(No Model.)

F. A. GRATER & E. H. WHITNEY.

DRIVING GEAR FOR SHIPS' WINDLASSES.

No. 386,812. Patented July 31, 1888.

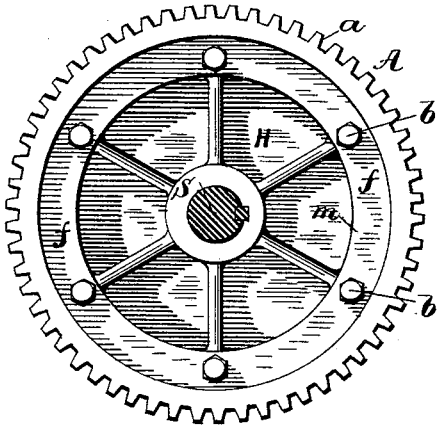

FIG. 2.

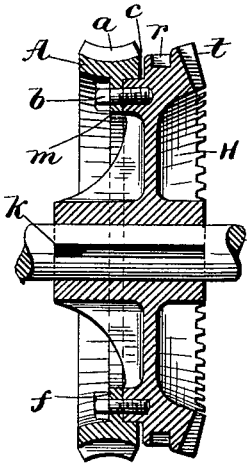

FIG. 1.

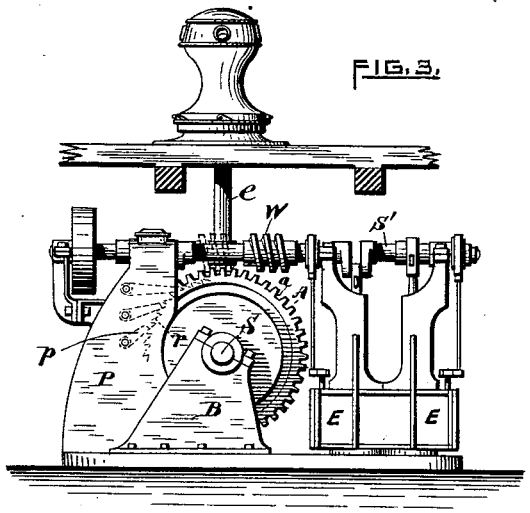

FIG. 3.

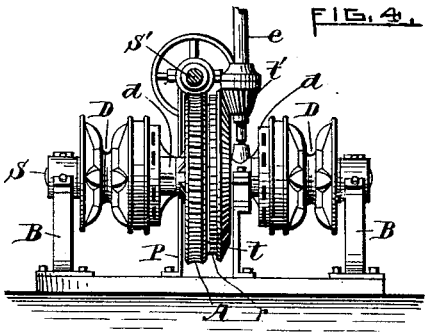

FIG. 4.

WITNESSES.

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UNITED STATES PATENT OFFICE.

FRANCIS A. GRATER AND EDWIN H. WHITNEY, OF PROVIDENCE, RHODE ISLAND, ASSIGNORS TO THE AMERICAN SHIP WINDLASS COMPANY, OF SAME PLACE.

DRIVING-GEAR FOR SHIPS' WINDLASSES.

SPECIFICATION forming part of Letters Patent No. 386,812, dated July 31, 1888.

Application filed July 20, 1887. Serial No. 244,817. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS A. GRATER and EDWIN H. WHITNEY, citizens of the United States, both residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Driving-Gear for Ships' Windlasses; and we 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in ship's windlass; and it consists, essentially, in the combination, with a rigidly-secured driving-head, of a worm-wheel rim secured thereto, all as will be more fully hereinafter set forth and claimed.

It is well known that the worm-gearing of steam-windlasses is subjected at times to very severe strains, the result sometimes being to fracture the gear and also to produce excessive wear. In such event, in order to replace the broken gear with a new one, it has been necessary heretofore, where the gear as a whole is secured to the shaft intermediate of the two wild-cats, to first roll out the windlass from its bearing and then to remove one of the wild-cat driving-heads in order to get at the worm-gear. As the driving-heads are forced upon the shaft, their removal therefrom is attended with great difficulty, thereby necessitating sending the shaft, &c., to a shop having facilities for such removal, thus increasing the cost for repairs and consuming a great deal of time, the vessel in the meantime being thereby unprovided with its means for hoisting.

The object of our present invention is to overcome the disadvantages just stated. To this end we rigidly secure a head to the windlass-shaft intermediate of the wild-cats, said head having its periphery turned to receive and support an annular rim carrying worm-gear teeth, the rim being secured to the head by bolts. The wild-cat is loosely mounted upon the windlass-shaft, a driving-head being rigidly secured upon the shaft adjacent thereto, the wild-cat being adapted to be locked to the head by loose keys, as usual. In view of such construction, we make the inner diameter of the worm-gear rim somewhat greater than the outer diameter of the driving-head. By means of this arrangement it is obvious that the old worm-gear may be readily removed from the windlass and a new one quickly substituted after the wild-cat is first taken off. The latter may then be replaced and the windlass returned to its place with the shaft resting in the main bearings, the whole being ready for use. Practically, in making a windlass, we enter in a book kept for the purpose the diameters of the flange or rim of the main head which is to receive the gear-ring, and also the number and dimensions of the securing-bolts. Now, in case a windlass thus constructed subsequently requires a new worm-gear the order therefor may be sent by mail or even telegraphed to the works, the order being filled from the data referred to, the delay, expense, and annoyance incident to reshipping the windlass itself to the works being thereby avoided.

In order to illustrate our invention, we have prepared the accompanying sheet of drawings, in which—

Figure 1 represents in vertical longitudinal section a driving-head having an annular worm-gear ring secured thereto, the driving-head in this case being the center or main driving-gear adapted to intergear with a smaller gear operated by manual power. Fig. 2 is an end view thereof. Fig. 3 is an end elevation of a steam capstan-windlass, adapted also to be operated by hand, viewed from the port side; and Fig. 4 is a front view of the windlass, the capstan and engines being omitted.

The following is a more detailed description of the invention, including the parts of the windlass intimately relating thereto.

A designates the annular rim as a whole, the same having worm-gear teeth *a* formed thereon, and also having a flange or web, *f*, formed on its inner portion, said flange being drilled to receive a series of securing-bolts, *b*. The inner or smallest diameter, *m*, of the flange is such that it will permit a wild-cat head, *d*, to pass freely through it.

H indicates a main driving-head forced onto the windlass-shaft S, and secured by a key, *k*, and located intermediate of the two wild-cats D. The head H also serves as the main gear, the same having bevel-gear teeth *t* and also a series of ratchets, *r*. A rim, *c*, is formed on said gear which is turned off true to receive and center the gear-rim A, the latter being firmly secured thereto by bolts *b*. (See Fig. 1.)

In Figs. 3 and 4 is represented a steam-windlass having engines E E connected with the crank-shaft *s'*, on which is mounted a worm, *w*, adapted to mesh into the teeth *a* of the gear A to revolve the windlass. As drawn, the worm is adapted to slide endwise on splines fitted into the shaft. By means of this arrangement, in connection with the upright shaft *e*, pinion *t'*, and capstan, the mechanism may be readily converted into a steam or hand power windlass, as desired. The main shaft rests in the side bits, B, and pawl-bit P, the latter also supporting the engine-shaft *p*. (See dotted lines indicating pawls engaging the ratchets *r*, as common.)

D indicates chain-wheels or "wild-cats," so called, loosely mounted on the main shaft and adapted to be locked to the heads *d* by keys, as usual.

We do not claim, broadly, as our invention a gear having its toothed rim bolted to the hub or center portion, such construction—as, for example, in mill-gearing—being old and in common use.

We claim as our invention—

In a ship's windlass, a driving-gear, H, secured to the shaft between the wild-cats, having ratchets *r*, and an annular rim or shoulder, *c*, and an annular worm-gear rim, A, fitting the shoulder *c* and provided with an internal flange, *f*, and bolts *b*, passing through said flange into the driving-gear H, the inner diameter of the flange being somewhat greater than the extreme outer diameter of the wild-cat driving-head, substantially as and for the purpose set forth.

In testimony whereof we have affixed our signatures in presence of two witnesses.

FRANCIS A. GRATER.
EDWIN H. WHITNEY.

Witnesses:
CHARLES HANNIGAN,
GEO. H. REMINGTON.