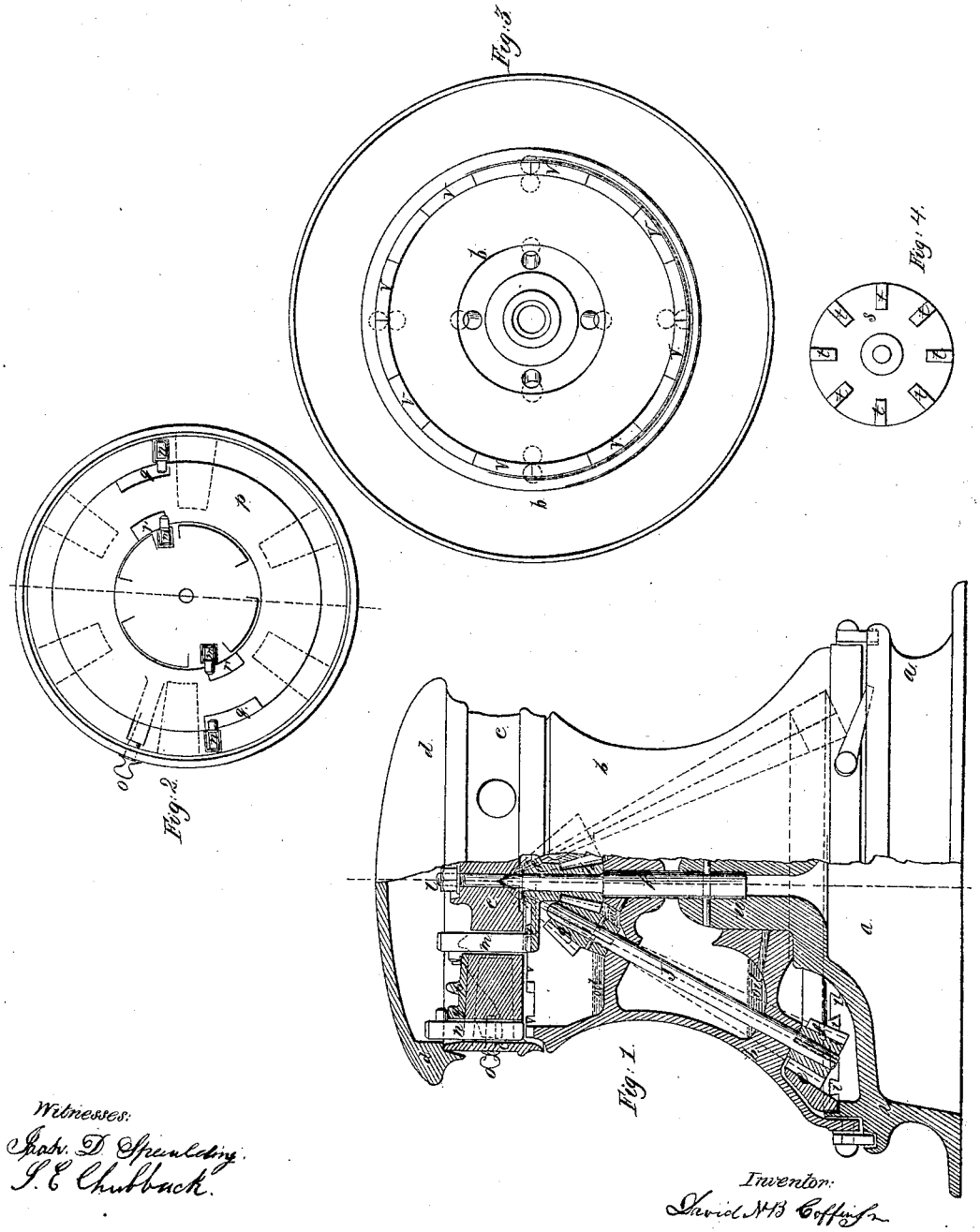
D. N. B. Coffin, Jr.,

Capstan.

No. 51,107. Patented Nov. 21, 1865.



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AM. PHOTO-LITHO. CO. N.Y. (OSBORNE'S PROCESS)

UNITED STATES PATENT OFFICE.

DAVID N. B. COFFIN, JR., OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF AND IRAH D. SPAULDING, OF SAME PLACE.

IMPROVED POWER-CAPSTAN.

Specification forming part of Letters Patent No. **51,107**, dated November 21, 1865.

To all whom it may concern:

Be it known that I, DAVID N. B. COFFIN, Jr., of Boston, in the county of Suffolk, and Brookline, in the county of Norfolk, and State of Massachusetts, have invented a new and useful Improvement in Capstans, of which the following is a full and exact description, reference being had to the accompanying drawings, forming part of this specification, and to the letters of reference marked thereon.

The nature of my invention relates to improvement in the method of gearing and other peculiarities of construction in that class of capstans denominated "power-capstans" or "geared capstans," and which are susceptible of being operated as power or as simple capstans at pleasure.

With reference to the accompanying drawings, Figure 1 is a sectional elevation. Fig. 2 is a plan of the lever-head. Fig. 3 is a plan of the capstan barrel or windlass. Fig. 4 is a plan of a flange connected to gear *h* and furnished with lugs *t*.

Like letters of reference indicate the same or like parts in all the drawings.

a is a bed-plate furnished with a bearing, *u*, for the lower part of the barrel or windlass *b*, and with inclined lugs *i*, facing in opposite directions, and the usual pockets for the pawls on the base of the barrel. The shaft *k* is secured permanently in the projecting bearing *u*, and forms the upper bearing for the capstan-barrel and the bearings for gear *h* and lever-head *c*. A conical internal gear, *e*, is furnished on its under side with inclined lugs, facing in opposite directions and corresponding to lugs *i* on the bed-plate, the spaces being sufficient to allow free interlocking with those on the bed-plate, so that when force is applied, tending to rotate gear *e* in either direction, these inclines cause it to be closely held stationary to the bed-plate, while at the same time it is free to be lifted off whenever the force is removed.

Playing into the stationary conical gear *e* are a series of conical gears, *f*, for the action of which gear *e* becomes the fulcrum. Gears *f* are secured to shafts *j* at their lower outer ends, and to the upper inner ends of the same shafts are secured the gears *g*. The shafts *j* are arranged at any desirable angle in relation to the axis of the capstan, whereby the required amount of power is secured, as it will be observed that the greater the angle the farther the fulcrum-gear *e* is removed from the center with the consequent increase of power, and the less the angle the nearer the fulcrum and less the power derived by the gear *f* acting upon gear *e* as its fulcrum. The gear *h* plays into the gears *g* and turns freely upon shaft *k*. The lever-head *c* is furnished with the usual lever-sockets and turns freely upon the shaft *k*, resting upon a suitable shoulder thereon, so as not to bear on the parts connected to gear *h*.

Upon the lever-head lies loosely a ring, *p*, guided by suitable lugs, and furnished with inclined lifters *q r*. Dropping loosely through mortises in lever-head *c* are the dogs *n m*, the dogs *n* being directly over the two-faced lugs *v* on the capstan-barrel, and *m* over the two-faced lugs *t* on *s* connected to gear *h*. The dogs *m n* have each a projection on one side, and the inclines or lifters on *p* are so arranged that when the ring *p* is rotated in one direction the dogs *n* are lifted clear from the lugs *v* by the inclines *q* acting against the projecting part, and the dogs *m* are dropped (or left free to drop when the head is turned) between the lugs *t* on *s*. When the ring *p* is rotated in the opposite direction the dogs *m* are lifted clear of lugs *t* by inclines *r* acting on its projecting part, and the dogs *n* are left free to drop between lugs *v*. The ring *p* is rotated by means of a knob, *o*, outside. When the parts are made and the capstan is to be put together, the shafts *j*, with gears *e*, *f*, *g*, and *h*, are adjusted in their proper places and relations within the capstan-barrel, as shown, and the whole is then slipped down upon the spindle *u k*. The lever-head is then furnished with the parts belonging thereto and slipped down upon the spindle, after which the nut or a pin is applied to the top end of the spindle, and the whole is thereby secured.

When the capstan is to be used as a simple one with the simple purchase of the handspikes, the ring *p* is turned so as to drop the dogs *n* into connection with lugs *v* on the barrel, the lugs *m* by the same movement being lifted from contact with lugs *t*. The capstan is ready then for action, and on being put in motion the gears will not come into use, but will, with the exception of fulcrum-gear *e*, rotate freely.

When power is required the ring *p* is then turned in the opposite direction, lifting dogs *n* from contact with lugs *v*, disconnecting thereby the lever-head from the barrel and by the same movement dropping the dogs *m* into connection with lugs *t* on *s*. This is the position shown in the drawings. Now, the lever-head being set in motion with handspikes, dog *m*, drives *t s* and gear *h*. Gears *g* are driven by gear *h*, and through the angular shafts *j* and gears *f* act upon the fulcrum-gear *e*, giving impulse to the capstan-barrel, causing it to rotate in the direction of motion of the lever-head.

The capstan may be rotated in either direction, both by the gears for greater power and as a simple capstan, the base-pawls being thrown in the proper direction.

Any convenient number of the dogs *m* and *n* and the shafts *j* may be used.

The base or bed plate may be of cast-iron, with bearing *u* cast on it, the upper part, *k*, of the spindle being of steel or wrought-iron, as this angular method of gearing will allow an abundance of space not otherwise attainable for a massive cast-bearing, *u*, thus securing extraordinary strength.

Having thus fully described my improvement, what I claim as my own invention, and desire to secure by Letters Patent, is as follows:

1. In combination with conical gears *h g f e*, angular shafts diverging from the axes of gear *h* and the capstan, substantially as and for the purposes set forth.

2. The arrangement of the dogs *n m*, ring *p*, and its inclined lifters *q r*, in combination with the lugs *v t*, substantially as described.

3. Compounding the spindle *u k* by forming the lower bearing, *u*, on and as part of the bed-plate and then inserting a comparatively-light wrought shaft, *k*, to form the upper bearings and receive the nut *l* or a pin, substantially as described.

4. Connecting the fulcrum-gear *e* to the bed-plate automatically by furnishing each with a double series of opposing inclined surfaces or lugs, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand.

DAVID N. B. COFFIN, JR.

Witnesses:

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