

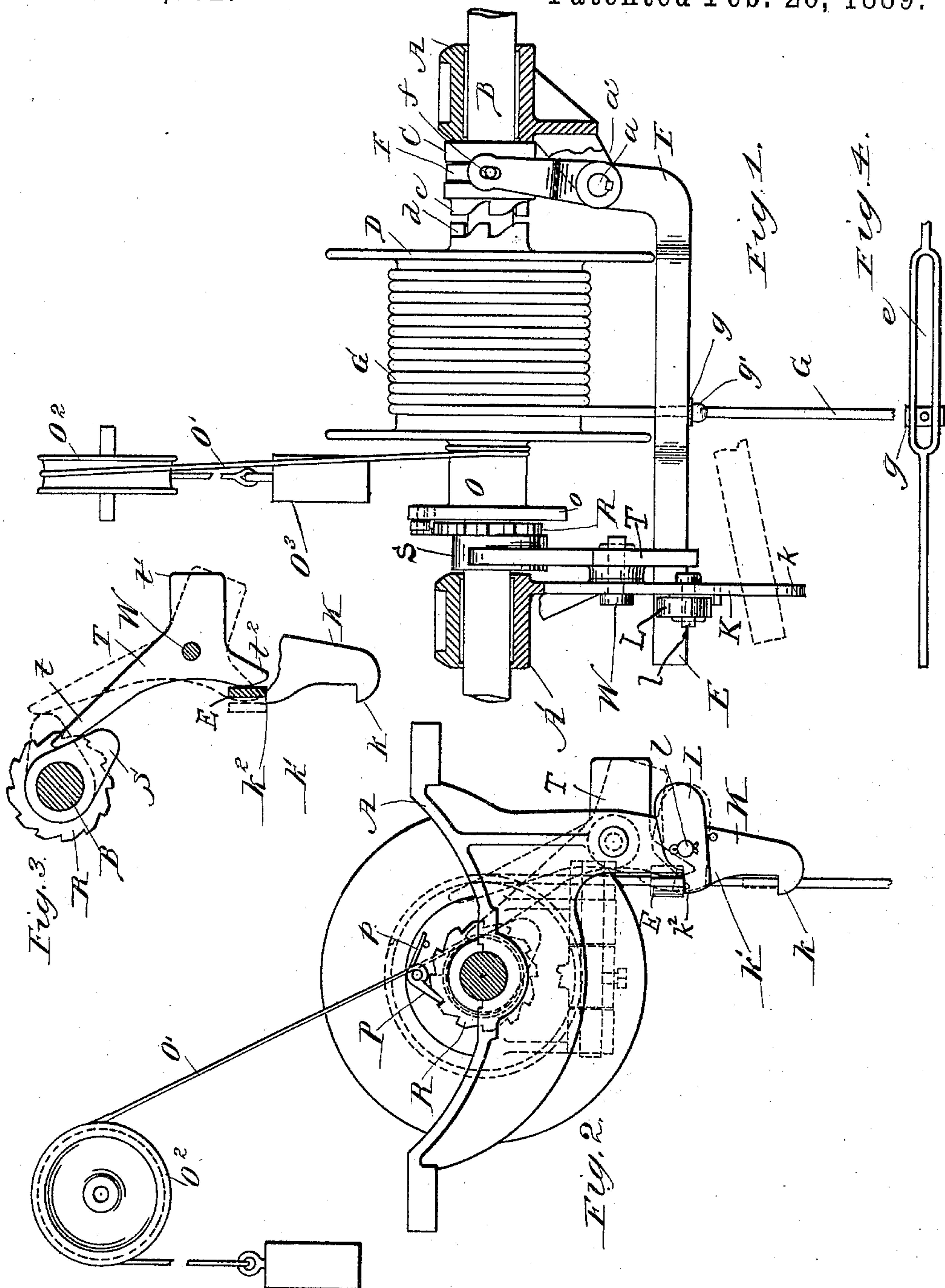
(No Model.)

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CLUTCH MECHANISM FOR WINDING DRUMS.

No. 398,502.

Patented Feb. 26, 1889.



WITNESSES:

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CLUTCH MECHANISM FOR WINDING-DRUMS.

SPECIFICATION forming part of Letters Patent No. 398,502, dated February 26, 1889.

Application filed February 14, 1888. Serial No. 263,983. (No model.)

To all whom it may concern:

Be it known that we, JULIUS A. DYBLIE and EYVIND LEE HEIDENREICH, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Clutch Mechanism for Winding-Drums, of which we do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

Our present invention has relation more particularly to the improvement of the clutch mechanism of such winding-drums as are commonly employed in connection with steam-shovels—such as are used for unloading grain from cars and the like—although it will be readily understood that the invention is applicable for use in a great variety of other situations where winding-drums are employed.

The object of our invention is to provide improved mechanism whereby the winding-drum may be automatically thrown into and out of gear with the main drive-shaft; and to this end our invention consists in the various novel features of construction hereinafter described, illustrated in the accompanying drawings, and particularly defined in the claims at the end of this specification.

Figure 1 is a view in side elevation (the hangers being shown in vertical section) of a winding-drum and clutch mechanism embodying our invention. Fig. 2 is a view in end elevation. Fig. 3 is a detail view in vertical section through the main drive-shaft adjacent the throw-off lever, the throw-off lever and adjacent parts being shown in side elevation. Fig. 4 is a detail plan view of the longer arm of the operating-lever.

A and A' designate suitable hangers or supports, wherein is journaled the main drive-shaft B, on which is held in a manner free to slide the clutch-box C, the teeth *c* of which are adapted to engage with the corresponding teeth, *d*, formed upon the end of the winding-drum D, that is loosely mounted upon the shaft, but is caused to rotate therewith when the teeth *c* of the clutch-box C are thrown into engagement with the corresponding teeth, *d*, upon the end of the winding-drum. The lateral movement of the clutch-box C, which

enables it to engage and disengage the winding-drum D, is effected by means of an operating-lever, E, preferably of elbow shape, the upper end of the shorter arm of this lever being yoke-shaped and connected by the pins or trunnions *f* with the ring F, that loosely fits within the grooved periphery of the clutch-box C; and to permit proper relative operation of the clutch-box and operating-lever E the yoke-shaped ends of this lever are provided with oblong slots to receive the pins *f*.

The operating-lever E is sustained upon a rod or shaft, *a*, that is journaled in the brackets *a'*, depending from the hanger A, and that portion of the longer arm of this lever E which extends beneath the winding-drum is divided to form an open space, *e*, through which will pass the lifting or load rope or cable G, that is wound between the flanges of the winding-drum D. Our purpose in thus forming the longer arm of the operating-lever E with the space or opening *e* therein beneath the winding-drum is to afford a ready means for effecting the lifting of the lever by the engagement therewith of the washer *g*, that is held upon the rope or cable G and bears against the ball *g'*, that is fixed upon or within the rope, and it is obvious that in order to enable the rope G to lift the longer arm of the operating-lever E the washer *g* is made somewhat larger than the space formed in the lever through which the rope or cable passes. From the construction, as thus far defined, it will be seen that when the rope or cable G has been wound upon the drum D to such extent that the washer *g* is forced by the ball *g'* of the rope into engagement with the operating-lever E the longer arm of this lever E will be lifted, thereby causing its shorter arm to throw the clutch-box or sleeve C away from the winding-drum, and consequently disengage the teeth *c* of the clutch-box from the corresponding teeth of the drum. The end of the longer arm of the operating-lever E is sustained when in its lowest position by means of the shoulder *k*, formed near the lower end of the dependent arm or bracket K, and over the inclined edge *k'* of the bracket K the lever is caused to ride as it is drawn upward by the engagement of the ball upon the winding-rope, and when the lever is to retain the

clutch-box out of engagement with the winding-drum the longer arm of the lever will rest upon the shoulder k^2 of the depending arm K.

It will be readily understood that the metal
5 of which the operating-lever E is formed will be sufficiently flexible and elastic to permit the outer end of the long arm of the lever to be drawn over the face k' of the dependent arm or bracket K and spring into the notch
10 above the shoulder k^2 . By preference there is attached to the side of the arm or bracket K a pivoted dog, L, sustained upon the journal-pin l , that passes through the arm K, this dog being pivoted off its center in such man-
15 ner that the excess weight of its rear end will tend to hold it normally in the position indicated by dotted lines in Fig. 2—that is to say, with its front end parallel with and ex-
20 tending above the shoulder k^2 of the arm or bracket K and obstructing the entrance of the operating-lever E into the space above the shoulder k^2 . It will therefore be seen that as the operating-lever E is drawn up-
25 ward by the ball of the load rope or cable the outer end of this lever will ride upward upon the inclined face k' of the arm or bracket K and will be prevented from springing into the notch formed in this arm or bracket above the shoulder k^2 until after the lever has passed
30 above the inner end of the dog L, when it will be free to spring inward, and as the load rope or cable is drawn backward or unwound from the drum D it will depress the inner end of the dog L until the lever E rests upon the shoul-
35 der k^2 . Our purpose in thus employing the pivoted dog L will hereinafter more fully appear. After the outer end of the operating-lever is in the elevated position last described, and the clutch-box C is out of engagement with
40 the winding-drum, it is obvious that the load rope or cable G can be drawn backward until the shovel or other load-carrier at the end of this rope is in position to receive its new load, and when in such position the clutch-
45 box C will be automatically thrown into engagement with the winding-drum by the operation of the following mechanism: Upon the driving-shaft B and affixed to the wind-
ing-drum D is a smaller drum or cylinder, O,
50 upon which is wound the rope O', which, for convenience, I term the "engagement-rope," and which passes over a suitable pulley, O², and is provided at its outer end with a counter-weight, O³, and it is obvious from this con-
55 struction that as the load-rope G is drawn backward and unwound from the drum D the engagement-rope O' will be wound upon the periphery of the smaller drum, O, the counter-weight O³ being correspondingly lifted. Upon
60 the outer end of the smaller drum, O, is formed the flange o, to the outside face of which is pivoted the pawl P, that is held in engagement with the teeth of the ratchet-wheel R by means of a suitable spring, p, also affixed to
65 the side of the flange o. This ratchet-wheel R is loosely mounted on the main drive-

shaft B, and affixed to this ratchet-wheel or formed therewith is the cam S, which at the proper time will engage with the longer arm, t , of the throw-off lever T, that is pivoted upon
70 a pin, W, extending through the dependent arm or bracket K, this throw-off lever T being formed with the counter-weight t' , which serves to hold it normally in the position indicated by dotted lines in Fig. 3, in which po-
75 sition the shorter end, t^2 , of the throw-off lever will be approximately in line with the outer end of the pivoted dog L.

From the foregoing description it will be seen that if the parts are in the position in-
80 dicated by full lines in the drawings the load-rope or cable G can be unwound from the winding-drum D until the shovel or other load-carrier is at the proper point to receive its load, and during this unwinding of the
85 load-rope G the engagement-rope O' will be wound upon its drum O, thus lifting the counter-weight O³ to the position shown in the drawings. When the load rope or cable G has been thus unwound it will be found
90 that if this rope G be now slackened somewhat, as by the act of advancing the shovel into the grain, the counter-weight O³, attached to the engagement-rope O', will cause a revolution in whole or in part of its drum
95 O, and by means of the pawl P and ratchet-wheel R will cause the cam S to revolve and engage with the longer arm, t , of the throw-off lever T, thereby moving the lever to the position shown by dotted lines in Fig. 3, and caus-
100 ing the shorter end, t^2 , of this lever to push the longer arm of the operating-lever E off the shoulder k^2 , thus permitting it to drop onto the shoulder k , thereby causing the clutch-box C to be thrown into engagement
105 with the winding-drum D. When the clutch-box C is thus thrown into engagement with the winding-drum D, it is plain that this drum will be forced to rotate with the drive-shaft B, and will again wind the load rope or cable
110 G until the shovel or other load-carrier is drawn forward or upward, and this operation will continue until the ball g' has forced the washer g into engagement with the divided portion of the operating-lever E and has so
115 lifted this lever as to throw the clutch-box C out of engagement with the winding-drum. It will now be understood that by providing the pivoted dog L, the outer end of which obstructs the space above the shoulder k^2 of the
120 dependent arm or bracket K, the operating-lever E will be prevented from entering the space above the shoulder k^2 , and consequently all danger of this lever springing inward and throwing the long arm t of the throw-off lever
125 T into position to be struck by the cam S will be avoided until the clutch-box has with certainty been disengaged from the winding-drum and until the lifting-rope G has been unwound and sufficiently slackened to per-
130 mit the re-engagement of the clutch with the winding-drum.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the winding-drum 5 having teeth on its hub, a clutch-box for engagement with said hub, and a load-rope provided with a suitable stop, of a pivoted elbow-lever, E, one arm of which is connected directly with and is adapted to move in the 10 same direction as the clutch-box, and the opposite arm of which extends across the winding-drum and is provided with an open space, e, adapted to engage with the stop on the load-rope, substantially as described.
2. The combination, with a winding-drum 15 having teeth upon its hub, a clutch-box for said drum, and a winding-rope provided with a suitable stop, of an operating-lever adapted to engage said stop of the winding-rope, a 20 suitable arm or bracket for engaging said operating-lever, a cam connected with and controlled by the movement of said winding-drum, and a throw-off lever having one arm extending into the path of said cam and hav- 25 ing its opposite arm arranged to move the operating-lever for throwing the clutch-box into engagement with the winding-drum, substantially as described.
3. The combination, with a winding-drum 30 having teeth on its hub and its clutch-box, of an operating-lever connected with said clutch-box, a suitable dependent arm or bracket for sustaining said operating-lever in elevated

position, a throw-off lever for releasing said operating-lever, a cam for moving said throw-off lever, a ratchet-wheel for controlling the 35 movement of said cam, and an engagement-rope and its winding-drum having a pawl for effecting the movement of said ratchet-wheel, substantially as described. 40

4. The combination, with a winding-drum having teeth on its hub and its clutch-box and a load-rope, of an operating-lever, E, a dependent arm or bracket, K, provided with a shoulder, k^2 , a counterweighted throw-off 45 lever, T, a cam, S, and ratchet-wheel R upon the main shaft, a pawl, P, engaging with said ratchet-wheel R, a drum, O, and engagement-rope O', and a counter-weight, O³, substantially as described. 50

5. The combination, with a winding-drum having teeth on its hub and its clutch-box and a load-rope, of an operating-lever, E, for controlling said clutch-box, a dependent arm or bracket, K, having a shoulder, k^2 , a dog, L, 55 to temporarily prevent the entrance of said operating-lever into the space above said shoulder, and suitable mechanism for throwing said operating-lever out of engagement with the shoulder k^2 , substantially as de- 60 scribed.

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