No. 771,338.

PATENTED OCT. 4, 1904.

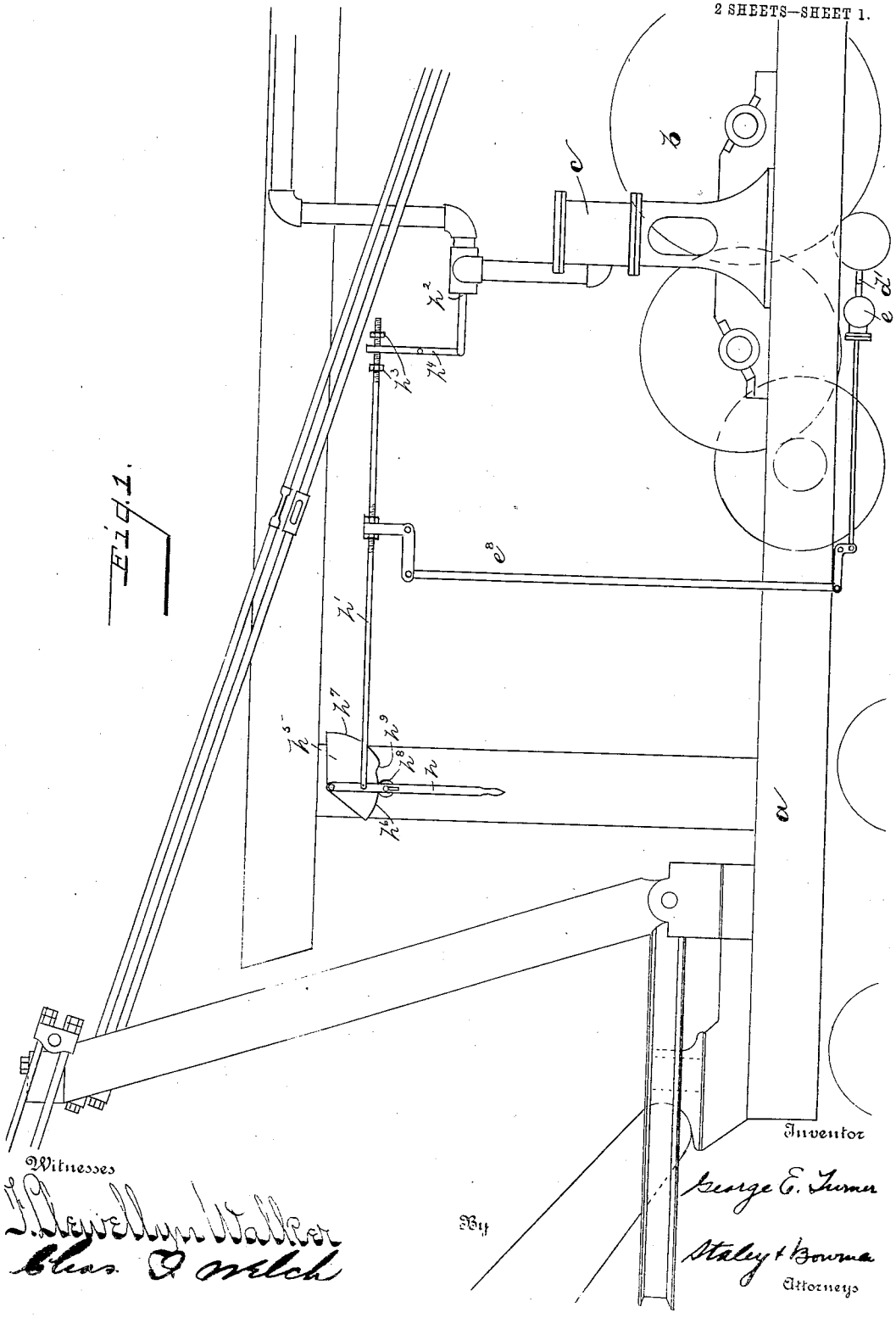
G. E. TURNER.

OPERATING MECHANISM FOR HOISTING DEVICES.

APPLICATION FILED DEC. 24, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2

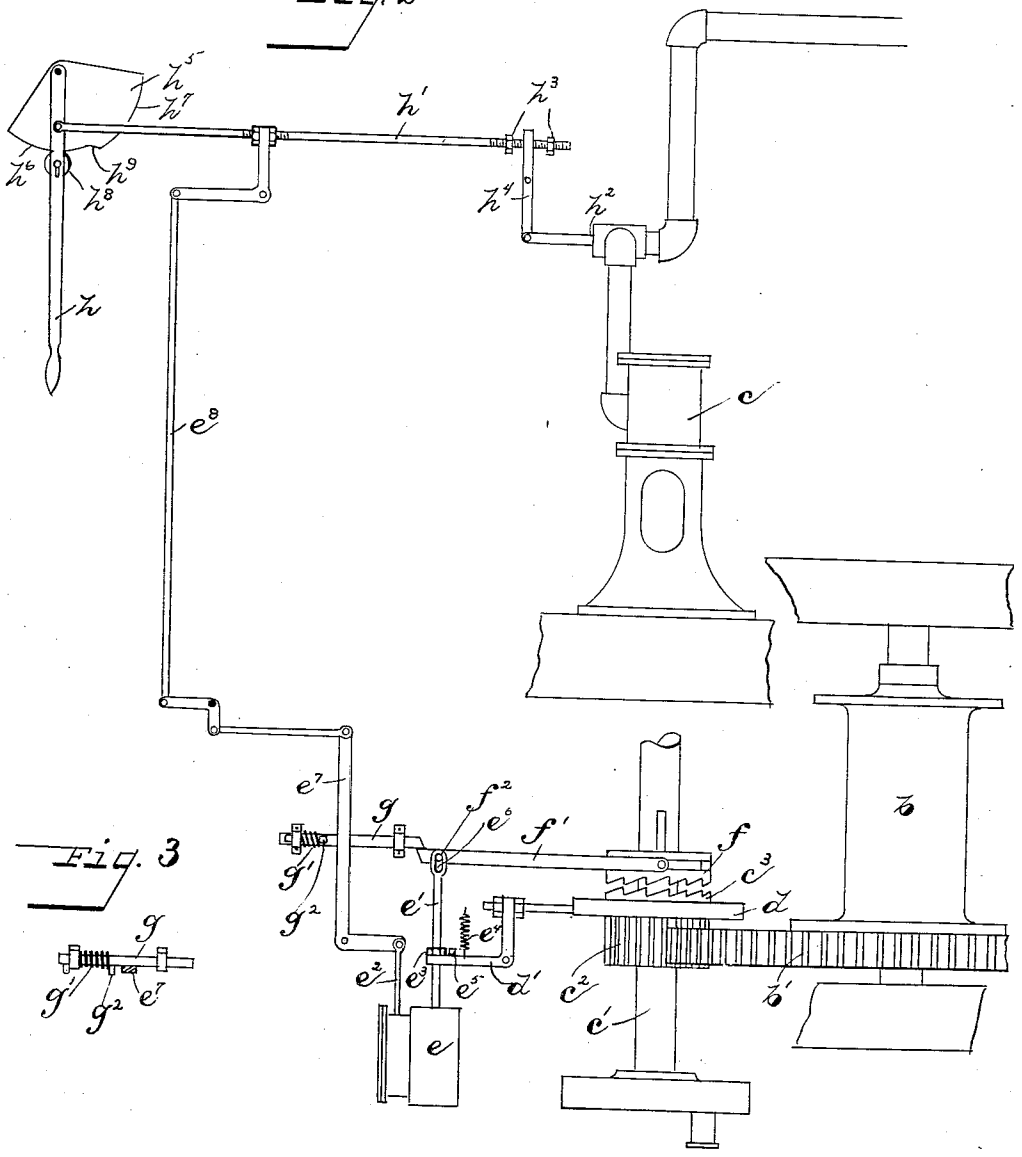


Fig. 3

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No. 771,338. Patented October 4, 1904.

UNITED STATES PATENT OFFICE.

GEORGE E. TURNER, OF BELLEFONTAINE, OHIO.

OPERATING MECHANISM FOR HOISTING DEVICES.

SPECIFICATION forming part of Letters Patent No. 771,338, dated October 4, 1904.

Application filed December 24, 1903. Serial No. 186,471. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. TURNER, a citizen of the United States, residing at Bellefontaine, in the county of Logan and State of Ohio, have invented certain new and useful Improvements in Operating Mechanism for Hoisting Devices, of which the following is a specification.

My invention relates to improvements in controlling mechanism for hoisting devices, and it is especially adapted for use with steam-shovels and similar machines.

The object of the invention is to provide means for controlling the hoisting apparatus both in raising and lowering and to work the mechanism from a single operating-lever.

The invention consists of the constructions and combinations of parts hereinafter described, and set forth in the claims.

In the drawings, Figure 1 is a side elevation of a device embodying my invention, same being herein shown as applied to a steam-shovel. Fig. 2 is a diagrammatic view of the controlling mechanism. Fig. 3 is a detail of the same.

Like parts are represented by similar letters of reference in the several views.

In the drawings, *a a* represent the main frame of the machine. *b* is the hoisting-drum, mounted thereon in the usual way, and *c* is the driving-engine, the crank-shaft *c'* of which is provided with a pinion c^2, which meshes with a spur-gear *b'* on the drum *b*. The pinion c^2 runs loosely on the engine-shaft *c'*, but is provided with a clutch c^3, adapted to be engaged by a clutch-collar *f*, splined onto the engine-shaft *c'*, so as to turn therewith, but adapted to move longitudinally thereon in a well-known manner. The pinion c^2 is also provided with the usual band or friction brake *d*, by means of which the pinion and the drum may be stopped when the clutch is disconnected, while the engine-shaft continues to revolve. This brake or brake-band is connected through suitable mechanism to a piston-rod *e'* of a power-cylinder *e*. This power-cylinder *e* may receive its motive power from any convenient source, preferably from the boiler which supplies the engine *c*, and is of that usual construction which permits the motive power to be admitted to either end and drive the piston *e'* in either direction or to maintain it in a stationary position, depending on the position of the controlling-valve, which is supported by the valve-stem e^2, these constructions being usual and well-known appliances and needing no detailed description here.

The brake *d* is preferably connected to the piston *e'* through the agency of a bell-crank *d'*, one arm of which is adapted to contact with a projection e^3 on the piston-rod *e'*, so as to move the brake-band in one direction only—that is, in a direction to apply the friction on the brake—the movement in the other direction being obtained by a spring e^4, this arrangement permitting a continued movement of the piston *e'* after the brake has been released, a stop e^5 being preferably provided for the bell-crank arm *d'* to prevent the spring e^4 from moving the arm too far. The piston-rod *e'* is also connected at its outer end to the clutch-operating lever *f'*, which is also of the usual construction and adapted when moved in either direction to move the clutch-collar *f* on the shaft to cause it to engage or disengage the clutch c^3 on the driving-pinion c^2. The connection between the piston-rod *e'* and the clutch-lever *f'* is a loose connection, preferably obtained by employing a slotted opening e^6, through which extends a pin or other suitable projection f^2 on the clutch-collar, so that the piston-rod *e'* may have a limited movement without moving the clutch-lever *f'*. When the clutch is out of engagement with the pinion and in position shown in Fig. 2, the lever *f'* is engaged by a spring-actuated catch *g*, which I term the "safety-catch" and which prevents the clutch from being thrown into engagement until said safety-catch is withdrawn. This safety-catch is pressed into engaging position by a spring *g'*, and the outer end is preferably beveled in such a way that the clutch-lever *f'* when moved into disengaging position can pass the catch, forcing it back against the tension of its spring, after which the catch will immediately spring forward and engage the clutch-lever until it is

disengaged by the means hereinafter described.

The valve-stem e^2 of the power-cylinder e is operated by a lever e^7, which lever is connected by suitable rods and connecting devices e^8 to a main operating-lever h. This main operating-lever h is also connected by a suitable connection h' to the throttle or controlling-valve h^2 of the driving-engine c, the connection between the throttle-lever and the connecting-rod h' being preferably a loose connection which permits a limited movement of the controlling-handle h without disturbing the throttle or controlling-valve h^2, this being preferably accomplished by means of adjustable stops h^3 on each side of the throttle-lever h^4. The spring-catch g is provided with a projection g^2, adapted when the controlling-lever e^7 of the power-cylinder is moved to an unusual position to be engaged by said lever and on a continued movement of said lever to withdraw the safety-catch g.

The controlling-lever h is provided with a segment h^5, which is preferably provided with two concentric faces h^6 and h^7, but formed on different radii from the pivotal point of the lever h and connected by an offset h^9. The lever h is also provided with a spring-pressed roller h^8, which is adapted to travel over the respective faces.

The operation of the device thus described is as follows, the parts being in the position shown in Fig. 2, which may be termed the "normal" position, with the clutch f disengaged and the brake also disengaged from the pinion and with the engine c at rest: In this position the winding-drum is disconnected from the shaft and will permit the hoisting-chain to run freely from the same by gravity. If it is desired to apply the brake, the engineer moves the controlling-lever h in Fig. 2 to the left, thus moving the lever e^7 away from the stop g^2 and moving the valve of the power-cylinder e in position to draw the piston-rod downwardly. The stop e^3 contacts with the bell-crank d' and applies the brake just to the extent that the operator desires under control of the lever h. The operator can move the lever h within the limits of the track h^6 without disengaging the safety-catch g. When the roller h^8, however, comes against the offset h^9, which forms what may be termed a "movable stop," he has reached the limit within which he can operate the power-cylinder e without disengaging the latch g, and hence without applying the clutch f. It will be understood that the movement of the controlling-lever h is free around the tracks h^6 and h^7; but it requires an additional effort on the part of the operator to crowd the roller over the offset h^9, or, in other words, in passing from one track to the other. The offset and the safety-catch therefore furnish the means of preventing any accidental engagement of the clutch while handling the brake mechanism through the agency of the controlling-lever h. When it is desired to start the drum for hoisting, the controlling-lever h is thrown over until the roller h^8 passes the offset h^9 and comes onto the track h^7. The controlling-arm e^7 is brought into contact with the safety-catch and releases the same. At the same time the power is applied to the cylinder e and forces the clutch into engagement. This movement of the controlling-lever also operates the throttle-valve of the engine and starts the engine. If the controlling-lever h is to be used simply for controlling the engine, it is kept on the track h^7 and may be moved within the limits of this track to control the engine without disturbing the other operating parts. As soon as the controlling-lever h is moved back to the offset h^9, however, which will shut off the steam, the operator is notified that a further movement of the lever in that direction will disengage the clutch, and it will be seen that this arrangement permits the application of the brake upon the same movement that throws out the clutch. Hence the drum may be stopped and controlled without regard to the stopping of the engine, which may continue to operate although the steam may be shut off therefrom.

I have shown the different parts—such as the brake, the clutch, and the operating parts—of a well-known construction; but it is obvious that any suitable well-known form of these parts may be employed instead of the specific form shown.

Having thus described my invention, I claim—

1. In a hoisting device, a hoisting-drum, a brake, a clutch, and a driving-motor for operating said drum, a motor for operating said clutch and brake, a controlling-lever connected to the respective motors, a safety-catch for holding said clutch out of engagement, and means connected with said controlling-lever to determine when said catch is released, substantially as specified.

2. The combination with a winding-drum, a brake, a clutch and a motor for driving same, of a motor connected to said brake and clutch respectively by means which permit an independent movement of the said parts, a safety-catch, a controlling-lever adapted to control the movement of both of said motors and also to operate said safety-catch, and means connected with said controlling-lever to determine when said catch is released, substantially as specified.

3. The combination with the winding-drum, the main driving-shaft, a clutch for connecting said driving-shaft to said drum, and a brake for controlling said drum, a motor for operating said shaft, and a separate motor for controlling said brake and clutch, a controlling-lever connected to each of said motors and

adapted to control the same when in different positions, and a movable stop on said lever to determine when said lever has passed from the control of one device to that of the other, substantially as specified.

4. The combination with the rotating shaft, the winding-drum, the movable clutch for connecting said shaft to said drum, a brake for controlling the drum, a catch for holding said brake out of engagement, a motor for operating said brake and clutch, and a controlling-lever adapted when moved to an unusual position to disengage said catch, substantially as specified.

5. The combination with the driving-shaft and the drum, a clutch between said drum and shaft and a brake connected to said drum, a safety-catch for said clutch, a controlling device for operating said clutch and brake respectively, said controlling device being adapted to move said clutch when moved to one position and capable of an independent movement to control said brake, substantially as specified.

6. The combination with a rotating shaft, winding-drum, clutch, and brake as described, a motor for operating said shaft and a controlling-lever for said motor, said controlling-lever being also adapted to operate the brake and clutch, and a movable stop connected with said lever to determine the range of movement of said lever for operating the respective parts, substantially as described.

7. The combination with the rotating shaft, drum, brake and clutch, a motor for driving the shaft, a motor for driving the clutch and brake, a safety-catch for said brake, the controlling-lever connected to the respective motors and to said catch, said controlling-lever being provided with a segment having concentric tracks separated by an offset, and a spring-pressed contacting device to engage said device and offset, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand this 17th day of December, A. D. 1903.

GEORGE E. TURNER.

Witnesses:

JOHN E. WEST,

CHAS. B. HARNER.