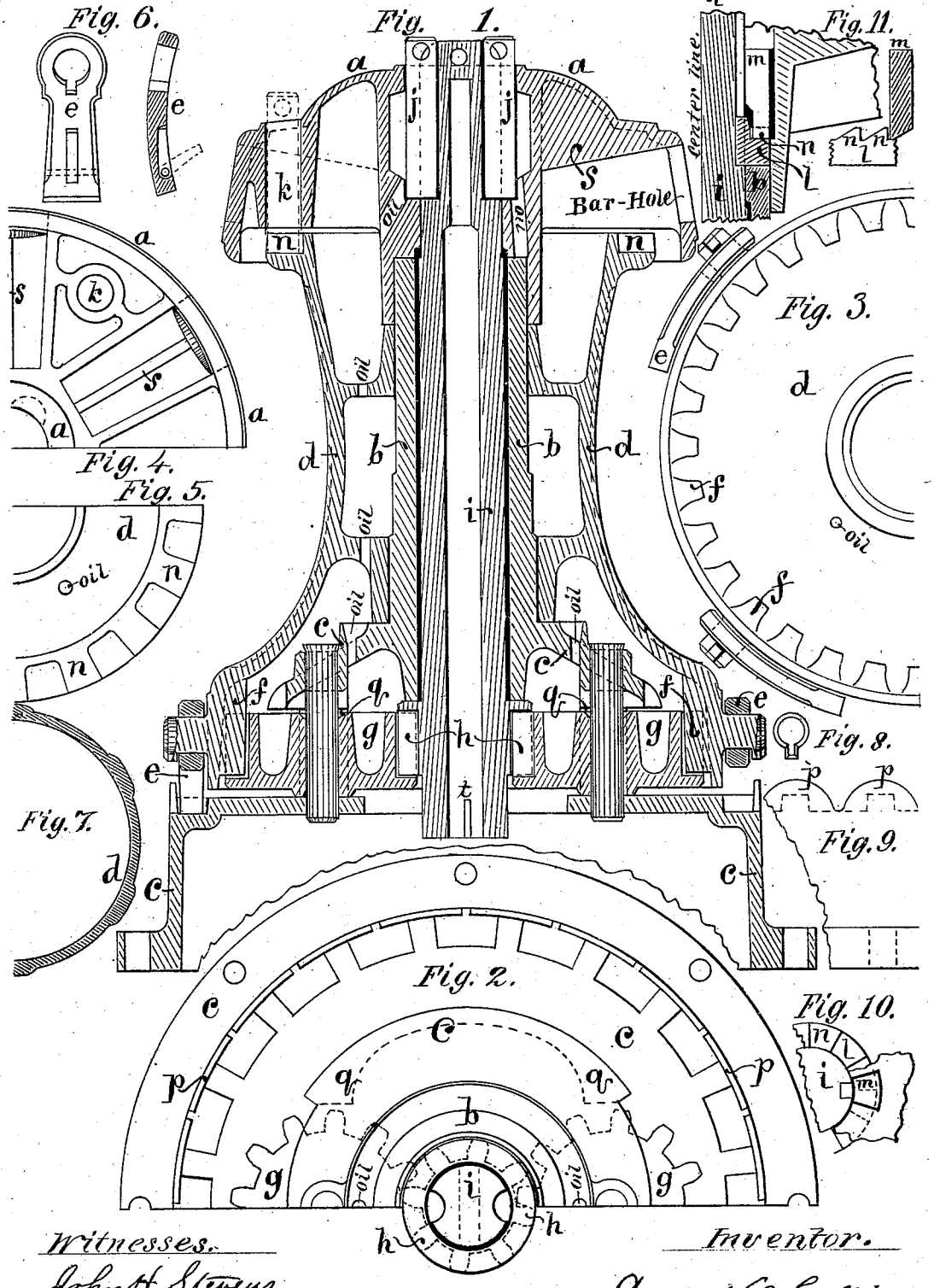
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CAPSTAN.

No. 261,530. Patented July 25, 1882.



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(No Model.) 4 Sheets—Sheet 2.

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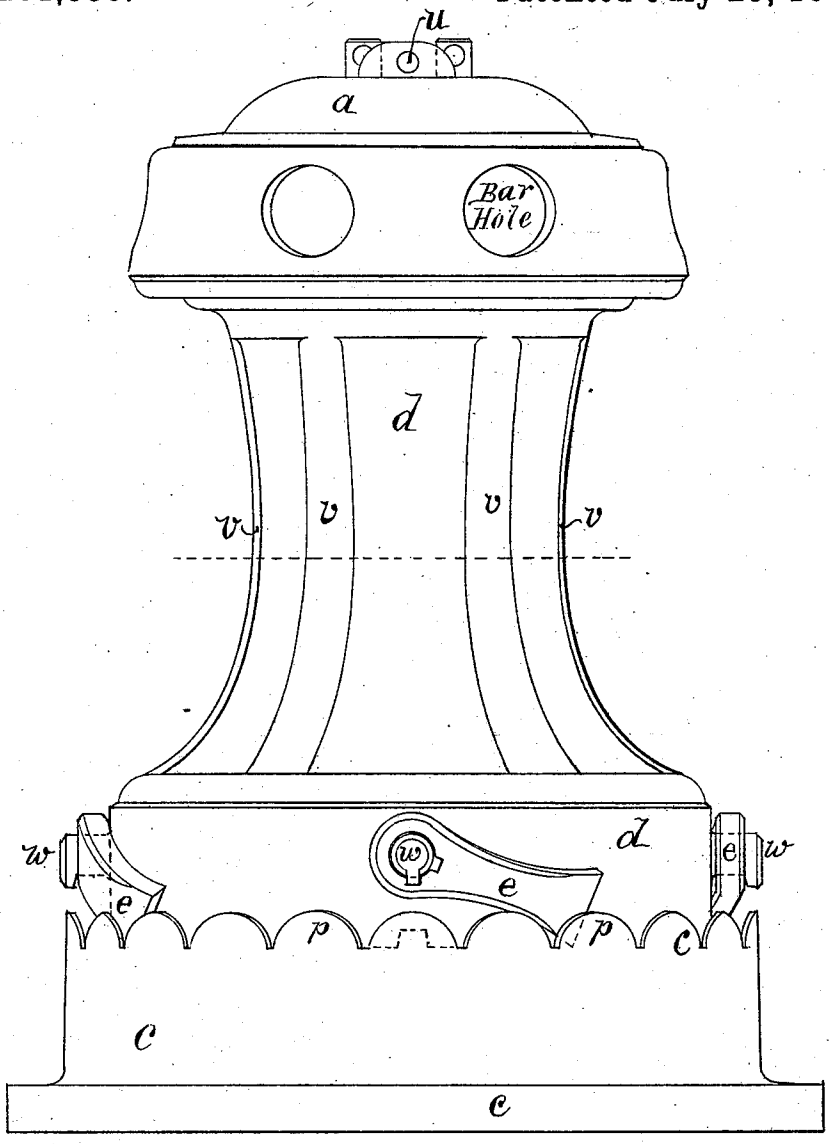


Fig. 12.

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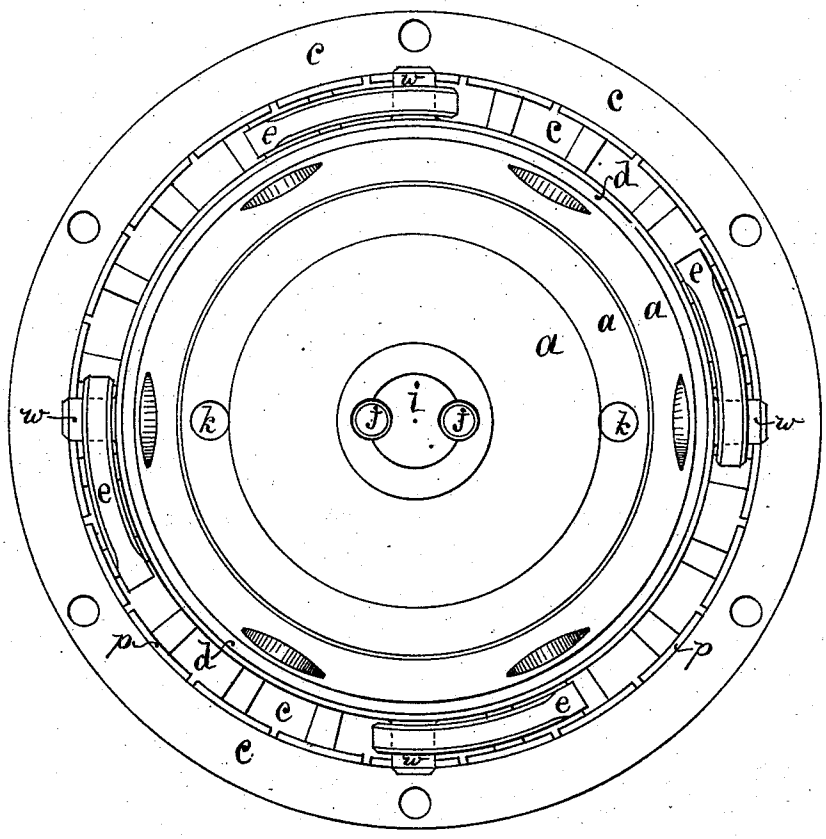


Fig. 13.

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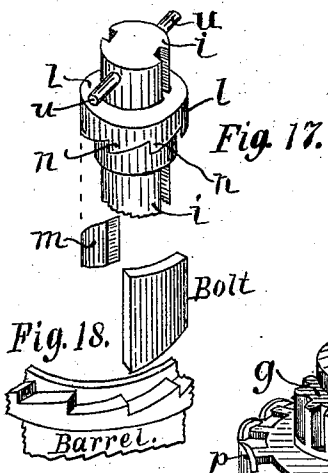


Fig. 17.

Fig. 18.

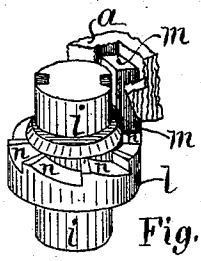


Fig. 16.

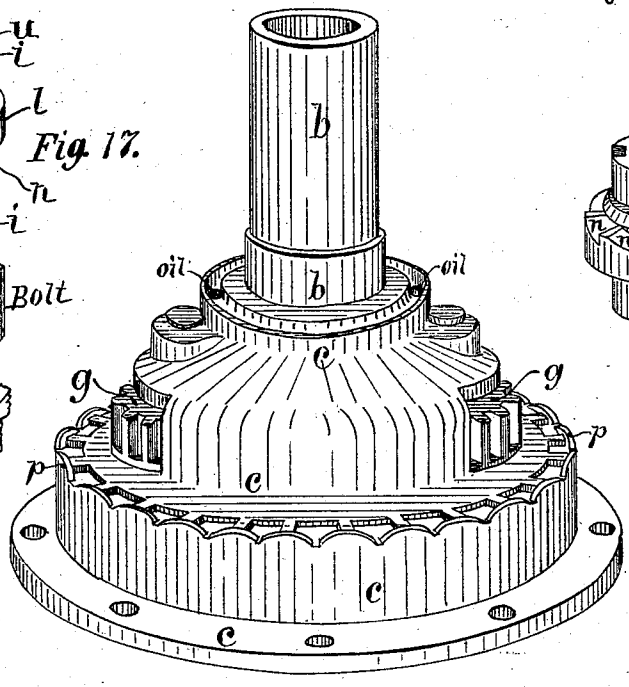


Fig. 14.

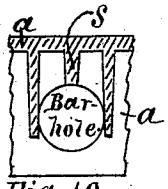


Fig. 19.

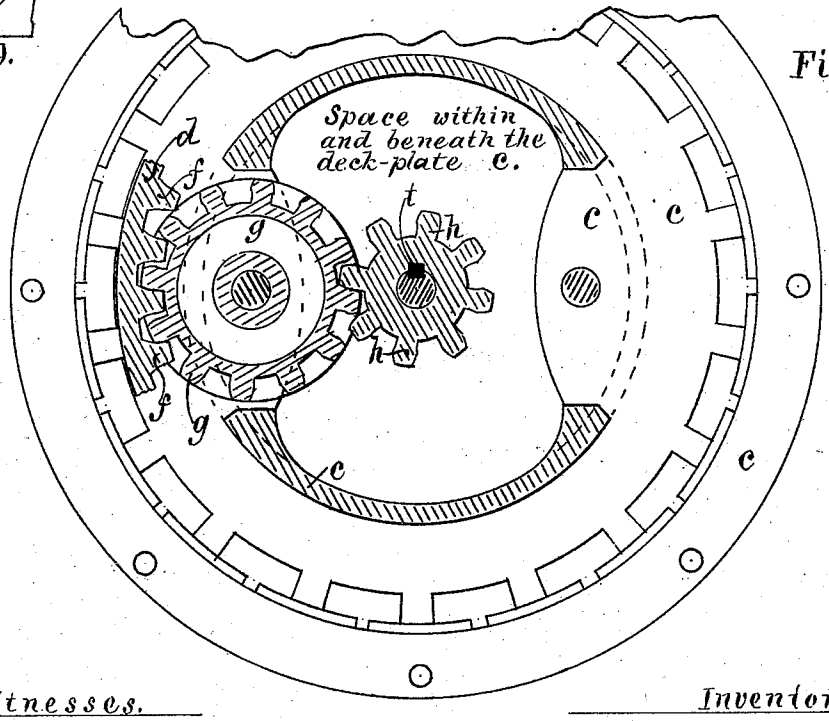


Fig. 15.

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UNITED STATES PATENT OFFICE.

DAVID N. B. COFFIN, OF NEWTON, MASSACHUSETTS.

CAPSTAN.

SPECIFICATION forming part of Letters Patent No. 261,530, dated July 25, 1882.

Application filed March 10, 1882. (No model.)

To all whom it may concern:

Be it known that I, DAVID N. B. COFFIN, of the city of Newton, county of Middlesex, and State of Massachusetts, have invented certain new and useful Improvements in Capstans, of which the following is a full and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon, of which drawings—

Figure 1 is a sectional elevation; Fig. 2, a plan of parts; Fig. 3, an under view, in part, of the barrel, &c.; Fig. 4, an under view of the lever-head in part, &c.; Fig. 5, a plan of top of barrel in part. Fig. 6 comprises an elevation and a sectional elevation of one pawl. Fig. 7 is a sectional view of barrel at line Fig. 1. Fig. 8 is an elevation of a pawl-wrist or journal; Fig. 9, a partial elevation of lower part of the deck-plate. Fig. 10 is a partial plan of parts. Fig. 11 embraces two sectional and partial elevations. Fig. 12 is an elevation. Fig. 13 is a plan. Fig. 14 is a perspective view of the deck-plate and two-part spindle *b*, showing also the intermediate gears, *g*, projecting through openings in the deck-plate, &c. Fig. 15 is a sectional plan, the plane of section cutting horizontally through the center gear, intermediate gear, and annular gear, and the deck-plate at the height of the openings through which the intermediate gears protrude. Fig. 16 is a perspective view, illustrating the ratchets *n m*, &c. Fig. 17 further illustrates the same, with parts *l m* inverted, as described. Fig. 18 illustrates the ratchet at the top of the barrel. Fig. 19 further illustrates the lever-head and bar-holes in a sectional view, looking outward from within.

Like letters refer to the same or corresponding parts in all the figures.

The invention consists in the novel construction of parts and the combination thereof, substantially as hereinafter more fully set forth, and pointed out in the claims.

This capstan's deck-plate is cast in one with or otherwise attached to a part of the spindle *b*, which is made hollow to receive the other part, *i*. The first part named is marked *b*, the last *i*. From the part *b* of the spindle the deck-plate spreads outward and extends downward in a circular form, inclosing a somewhat dome-shaped space beneath, and terminates in a flange at the bottom, provided with bolt-holes for bolting it to the deck. Through this part of the deck-plate, which, for want of a more accurate term, I will call "dome-shaped," is made an opening or openings, through which protrude the intermediate gears, *g*.

The gears *g* are journaled to and mounted in the deck-plate, which I have designated by the letter *c*. The deck-plate *c* is provided with pawl-pockets and lugs, the lugs being re-enforced by separate flanges, as seen in Figs. 9, 12, and 1, letter *p*. These separate flanges *p* leave between them spaces for drainage, which let the water run off freely from the pawl-pockets without the necessity of making drainage-holes, which are constantly getting filled up. The center or first moving gear, *h*, has an upward extension or shaft, *i*, and which extends up through the part *b* of the spindle and constitutes the spindle's upper part, whereby the lever-head *a* is held down, the lower part of the spindle *b* being fixed to the deck-plate, the shaft *i* being free to turn in part *b*. This upper part of the shaft *i* has a pin, *u*, in its upper end, and the attached gear *h* at the lower end acts as a head or flange, so that by it the lever-head, barrel, and deck-plate, with part *b*, are securely held together, and by taking out pin *u* all can be taken apart.

A shaft driven by power may be connected to the gear at the bottom, as indicated, by a key, *t*, in Fig. 1. The shaft *i* is connected to the lever-head, so as to be driven by it or detached from it at pleasure, by means of the drop or lock bolt or bolts *j*, or by any other means, positive, as illustrated in Fig. 1, or automatic, as illustrated in Fig. 11, which shows one of a class of automatic connections which may be employed.

The barrel *d* is furnished with welts *v*, which terminate at the lower end against a zone of the barrel of equal height with themselves from the depressed surface between the welts *v*. The barrel *d* is also furnished with an annular gear, *f*, into which plays the intermediate gear or gears, *g*. The barrel is furnished with lugs or ratchet-teeth *n* on top of the barrel, re-enforced by an upwardly-projecting rim or flange on the inside, which both strengthens the teeth and turns the water outward and prevents it from running into the barrel.

The spaces between the teeth are called "pawl-pockets" or "lock-bolt pockets."

The barrel *d* is fitted to turn on the spindle *b* freely, and either or both are furnished with ordinary bearings, or, what is better, as it is peculiarly adapted to the conditions found in a capstan on salt-water, different from any other machinery—viz., with chilled bearings or chill-hardened bearings applied to either or both barrel and spindle. No other bearings seem so fully to meet the conditions of slow moving, heavy pressure, and the rust and corrosion incident to capstans and windlasses in salt-water service.

The barrel *d* is also provided with wrists or journals *w*, which have a small lug at the outer end. These wrists carry pawls playing in the pawl-pockets on the deck-plate. The pawls have a through open eye or socket which fits loosely the wrists *w*. In the part of the eye toward the opposite end of the pawl is the through open recess, shown of suitable size to allow the lug on the end of the wrist to pass. When the pawl is turned from the position in which it slips onto the wrist the lug keeps it from slipping off.

Fig. 6 shows the pawl provided with a recess on the inside, in which is jointed something like a pocket-knife blade, a blade or finger, or tongue, which, on being opened, as seen in dotted lines, Fig. 6, the pawl being raised, will rest on any projecting part of the barrel, or rest provided for it, and hold the pawl up out of action until it is required. Then, closing the tongue, it again operates.

Fig. 11 illustrates a variety of automatic methods of detachably connecting the lever-head to the center gear shaft. There is a part, *l*, surrounding the shaft *i*, and provided with ratchet-teeth *n*. These teeth are prevented from rotating on shaft *i* by lugs playing in the side grooves in shaft *i*. This part *l*, having the ratchet-teeth, may be put on shaft *i* either end up. If the teeth are up, then a loose sliding bolt, *m*, in a suitable socket in the lever-head, and beveled at its lower end, will catch the teeth and turn the shaft *i* when the lever-head is turned one way, and slide over and not catch when it is turned the other way; or both bolt *m* and part *l* may be turned bottom up, bringing the bolt to the bottom. Then when the lever-head is turned one way part *l* will slide over the bolt *m*, slipping up on the shaft *i* and down; but on reversing the motion of the lever-head the teeth *n* will catch on bolt *m* and so rotate the shaft *i*. For the bolt *m*, may be substituted, in the latter case, teeth in the lever-head, corresponding to those on part *l*, but in reverse order, corresponding to bolt *m*, if preferred.

When the automatic device above described is used a bolt like *m* is substituted for bolt *j* in a suitable socket at *k* and the bolt *j* omitted or dispensed with; and the teeth *n* on the barrel are made like teeth *n* on part *l*—viz., with a beveled back—though the latter change is not essential, it only being essential to have the bolt face so as to catch in the opposite movement from that when shaft *i* is driven by ratchet-teeth *n*.

The lever-head is peculiar in several particulars—viz., the bar-holes, except through the outer rim, and the spaces between the bar-holes also, are wholly open from beneath—*i. e.*, between the hub and the outer rim. Depending flanges or ribs constitute both the sides and top of the bar-holes. (See Fig. 19.) The rib or flange S forms the top rest or guide for the bar, which, resting in the hole in the outer rim, needs no other bottom support. This construction facilitates the casting by allowing the lever-head pattern to form its own core for these parts. It also obviates the great difficulty always found in keeping drainage-holes for the bar-holes and lever-head open. With this construction none are required.

The center gear, *h*, drives the gear or gears *g*, which play into and drive the annular gear *f*, which drives the barrel. This order of operation occurs when the power purchase is used. When the fast purchase is used and the barrel is driven directly by being connected to the lever-head by its ratchet-teeth or lugs *n*, then the annular gear *f* drives the gears *g*, which drive the gear *h*, which is then detached from the lever-head either by the removal of bolts *j* from shaft *i* or by the automatic action of ratchet-teeth *n*, &c., as describe. For power the lever-head is turned in one direction. For simple or fast purchase it is turned in the opposite direction. For change of power what is required is the use of the automatic ratchets shown in Fig. 11. If the bolts *j* are used, they have to be changed from *k* to shaft *i* for power, and vice versa for speed.

The materials used in construction, except so far as referred to already, may be those ordinarily used, generally cast and wrought iron, and steel, brass, &c., if desired.

The openings in the deck-plate through which the gears *g* protrude should be re-enforced or strengthened at their sides, as indicated at *q*, the additional metal being so disposed as to best suit convenience in casting and obviate danger from cracks by unequal contraction in cooling.

Steel journals are preferred for gears *g* when case or chill hardened ones are not used.

Oil poured in around the spindle at the top finds its way through the oil-passages shown in the drawings to all the bearings.

I claim—

1. The deck-plate of a capstan as constructed—viz, with lateral openings, connecting the inclosed space beneath the deck-plate with the exterior, for the purpose of admitting the intermeshing of an intermediate gear with the center gear within and an annular gear without, substantially as described.

2. The spindle of a capstan as constructed—viz., the lower part hollow and attached to the deck-plate and the upper part a shaft attached

to a center gear located beneath the fixed part of the spindle, substantially as described.

3. The center gear, with its upward prolongation or shaft and pin, in combination with the deck-plate, a two-part spindle, barrel, and lever-head, substantially as described.

4. The combination of a center gear within the cavity beneath the deck-plate with an intermediate gear protruding through the deck-plate and an annular gear exterior to the deck-plate.

5. An intermediate gear located in an opening through the deck-plate and partly within the inclosed space beneath the deck-plate and partly outside the deck-plate, substantially as described.

6. An intermediate gear, in combination with a center gear within the inclosed cavity beneath the deck-plate and an annular gear exterior to the deck-plate, substantially as described.

7. An intermediate gear so located and journaled to the deck-plate as to intermesh with a center gear within the inclosed space beneath the fixed part of the spindle, and an annular gear, substantially as described.

8. A deck-plate as constructed—viz., a deck-plate or base spreading outward and downward from its connection to the spindle and in a circle passing between the intermediate gear-journals and the annular gear, whereby a large circumferential or annular section is obtained through which to make the openings for gears *g*, substantially as shown.

9. The combination of the center, intermediate, and annular gears as constructed—viz., the center and annular gears having their teeth supported by flange at the top, and the intermediate gear at the bottom, substantially as described.

10. The deck-plate as constructed—viz., with the described openings having re-enforcement at their sides of thick metal, substantially as shown.

11. The deck-plate as constructed—viz., with openings through which protrude intermediate gears.

12. A capstan-lever head as constructed—viz., with bar-holes or lever-sockets conforming to the ordinary shape of the bar-section in the outer rim, but entirely open from beneath inside of that rim, or substantially so.

13. The lever-head as constructed—viz., with a depending rib or bearer to bear upon and form a rest or vertical stop against the upper side of the bar in the bar-socket or lever-socket.

14. The capstan as constructed—viz., with a center gear in the cavity beneath the deck-plate detachably connected to the lever-head by means of an upward extension or shaft inside the fixed portion of the spindle, substantially as described.

15. The pawl-pockets on the deck-plate as constructed—viz., with outwardly-open drainage-spaces.

16. The deck-plate as constructed—viz., with pawl-lugs re-enforced by detached or separate flange to each, substantially as described.

17. The described construction of the upper end of the capstan-barrel *d*—viz., with an annular or continuous series of ratchet-teeth abutting toward the axis of the barrel against a continuous or annular flange, substantially as described.

18. In combination with the barrel and deck-plate of a capstan, the pawl as constructed—viz., with a through circular opening provided with a through-recess, like a keyway, in combination with a wrist or journal fixed to the barrel and having a spur or lug at its outer end, substantially as described.

19. In combination with the barrel and deck-plate of a capstan, the capstan-pawl as constructed—viz., with a recess on the inside toward the capstan-barrel, in which is jointed or hinged a tongue, substantially as described.

20. The capstan as constructed—viz., with a deck-plate inclosing a center gear in the space beneath it, and an upward extension or shaft of the center gear through the hollow spindle, said shaft connected by a ratchet mechanism to the lever-head, and said center gear connected by intermediate gears and an annular gear to the lower part of the capstan-barrel, substantially as described.

21. The capstan as constructed—viz., with the lever-head connected to the top of the barrel by ratchet mechanism, in combination with the annular barrel-gear, intermediate gears, the center gear inclosed beneath the deck-plate, its upward extension or shaft, and its ratchet mechanism, and hollow spindle, substantially as described.

22. The ratchets *m n*, in combination with the center gear located beneath the deck-plate, its shaft *i*, hollow spindle *b*, and the lever-head, substantially as described.

23. The barrel of a capstan as constructed—viz., with the fleeting ribs or welts *v* to abut at their lower ends against a raised zone of the barrel, the middle of the welts being flush or of equal elevation from the general surface of the contiguous part of the barrel with the raised zone, substantially as shown.

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