

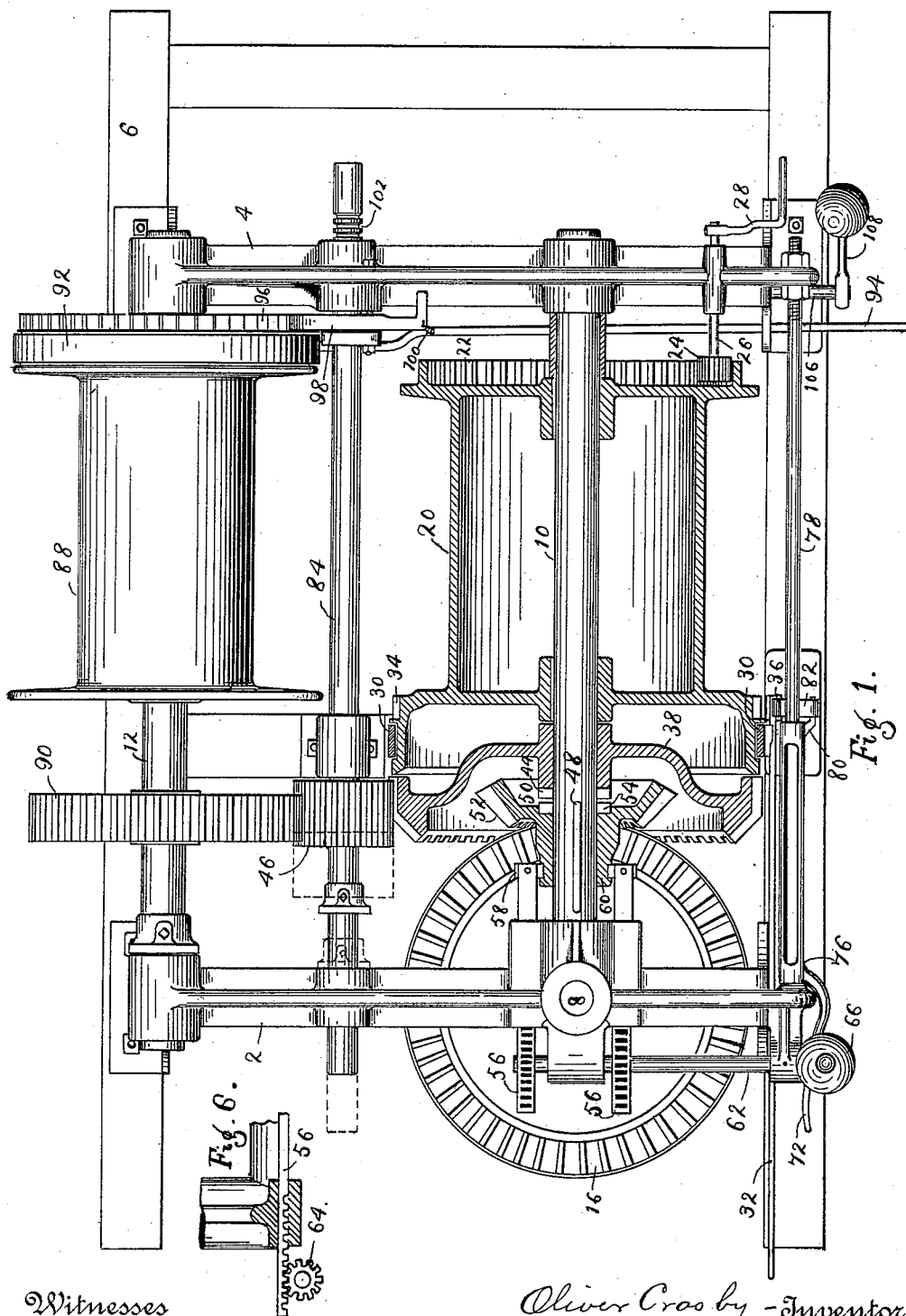
(No Model.)

2 Sheets—Sheet 1.

O. CROSBY.
HOISTING MACHINE.

No. 465,982.

Patented Dec. 29, 1891.



Witnesses
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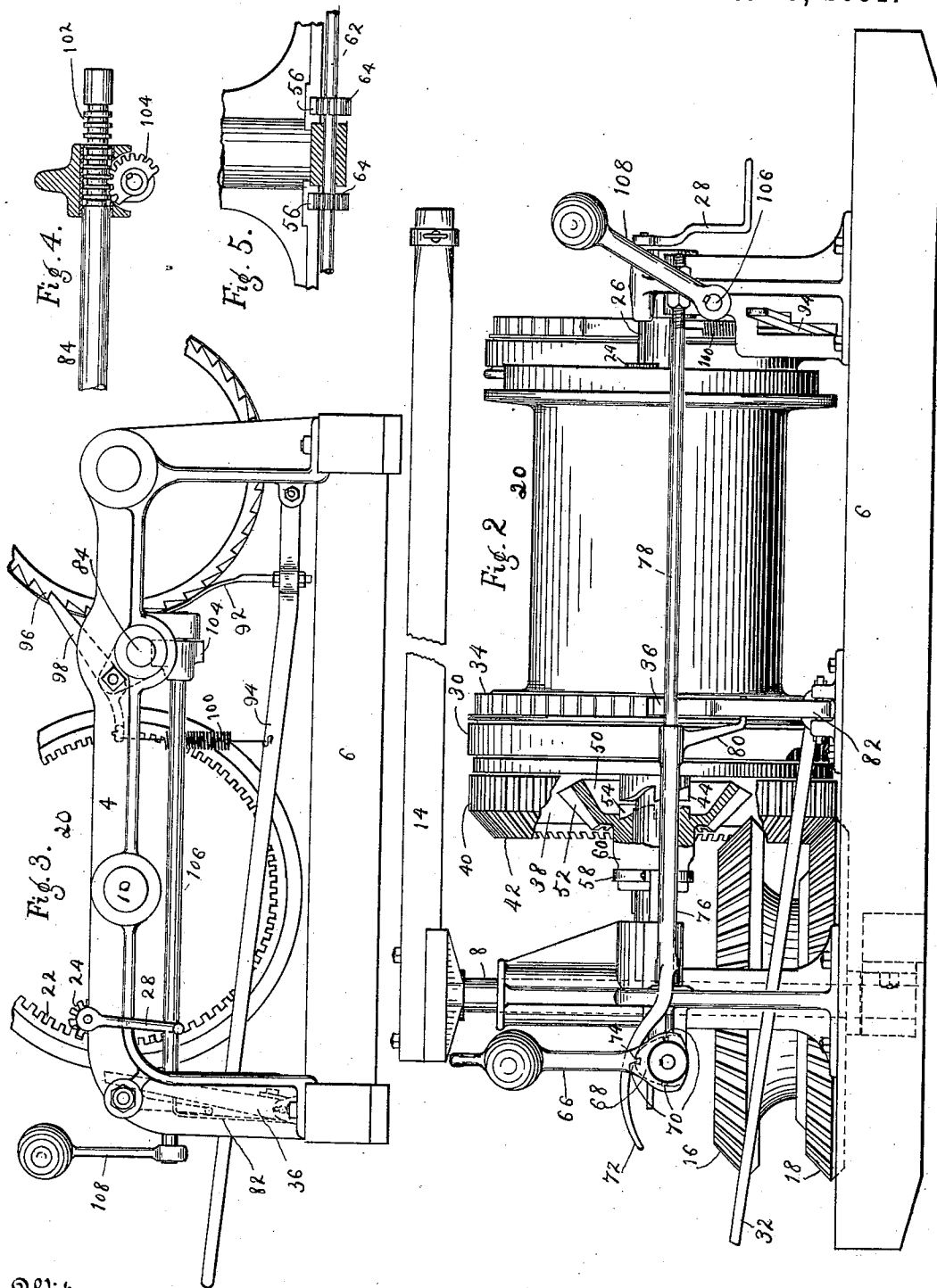
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UNITED STATES PATENT OFFICE.

OLIVER CROSBY, OF ST. PAUL, MINNESOTA.

HOISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 465,982, dated December 29, 1891.

Application filed January 26, 1891. Serial No. 379,062. (No model.)

To all whom it may concern:

Be it known that I, OLIVER CROSBY, of St. Paul, Ramsey county, Minnesota, have invented certain Improvements in Hoisting-Machines, of which the following is a specification.

My invention relates to improvements in hoisting-machines having a main drum for the hoisting-weight cable, adapted to be run at different rates of speed, and a secondary drum for the boom-hoisting cable; and it consists in the construction and combination hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a plan view and partial section of my improved machine, showing the means for driving the main drum and the connections between it and the secondary drum. Fig. 2 is a side elevation of the same. Fig. 3 is a partial rear elevation of the same, some of the parts being removed. Fig. 4 is a detail of the mechanism for throwing the secondary drum into and out of gear, and Fig. 5 is a detail of the mechanism for throwing the main drum into or out of gear with the primary driving mechanism.

In the drawings, 2 and 4 are cast-iron standards or frame-pieces secured upon the bed 6 and provided with suitable bearings for the vertical driving-shaft 8 and the horizontal drum-shafts 10 and 12 and pinion-shaft 84. To the vertical shaft 8 are secured the sweep 14 and the bevel-gears 16 and 18. Upon the shaft 10 is rigidly secured the main drum 20, in the outer end of which is provided an internal or annular gear 22, meshing into which is a pinion 24, mounted on a shaft 26, which is turned by means of a handle 28 to rotate the drum independently of the driving mechanism. Surrounding the other end of the drum is the friction band or brake 30, which is operated by means of a lever 32 to control the movement of the drum. The drum is also provided with a ratchet 34, with which engages a pawl 36, holding the drum from reverse movement.

Running loosely on the shaft 10 is the two-faced gear 38, having the spur-gear teeth 40, bevel-gear teeth 42, and clutch-teeth 44. The bevel-gear 42 engages with the bevel-gear 18

and the spur-gear with the pinion 46, herein-after described. Sliding on a feather 48 on the shaft 10 is the combined gear and clutch 50, having the bevel-gear 52 and the clutch-teeth 54, the parts being so arranged that when the gear 52 is in engagement with the gear 16 the teeth 54 are disengaged from the teeth 44 of the gear-wheel 38, and vice versa, and when the gear 50 is in an intermediate position it is out of engagement with both. Thus, as will be seen, with the gear 50 in its forward position engaging the gear 16 the shaft 10 and its drum are driven at a higher speed than the shaft 8, while with the gear 50 in the opposite position engaging the gear 38 the shaft and drum are driven from the gear 18 at approximately the same speed, the gears 18 and 42 being shown in the drawings as of approximately the same size, while with the gear 50 out of engagement with both the gears 38 and 16, as shown in Fig. 2, the gear 38 runs loosely on the shaft 10 and the drum is stationary.

In order to slide the gear 50 to and fro upon the shaft 10 into its various positions, I provide the racks 56, arranged parallel with the shaft 10 and connected to a collar 58 upon the hub 60 of the gear, engaging with which racks are pinions 64, mounted upon a counter-shaft 62. The counter-shaft and pinions are partially rotated or rocked to move the racks to and fro by means of a weighted arm 66. When this is in a vertical position, as shown in Fig. 2, the gear 50 is held in an intermediate position out of engagement with either of the other gears, but when thrown toward the left the gear 16 is engaged by it, and when thrown to the right the clutch-teeth 44 of the gear 38 are engaged. In order to lock the arm 66 in any one of the three positions named, the shaft 62 is provided with a cam 68, having notches 70. Bearing upon the face of the cam is an arm or lever 72, having a detent or tooth 74, which engages with either of the notches 70 when brought beneath it, thereby holding the arm 66 locked in whichever position it may be placed. The arm 72 is connected to and offset laterally from a rock-shaft 76, which turns as a sleeve upon a fixed rod or shaft 78 and is provided with a downwardly-projecting arm 80, standing back

of and engaging the spring 82 of the pawl 36, the pawl of its own weight lying in engagement with the ratchet 34 of the drum 20. The spring is secured at its lower end to the pawl, but free at its upper end, so that if the pawl is in engagement with a ratchet-tooth when the arm is thrown outward the spring will yield to it and by its tension throw the pawl outward as soon as freed from the tooth.

When the lever 66 is in the position shown in Fig. 2, the cam 68 projects upward from the shaft 62 and raises the lever 72, so as to turn the rock-shaft 76, which throws the arm 80 outward, and with it the spring 82 and the pawl 36, whereby the drum 20 is free to turn in either direction, the gear 50 being out of engagement with both the gears 16 and 38. When the arm 66 is turned down in either direction, the arm 72 drops downward, the arm 80 is disengaged from the spring 82, and the pawl drops into engagement again with the ratchet.

Mounted in suitable bearings, in which it both turns and slides, is the shaft 84, intermediate of the shafts 10 and 12 and having the pinion 46, which is thrown into and out of engagement with the spur-gear 40 by the sliding of its shaft 84, the full lines of Fig. 1 showing it in engagement and the dotted lines out of engagement with it. Mounted upon the parallel shaft 12 is the secondary drum 88, the shaft being also provided with the spur-gear 90, which meshes into the pinion 46, so that when the pinion is in engagement with the gear-wheel 38 the secondary drum is driven by it, but may be stopped by simply sliding the shaft 84 to throw the pinion out of engagement with it, the pinion being of such length that it at all times remains in engagement with the gear 90 whether in or out of engagement with the gear 38.

The secondary drum 88 is provided with a strap-brake 92, operated by means of a lever 94, and also with the ratchet 96 and the gravity-pawl 98. The lever 94 and the pawl 98 have an elastic or spring connection 100, such that when the lever is depressed the tension upon the connection will lift the pawl away from the ratchet unless it be in actual engagement with it, when the spring will yield to the tension applied; but as soon as the pawl is freed from the tooth of the ratchet by the rotation of the drum it will be thrown outward by the spring and away from the ratchet.

In order to reciprocate the shaft 84 and throw the pinion 46 into or out of gear with the wheel 38, I cut a circumferential rack 102 upon the shaft, with which engages a segmental pinion 104, keyed upon a shaft 106, having a weighted arm 108, the throwing of which in either direction turns the segmental pinion and slides the shaft 84, whether rotating or stationary. It will thus be seen that with the driving-shaft 8 running continuously at uniform speed the drum 20 may be driven at either of two rates of speed or held sta-

tionary, according to the position of the gear-wheel 50, whether in engagement with the gear 16 or the gear 38, and the secondary drum 88 is operated independently of the drum 20 and may be thrown into or out of gear at will, the whole machine being under the control of the operator by means of the various operating-levers described.

I claim—

1. In a device of the class described, the combination of a vertical driving-shaft, two gears fixed thereon, a horizontal drum-carrying shaft, a loose gear thereon engaging the lower gear of the drive-shaft, a combined clutch and gear slidably secured on the drum-shaft and adapted to be thrown into engagement with the upper gear of the drive-shaft or with the loose gear of the drum-shaft, a secondary drum, a fixed gear upon its shaft, and a pinion-gear meshing therewith and adapted to be thrown into or out of engagement with the loose gear of the other drum-shaft, substantially as and for the purposes set forth.

2. The combination of the vertical drive-shaft 8, its fixed gears 16 and 18, the horizontal shaft 10, carrying the drum 20, the loose gear 38, journaled on said shaft 10 and meshing into the gear 18, the combined clutch and gear 50, adapted to slide on a feather on said shaft 10 and adapted to be thrown into engagement with the gear 16 or with the gear 38 or held in an intermediate position out of engagement with both, the secondary drum 88, mounted upon the shaft 12, the gear 90 upon said shaft, the slidable shaft 84, intermediate of the shafts 10 and 12, and the pinion 46 upon the shaft 84, at all times in engagement with the gear 90 and adapted to be thrown in or out of engagement with the gear 38, according to the position of the shaft 84, substantially as and for the purposes set forth.

3. In a device of the class described having a vertical driving-shaft and a horizontal drum-shaft, the combination of a fixed gear upon the driving-shaft, a gear meshing therewith, turning loosely on the drum-shaft, a clutch for locking said loose gear to its shaft, a secondary-drum shaft having a fixed gear, and a pinion engaging the gear upon the secondary shaft and adapted to be thrown into and out of engagement with the gear upon the other drum-shaft, substantially as and for the purposes set forth.

4. In a device of the class described, the combination of a drum-shaft, a loose gear journaled thereon and connected with the primary driving mechanism, a slidable clutch upon said shaft adapted to engage said gear, rack-bars parallel with the shaft and connected to said clutch, a counter-shaft having pinions engaging said racks, and a weighted arm upon said counter-shaft for rocking the same to throw said clutch into or out of engagement with said gear, substantially as and for the purposes set forth.

5. In a device of the class described, the

combination of a vertical driving-shaft carrying two fixed gears, a horizontal drum-shaft, a gear loosely journaled on the drum-shaft and engaging one of the gears of the driving-shaft, a combined clutch and gear upon the drum-shaft, adapted to engage the second gear of the driving-shaft or the loose gear of the drum-shaft or to be thrown out of engagement with both, and a rock-shaft connected to the combined gear and clutch for adjusting the position of the same upon its shaft, substantially as and for the purposes set forth.

6. In a hoisting-machine, the combination, with the drum-shaft, a bevel-gear upon said shaft engaging the driving mechanism, and a clutch upon said shaft adapted to engage said loose gear, of a counter rock-shaft for operating said clutch, a pawl-and-ratchet attachment to the drum, a rock-shaft engaging said pawl and adapted to throw it out of engagement with the ratchet, a notched cam upon said first rock-shaft, and a laterally-extending arm upon said second rock-shaft bearing upon the face of said cam and having a detent to engage the notches, therein, whereby as the counter rock-shaft is turned so as to throw the combined gear and clutch out of engagement with the loose gear the arm is raised by the cam, so as to rock its shaft and throw the pawl out of engagement with the loose gear, and the counter rock-shaft is locked by the detent engaging a notch in the cam, substantially as described.

7. In a device of the class described, the combination, with the drum-shaft, of a clutch thereon adapted to be connected with the driving mechanism, a pawl-and-ratchet attachment to the drum, a rock-shaft engaging the pawl, a counter rock-shaft for throwing the clutch, and connected devices upon said rock-shafts, whereby when the clutch is thrown out of engagement with the driving mechanism the pawl is also thrown out of engagement with the ratchet, substantially as and for the purposes set forth.

8. In a device of the class described, the combination, with the drum-shaft, of a slidable clutch thereon for connecting it to the driving mechanism, a loose collar upon said clutch, a rack connected to said collar and parallel with the shaft, a counter rock-shaft, a pinion upon said shaft engaging with said rack, an upwardly-extending weighted arm for throwing said rock-shaft, and means for automatically locking the same to hold the clutch in or out of engagement with the driving mechanism, substantially as described.

9. In a device of the class described having main and secondary drums, the combination of a loose gear upon the main-drum shaft connected with the driving mechanism, a clutch for said gear, a gear fixed upon the secondary-drum shaft, and a pinion engaging the said fixed gear and adapted to be thrown into or out of engagement with said loose gear, substantially as described.

10. In a device of the class described having main and secondary drums, a loose gear upon the main-drum shaft, and a clutch adapted to engage said loose gear, the combination therewith of a fixed gear upon the secondary-drum shaft, an intermediate slidable shaft, a pinion upon the same engaging said fixed gear, a circumferential rack upon said slidable shaft, a counter rock-shaft, and a segmental pinion upon said counter-shaft engaging said rack, substantially as described.

11. The combination of the vertical driving-shaft 8, having the gear 18, the horizontal drum-shaft 10, having the loose gear 38, a clutch to lock said gear upon said shaft, the horizontal drum-shaft 12, having the gear 90, the intermediate shaft 84, having the pinion 48, engaging said gear 90 and said loose gear 38, the circumferential rack 102 upon said shaft 84, the counter rock-shaft 106, and the segmental pinion 104, mounted upon said counter rock-shaft and engaging said rack, substantially as and for the purposes set forth.

12. In a hoisting-machine, the combination, with the driving-shaft and main-drum shaft, of a bevel-gear upon the driving-shaft, a double-face gear upon the drum-shaft, having its bevel-gear teeth in engagement with the gear of the driving-shaft, a secondary-drum shaft, a fixed spur-gear thereon, a pinion engaging said spur-gear, and means for throwing it into or out of engagement with the spur-teeth of said double-face gear, substantially as described.

13. In a hoisting-machine, the combination, with its drum, of a strap-brake encircling said drum, a pivoted lever for applying said brake, a ratchet upon said drum, a gravity-pawl engaging said ratchet, and an elastic connection between the brake-lever and said pawl, whereby as the lever is thrown to apply the brake tension is applied to the pawl to throw it out of engagement with the ratchet, substantially as and for the purposes set forth.

14. In a hoisting-machine having main and secondary drums, the combination of a double-face gear upon the main-drum shaft, with its bevel-teeth engaging the driving mechanism, a spur-gear upon the secondary-drum shaft, and a slidable idler-pinion engaging said spur-gear and adapted to be thrown into or out of engagement with the spur-teeth of the double-face gear, substantially as and for the purposes set forth.

15. In a hoisting-machine having main and secondary drums, the combination of a double-face gear on the main-drum shaft, having its bevel-teeth engaging the driving mechanism, a spur-gear upon the secondary-drum shaft, and means for connecting or disconnecting it and the spur-teeth of said double-face gear, substantially as and for the purposes set forth.

16. In a hoisting-machine, the combination, with the main and secondary drums, of a

double gear on the main-drum shaft, consisting of a bevel and a spur gear, the bevel-gear engaging the driving mechanism, means for driving the secondary drum from the spur-gear, and means for throwing said secondary drum into and out of engagement with said spur-gear, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand this 20th day of January, 1891.

OLIVER CROSBY.

In presence of—

T. D. MERWIN,
A. MAE WELCH.