A′; but if revolved in the opposite direction it moves independently of the capstan A, the pawls b^2 b^2 sliding over the teeth of the rack A′, and not engaging with them. The capstan A cannot move with the capstan B in this direction, as it is locked by the pawls e e, as above described, which prevent it from moving from right to left, and the capstan B moves alone. If now the knob b^4 be shifted to the right to its limit of motion, the other knobs remaining to the left, and power be applied to the capstan B, a compound motion is produced, the capstan B revolving to the right four revolutions to one of the capstan A. This compound motion is produced by reason of both capstans revolving in the same direction—that of the former revolving with the shaft A, while motion to the capstan A is communicated from the wheel H′ on the shaft H, and thence through the followers g^4 g^5 to the rack G, causing the capstan A to revolve more slowly in the proportion of the number of teeth in the rack G to those of the followers g^4 g^5 and wheel H′. By further shifting the knobs b^4, d^5, and f as follows these resulting motions are produced: If b^4 and f are shifted to the right and d^5 to the left, the capstans are locked and cannot revolve in any direction. If b^4, d^5, and f are shifted to the right, and power applied to the capstan A, it will revolve from right to left singly or carrying loosely therewith the capstan B. If power be applied to the capstan B, it will revolve either from right to left conjointly with A or from left to right independently of the capstan A. If f is shifted to the left, and d^5 and b^4 remain to the right, a compound motion of the capstans A and B from left to right is obtained if power is applied to capstan A. If applied to capstan B, it alone will revolve from left to right.

If steam be used to operate the capstan, it may be applied by means of the beveled gear m on the shaft M working into the gear-wheel h^2 on the end of the shaft H. N is a pulley on the end of the shaft M, which is connected by a belt to a pulley on the main shaft of the engine from which power is obtained. Instead of using a belt, a cog-chain, as shown in Fig. 2, may be used.

O is a brake designed to be used when the capstans are operated by steam-power. It consists of a shaft, O′, properly mounted in the journal-bearing, which is attached to the block C, as shown. On its extremities are secured the spur-wheel L, which meshes with the rack G on the capstan A, and also the grooved wheel P, in which groove a friction-brake, P′, is applied by means of the lever p.

What I claim as my invention is—

1. In combination with the capstan A and shaft H, the latter having a pinion, H′, the wheel G^1, holding idlers g^4 g^5, substantially as shown and described.

2. In combination with the body A, having the annular rack G and the base C sustaining the pawls e e e e, the sliding ring F, having the beveled blocks f' and knob or handle f, substantially as shown and described.

3. In combination with the hub C′ and pawls d d d d sustained thereon, the sliding ring D, having double inclined blocks d^4 and actuating handle d^5, said pawls being arranged to engage with the teeth I on the under side of the wheel G^1, substantially as and for the purpose set forth.

4. In combination with the body A, having an annular rack, A′, and the capstan B sustaining pawls b^2 b^2, the sliding ring B^1, for permitting and preventing the engagement of said pawls and rack, so as to govern the relative motions of the said sections A and B, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 21st day of June, 1876.

WILLIAM J. ALRICH.

Witnesses:

SAML. J. VAN STAVOREN,

GEO. C. SHELMERDINE.