To all whom it may concern:

Be it known that we, HARRY N. COVELL, of the city of New York, borough of Brooklyn, county of Kings, and State of New York, and CHARLES A. BAECHTOLD, of Westfield, Union county, and State of New Jersey, have invented a new and useful Improvement in Reversible Driving Devices, of which the following is a specification.

Our invention relates to an improvement in reversing driving mechanisms, and comprises novel features, which will be hereinafter particularly pointed out in the claims.

We have herein shown our device as applied to a winch-head in such manner that it may be reversed in direction of rotation, as desired. It is, however, to be understood that our device may be used for connecting a shaft rotating constantly in one direction with any other device which it is desired to turn in both directions.

Figure 1 shows a longitudinal section of our device as applied to a winch-head. Fig. 2 is a section taken upon the line 2 2 of Fig. 1. Fig. 3 is a plan and partial section of a modification of our device.

The drawings accompanying herewith illustrate the form of construction now preferred by us, but not the only form of which we are aware in which our invention may be embodied. The construction of this form will now be described.

In the drawings, A represents the shaft, which is constantly rotated in one direction. In the case of a winch-head as applied to a hoisting-engine, for which use our device is particularly designed, this shaft would ordinarily be the shaft of one of the hoisting-drum. It will be so considered and described herein, although it is to be understood that our invention may be employed independently of a hoisting-drum. To this shaft is keyed or otherwise fixedly secured a sleeve B, which is provided near one end with a radially-extending flange B', one face of which is provided with teeth, forming a bevel-gear B'. Loosely mounted upon the end of the sleeve B is a winch-head C, which is secured in place thereon by means of a washer J and a bolt J', which screws into the shaft A. Loosely mounted upon the opposite end of the sleeve B or upon the section thereof is a member which consists of a radial disk D, terminating at its outer edge in a circular ring D', thus forming a hood which incloses the operating mechanism and acts as a pinion-carrier. The inner face of the winch-head C is provided with teeth, forming a bevel-gear C', which corresponds in size and is located opposite the bevel-gear B'. Radially journaled upon shafts I, which are secured to the hood D', are beveled pinions I, which mesh with the two gears B' and C'. The outer periphery of the hood is provided with a friction-surface b', adapted to be engaged by a friction-brake of any character. The brake herein shown consists of a band E, which has its ends secured to pins k and k', carried by a lever K', at unequal distances from a central shaft K. A disk F is secured to turn with the shaft A, but to slide longitudinally thereon, and carries one half of a friction-clutch, the other half being carried by the disk D. The friction-clutch may be of any desired construction, the construction herein shown consisting of annular disks or rings G and G', secured, respectively, to the disks D and F. Any other well-known form of friction device may, however, be substituted therefor, as the employment of the particular kind of friction device illustrated is not essential to the success of our invention. The disk D may be slid longitudinally of the shaft by any desired mechanism in order to apply the friction-clutch. If any other form of friction device is employed, a suitable applying mechanism therefor would be employed. The mechanism herein shown consists of two cam-disks H and H', surrounding the shaft, the disk H being held against movement by engagement with the frame of the engine and the disk H' being turnable upon the shaft. These two disks are provided with cam-surfaces A, so that when the disk H' is turned the disk F will be moved upon the shaft to engage or disengage the friction-clutch. The disk H' is provided with an arm H', which is connected, by means of a link L, with one end of the lever K upon the operating-shaft. The connections of the cams and the band-brake with the lever K' are such that when one is applied the other is released. The shaft K may be mounted in any suitable manner and provided with an operating-handle at any convenient point.
From this description the operation of our improvement will be readily apparent. For instance, if it is desired to have the winch-head C turn in the same direction as the shaft the friction-clutch is thrown into operative position and the brake B is taken off the disk, so that the pinion-carrying disk and the winch-head will be locked by the action of the friction device and will turn the shaft.

If it is desired to reverse the direction of the winch-head C, the friction-clutch is thrown out of operation and the band-brake E is brought into engagement with its braking-surface, this holding the pinion-carrying disk stationary, so that as the sleeve member B turns with the shaft the radially-extending flange B' will turn the pinsions about their respective axes, and as such flange is fast with and turning in the same direction as the shaft the direction of rotation of the pinions intermeshing with the part C' of the winch-head C will drive such winch-head in a direction opposite, or the reverse of the rotation of such shaft.

In the modification shown in Fig. 3 the winch-head C is not mounted upon the same shaft as that carrying the reversing mechanism. In this case the winch-head is mounted upon an auxiliary shaft A' and is provided with a radial flange C' which is provided with teeth forming a gear which is in mesh with a gear upon the shaft A, carrying the reversing mechanism. As herein illustrated, these gears are spur-gears, the gear C' upon the winch-head being an internally-toothed gear. The reversing mechanism employed in this modification is similar in construction to that shown in Fig. 1. The gear C' corresponds with the winch-head C, as shown in Fig. 1.

It is evident that the reversing mechanism may be connected with a winch-head, which is separated from the main shaft A in any suitable or desired manner. The connections as herein shown are simply given as instances thereof. We do not, therefore, wish to be confined to the exact form of the device as herein shown, as the same is capable of many variations without departing from the spirit of the invention.

Among the characteristic features of our device is the use of two fixed and two loose members upon the revolving shaft and the use therewith of a single train of gears between the shaft and the winch-head or other object to be turned, the support for an intermediate gear of the train being engagable with friction devices, to be either held against rotation or to be turned about its axis.

One great advantage of our device is that the winch head or drum being unobstructed at one end permits a rope being applied or removed without difficulty and enables the strain to be applied to pull upon either end of the rope without reversing the engine. It is thus well adapted for use upon hoisting-engines, and especially for the purpose of swinging a derrick.

We do not wish to be understood as limiting ourselves to the particular construction shown, but desire to claim any constructions which are substantial equivalents or reversals of the construction herein illustrated.

We claim—

1. In a hoisting apparatus the combination with a non-reversible rotating shaft and a winch-head loosely mounted thereon, of a driving connection between shaft and winch-head containing a gear member, a rotatable support for said gear member, a friction device adapted to engage said gear-member support to turn it with the shaft or to prevent its rotation.

2. In a hoisting apparatus the combination with a non-reversible rotating shaft and a winch-head loosely mounted thereon, of a driving connection between shaft and winch-head containing a gear member, a rotatable support for said gear member, and two separate friction devices of which said gear-member support is a common member and the cooperating friction members respectively secured to turn with the shaft and held against turning.

3. In a hoisting apparatus the combination with a non-reversible rotating shaft and a winch-head loosely mounted thereon, of a driving connection between the winch-head and shaft containing a gear member, a friction device comprising one member secured to turn with the shaft and one adapted to turn upon the shaft, the latter carrying the intermediate member of the winch-head driving connection, and means for holding the loose or intermediate carrying member of the friction-driving device against turning.

4. The combination with a non-reversing rotating shaft, a driving-gear fixedly secured to said shaft and having sleeves extending oppositely therefrom, a disk or driving friction member secured to rotate with and slide upon said shaft and means for shifting said friction member, of a winch-head mounted to turn freely upon one of said sleeves and having a bevel-gear upon its inner end similar to and facing the other bevel-gear, a disk loosely mounted upon the other sleeve between the driving friction member and the driving bevel-gear and constituting a driving friction member, said disk having a hood enclosing both bevel-gears, bevel-pinions journaled on said hood and engaging both bevel-gears, and a friction band-brake engaging the outer surface of said hood.

5. The combination of a non-reversible rotating shaft, a driving-bevel-gear fixedly secured to said shaft, a disk or driving friction member secured to rotate with and slide upon said shaft and means for shifting said disk upon the shaft, with a winch-head mounted to turn freely about said shaft and having
teeth thereon forming a bevel-gear opposite to and like the teeth of the driving bevel-gear, a freely-rotatable disk between the driving bevel-gear and the friction member and constituting a driven friction member, said driving and driven friction members carrying engageable friction-surfaces, said driven friction member having a hood incasing both bevel-gears and the inner edge of the winch-head, bevel-pinion within said hood and jour-naled thereon to engage both bevel-gears, and a friction band-brake engaging the outer surface of said hood.

6. In a hoisting apparatus, the combination with a drum-shaft projecting at one end beyond its bearings, and means for driving said shaft, of a winch mounted loose on said projecting end of the shaft, said winch terminating at its outer end approximately with the extremity of the shaft, and permitting free access to its periphery, and means adapted to engage the inner end of the winch to transmit motion thereto from the drum-shaft to turn said winch either with or against the shaft.

7. In a hoisting apparatus, the combination with a drum-shaft adapted to be continuously rotated in one direction, and means for rotating said shaft, of a drum mounted loose on said shaft and presenting a free peripheral exterior, and means adapted to frictionally transmit motion from the shaft to said drum at its end to rotate said drum either with or against the shaft.

8. In a hoisting apparatus, a drum-shaft, a winch or spool mounted loose on the projecting end of the drum-shaft and having its peripheral groove freely accessible from the outer end, and means adapted to transmit motion to the inner end portion of the winch to turn said winch either with or against the drum-shaft.

9. In a hoisting apparatus, a shaft, a winch mounted loose on the freely-projecting end of said shaft and having a peripheral rope-receiving groove, means for holding said winch on the shaft while permitting free access to said rope-receiving groove over the outer ends of the winch and shaft, and means for frictionally transmitting motion to the inner end portion of the winch to turn the same either with or against the shaft.

10. In combination, a shaft, a member provided with a cogged surface, a member pro-vided with a friction-surface one of said members being revoluably fixed and the other revolvably loose upon said shaft, means whereby one of said members may be moved toward the other along said shaft, a gear-wheel and a pinion-carrier between said members and, re- spectively, revoluvably fixed and revoluably loose on said shaft, a pinion journaled in said pinion-carrier and internmeshing with said cogs and said gear-wheel, a brake; said pinion-carrier being provided with friction-surfaces engaging, respectively, with said friction member and said brake.

11. In combination, a shaft, a carrier revoluably loose on said shaft and containing a clutch-surface, a brake-surface and a pinion, a cogged member engaging with said pinion, a clutch member engaging the said clutch-surface, a gear-wheel revoluvably fixed on said shaft engaging said pinion and a brake engaging said brake-surface; said cogged member and clutch member being relatively revoluably fixed and loose on said shaft.

12. In combination with a shaft, a friction-disk movably secured to the shaft, a drum loose upon the shaft and carrying a beveled gear on the end toward the friction-disk, a spur or hook shaped friction-disk loosely mounted on the shaft between the other friction-disk and the drum, a beveled gear fixed to the shaft within the hood thereof, a beveled gear journaled on the loose friction-disk and meshing with the beveled gears which are respectively carried by the drum and fixed to the shaft, a friction-brake adapted to engage the loose friction-disk and means for shifting the other friction-disk into engagement with the loose friction-disk.

13. A derrick-swinging attachment for hoisting-engines comprising a shaft, a drum loose on said shaft, two friction members one loose upon and one fixed to turn with the shaft, two beveled gears one fixed to the shaft and the other to the drum, beveled pinions carried by the loose friction member and engaging the beveled gears, means for engaging the friction members to bind them together and a friction-holding means for the loose friction member.

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

HARRY N. COVELL.
CHARLES A. BAECHTOLD.

Witnesses:
Chas. G. Munier,
Chas. C. Peirce.