No. 817,916. PATENTED APR. 17, 1906.

J. T. HORTON.

SAFETY MECHANISM FOR HOISTS AND THE LIKE.

APPLICATION FILED NOV. 7, 1905.

Fig. 1

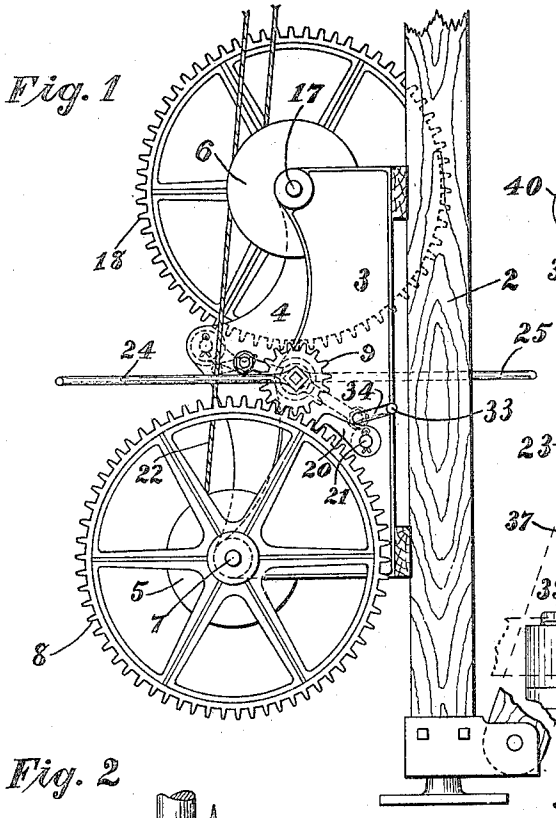
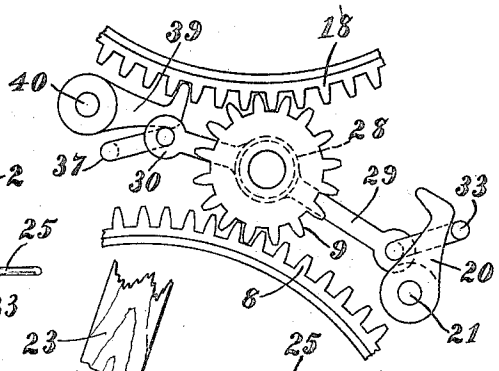


Fig. 4



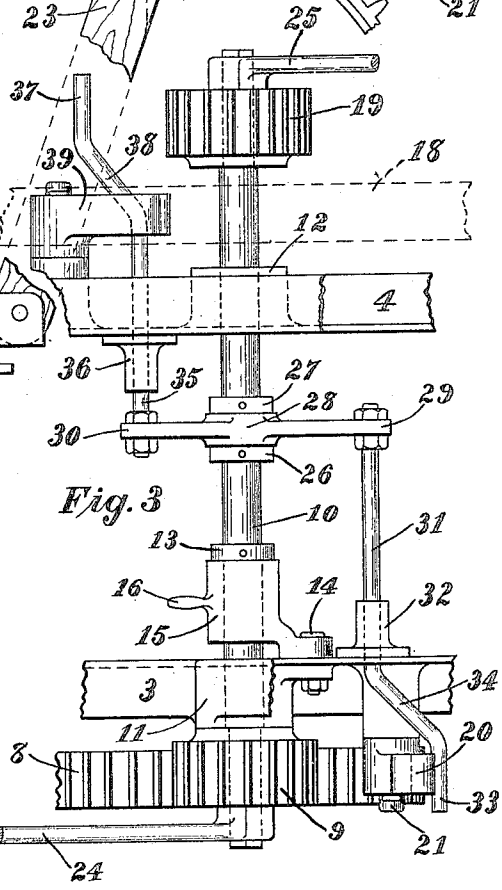


Fig. 2

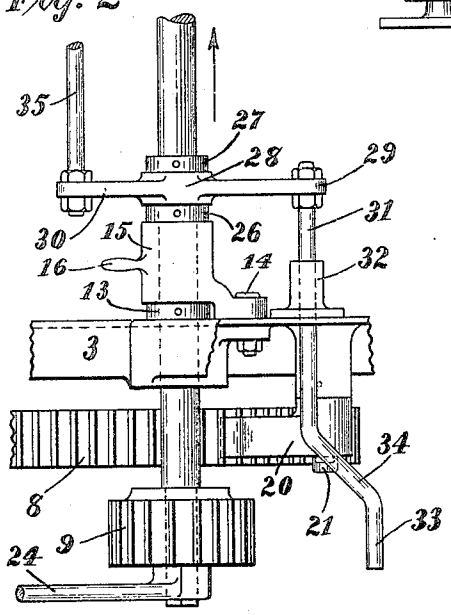


Fig. 3

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UNITED STATES PATENT OFFICE.

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SAFETY MECHANISM FOR HOISTS AND THE LIKE.

No. 817,916. Specification of Letters Patent. Patented April 17, 1906.

Application filed November 7, 1905. Serial No. 286,217.

To all whom it may concern:

Be it known that I, JOHN T. HORTON, a citizen of the United States, residing at New York, N. Y., have invented a new and useful Improvement in Safety Mechanism for Hoists, Winches, and the Like, of which the following is a specification.

This improvement relates to safety mechanism for hoists, winches, and the like, and has for its object to provide automatically-operable means to prevent the rotation of the drum-gear when the driving-pinion is removed from engagement therewith.

In the drawings accompanying this specification is illustrated one form and which may be the preferred form of my improvement, wherein—

Figure 1 is a side elevation of the hoisting mechanism of a boom-derrick embodying my improvement. Fig. 2 is a plan view, on an enlarged scale, of a portion of Fig. 1 with the near pinion out of engagement with its respective drum-gear. Fig. 3 is a plan view similar to Fig. 2, but showing both sides of the mechanism of Fig. 1 and with the near pinion in engagement with its respective drum-gear. Fig. 4 is a side elevation corresponding with Fig. 3.

Similar characters refer to similar parts throughout the figures of the drawings.

In Fig. 1 the mast 2 of a derrick has fixed thereto the usual winch-frames 3 and 4 for the support of the boom-drum 5 and the load-drum 6. Said boom-drum 5 is fixed to shaft 7, and which shaft turns in suitable bearings in frames 3 4. Also fixed to shaft 7 is gear 8, through which from pinion 9 power may be communicated to said drum. Pinion 9 is fixed to shaft 10, and which shaft is mounted for revolution in suitable bearings 11 12 in frames 3 4, respectively. Said shaft is also slidable axially in its bearings, whereby pinion 9 may be moved into engagement with drum-gear 8, Fig. 3, or out of engagement therewith, Fig. 2. Pinion-shaft 10 may be driven by the usual hand-power cranks 24 25 or by other means, as desired.

The following means are provided to lock pinion 9 either in or out of engagement with gear 8. On shaft 10 is fixed collar 13, and pivoted to frame 3 at 14 is latch 15. By any convenient means, as handle 16, said latch may be lifted from engagement with shaft 10 and collar 13, and when shaft 10 is moved endwise in the direction of the arrow in Fig. 2 may pass under said latch from the position of Fig. 2 to that of Fig. 3 and back again at will. In the position of Fig. 2 pinion 9 is out of engagement with gear 8 and collar 13 is locked against frame 3 by the engagement of the outer side of latch 15 therewith. In Fig. 3 pinion 9 is in engagement with gear 8 and has its hub impinging against box 11 of frame 3 and in which position it is locked by the engagement of the inner side of latch 15 with collar 13.

Load-drum 6 is fixed to shaft 17, mounted for revolution in suitable bearings in frames 3 4. Also fixed to shaft 17 is gear 18, through which from pinion 19 on shaft 10 power may be communicated to said drum 6. Pinions 9 and 19 are so arranged on shaft 10 that when pinion 9 is in engagement with gear 8 pinion 19 will be out of engagement with gear 18, Fig. 3, and vice versa. To prevent the rotation of drum 5 when pinion 9 is out of engagement with gear 8, the usual locking-pawl 20 is provided. Said pawl is pivoted on frame 3 at 21. Heretofore it has been customary to rely upon the operator to throw said pawl 20 into engagement with gear 8 before sliding pinion 9 out of engagement with said gear. It often occurs, however, that the operator being intent upon other matters or careless neglects to throw the locking-pawl into engagement with gear 8 before withdrawing pinion 9, whereupon gear 8 and drum 5 are allowed to freely revolve, boom-hoist rope 22 to unwind, and boom 23 to fall, to the possible injury of the derrick and the endangering of the lives of workmen in the vicinity. The construction set forth in the foregoing description is of an ordinary and well-known type, and I will now proceed to describe the application of my improvement thereto. By my improvement this uncertainty and danger of operation just described are entirely obviated, and the throwing in of the lock before the removal of the pinion from engagement with the gear positively assured.

Between two collars 26 27, pinned to shaft 10, is hub 28. Said shaft is free to turn in hub 28, and said hub has arm 29, extending in one direction therefrom, and arm 30, extending in an opposite direction therefrom, both normal to shaft 10. Fixed to arm 29 is reciprocating cam-arm 31. Said arm is slidably supported in bearing 32 in frame 3. Said cam-arm 31 is reciprocated back and

forth in its bearing 32 in unison with the endwise movement of shaft 10 through the connections just described. The outboard end of arm 31 is so shaped or bent at 33 that when pinion 9 is in mesh with gear 8 and arm 31 in its inner position, Fig. 3, pawl 20 may be lifted out of engagement with gear 8 and may rest against said offset portion 33 of arm 31. Offset portion 33 of arm 31 is connected to the main portion of said arm by an inclined or cam-shaped portion 34, so that when pinion 9 is withdrawn from engagement with gear 8 (from the position of Fig. 3 to the position of Fig. 2) said cam portion 34 operates to force pawl 20 from its idle position of Figs. 3 and 4 to its position in engagement with gear 8 of Figs. 1 and 2. Furthermore, cam portion 34 is so shaped and positioned on arm 31 that pawl 20 is forced into engagement with gear 8 before pinion 9 can pass out of engagement with said gear. Also in returning pinion 9 to engagement with gear 8 cam-arm 31 prevents the withdrawal of pawl 20 until after said pinion is in substantial engagement with the gear. By these means gear 8 is always under the control of either the pinion or the pawl and safety thereby assured. This safety mechanism may also be applied to gear 18 of drum 6 to work in alternation with the safety mechanism of gear 8. Arm 30 of hub 28 may be provided with reciprocating cam-arm 35, which arm is slidably supported in bearing 36 in frame 4. Said cam-arm is reciprocated back and forth in unison with and by means of shaft 10 in the same manner as cam-arm 31 is moved. Cam-arm 35 is provided with an outboard-offset portion 37 and an inclined or cam-shaped portion 38 and which members are operable to allow pawl 39, pivoted at 40 in frame 4, to swing out of engagement with gear 18 and to force said pawl into engagement therewith, respectively, operating in all ways similar to the operation of the locking mechanism of gear 8. As shown in Figs. 1 and 2, when pinion 9 is out of engagement with gear 8 said gear is locked and pinion 19 is in engagement with gear 18 and which gear is unlocked and free to be turned. As shown in Figs. 3 and 4, when pinion 9 is in engagement with gear 8 said gear is unlocked and free to turn and pinion 19 is out of engagement with gear 18 and said gear is locked against rotation.

I claim—

1. The combination of a gear, a pinion slidable into and out of engagement therewith, a pawl for engagement with the gear and means operable by the sliding of the pinion out of engagement with the gear to move the pawl into engagement therewith.

2. The combination of a gear, a pinion mounted for movement into and out of engagement therewith, a pawl for engagement with the gear and means operable by the movement of the pinion out of engagement with the gear to move the pawl into engagement with the gear.

3. The combination of a gear, a pinion slidable into and out of engagement therewith, a pawl for engagement with the gear, and means operable by the sliding of the pinion out of engagement with the gear to move the pawl into engagement with the gear before the pinion passes out of engagement therewith.

4. The combination of a gear, a pinion slidable into and out of engagement therewith, a pawl for engagement with the gear and means operable by the sliding of the pinion out of engagement with the gear to move the pawl into engagement therewith before the pinion passes out of engagement with the gear and means to lock the pawl in engagement with the gear until the pinion is returned to engagement therewith.

5. The combination of two gears, two pinions mounted on one shaft for engagement with the gears respectively, means to move endwise simultaneously, one pinion into engagement and the other pinion out of engagement with their respective gears, a pawl for engagement with each gear and means operable from the endwise movement of the pinions to move each pawl into engagement with its respective gear prior to the disengagement of its respective pinion therefrom.

Signed this 20th day of October, 1905, at New York, N. Y., in the presence of two subscribing witnesses.

JOHN T. HORTON.

Witnesses:

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LLEWELLYN MORGAN.