June 5, 1951 E. C. S. CLARK 2,555,676

TRAWL WINCH

Filed April 27, 1948 3 Sheets-Sheet 1

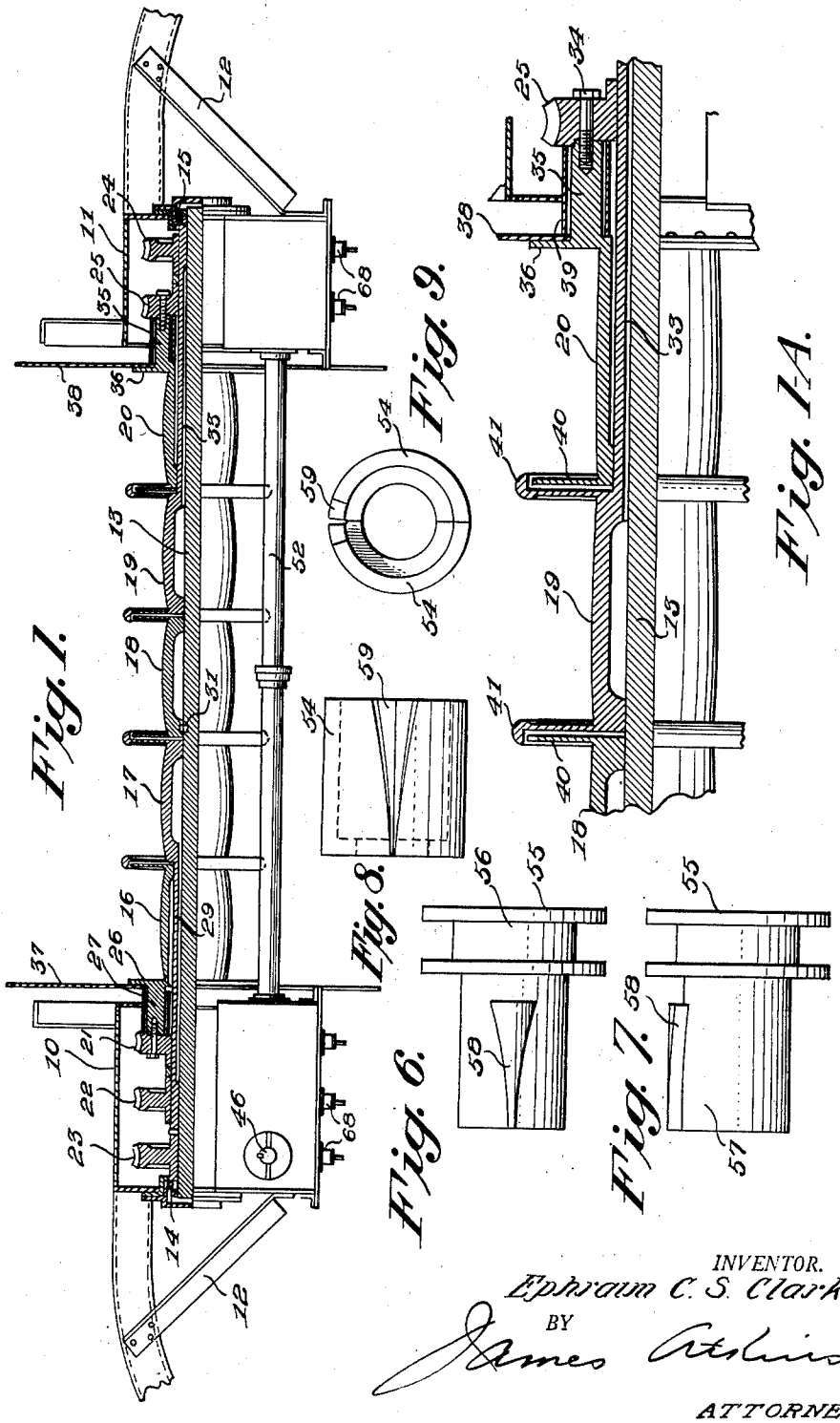


Fig. 1.

Fig. 1A.

Fig. 8.

Fig. 6.

Fig. 7.

Fig. 9.

INVENTOR.
Ephraim C. S. Clark
BY
James Atkins
ATTORNEY

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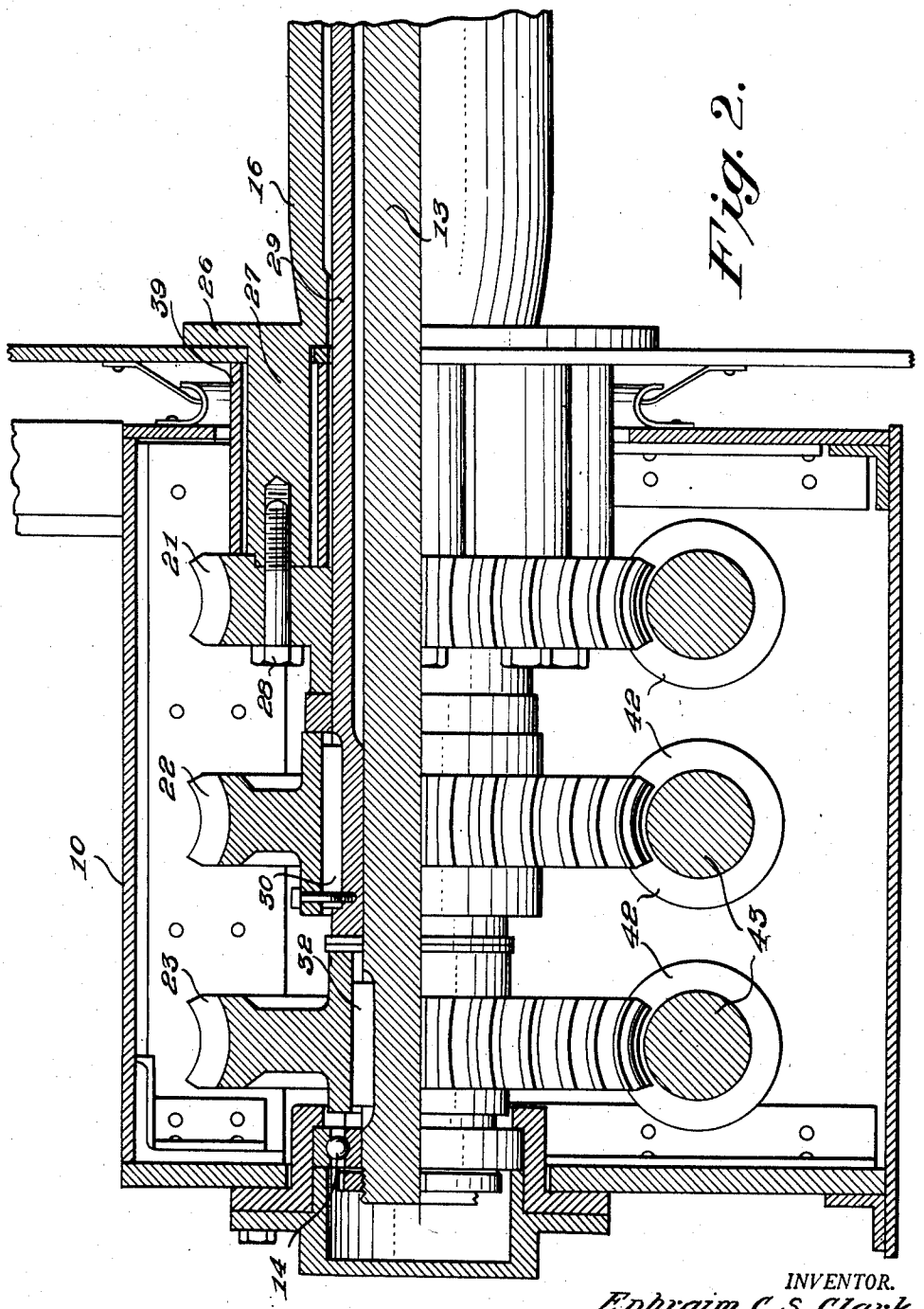


Fig. 2.

INVENTOR.
Ephraim C. S. Clark
BY
James Atkins
ATTORNEY

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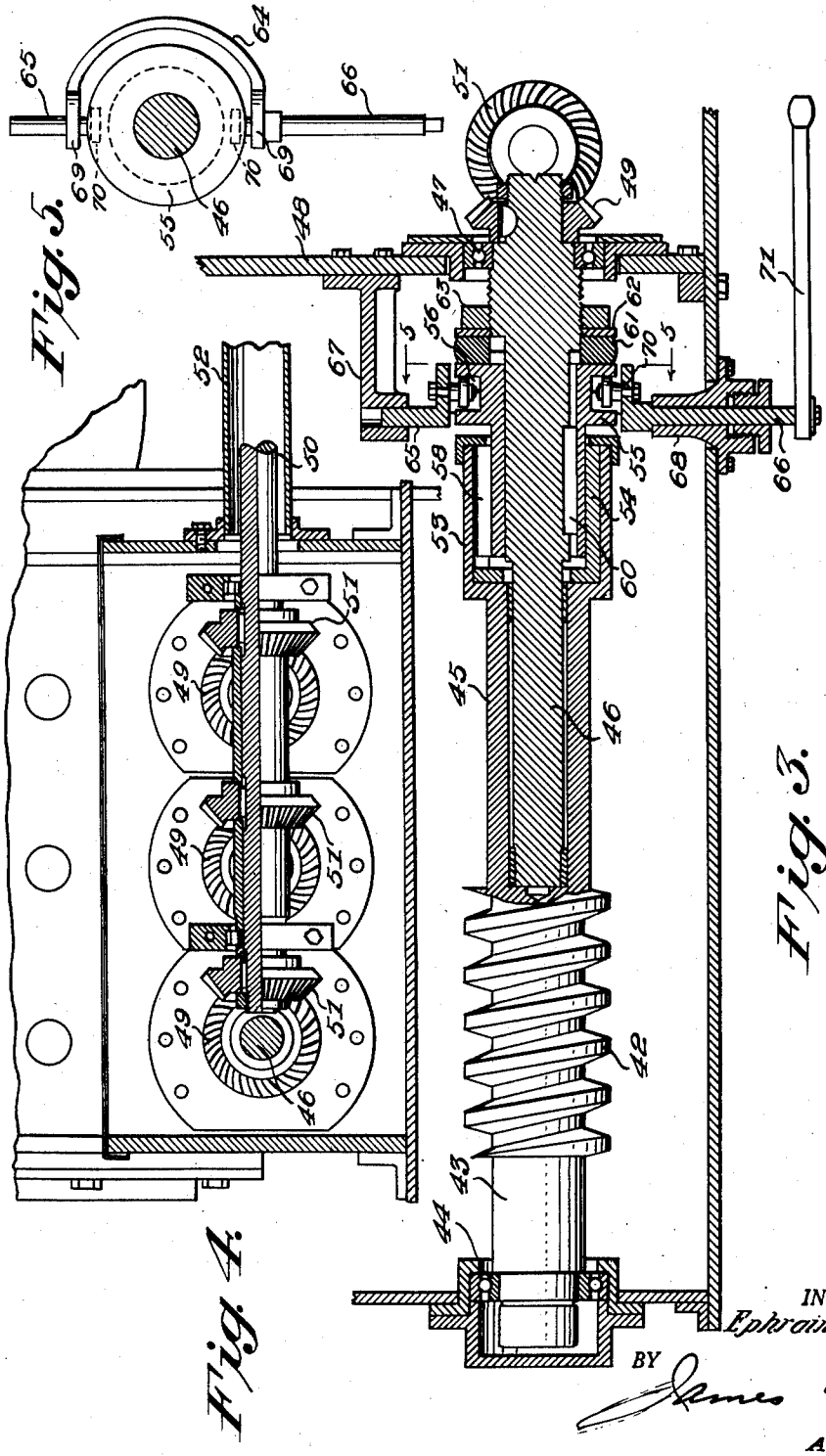


Fig. 3.

Fig. 4.

INVENTOR.
Ephraim C.S. Clark
BY James Carlin
ATTORNEY

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UNITED STATES PATENT OFFICE

2,555,676

TRAWL WINCH

Ephraim C. S. Clark, Gloucester, Mass.

Application April 27, 1948, Serial No. 23,521

9 Claims. (Cl. 254—137)

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This invention relates to a trawl winch.

The invention is particularly concerned with a winch adapted for use in drawing in a plurality of nets and winding the tow lines and nets onto a plurality of bobbins or spools supported on a fishing boat.

A primary object of the invention is the provision of a winch for the above noted purpose which is highly efficient in operation and which substantially overcomes objections inherent in prior constructions of this kind.

A further object of the invention is to provide a trawl winch including a plurality of tow line bobbins which are individually controllable in their rotation about a common axis, whereby the tow lines may be readily evened up and the bobbins providing the core of a relatively large spool for winding of the nets thereon when the lines have been wound onto the bobbins.

A still further object of the invention is to provide a trawl winch which is relatively simple in construction and which is capable of manufacture at relatively low cost.

Other objects and advantages of the invention will become apparent in the course of the following detailed description, taken in connection with the accompanying drawings, wherein:

Figure 1 is a view of the winch as viewed from the rear, the view being partially in section and partially in elevation.

Fig. 1–A is an enlarged view of the right-hand portion of Fig. 1 and showing in particular the mounting of the axially-alined bobbins.

Fig. 2 is a substantially enlarged vertical sectional view of the left-hand portion of Fig. 1.

Fig. 3 is a fragmental sectional view showing in particular one of the clutch-controlled shafts which is operatively associated with each worm gear shown in Figs. 1 and 2, and which is disposed at right angles to the axes of such gears as is seen in Fig. 2.

Fig. 4 is a fragmental view in a plane parallel with that from which Fig. 1 is observed, the view being partly in section and partly in elevation and showing in particular a connecting shaft between the several clutch-controlled shafts.

Fig. 5 is a sectional view in the plane of line 5—5 on Fig. 3 and showing the clutch actuator and operating means therefor.

Fig. 6 is a top plan view of the clutch actuator.

Fig. 7 is a side elevational view of the clutch actuator.

Fig. 8 is a top plan view of the clutch segments.

Fig. 9 is an end view of the clutch segments shown in Fig. 8.

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Referring now in detail to the drawings, the trawl winch embodies left and right gear housings 10 and 11 which may be suitably anchored to a boat, as by the bars 12.

A shaft 13 extends through and between the spaced housings 10 and 11 and has its opposite ends rotatably journalled in ball bearings 14 and 15 suitably supported in the end walls of the housings.

A plurality of line-receiving bobbins 16, 17, 18, 19 and 20 are supported on the shaft 13 between the housings 10 and 11, and these bobbins are respectively rotated through worm gears 21, 22, 23, 24 and 25, the gears 21, 22 and 23 being disposed in housing 10 and the gears 24 and 25 being disposed in the housing 11.

The bobbin 16 includes an end flange 26 from which project a circumferential series of lugs 27 which are connected to gear 21 by means of screw bolts 28, and the gear 21 is rotatably journalled on a sleeve extension 29 of the bobbin 17. The gear 22 is keyed as at 30 to said extension 29 and the latter is rotatably supported on the shaft 13. The bobbin 18 is keyed as at 31 to the shaft 13 and the gear 23 is keyed to the shaft as at 32.

The bobbin 19 is provided with a sleeve extension 33 to which gear 24 is secured in a similar manner to gear 22, and the sleeve extension 33 is rotatably journalled on the shaft 13.

The gear 25 is connected as by screw bolts 34 to a circumferential series of lugs 35 projecting from an end flange 36 on bobbin 20.

A pair of opposed relatively large disks 37 and 38 are disposed at opposite ends of the assembled bobbins and which in effect provide a large spool having the several bobbins as its core. The disks 37 and 38 are secured in position by extension of the lugs 27 and 35 through apertures therein, and cylindrical spacers 39 surround the lugs and have their opposite ends engaging the gears 21 and 25 and the disks 37 and 38.

Thus, it will be seen that the central bobbin 18 is rotatable with shaft 13 which is rotated by gear 23 keyed thereto, bobbins 17 and 19 have cylindrical extensions rotatably supported on the shaft and to which gears 22 and 24 are keyed, and the endmost bobbins 16 and 20 are rotatably supported on the said extensions and have the gears 21 and 25 secured to lugs extending therefrom.

The bobbins, while being mounted for joint or relative rotation, are so constructed that a non-line catching flange is provided between each pair of bobbins, and to provide for such construction the bobbins 16, 18 and 20 are provided with

plain disk-like end flanges adjacent the bobbins 17 and 19, and the latter bobbins are provided with similar end flanges having widened and rounded peripheral portions 41 which overhang the flanges 40.

The worm gears 21 to 25 are each driven by a worm 42 on a shaft 43 having one end thereof journalled in a ball bearing assembly 44 suitably supported in the rear wall of housing 10 or 11.

The worm shafts 43 embody tubular portions 45 in which are rotatably journalled portions of driven shafts 46, as is clearly shown in Fig. 3. The shaft 46, cooperating with the worm shaft 43 which is operatively associated with gear 23, extends through the front wall of housing 10 and is adapted for connection with any suitable driving power, as through an extension shaft connected thereto.

Each shaft 46 is journalled adjacent its ends opposed to the portions thereof journalled in tubular portions 45 in ball bearings 47 suitably supported in walls 48 of the housings, and each such shaft is provided with a miter gear 49.

A shaft 50 extends parallel with shaft 13 and transverse to the shafts 46, and this shaft is provided with miter gears 51 operatively engaged with gears 49, whereby the shafts 46 are all rotated in unison.

The shaft 50 extends through a tubular housing 52 extending between and having its ends secured to the housings 10 and 11. With this arrangement, one of the shafts 46 is positively driven, and by means of the shaft 50 and cooperating miter gears 49 and 51 all of the shafts 46 are driven at constant speed.

The shafts 43 and 46 have clutch-driving connections whereby the rotation of shafts 43, gears 21 to 25, and bobbins 16 to 20 may be varied in their rotations, even though the shafts 46 are constantly rotated.

The clutch-driving connections comprise drums 53 outwardly of the tubular portions 45, in which are housed clutch segments 54 in surrounding relations to the shafts 46, and clutch actuators 55 are disposed between the segments and shafts 46.

Each actuator embodies a circumferential raceway 56 and a cylindrical body portion 57 having a wedge-shaped projection 58 enterable between a similarly formed slot 59 between the clutch segments 54, whereby such segments are spread into frictional driving engagement with the drums 53 upon forward movement of the projections 58 into the slots 59.

The actuators 55 are keyed at 60 for longitudinal movement on the shafts 46, but constrained for rotation therewith.

The clutch actuators 55 are normally urged into segment-expanding position by means of neoprene washers 61 disposed between the actuators and disks 62, backed by nuts 63 threaded on the shafts 46, whereby the yieldable action of the neoprene washers 61 on the actuators may be varied.

The washers, while normally maintaining the clutch-driving connections operative, are such that the shafts 43 and 46 will normally rotate in unison, but in the event of a snarl in a trawl line being wound on any particular bobbin, the clutch associated therewith will slip, thereby preventing rupture of the line.

Control means are provided for each clutch-driving connection, and such comprises a yoke 64 having axially-alined journal portions 65 and 66, which are respectively journalled in a plate 67 and a boss 68, and ears 69 are provided in laterally offset relation to portions 65 and 66.

The ears 69 support rollers 70 which track the raceway 56. The journal portion 66 is provided with a handle 71, whereby the yoke may be rotated about portions 65 and 66, and due to the offset relation of the rollers 70 the actuators 55 will be moved longitudinally of shaft 46.

The yoke may be moved to increase the frictional drive between shafts 45 and 43 or to wholly release the drive connection. When the drive connection is released, as in Fig. 3, the rollers will be laterally of portions 65 and 66 and in the vertical axial plane of shafts 43 and 46, whereby they will remain in such position.

The worms 42 provide a locking connection with the worm gears and the miter gears in one housing are opposed to the ones in the other housing to equalize the thrust.

In operation of the structure above described, a trawl line is attached to each bobbin 16 to 20, and the purpose of the winch is to wind in the lines on the bobbins, after which the nets may be wound on the large spool, including the disks 37 and 38.

The shafts 46 are all uniformly driven, as described, and, by means of the clutch-control means, the rotation of shafts 43 may be varied in order to even up the tow lines.

In the event of a line catching, the respective clutch will slip, and if it be desired to part any particular tow line, the frictional drive of the particular clutch associated with the bobbin winding such tow line may be increased by movement of the handle 71.

It will be particularly noted from Fig. 1 that the clutch controls are readily accessible from the rear of the winch and beneath the gear housings 10 and 11.

While I have disclosed my invention in accordance with a single specific embodiment thereof, such is to be considered as illustrative only, and not restrictive, the scope of the invention being defined in the following claims.

What I claim and desire to secure by U. S. Letters Patent is:

1. A trawl winch comprising a rotatable shaft, a plurality of axially alined tow line bobbins supported on the shaft in substantially end-to-end abutting relation, shaft and gear drive means for each of the bobbins, and manually operable clutch means in each of said last means, whereby the rotation of the bobbins may be controlled for evening up the tow lines, said shaft and gear drive means being disposed adjacent the endmost ones of said bobbins.

2. A trawl winch according to claim 1, together with a pair of relatively large disks secured to the endmost bobbins and providing therewith a spool for winding thereon nets towed by said lines.

3. A trawl winch comprising a pair of spaced gear housings, a shaft extending through and between said housings, a plurality of tow line bobbins supported on said shaft in substantially end-to-end abutting relation and in axial alinement therewith and disposed between said housings, worm gears in said housings with each one thereof operatively connected with one of said bobbins, and clutch controlled shaft and gear drive means in said housings operatively associated with each of said worm gears.

4. A trawl winch comprising a shaft journalled in gear housings at its opposite ends, a plurality of axially alined tow line bobbins supported on

the shaft and disposed between the housings, worm gears disposed within each of the housings and each gear operatively connected with one of the bobbins for rotating same, a plurality of shafts journalled in the housings at right angles to said first shaft and each having a worm meshing with one of said worm gears, other shafts axially alined with said plurality of shafts and having clutch driving connections therewith, one of said plurality of shafts being power driven, and a shaft extending at right angles to said other shafts and having miter gear connections therewith.

5. A trawl winch according to claim 4, wherein said clutch driving connections each comprise a drum on one of said plurality of shafts, clutch segments disposed within said drum in surrounding relation to one of said other shafts, a clutch actuator slidably supported on said other shaft for expanding said segments into frictional driving engagement with the drum and yieldable means normally holding said actuator in segment expanding position.

6. A trawl winch according to claim 5, wherein said yieldable means comprises a neoprene washer adjustably supported on said other shaft.

7. A trawl winch comprising a pair of spaced gear housings, a shaft extending through and between said housings, a plurality of tow line bobbins supported on said shaft in axial alinement therewith and disposed between said housings, worm gears in said housings with each one thereof operatively connected with one of said bobbins, and clutch-controlled shaft and gear drive means in said housings operatively associated with each of said worm gears, one of said bobbins being keyed to the said shaft, others of said bobbins having sleeve extensions rotatably supported on said shaft, others of said bobbins rotatably supported on said extensions, one of said worm gears being keyed to said shaft, others of said gears being keyed to said extensions, and others of said gears being connected to the bobbins rotatably supported on said extensions.

8. A trawl winch comprising a pair of spaced gear housings, a shaft extending through and between said housings, a plurality of tow line bobbins supported on said shaft in axial alinement therewith and disposed between said housings, worm gears in said housings with each one thereof operatively connected with one of said bobbins, and clutch-controlled shaft and gear drive means in said housings operatively associated with each of said worm gears, adjacent bobbins including contiguous end flanges, and one of said flanges having an outwardly rounded rim portion overhanging the other flange.

9. A trawl winch comprising a shaft journalled in gear housings at its opposite ends, a plurality of axially alined tow line bobbins supported on the shaft and disposed between the housings, worm gears disposed within each of the housings and each gear operatively connected with one of the bobbins for rotating same, a plurality of shafts journalled in the housings at right angles to said first shaft and each having a worm meshing with one of said worm gears, other shafts axially alined with said plurality of shafts and having clutch driving connections therewith, one of said plurality of shafts being power driven, a shaft extending at right angles to said other shafts and having miter gear connections therewith, said clutch driving connections each comprising a drum on one of said plurality of shafts, clutch segments disposed within said drum in surrounding relation to one of said other shafts, a clutch actuator slidably supported on said other shaft, for expanding said segments into frictional driving engagement with the drum, yieldable means normally holding said actuator in segment expanding position, and manually operable means for actuating said clutch actuator.

EPHRAIM C. S. CLARK.

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