

Sept. 27, 1960

F. J. LUKETA

2,954,209

WINCH

Filed April 9, 1956

5 Sheets-Sheet 1

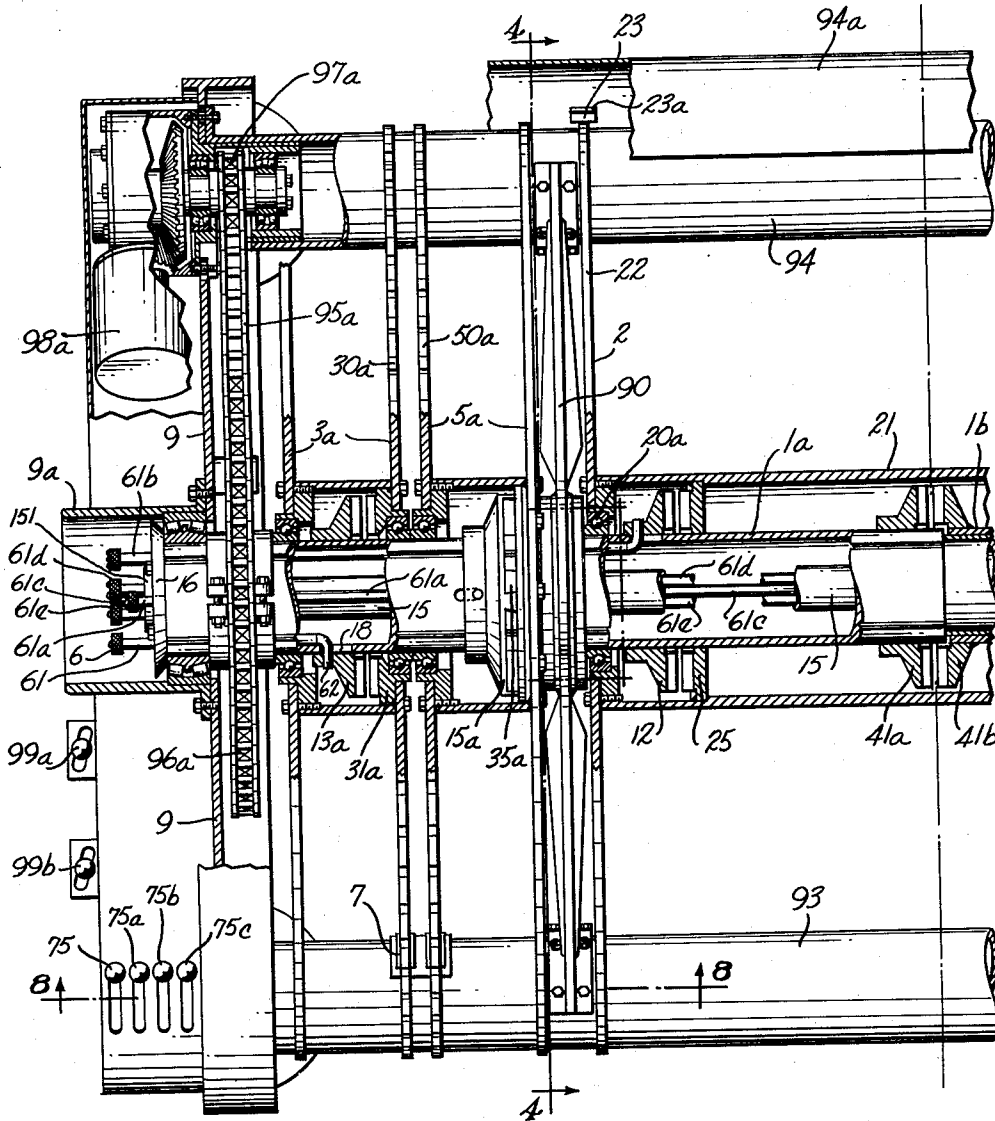


Fig. 1.

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5 Sheets-Sheet 2

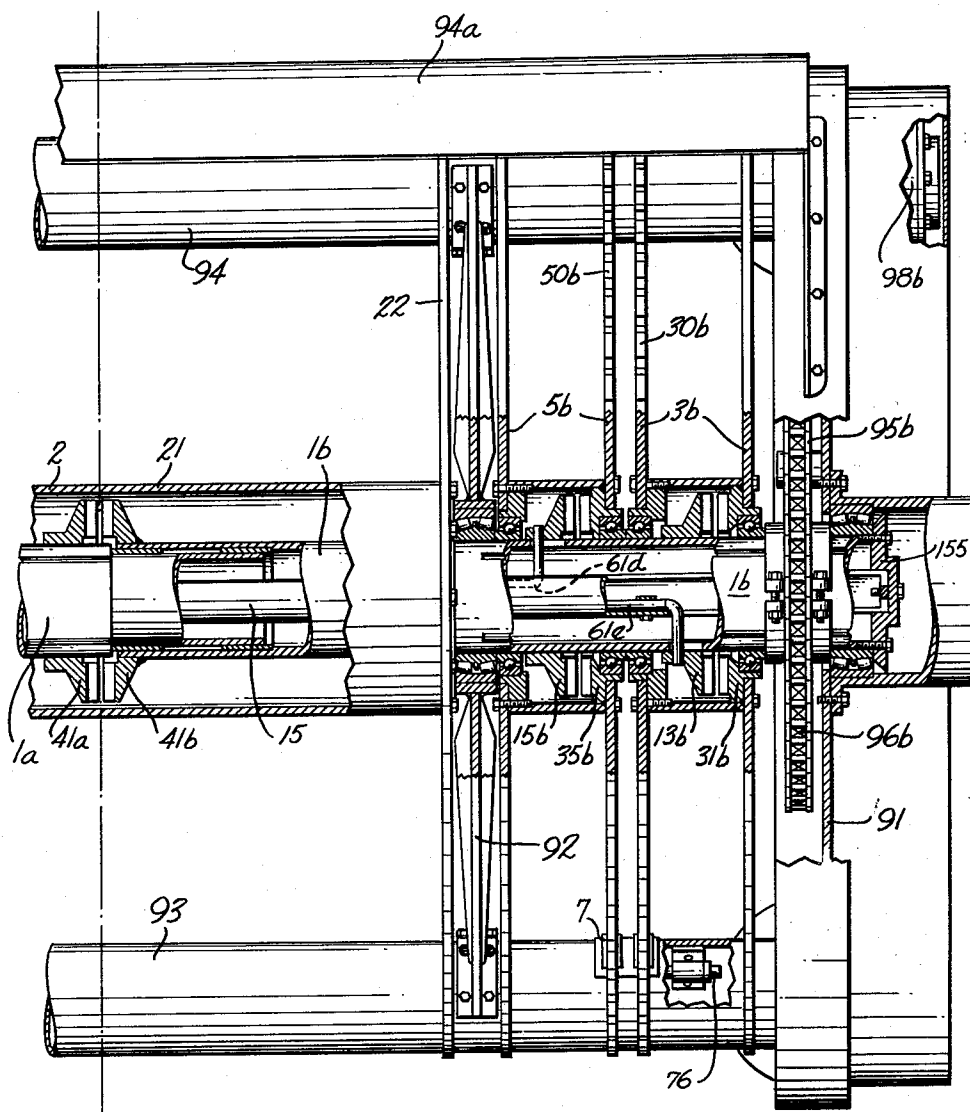


Fig. 2

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Fig. 3.

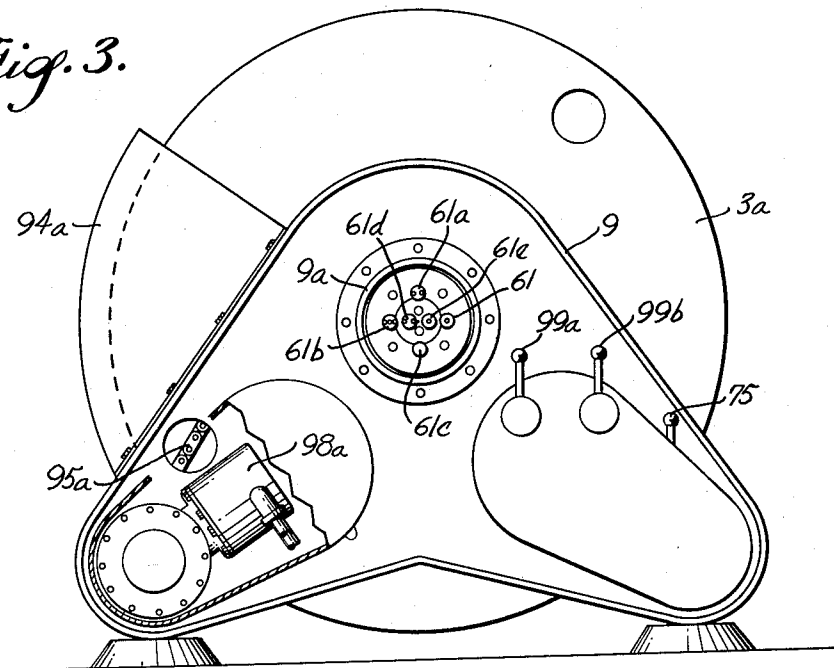
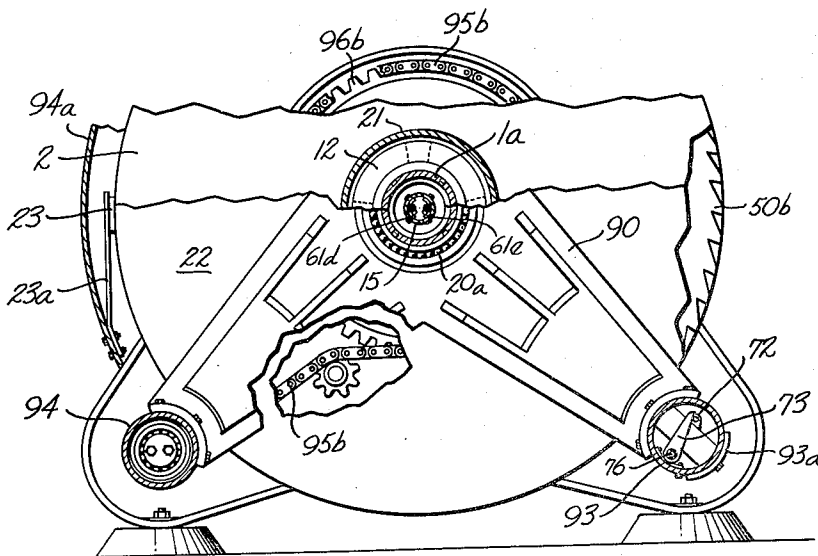


Fig. 4.

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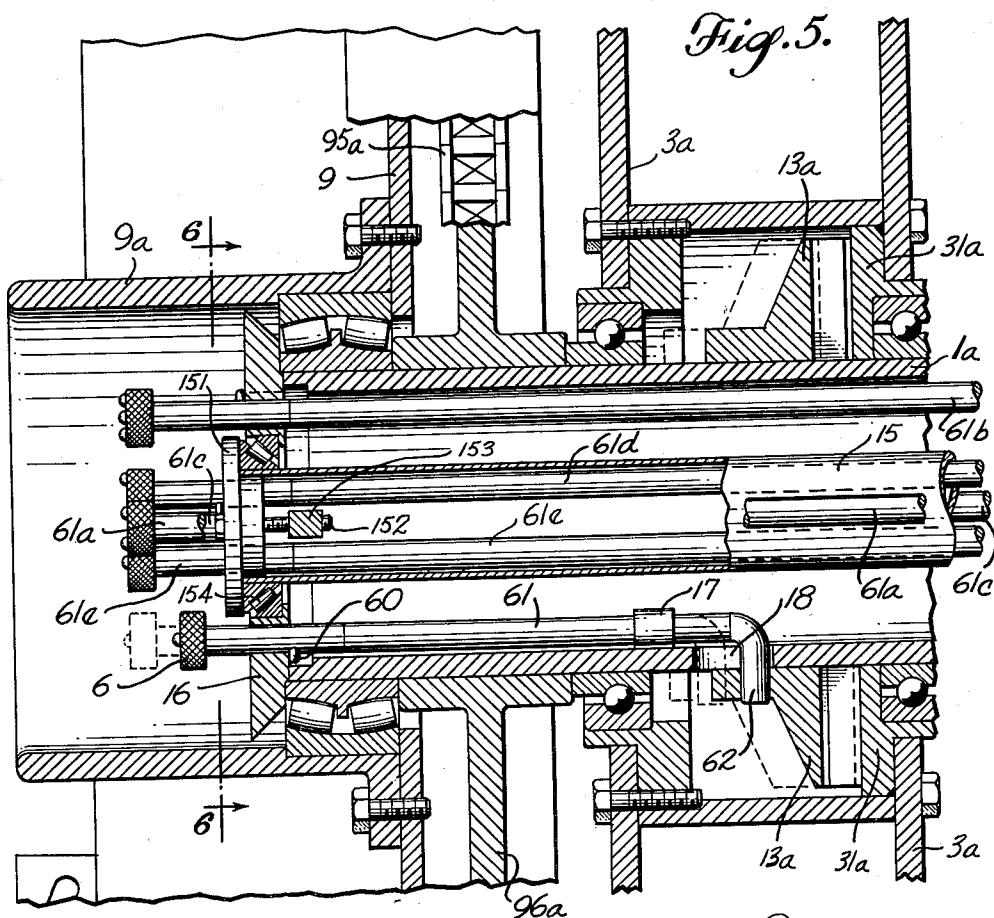
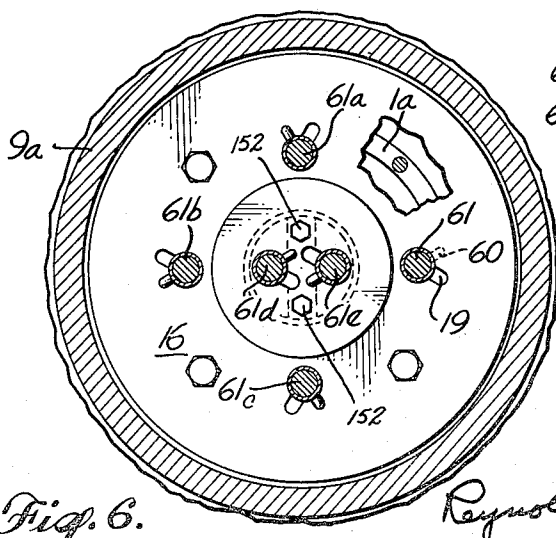
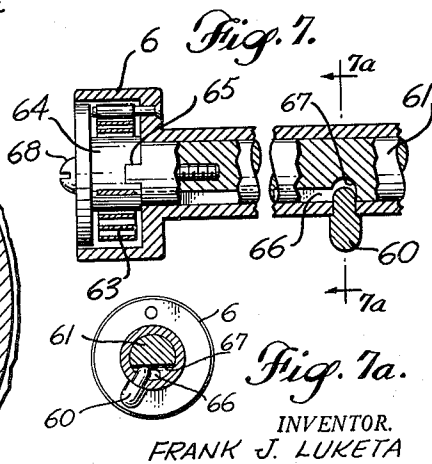
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Fig. 8.

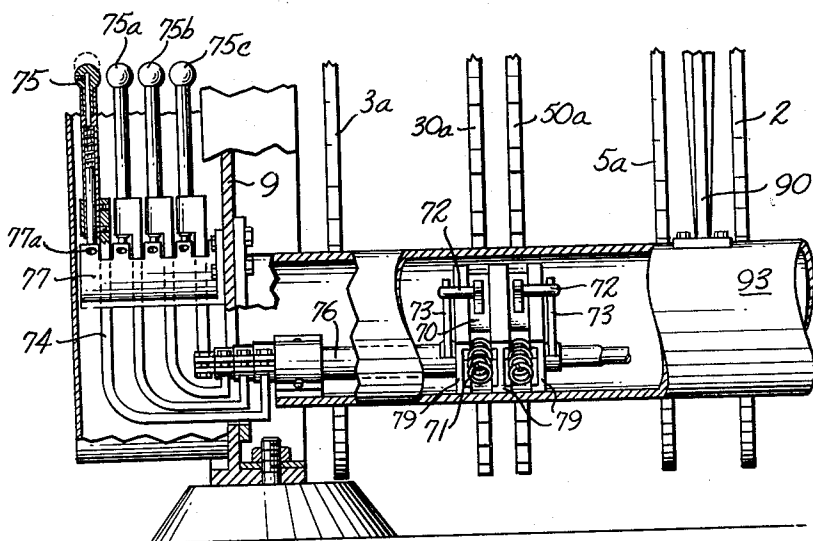
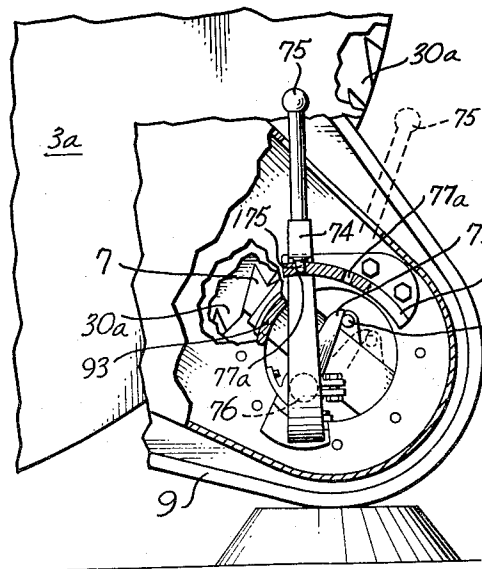
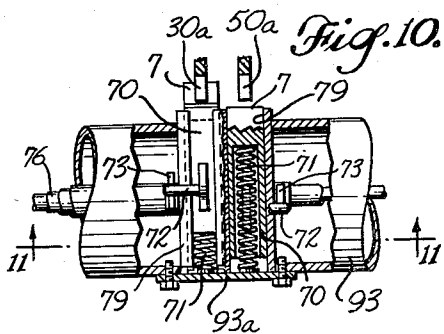
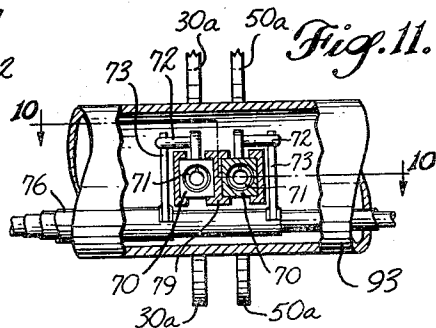


Fig. 9.



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WINCH

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Filed Apr. 9, 1956, Ser. No. 576,941

14 Claims. (Cl. 254—185)

This invention relates to a winch having a plurality of drums, together with means for driving any one or any pair of drums, or indeed any number or all thereof, either from a single variably driven motor means or from both of two motor means, all to the end that the drive of any drum or set of drums can be accomplished in a wholly flexible manner, with regard to the power available for application to the drum, and with regard to the number of drums and the relative speed thereof during operation, at any given time.

The winch of this invention is capable of use in any of various circumstances where a multiple drum winch is desired (for instance, in logging operations), but it has been particularly designed for use in connection with the Trawl Net Hauling Gear shown in my co-pending application Serial No. 570,771, filed March 12, 1956. It is to be understood, however, that no restriction to such use is intended thereby.

It is one of the objects of the present invention to provide a multiple drum winch of the character generally indicated above, so constructed and arranged that the winch as a whole will occupy a minimum of space, since deck space is limited on a trawler, and, in addition to provide such a winch in which all controls are located, preferably, adjacent a single control station at an end of the winch, whereby from that station a single operator can control the number of motors connected to any drum or drums of the winch, can control which drum or drums are energized, can hold any given drum or drums, except possibly one, positively from reverse rotation or paying out, and can control the speed and power applicable to the driven drum or drums. One reason for desiring such control from a single control station and by a single operator is that the number in the crew of a trawler, such as this winch is designed for, is always small and it is desirable that as many crew members as possible be available for jobs in handling the net itself and the lines running to the net, and the catch, rather than be concerned with the operation of the winch.

The winch of this invention, speaking generally, comprises a drive shaft, which preferably is hollow so that certain push-pull clutch control rods may extend through it, and which preferably is made in two separate halves, each capable of being driven by its own independent motor means, and capable also of being interconnected so that the drive shaft as a whole may be driven from the two motor means conjointly, or by either motor means. Journaled upon the drive shaft are several drums. These would include usually a common drum, which is designated hereinafter a "first" drum, which is journaled in part upon one of the shaft halves and in part upon the other shaft half, and which can be driven from one of those shaft halves through clutch means, or from the two interconnected shaft halves. At least one other drum, and usually two, are journaled upon each shaft half, in addition to the first drum, mentioned above, and each is driven from the corresponding shaft half through clutch means. The several clutch means, including the clutch

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means for interconnecting the two shaft halves, are controllable by push-pull rods which extend through the hollow shaft, from a control station to the shiftable clutch plate of the individual clutch means. Certain novel clutch-actuating mechanism is associated with each push-pull rod. Each clutch means is preferably located within a hollow hub of its drum, thereby lessening the axial length of the winch, as a whole, yet without materially increasing the diameter of the winch. Ratchet mechanism is provided for holding each of the drums, except perhaps the common first drum, against retrograde rotation, and these ratchet means are controllable also from the control station by mechanism which is, in itself, novel. The controls for energization of the two motor means are also located at the same control station, these motor means being preferably hydraulic motors of the infinitely variable speed type, so that the control means may be in the nature of valves or tiltable plates. The several controls, where there are like controls for each of several drums, are arranged in the order of succession of the drums, whereby the operator is unlikely to become confused and operate the wrong control, and this requires certain special mechanical arrangements to connect between the control handles, or the like, and the parts controlled.

All these and other details will appear more fully hereinafter as this specification progresses, and can be ascertained from the accompanying drawings, wherein the invention is illustrated in a presently preferred form. The features of novelty in which the present invention resides will be brought out in the appended claims.

Figure 1 is, in part, a plan view and, in part, an axial section through the control end of the winch, and Figure 2 is a similar view, showing the opposite end of the winch.

Figure 3 is an end elevation from the control end, with parts broken away to illustrate in particular the motor means at the one end.

Figure 4 is a transverse sectional view, substantially on the line 4—4 of Figure 1, through an intermediate part of the winch.

Figure 5 is an enlarged axial sectional view of the clutch selecting and operating mechanism at the control end of the winch.

Figure 6 is a transverse sectional view at the line 6—6 of Figure 5. Figure 7 is an axial sectional view of a rotatable head associated with a single push-pull rod, and Figure 7a is a sectional view thereof at the line 7a—7a of Figure 7.

Figure 8 is, in part, an elevation and, in part, a sectional view on a vertical plane axially of the locking dog controlling mechanism. The sectional plane is indicated generally by the line 8—8 in Figure 1.

Figure 9 is a transverse sectional view through one of the control levers for a locking dog.

Figure 10 is a sectional view substantially as indicated at 10—10 in Figure 11, and Figure 11 is a sectional view substantially on the line 11—11 of Figure 10, illustrating further details of the locking dog mechanism.

Because of the length of the winch and the small size of the details which are assembled compactly within the winch, it is not feasible to show the winch as a whole in a single view, but Figures 1 and 2 are views which slightly overlap at the central portion, and which show the respectively opposite ends of the winch. Figure 1 shows the control end, and Figure 2, the opposite end. Such a winch includes a drive shaft, referred to as a whole by the numeral 1, but which normally is made in two axially aligned, but separate, halves, designated to distinguish them 1a and 1b. For reasons which will appear shortly, this composite drive shaft 1 is hollow. Each half is separately journaled in frame elements 9

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and 90, 91 and 92, respectively, and these are all connected rigidly by transverse frame members 93 and 94. Each drive shaft half carries a sprocket gear 96a, or 96b; a driving sprocket 97a, and a similar one, not shown, at the opposite end journaled in the frame member (for instance, in the tubular frame member 94), is driven through a drive chain 95a or 95b from its individual motor means such as 98a, and a similar motor member at the opposite end 98b. Preferably, the motor means are brakeable, reversible hydraulic motors of the tilting plate or infinitely variable speed type, and are controllable from a control station by the respective control handles 99a and 99b.

By such means, the control shaft or either of its halves is capable of rotation at any desired speed and with any gradation of power, independently of the other half or conjointly therewith, or in opposite directions.

Since there are times when it is desirable to connect the two motor means to the shaft 1 in common, so that both may be employed for rotating the shaft, clutch means are provided for this purpose, located where the aligned ends of the shaft halves, 1a and 1b, abut, and consisting, for example, of a clutch plate 41b fast to the shaft half 1b, and a clutch plate 41a keyed to rotate with the shaft half 1a and capable of sliding axially along the shaft half 1a into and from engagement with the clutch plate 41b. The two clutch plates may be dog clutch elements, and this is the preferred arrangement. The mechanism for shifting the clutch plate 41a will be explained hereinafter.

A drum, generally designated by the numeral 2, will be designated hereinafter as the "common" drum or the "first" drum, and is journaled upon the drive shaft, one end of the drum 2 being journaled at 20a upon the shaft half 1a, and the other half being journaled upon the shaft half 1b in similar manner, although it is not illustrated in detail. These bearings for the first drum 2 are located, it will be noticed, closely adjacent the frame elements 90 and 92 in which the shaft halves, 1a and 1b, respectively, are themselves journaled.

Preferably, the drum 2, like the other drums to be described later, is formed with a hollow hub 21, and opposite flanges 22. The hollow hub 21 is spaced radially outwardly from the shaft sufficiently to leave an annular tunnel between them, within which tunnel are located the clutch elements 41a and 41b previously referred to, and other clutch elements which will shortly be described.

In addition to the drum 2, at least one other drum (and in the winch shown there are two others), is journaled upon each shaft half. Thus, the drums 5a and 3a in succession are journaled upon the shaft half 1a outwardly of the first drum 2, and the drums 5b and 3b are journaled upon the shaft half 1b. In most respects, the construction and mounting of these drums are similar to the construction and mounting of the drum 2. Each has an enlarged hollow hub which houses certain clutch elements to be referred to shortly. Differing from the drum 2, however, each of the drums 3a, 3b, 5a and 5b is provided with a series of circumferentially arranged ratchet teeth 30a, 50a, 30b, and 50b for engagement with certain ratchet locking dogs which will be described later. The drum 2 runs freely but its rotation is braked by a brake shoe 23, spring-pressed by the spring arm 23a against a flange of the drum. This, however, is a matter of choice and convenience, and the drum 2 as well as the other drums might be positively controlled and locked in rotated position by a locking dog such as that to be described, which controls the other drums.

Since each of the drums is journaled freely upon the drive shaft 1, it is necessary to clutch each one to the shaft when that drum is to be rotated positively. Referring to the drum 3a, which is typical of all the others, a pair of clutch elements is provided, one of the pair being connected to the drum and the other to the driving shaft 1. Thus, the clutch plate 31a is connected to the drum

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3, and the clutch plate 13a is keyed to rotate with the shaft half 1a and to slide therealong. Similar pairs of clutch elements, designated 35a and 15a for the drum 5a; 31b and 13b for the drum 3b; and 35b and 15b for the drum 5b, are arranged to engage and to disengage, to effect or to discontinue rotation of the corresponding drums. All such clutch elements are located within the annular tunnel between the hollow hub of the corresponding drum and the drive shaft which extends through that hollow hub.

In addition, and for the purpose of driving the drum 2, a clutch element 12 is mounted to rotate with and to slide lengthwise of the shaft half 1a and to engage with a complementary clutch plate 25 fast to the hub of the drum 2. The shaft 1 is splined for keying interengagement with these shiftable clutch plates.

Each shiftable clutch plate of the six pairs described is movable by its individual push-pull rod which extends through the hollow shaft 1 from the control station shown at the left in Figure 1. The movement of the clutch element might be effected by servo means, but for simplicity and directness the use of the push-pull rods is preferred.

Figures 5, 6 and 7 best show such a push-pull rod and the manner of its connection and operation for shifting of the clutch plate 13a into and from engagement with the complementary clutch plate 31a, for rotation of the drum 3a. Here, a rod 61 extends through a transverse end plate 16, which is fast to the end of the shaft half 1a, and may be guided also at 17 within the hollow shaft 1a. At its inner end the rod 61 is provided with an out-turned toe 62, which extends through a slot 18 in the hollow shaft, to engage with the shiftable clutch plate 13a. The push-pull rod 61 is provided with a head 6 exteriorly of the transverse plate 16, which head includes also a sleeve and is rotatable with relation to the remainder of the rod 61. This head carries a key 60 which is rotatable with the head, and which cooperates with a keyhole slot 19 in the transverse plate 16, so that when the key 60 is at the exterior face of the plate 16 and out of registry with the keyhole 19, the push-pull rod is locked in its outward position, whereas when the key 60 is rotated into registry with the keyhole slot 19, the rod may be pushed through, and then by rotation of the key out of registry with the keyhole slot 19 and into engagement with the inner face of the plate 16, the push-pull rod is locked in its inward position. It is so locked in Figure 5, and in consequence the shiftable clutch plate 13a has been shifted from the dash line position of that figure into the full line position thereof, in which latter position the clutch plates 13a and 31a are engaged.

The head 6 is urged rotatively into a position wherein the key 60 is out of engagement with the keyhole slot 19. To this end a spiral spring 63 is connected at one end to the head 6 and at its other end to a plug 64 which is non-rotatively engaged at 65 with the non-rotative push-pull rod 61. The outer end of the rod 61 is recessed, as indicated at 66, to enable axial movement, during assembly, of the inner end of the key 60 with relation to the rod. The rod 61 is also transversely slotted at 67 to cooperate with the inner end of key 60 to the end that positive stops are provided at each end of the thus limited range of movement of sleeve 6, so that when the headed sleeve 6 is manually rotated clockwise it is stopped automatically in registry with keyhole slot 19. Parts are held in their engaged position by the cap or plug 64 and the screw 68 which passes through this cap and into the outer end of the push-pull rod 61, as shown in Figure 7.

Each of the push-pull rods is similarly controlled and shiftable, and capable of being locked in either the clutch-engaged or the clutch-disengaged position. Just as the rod 61 controls the clutch elements for the drum 3a, the rod 61a controls the clutch elements 15a and 35a for the drum 5a, the rod 61b controls the clutch elements 12 and 25 for rotation of the first drum 2, the rod 61c controls the engagement of the clutch elements 41a and

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41b for interconnection of the shaft halves 1a and 1b, the rod 61d controls the engagement of the clutch elements 15b and 35b for the drum 5b, and the push-pull rod 61e controls the clutch elements 13b and 31b for the drum 3b.

It will be noted that the push-pull rods 61d and 61e which control the clutch elements for the drums 5b and 3b, located at the end of the winch that is distant from the control station, extend through a tubular core 15 which is mounted axially within the shaft 1, whereas the other four push-pull rods are located externally of the core 15, although still within the hollow shaft. The core 15, at the control station end, has a cap 151 secured by a screw 152 threaded into a cross bar 153, fast to the core 15, and is journaled at 154 within the end of the shaft half 1a. At the distant end core 15 is fast to a cap 155 which is also fast to shaft half 1b; see Figure 2. It follows that core 15 rotates (or remains non-rotative) in accordance with rotation (or non-rotation) of shaft half 1b, whereas shaft half 1a may at the same time be rotating or stationary, or may even be rotating in the reverse sense. The rods 61, 61a, 61b, and 61c necessarily conform, as to rotation, to the shaft half 1a, through the end plate 16 whereof they protrude. If the rods 61d and 61e merely protruded likewise through the plate 16, any disconformity between the rotation of shaft halves 1a and 1b would twist off the rods 61d and 61e, but by thus freeing the rods 61d and 61e from any necessity to rotate in conformity with shaft half 1a, and requiring their rotation only in conjunction with shaft half 1b, to clutch elements whereon these rods 61e and 61d pertain, any such difficulty is avoided.

It is preferred that the various heads for the push-pull rods be housed within a sleeve 9a which is mounted upon the frame element 9, and it will be noted that each of them bears a distinctive marking so that the operator can identify the individual rods by feel as well as by sight, for they revolve with the respective halves of the shaft 1, as just explained. Located within the sleeve 9a they are protected from injury and from accidental operation.

The tubular frame member 93 furnishes a convenient means for housing certain locking mechanism for holding the individual drums, other than the first drum 2, in an attained position against retrograde rotation. These several drums, it will be remembered, are provided with the circumferentially arranged ratchet teeth 30a, 50a, 50b, and 30b, respectively. Preferably, these teeth are ratchet teeth, that is to say, they will permit or cause a spring-held dog to yield upon rotation one sense, but the dog will lock against rotation in the reverse sense. A ratchet dog 7 is shown in Figures 9 and 10 in engagement with the ratchet teeth 30a of the drum 3a. This dog is formed at an end of a slide 70, which is guided at 79 in the frame, and which is longitudinally bored for the reception of a compression spring 71. This spring, reacting between the bottom of the bore and the side of the tubular member 93, or a closure cap 93a, which is opposite the dog 7, urges the dog yieldingly toward engaged position with respect to the ratchet teeth 30a. A pin 72 projecting laterally from the slide 70, is in position for engagement by a nose 73 of a control lever mechanism, which includes the lever 74 and its handle 75, which are pivotally mounted at 76 within the tubular frame member 93. The handle 75 is movable lengthwise of the lever 74 as well as oscillatably with the latter, to engage the dog 175 within one or the other of two holes 77a in an arcuate plate 77, and to disengage the same, whereby to hold the handle 75 in one or the other of the full line or the dash line positions shown in Figure 9. In the full line position, the nose 73 permits the pin 72, and hence the correspondingly slide 70 and dog 7, to be urged radially inwardly under the influence of its spring 71 into engagement with the ratchet teeth 30a of the drum. In the dash line position of the

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handle shown in Figure 9, the dog 7 is pulled radially outwardly to disengage the dog from the teeth 30a, and so to free the drum 3a for rotation. Even when locked, however, the drum 3a may rotate in one sense by pushing the ratchet dog 7 inwardly in opposition to its spring 71.

By similar arrangement, each of the handles 75a, 75b, and 75c controls the locking of the corresponding dogs for the respective drums 5a, 5b, and 3b, respectively. It will be noted in Figure 8 that the successive positions of the several locking handles 75, 75a, 75b and 75c corresponds to the successive positions of the drums which each such handle controls.

When all the clutch plates are disengaged, the several handles 6 of the individual push-pull rods will be in their leftward position, as seen in Figures 1 and 6 for instance. Normally at such times the handles 75, 75a, etc., would be in their locked positions, and this would be clearly indicated by their position. When it is desired to reel in on any individual drum, for instance the drum 3a, the dog 7 of that drum would be released and the clutch plates 13a and 31a of that drum would be engaged by pushing inward the corresponding push-pull rod 61 as is indicated in Figure 5. This clutch engagement would normally be accomplished before rotation of the drum had been commenced, and could be accomplished while the locking dog 7 for this drum is still in engagement but the motor means 98a is still deenergized. Now, upon energization of the motor means 98a and disengagement of the dog 7 the drum 3a is reeled in, by virtue of its clutch connection to the driving shaft half 1a. It is not necessary that the corresponding but opposite drum 3b be reeled in at the same time, but ordinarily this would be desirable, and can be accomplished by corresponding operation of the controls for the drum 3b and energization of the corresponding motor means at the opposite end of the winch or indeed by the same motor. The motor controls, as previously indicated, are at 99a and 99b at the single control station. During this rotation of the two drums 3a and 3b conjointly, it is not necessary that the two shaft halves, 1a and 1b, be interconnected. If, however, there is an especially hard pull upon a single drum for example, or if precise synchronization of the drums 3a and 3b is desired, it is possible to interconnect the two shaft halves 1a and 1b by interengaging the clutch plates 41a and 41b through manipulation of the corresponding push-pull rod 61c. Thereupon both motor means are connected for driving any one or all of the drums which are clutched to the shaft 1, and all clutched drums are rotated alike.

In similar fashion, each of the drums 5a and 5b may be driven either from the respective shaft halves 1a and 1b, or conjointly from the shaft 1 with the clutch plates 41a and 41b interconnected. Finally, the first drum 2, which is common to the two driving shaft halves 1a and 1b can be driven from the motor means 98a through the shaft 1a and the clutch elements 12 and 25 alone, or by the other motor means 98b or by both motor means. The drag placed upon the drum 2 by the friction shoe 23 is inconsiderable, and it has not been found necessary to relieve this drag when the drum is positively rotated by the respective or the individual motor means.

Having attained a given reeled-in position, any of the drums 3a, 5a, 5b or 3b may be locked in that position by reengagement of the respective ratchet dogs 7 with the corresponding serrated or toothed flange of the corresponding drum. The first drum 2, on the other hand, would be held in position normally under the influence of the motor means at 98a or the companion motor means at 98b, or, when there is no strain on the drum, by the friction shoe at 23 under the influence of its spring mounting arm 23a.

The winch according to the present invention thus combines in a high degree flexibility as to applicable power, and individual drums which can be individually

driven or driven from the two motor means, if preferred. It includes also compactness in the axial direction, and convenience of operation from a single control point. The rear side of the several drums, particularly the ratchet flanges thereof, may be hooded in if desired by the hood 94a.

I claim as my invention:

1. In a winch in combination, a drive shaft formed of two separate, axially aligned halves, two separate motor means each operatively connected to its corresponding shaft half and independently energizable to rotate the latter in the same rotative sense, a first drum journaled in part upon one shaft half and in part upon the other, at least one additional drum journaled wholly upon each of the shaft halves, clutch means for operatively connecting each of the latter drums with and disconnecting it from the corresponding shaft half, clutch means for operatively connecting said first drum to and disconnecting it from one, only, of the shaft halves whereon it is journaled, and clutch means for operatively interconnecting the two shaft halves for conjoint rotation by the two motor means, and for disconnecting them for independent rotation, each by its corresponding motor means.

2. A winch as in claim 1, wherein the drive shaft is hollow, and the several clutch elements each includes a clutch plate shiftable axially relative to a paired clutch plate, the winch including also push-pull rods extending through the hollow shaft from a control station at the end of the winch each to its shiftable clutch plate, for shifting the latter.

3. A winch as in claim 2, including a transverse plate fixed to the drive shaft at the control station, and keyhole-apertured for passage of certain push-pull rods, each such rod having a relatively rotatable head and a key thereon for passage through the keyhole aperture, by rotation of the key from registry with the keyhole aperture to retain the rod in either of two axially shifted positions, corresponding to clutch-engaged and clutch-disengaged positions, respectively.

4. A winch as in claim 2, including also a tubular core coaxial with, spaced from, and extending through the hollow shaft, means connecting said core to the shaft half which is distant from the control station, for conjoint rotation with said distant shaft half, journal means interposed between said core and the shaft half which is at the control station end, for relative rotation of the last-mentioned shaft half and the core, such push-pull rods as control clutch means which include a clutch plate upon the distant shaft half extending through and being guided in said core, and all other push-pull rods being located in the space intermediate the shaft half which is nearer the control station end and said core, and being guided in that shaft half.

5. A winch as in claim 4, including a transverse annular plate fixed to the shaft at the control station end, a cap fixed to the end of the core at the control station end, each of the plate and cap being keyhole apertured for passage and guidance of the respective push-pull rods, each such rod having a relatively rotatable head located externally of the plate or cap as the case may be, and a key on each head for passage through the keyhole aperture, by rotation of the key into registry with the keyhole aperture to enable axial movement of the corresponding head and its key, until the key passes through its plate or cap, and then by rotation of the key out of registry with the keyhole aperture to retain the rod in either of two axially shifted positions, corresponding to clutch-engaged and clutch-disengaged positions, respectively.

6. A winch as in claim 1, wherein the several drums include hollow hubs spaced from the drive shaft, and the clutch means are disposed within the respective hollow hubs, the clutch means for interconnecting the two shaft halves being disposed within the first drum.

7. A winch as in claim 1, wherein the drive shaft is hollow, and wherein the several drums are formed with

hollow hubs spaced from the drive shaft to define an annular tunnel, the several clutch means being located within such annular tunnel, and each including an axially shiftable clutch plate, and push-pull rods extending through the hollow drive shaft from a control station at the end of the winch, and through the drive shaft at each rod's inner end for connection each to its shiftable clutch plate.

8. A winch as in claim 1, wherein each drum that is journaled wholly upon a single shaft half is formed with ratchet teeth circumferentially arranged, a dog fixedly positioned for engagement with the teeth of each such drum, and means at a control station to shift each dog into and from engaged position, and to retain the dog in either shifted position.

9. A winch as in claim 8, and a friction brake engaged with the first drum, as a drag thereon.

10. In a winch, in combination, a hollow drive shaft, motor means to rotate said drive shaft, a plurality of drums journaled upon said drive shaft, clutch means for operatively connecting certain of said drums with and disconnecting each thereof from said drive shaft, including a clutch plate fixed to the drum and a complementary clutch plate keyed to rotate with and slidable axially along said shaft, a push-pull rod extending through the hollow shaft from each axially shiftable clutch plate to a control station at the end of the winch, a transverse plate upon the latter end of the shaft, keyhole-apertured for passage of certain push-pull rods, a head rotatably mounted upon the outer end of each such rod, a key projecting radially from and rotatable with each head, for passage through its keyhole aperture and for rotation thereafter into retaining engagement with either face of said transverse plate, spring means operatively connected to each head to urge the latter and its key into such retaining position, and a toe outturned at the inner end of each push-pull rod for engagement with its axially slidable clutch plate, the hollow shaft being slotted axially for protrusion and shifting of said toe.

11. In a winch, in combination, a hollow drive shaft, motor means for rotating said drive shaft, a plurality of drums journaled upon said drive shaft, clutch means for operatively connecting certain of said drums with and disconnecting each thereof from said drive shaft, including an axially shiftable clutch element keyed to rotate with the shaft, a push-pull rod extending through the hollow shaft from each axially shiftable clutch element to a control station at an end of the winch, a closure secured upon the end of the shaft at the control station, and keyhole apertured for passage of the respective rods, a head rotatably mounted upon each rod externally of said closure, spring means interposed between each rod and its head to urge the head in a given rotative sense, a key projecting internally and externally of each head, and of a size to pass through its keyhole aperture when in registry therewith, and being spring-urged from such registry, the rod being slotted transversely, in registry with the internal projection of said key, to limit the spring-urged rotative movement of the key and head, and to retain the key in position to contact one face or the other of the closure, so to retain the rod in a clutch-engaged or clutch-disengaged position.

12. In a winch, in combination, a hollow drive shaft, motor means operatively connected to said shaft for driving the same, a plurality of drums journaled thereon, pairs of complementary clutch elements disposed within the hollow drive shaft and in each pair fixed respectively to said shaft and to the corresponding one of said drums, clutch control devices located beyond an end of said hollow shaft, and means extending through said hollow shaft and operatively connecting each clutch control device to a clutch element of each pair, to connect or disconnect such elements, and so to drive any selected drum or drums from said drive shaft.

13. A winch as in claim 12, including separate first and second motor means, said clutch elements including further elements also disposed within the hollow shaft

and arranged for driving connection of either or both said motor means to the driving shaft, and the operative connections between each control device and all said clutch elements extending through the hollow shaft.

14. In a winch, in combination, a drive shaft formed of two separate, axially aligned halves, two separate motor means each operatively connected to its corresponding shaft half and independently energizable to rotate the latter, a plurality of drums, some whereof are journaled upon one shaft half and some whereof are journaled upon the other half, clutch means for operatively connecting each such drum with and disconnecting it from the corresponding shaft half, clutch means for

operatively interconnecting the two shaft halves for conjoint rotation by the two motor means, and for disconnecting them for independent rotation, each by its corresponding motor means, and control means for clutching and declutching each of said clutch means.

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