

J. T. BARBER.  
 RATCHET GEARING.  
 APPLICATION FILED MAY 7, 1912.

1,057,027.

Patented Mar. 25, 1913.  
 2 SHEETS—SHEET 1.

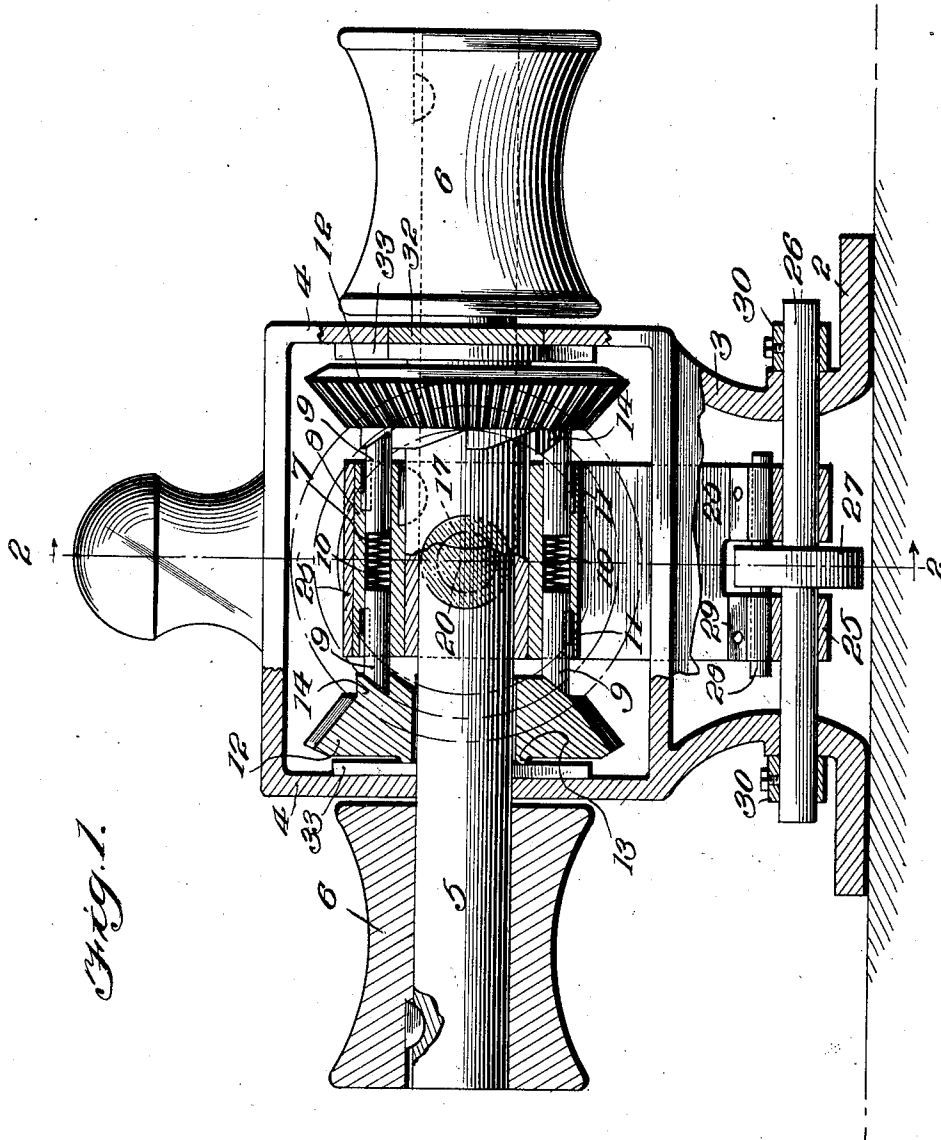


Fig. 1.

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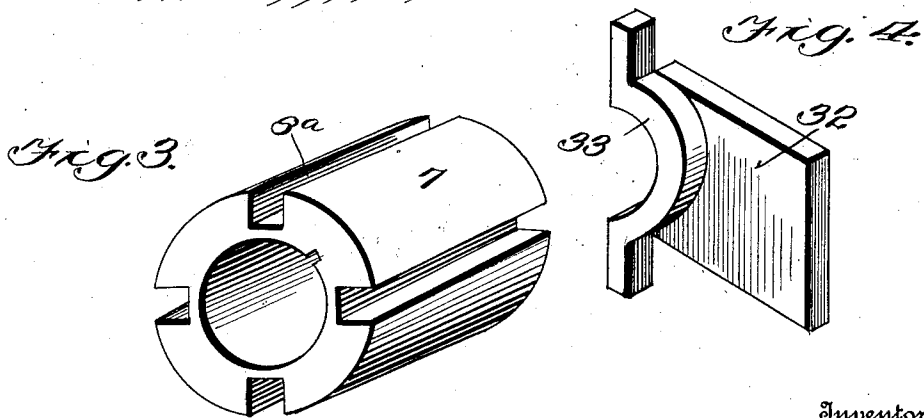
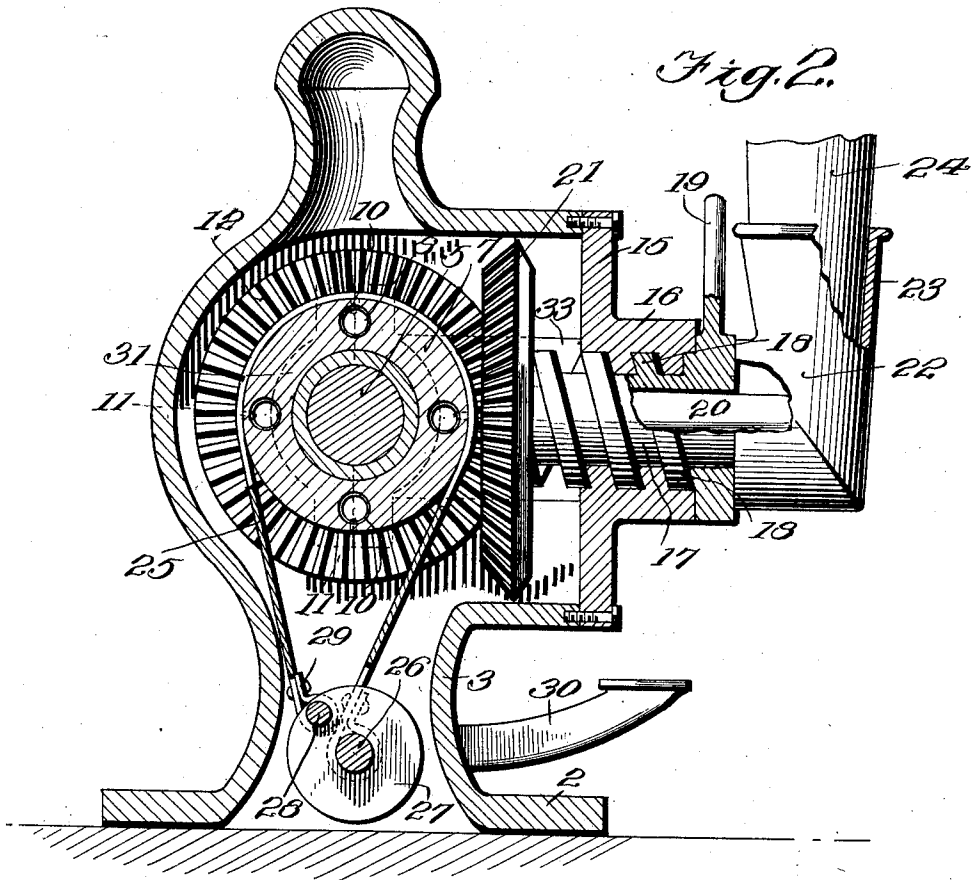
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# UNITED STATES PATENT OFFICE.

JAMES T. BARBER, OF BROOKLYN, NEW YORK.

## RATCHET-GEARING.

1,057,027.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed May 7, 1912. Serial No. 695,797.

*To all whom it may concern:*

Be it known that I, JAMES T. BARBER, citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Ratchet-Gearing, of which the following is a specification.

My invention relates to windlasses, and particularly to that class of windlass wherein the drum shaft of the windlass is rotated continuously in one direction by an oscillation of an actuating handle.

The primary object of my invention is to provide a very simple and effective mechanism of this character having few parts, and these under ready control.

A further object is to provide means whereby the driving gear of the windlass may be readily shifted into and out of engagement with the driven gear on the drum shaft and held positively in engagement or positively out of engagement as desired by the operator.

A further object is to provide a brake in connection with the drum shaft and pawl carrying drum which may be operated either when the driving gear is in engagement with the driven gears or out of engagement therewith.

A further object is to improve the details of construction in this class of mechanism as will appear more fully hereinafter.

My invention is illustrated in the accompanying drawings wherein:

Figure 1 is a front elevation of the windlass partly in section, the front plate of the casing and the driving gear being removed. Fig. 2 is a section on the line 2—2 of Fig. 1. Fig. 3 is a perspective view of a modified form of the pawl carrying drum. Fig. 4 is a detail view of one of the sections of a bearing for the driven shaft.

Corresponding and like parts are referred to in the following description and indicated in all the views of the accompanying drawings by the same reference characters.

Referring to the drawings, 2 designates a base of any desired character and having thereon the standard 3 which is preferably hollow. The standard has upwardly extending portions 4 at either end thereof having the form of walls and supporting a drum shaft 5 in suitable bearings as will be later described. This drum shaft 5 carries at its ends the winding drums 6 which are disposed outside of the walls 4, and these drums

6 may be either keyed to the shaft 5 or otherwise attached thereto in any suitable and obvious manner so that the shaft and drums will rotate together. Also carried upon the shaft 5 at the middle thereof and either keyed or otherwise attached thereto is a ratchet carrying drum 7 which likewise forms the brake drum of the apparatus as will be later described. This drum 7 is formed on its periphery with a plurality of pawl carrying recesses 8. As illustrated in Fig. 2, these recesses are circular in form but the recess may be rectangular in form as shown in Fig. 3 in which the recesses, however, are designated 8<sup>a</sup>.

Mounted in the recesses 8 (or 8<sup>a</sup>) are a plurality of pawls designated 9. In each recess there are a pair of these pawls extending in opposite directions and interposed between each pair of pawls is a spring 10 which may be of any suitable character but which is shown as a coil spring, this spring acting to force the pawls outward. The pawls of course conform to the shape of the recesses 8 or 8<sup>a</sup>, and if the recesses are circular, as in Fig. 1, then the pawls are provided with feathers or splines 11 which engage in spline-receiving extensions of the recesses 8. It is sufficient if any means is provided for preventing the rotation of the circular pawls in the recesses 8. Of course, where square recesses 8<sup>a</sup> are used, there is no necessity of using a spline or key. It will be noted in Fig. 1 that the pawls 9 of each pair of pawls are beveled in the same direction at their outer ends, that is, outward and downward. Loosely mounted upon the shaft 5 and independently rotatable thereon are the oppositely disposed bevel gears 12, each formed with a hub 13 which contacts with the inner face of the adjacent wall 4 and each formed upon its face with the projecting ratchet teeth 14 with which the pawls 9 engage. These ratchet teeth are of course inclined in the opposite direction to the inclined face of the pawls 9 as illustrated in Fig. 1. The front of the casing formed by the walls 4 is closed by a plate 15 having a central hub 16, this hub being interiorly screw threaded, the threads being square threads and relatively few in number. Disposed within the hub 16 is a sleeve 17 which is formed exteriorly with screw threads which engage with the internal screw threads of the hub 16. Attached to this sleeve 17 is a radially extending handle 19 whereby the

sleeve may be turned. Passing through the center of the sleeve 17 is a shaft 20 carrying at its inner end a bevel gear 21 which meshes with both of the bevel gears 12. It will be noted from Fig. 2 that the sleeve 17 bears against the inner face of the bevel gear 21.

Mounted upon the outer end of the shaft 20 and bearing against the exterior face of the sleeve 17, is a socket member 22. This surrounds the shaft 20 and is keyed thereto and is formed with the annular socket 23, outwardly flaring so as to receive a hand spike or windlass bar of any suitable character and designated 24. It will be seen that with this construction a rotation of the sleeve 17 caused by an actuation of the handle 19 will cause the shaft 20 to be shifted either inward or outward depending upon which direction the handle 19 is turned. Thus by rotating the handle 19 in one or the other direction, the gear 21 may be shifted either into or out of engagement with the gears 12. It will also be obvious that an oscillation of the socket member 22 in both directions will cause a rotation of the drum 7 and the shaft 5 in one direction, provided the gear 21 meshes with the gears 12. Surrounding the drum 7 is a brake band 25. One end of this brake band passes loosely around a shaft 26 which is mounted in suitable bearings and extends transversely of the windlass at the rear thereof. This shaft carries upon it a disk 27 having oppositely disposed pins 28 which engage with loops 29 formed in the other end of the brake band. The shaft 26 carries at its ends the forwardly projecting treadles 30. It will be obvious that upon a depression of the treadles the disk 27 will be rotated and the brake band tightened upon the drum 7. Where a brake band is used in connection with the drum 7, it is preferable to provide the drum 7 with the circular recess 8 and the cylindrical pawls 9 as thereby the continuity of the surface of the drum is not interrupted. For the purpose of forming bearings in the casing to support the shaft 5, I provide journal bearings, one 31 formed on each of the walls 4 and the other 33 being in the form of a cap and removable. This cap 33 has an extension 32 which extends along the wall 4 and abuts against the covering plate 15.

The operation of the invention is as follows: The handle 19 is shifted in a counterclockwise direction as far as it can go until gears 21 and 12 are in mesh. The brake lever 30 is then released and the handle 24 is oscillated whereby an oscillating movement is given to gears 21 and 12 and a continuous rotation given to the drum 7, the shaft 5 and the winding drums 6. To release the winding mechanism in order to permit the lowering of the object being raised by the windlass, the handle 19 is

moved in a clockwise direction until gear 21 is released from gears 12 and the shaft 5 will then run free except for the control exerted by the friction brake 25.

It will be seen that the construction described is very compact, is positive in its actuation, and that the means for putting the shaft 5 into and out of gear with the actuating handle is disposed immediately adjacent to the actuating handle and is very simple and positive in its operation. Furthermore, it will be seen that the brake may be used either when the gear 21 is in mesh with the gears 12 or not as desired.

What I claim is:

1. In apparatus of the character described a driven shaft, oppositely disposed bevel gear wheels loose on the driven shaft, oppositely disposed pairs of pawls carried by the driven shaft and engaging said gear wheels on a movement of the gear wheels in one direction but disengaging therefrom upon a movement of the gear wheels in an opposite direction, an oscillating driving member having gear teeth intermeshing with the teeth of the bevel gear wheels, said member being shiftable into and out of engagement with said bevel gear wheels, and means for oscillating said driving member.

2. In apparatus of the character described a driven shaft, oppositely disposed bevel gear wheels loose on the driven shaft, oppositely disposed pairs of pawls carried by the driven shaft and engaging said gear wheels on a movement of the gear wheels in one direction but disengaging therefrom upon a movement of the gear wheels in a reverse direction, an oscillating member having gear teeth intermeshing with both of the bevel gear wheels, said member being shiftable toward or from the gear wheels, means for oppositely shifting said member, and means for oscillating said member.

3. In apparatus of the character described, a driven shaft, a drum on the driven shaft, oppositely disposed bevel gear wheels located on each side of the drum and loose on the shaft, spring actuated pawls carried by the drum and engaging said bevel gear wheels on a movement of the said gear wheels in one direction but disengaging therefrom upon a movement in the reverse direction, an oscillating driving member having gear teeth intermeshing with the teeth of the bevel gear wheels, said member being shiftable into and out of engagement with the bevel gear wheels, a screw threaded sleeve engaging said member and rotatable in either direction to force the member into and out of engagement with the bevel gear wheels, and means on said member whereby it may be oscillated.

4. In apparatus of the character described, a driven shaft, a drum mounted on the

driven shaft and having a plurality of transverse grooves, bevel gear wheels disposed on each side of the drum loose on said shaft, each bevel gear wheel being formed with inwardly projecting ratchet teeth, oppositely disposed spring actuated pawls carried in the grooves of said drum engaging the ratchet teeth of the gear wheels, an oscillating member having gear teeth engaging with the teeth of both the bevel gear wheels, a shaft upon which the member is mounted, said shaft and member being shiftable toward and from the bevel gear wheels, a handle operatively connected to said shaft whereby it may be oscillated, and means engaging the shaft for shifting the driving member into and out of engagement with the bevel gear wheels.

5. In apparatus of the character described, a driven shaft, a drum mounted on the driven shaft and transversely grooved, oppositely disposed bevel gear wheels loose on the driven shaft and disposed on each side of the drum, each of the gear wheels having inwardly projecting ratchet teeth, spring actuated pawls mounted in the grooves of the drum and engaging said ratchet teeth, a shaft extending at right angles to the axis of the drum, a bevel gear wheel mounted on said shaft and adapted to engage the first named bevel gear wheels, said shaft being shiftable to carry the driving bevel gear out of engagement with the driven bevel gear wheels, a screw threaded sleeve surrounding said shaft, a fixed member having screw threads with which the screw threads of the sleeve engage, a handle on said sleeve whereby it may be rotated, and a handle operatively connected to the shaft whereby it may be oscillated.

6. In apparatus of the character described, a driven shaft, oppositely disposed bevel gear wheels loosely mounted on the driven shaft and each having inwardly projecting ratchet teeth, a drum on the shaft having transversely extending grooves, spring pressed pawls disposed in said grooves and having yielding engagement with the ratchet teeth on the bevel gear wheels, a driving shaft mounted at right angles to the drum, a bevel gear wheel mounted on said driving shaft and intermeshing with the driven bevel gear wheels, a fixed casing having interior screw threads through which said driving shaft passes, a sleeve surrounding the driving shaft and longitudinally movable therewith, said sleeve having exterior screw threads engaging the screw threads of the casing, a handle on said sleeve, and a socket operatively connected to the shaft and adapted to receive a handle.

7. In apparatus of the character described, a driven shaft, a drum mounted upon the

driven shaft, oppositely spaced bevel gear wheels loose on the driven shaft and disposed on each side of the drum, pawls carried by the drum and engaging said gear wheels on a movement of the gear wheels in one direction but disengaging therefrom on a movement in a reverse direction, a brake band passing around said drum, a brake lever connected to the brake band, an oscillating driving member having gear teeth intermeshing with the teeth of both the bevel gear wheels, said member being shiftable into and out of engagement therewith, means for oscillating said member, and means for positively shifting said member into and out of said engagement.

8. In apparatus of the character described, a driven shaft, a drum mounted thereon, oppositely disposed bevel gear wheels loose on the driven shaft and located at opposite ends of the drum, pawls carried by the drum and engaging said gear wheels on a movement of the gear wheels in one direction but disengaging therefrom on a movement in the reverse direction, a brake band surrounding the drum, mechanism for tightening the brake band on the drum, and mechanism for causing oscillations of the bevel gear wheels in directions reverse to each other.

9. In apparatus of the character described, a supporting standard, a driven shaft journaled in said standard, a centrally disposed brake drum mounted on said shaft and having a plurality of transversely extending grooves, oppositely disposed bevel gear wheels loosely mounted on the shaft at opposite ends of the drum and having ratchet teeth on their inner faces, spring actuated pawls mounted in the grooves of the drum and engaging the ratchet teeth of the gear wheels, a brake band surrounding the drum, a brake lever connected to the brake band, a driving member having teeth intermeshing with the teeth of both the bevel gear wheels, a shaft upon which the driving member is mounted, a casing through which the shaft passes, said casing having an interiorly threaded hub, a sleeve surrounding the shaft and supported within the hub having external screw threads engaging the threads of the hub, said sleeve being longitudinally movable with the shaft but independently rotatable with relation thereto, a handle for rotating said sleeve, a socket connected to the shaft, and a handle detachably engaging said socket.

In testimony whereof I affix my signature, in presence of two witnesses.

JAMES T. BARBER. [L. s.]

Witnesses:

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WILLIAM H. McELROY.