Feb. 13, 1940. H. J. DYKE 2,189,978

RAILWAY HAND BRAKE

Filed Feb. 25, 1938 2 Sheets-Sheet 1

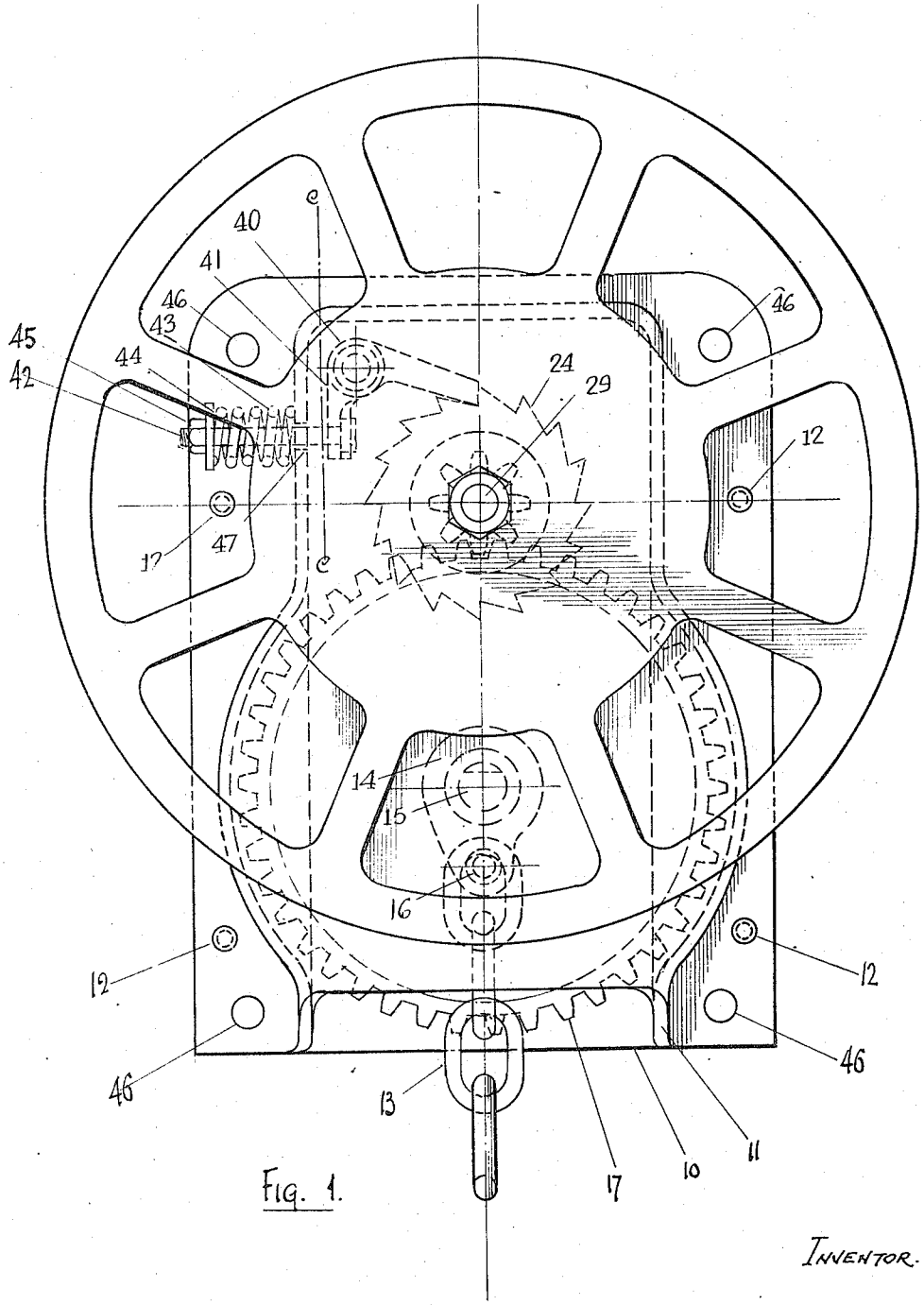


FIG. 1.

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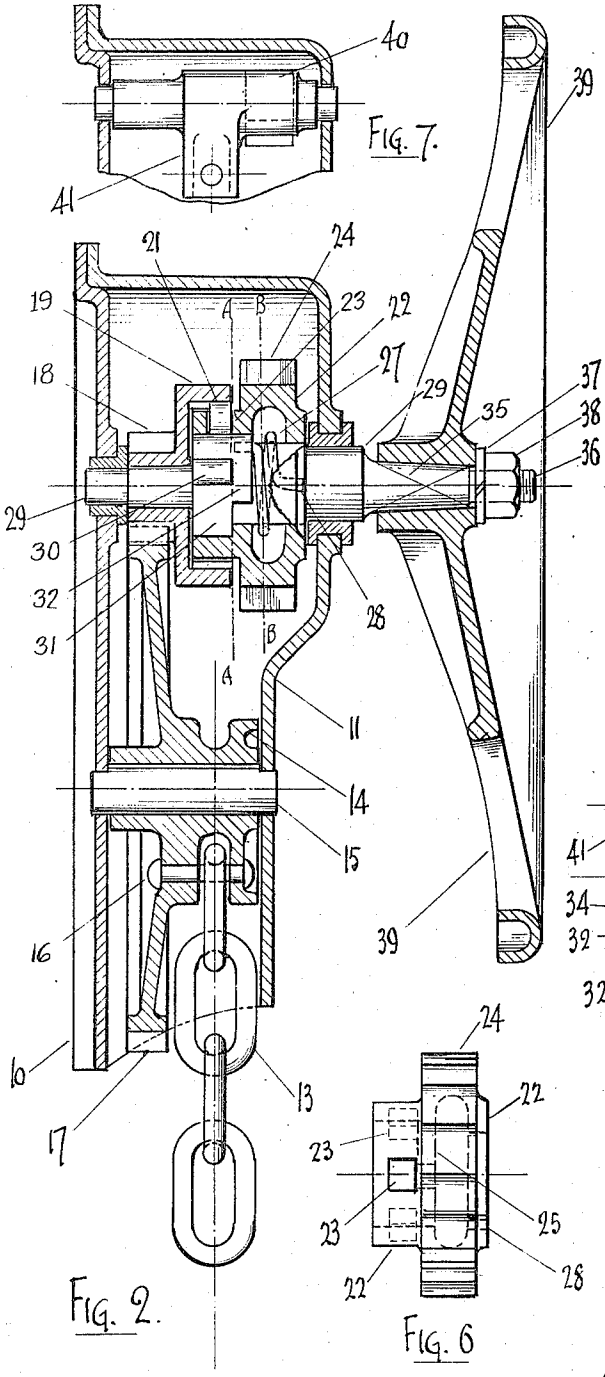


Fig. 7.

Fig. 2.

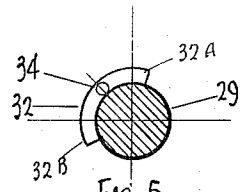


Fig. 5

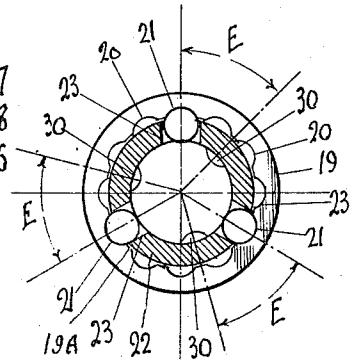


Fig. 3.

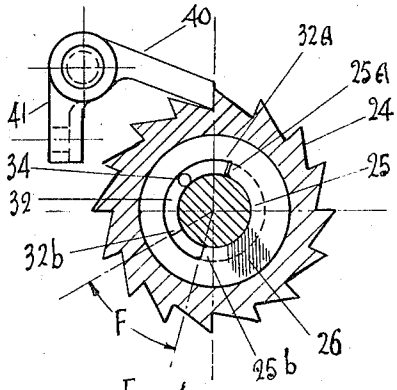


Fig. 4.

Fig. 6

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UNITED STATES PATENT OFFICE

2,189,978

RAILWAY HAND BRAKE

Herbert Jeffrey Dyke, Toronto, Ontario, Canada

Application February 25. 1938, Serial No. 192,527

2 Claims. (Cl. 74—505)

My invention relates to the type of hand brake operating mechanism for railway cars which is generally attached to the vertical wall of a car and actuated by means of a hand wheel turning on a horizontal axis, the mechanism comprising a winding drum for a chain to which the pull rod connections of the usual brake rigging is connected.

The primary object of my invention is to provide a safe holding and releasing mechanism for the winding drum whereby the drum may be wound up, instantaneously released, or gradually released, solely by the manipulation of the hand wheel by the brakeman without the use of trip levers or the like, and with the mechanism so arranged that the hand wheel cannot spin back.

With the hand brake mechanism described herein, the brakeman, standing on the usual platform provided, operates the hand wheel with his right hand and with his left hand takes a firm hold on some fixed part of the car, and maintains this position throughout the whole period of controlling the car by means of the hand brake. The chain of the winding drum is connected to the usual rods, levers, etc., of the brake rigging of the railway car. Winding up the hand brake mechanism tightens these connections and forces the brake shoes against the wheels of the car. Releasing the hand brake mechanism frees, or reduces the pull on the brake rigging connections and permits the brake shoes to fall away entirely or in part, from the wheels of the car.

The various advantages secured by the invention are pointed out in connection with its description.

In the accompanying drawings—

Fig. 1 is a front elevation of the hand brake mechanism to which this invention relates.

Fig. 2 is a sectional elevation of the hand brake mechanism shown in Fig. 1.

Fig. 3 is a detail sectional view of the clutch mechanism at line A—A of Fig. 2.

Fig. 4 is a detail sectional view of the clutch mechanism at line B—B of Fig. 2 with the locking pawl shown in its relative position.

Fig. 5 is a detail sectional view of the shaft stop as seen from line B—B of Fig. 2.

Fig. 6 is a detail view of the clutch body.

Fig. 7 is a detail view of the locking pawl as seen from line C—C of Fig. 1.

Similar numerals refer to similar parts throughout the several views.

The brake actuating mechanism is enclosed within a housing comprising a back plate 10 and a front casing 11 secured together by rivets or bolts 12 fastening holes 46 are provided for fixing the housing to the wall of a car.

A winding chain 13 is attached by means of a rivet or bolt 16 to a winding drum 14 said winding drum being freely journalled on a shaft 15 which is fixed in the back and front walls of the housing. A gear wheel 17 integral with the drum 14 meshes with a pinion 18 which is freely journalled on the rear part of shaft 29. Integral with the pinion 18 is a clutch drum 19 the inside peripheral face 19*a* of which is provided with a plurality of concave shaped notches 20 in which clutch rollers 21 are free to engage. A clutch body 22 is journalled on shaft 29 and is provided with a plurality of slots 23 in which the clutch rollers 21 freely fit. Ratchet teeth 24 are formed on clutch body 22 to engage a ratchet pawl 40. A stop 25 is arranged on clutch body 22 to limit the rotational movement of shaft 29 with respect to the clutch body 22. An annular recess 26 is provided in clutch body 22 in which is arranged a torsion spring 27 one end of which fits in the hole 34 in the shaft stop 32 and the other end in the hole 28 in the clutch body 22. The spring 27 is tensioned to hold the stop 32 of the shaft 29 against the stop 25 of clutch body 22 in the winding up direction. The shaft 29 is journalled in the front and back walls of the housing and is provided with a peripheral face 31 in which is arranged at suitable locations a plurality of concave notches 30. In the winding up position the clutch rollers 21 are held firmly in the drum notches 20 by the peripheral face 31, but when the shaft 29 has been rotated in the releasing direction by an angular movement E Fig. 3 the shaft notches 30 come in line with the clutch rollers 21 which are forced down by the pull of the brake chain in unwinding direction into the shaft notches 30 and out of the drum notches 20, thus freeing the clutch drum 19 from engagement with the clutch body 22 and from the shaft 29 with its wheel 39. The end 32*a* of the stop 32 integral with the shaft 29 engages against the end 25*a* of the clutch body stop 25 as shown in Fig. 4 so that when the shaft is rotated in the winding up direction the shaft 29 carries the clutch body 22 with it in the same direction the pawl 40 rising and falling over the teeth 22 permitting movement in this direction, when the shaft 29 is rotated in the releasing direction by an angular distance F Fig. 4 which equal to the angular distance E Fig. 3 the shaft stop end 32*b* contacts the clutch body stop end 25*b* and further movement in the releasing direction is prevented by the locking pawl 40 holding the clutch body 22. A hole 34 is arranged in stop

32 to engage one end of the torsion spring 27. The shaft 29 is provided with a square sectioned extension 35 to firmly seat a hand wheel 39 which thus turns with the shaft 29. A threaded end 36 is provided on the shaft with a spring washer 37 and nut 38 to hold the wheel 39 firmly on the shaft seat 35. A pawl 40 is journalled in the back and front walls of the housing and is provided with an extension 41, a bolt 42, a compression spring 43, a washer 44 and a nut 45. A hole 47 in the side wall of the housing permits the bolt to move freely to and fro. The spring 43 being in compression against the side wall of the housing tends to hold the pawl 40 firmly in the teeth 24, but permits the pawl 40 to rise and fall in the teeth 24 when the clutch body 22 is rotated in the winding up direction.

In operation the brakeman standing on the platform provided and grasping some fixed part of the car with his left hand will manipulate the hand wheel with his right hand to perform the functions of winding up, releasing or gradually releasing the hand brake mechanism to operate the brake shoes on the wheels of the car as aforesaid.

Generally to wind up hand brake mechanism of this type the hand wheel is rotated in a clockwise direction when looking at the front of the housing and this direction has been used for the drawings and description of this specification the mechanism would however be as equally effective were the opposite direction chosen.

In winding up the hand brake mechanism to apply tension on the brake rigging of a car the brakeman rotates the hand wheel 39 in a clockwise direction carrying the shaft 29 with it, the shaft stop end 32*a* being in engagement with the clutch body stop and 25*a* in turn rotates the clutch body 22 in the same direction the clutch body 22 being free to do so as the pawl 40 slides up the inclined edges of the ratchet teeth 24. The clutch body 22 carries with it the clutch rollers 21 located in the clutch body slots 23, and as the clutch rollers 21 are firmly held in the concave notches of the clutch drum 19 the clutch drum with its integral pinion 18 is also rotated in the same direction. The rotating pinion 18 meshing with the gear wheel 17 rotates the winding drum 14 thus winding up the chain 13 and exerting a pull on the brake rigging connections and forcing the brake shoes against the wheels.

To release the brakes quickly the brakeman pulls on the hand wheel in a counter clockwise direction. The clutch body 22 is held from rotation in this direction by the pawl 40 engaging the straight faces of ratchet teeth 24, but the wheel and shaft can turn counter clockwise alone for a short angular distance E Fig. 2 and F Figure 4, these being equal, until the shaft stop end 32*b* contacts with the clutch body stop end 25*b* at which point further anticlockwise rotation is prevented by the pawl 40 as clearly shown in the drawings, when the shaft 29 has moved back through angle E the shaft notches 30 are opposite the clutch body slots 23 and the unwinding pull of the chain transmitted through the gears and clutch drum 19 force the clutch rollers 21 inwards radially into the shaft notches 30 and free of the clutch drum notches 20. The clutch drum 19, pinion 18, gear 17, winding drum 14, are then free to rotate in unwinding direction and the chain runs out thus reducing the tension on the connections and freeing the brakes. The hand wheel 39 is then snapped back to its winding up position, being assisted in doing so by the spring 27, this forces the clutch rollers 21 back in to the drum notches 20 and the mechanism is again ready for a further winding up movement.

To gradually release the brakes the hand wheel 39 is given a limited counterclockwise rotation sufficient to permit the clutch rollers 21 to partially enter the shaft notches 31 and at the same time hold the said clutch rollers 21 against the clutch drum peripheral faces 19*a*, the frictional resistance thus set up permitting the brakeman operating the hand wheel 39 to control the speed of the clutch drum 19 as the pull of the chain tends to turn same in unwinding direction. When the clutch rollers 21 have slid back to a succeeding series of clutch drum notches 20, the hand wheel 39 is given a clockwise rotation and the clutch rollers 21 are forced into said notches 20 and the clutch drum 19 is held from further unwinding, it can readily be seen that the brakeman can obtain any degree of release and the mechanism held at any tension ready for rewinding up, being further gradually released or being fully released, all these functions being performed solely by the brakeman operating the hand wheel 39 in counterclockwise and clockwise directions.

From the foregoing it can readily be seen that the functions of the hand brake mechanism is controlled solely by the manipulation of the hand wheel and while said hand wheel is free to be rotated to wind up the brake chain, the unwinding pull of the brake rigging cannot rotate or spin the hand wheel thus a very safe and efficient device is obtained.

While I have shown in the drawings and described in the specification the clutch engaging members as short round rollers and three in number I may use balls or rectangular fingers with rounded or angular shaped ends in which cases the notches on the clutch drum and shaft for holding and releasing the clutch engaging members will be shaped to correspond to the particular shapes chosen and I may use more or less clutch engaging members all without departing from the scope of the invention.

I do not claim a hand brake mechanism broadly but only the particular type of mechanism as described herein.

I claim:

1. In a hand brake operating mechanism for railway cars the combination of a horizontally disposed shaft, a hand wheel on said shaft operable in one direction to set the brakes and in the opposite direction for a limited distance to release the brakes, means for holding the hand brake mechanism in, and releasing it from its brake setting position, comprising a clutch body mounted on said shaft with stops on said shaft and clutch body to limit the rotary movement of one with respect to the other, a spring to hold the clutch body and shaft stops in engagement in the winding up direction, a ratchet wheel integral with said clutch body, a pawl positioned to engage the ratchet wheel, a spring to hold pawl firmly on the ratchet wheel, slots in the clutch body to hold clutch engaging members, clutch engaging members forming the holding and releasing device, engaging and releasing means on the shaft member for controlling the clutch engaging members, a clutch drum and pinion with notches on the clutch drum to engage with the clutch engaging members, in combination with a gear wheel and winding drum, a shaft, a chain, and a housing.

2. In a hand brake operating mechanism, a

clutch device comprising a hand wheel means fixed at the outer end of a shaft, a shaft rotatably mounted in the back and front walls of a housing, engaging and disengaging means on said shaft for holding or releasing clutch engaging members, stops on said shaft to engage a clutch body, and an extension on which is rotatably mounted a clutch drum and integral pinion, a clutch body freely mounted on said shaft, ratchet teeth on said clutch body, stops on said clutch body to limit the rotation of said shaft with respect to said clutch body, slots in said clutch body to freely carry clutch engaging members, a spring disposed between said shaft and said clutch body arranged to hold the stops of said shaft and said clutch body in winding up position, a ratchet pawl pivotally mounted in the housing to engage the ratchet teeth of said clutch body, a spring to hold said ratchet pawl firmly in engagement with said ratchet teeth on said clutch body, clutch engaging members freely positioned in the slots of said clutch body, a clutch drum having an internal peripheral face, disengaging means in said peripheral face of clutch drum, a pinion gear integral with said clutch drum, said clutch drum and pinion being rotatably mounted on said shaft, said pinion gear meshing with a spur gear having an integral chain winding drum, the said clutch engaging members being held in positive engagement with the clutch drum when the hand wheel means is in the winding up position and free to be quickly or slowly disengaged from said clutch drum when the hand wheel means is rotated in the releasing direction.

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