

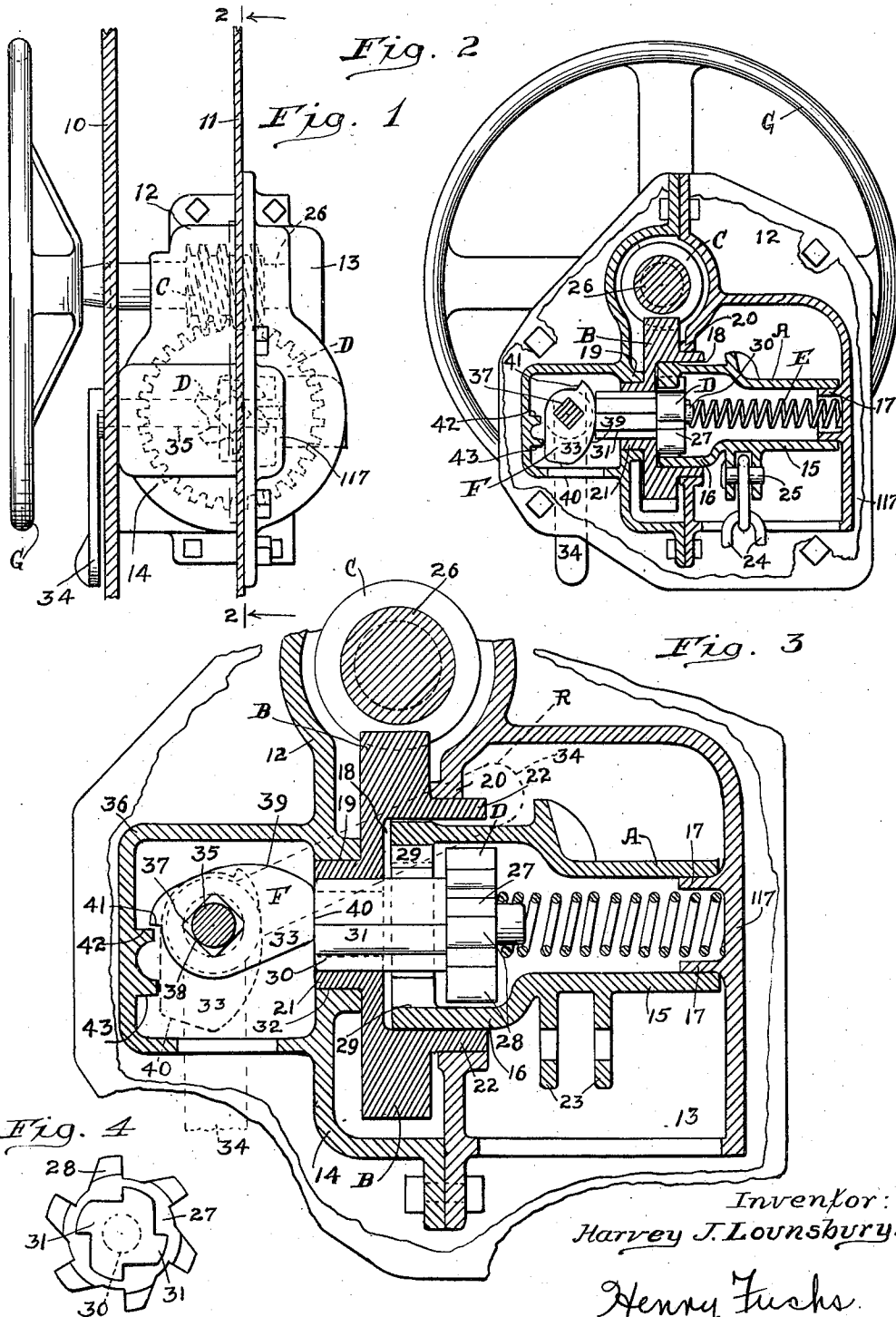
April 20, 1948.

H. J. LOUNSBURY

2,439,941

HAND BRAKE

Filed May 11, 1946



Inventor:
Harvey J. Lounsbury.

By Henry Fuchs.
ATTY.

UNITED STATES PATENT OFFICE

2,439,941

HAND BRAKE

Harvey J. Lounsbury, Glen Ellyn, Ill., assignor to
W. H. Miner, Inc., Chicago, Ill., a corporation
of Delaware

Application May 11, 1946, Serial No. 669,070

1 Claim. (Cl. 74—505)

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This invention relates to improvements in hand brakes of the power multiplying type, especially adapted for railway cars.

One object of the invention is to provide a hand brake mechanism of the character indicated including a chain winding element or drum and means actuated by the usual hand wheel for rotating the winding element to apply and release the brakes, wherein simple and effective means is provided for rendering the hand wheel inoperative to actuate the winding element and thereby prevent unauthorized application of the brakes.

A further object of the invention is to provide in a hand brake mechanism, comprising a chain winding drum and hand wheel actuated means for rotating the drum to wind the chain thereon or unwind the same therefrom, means for breaking the connection between the winding drum and the drum rotating means to prevent unauthorized or accidental application of the brakes, comprising a clutch normally connecting the drum rotating means and the drum, and a manually operated member for disengaging the clutch and locking the same in disengaged position.

Other objects of the invention will more clearly appear from the description and claim hereinafter following.

In the drawing forming a part of this specification, Figure 1 is a side elevational view of my improved hand brake mechanism, illustrating the same applied to the end wall of a railway car, the end wall of the car being shown in vertical section. Figure 2 is a transverse, vertical sectional view, corresponding substantially to the line 2—2 of Figure 1, showing the clutch and cam for operating the same in elevation. Figure 3 is a view similar to Figure 2, on an enlarged scale and partly broken away, showing the position that the parts assume when the clutch is in disengaged position. Figure 4 is a detail elevational end view of the clutch member of my improved mechanism, looking from left to right in Figure 3.

In said drawing, referring to Figure 1, 10 and 11 designate the inner and outer members of the vertical inner end wall of a railway car. My improved hand brake mechanism is illustrated as mounted on this end wall in such a manner as to be operable from the interior of the car with the hand wheel of the mechanism rotatable in a plane substantially parallel to said end wall. The operative parts of the mechanism are preferably enclosed in a housing 12, and the wall member 11 is cut out or recessed to accommodate the same.

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In carrying out my invention, I preferably form the housing of two parts, 13 and 14, to provide for ready assembling of the brake mechanism.

5 My improved brake mechanism proper comprises broadly a chain winding drum A; a worm wheel B; a worm element C; a sliding clutch member D; a clutch spring E; a lever actuated cam means F; and an operating hand wheel G.

10 The chain winding drum A is in the form of a hollow casting having a chain winding section 15 at one end and an enlarged section 16 at the other end adapted to accommodate the sliding clutch member D. The section 15 of the drum is of substantially cylindrical, tubular formation and is open at its right hand end, as seen in Figures 2 and 3. The drum is rotatably supported at its right hand end by a hollow bearing projection or boss 17 on the vertical wall 11 of the housing and over which the end of the section 15 of the drum is engaged. The opposite or left hand end of the drum is supported by the worm wheel B into which said end extends, the worm wheel having an axial bearing seat or opening 18 to receive said end. The worm wheel B, in turn, is rotatably supported in bearing members 19 and 20 of the housing, being provided with hollow, cylindrical hub portions 21 and 22 at opposite sides thereof engaged in said bearing members, respectively. The section 15 of the drum A is provided with the usual chain anchoring lugs 23 to which the inner end of the brake chain 24 is secured by a pin 25 extending through the lugs and the end link of the chain. 35 The brake chain 24, which is shown broken away in Figure 2, is connected to the brake mechanism proper of the car, not shown, in the usual well known manner.

The worm C, which meshes with and drives the worm wheel B, is disposed above the same, being fixedly mounted on a shaft 26 rotatably supported in suitable bearings of the housing 12 and having the hand wheel G fixed to the outer end thereof.

45 The clutch D, which normally operatively connects the chain winding drum A to the worm wheel B, comprises a head member 27 provided with peripheral clutch teeth 28 engaging interior teeth 29 on the enlarged section 16 of the drum A, and a stem 30 extending from said head. The stem 30 is slidably engaged in the hollow hub 21 of the worm C and normally projects therefrom as shown in Figure 2. The clutch D is at all times locked to the worm wheel B for rotation in unison therewith, being provided with elongated, peripheral ribs 31, which engage with correspondingly shaped grooves 32

formed internally of the hollow hub 21. The clutch D is thus mounted for sliding movement with respect to the worm wheel B with which it is rotatable in unison.

The spring E, which is arranged within the hollow drum A, is in the form of a helical coil interposed between the clutch D and the side wall 17 of the housing and normally holds the clutch in the position shown in Figure 2 with the teeth 28 thereof interlocked with the teeth 29 of the drum, thus locking the drum to the worm wheel for rotation therewith.

The cam means F comprises a cam member 33, an actuating lever 34, and a shaft 35 connecting the cam to the actuating lever. The cam member 33 is housed in an offset chamber 36 of the housing 12, being mounted on the shaft 35 for rotation therewith, the shaft being formed with a portion 37 of square cross section, fitting within an opening 38 of square cross section provided in the cam member 33. The shaft 35 is rotatably supported in suitable bearings provided in the opposite side walls of the chamber 36 and has the actuating lever 34 fixed to the projecting outer end thereof, as clearly shown in Figure 1. As shown in Figure 1, both the hand wheel G and the actuating lever 34 are located on the inner side of the end wall of the car for operation from the interior of the car. The parts are so mounted that the cam member 33 is in longitudinal alignment with the clutch D and is adapted to engage with the stem 30 of the clutch. This cam member is in the form of a relatively thick, heavy plate having a curved cam face 39 which engages the outer end of the stem 30 of the clutch when the latter is in the position shown in Figure 2, that is, in driving engagement with the chain drum A. Beyond the cam face 39, the cam 33 has a substantially flat locking face 40 adapted to have flat engagement with the flat outer end of the stem 30 of the clutch when the cam is swung to the full line position shown in Figure 3 to hold the clutch disengaged and lock it in that position. In order to limit rotation thereof and prevent overthrow, the cam member 33 has a stop shoulder 41 which is diametrically opposite the flat face 40 and cooperates with a stop lug 42 on the outer end wall 43 of the chamber 36. In Figure 3 the shoulder 41 is shown as slightly spaced from the lug 42, that is, when the face 40 of the cam member flatly engages the end of the stem 30 of the clutch. By this arrangement of the shoulder 41 with respect to the lug 42, the rotation of the cam member is positively stopped in the event that it is rotated slightly beyond the position shown in Figure 3.

The clutch D is in locking engagement with the worm wheel B during normal operation of the brakes, the hand wheel being turned in counterclockwise direction, as shown in Figure 2, to tighten the brakes and in clockwise direction to release the same, thereby rotating the drum through the worm wheel B which meshes with the worm wheel C which is actuated by the hand wheel G. During both operations of tightening and releasing the brakes, the drum is at all times locked to the worm wheel B for rotation in unison therewith, this being the normal condition of the mechanism. When the brake has been completely released, the attendant throws the clutch out of engagement to prevent unauthorized or accidental operation of the brakes. To disengage the clutch, the lever 34 is swung to the right from the pendant position shown in Figure 2 to the raised position, indicated by R in Figure 3. This

raised position is shown in dotted lines in Figure 3. In swinging the lever upwardly to the raised position, the cam forces the clutch out of engagement through the action of the cam face 39, and, when the lever reaches the position indicated by R, the clutch is locked in its released position by the flat face 40 of the cam member, the pressure exerted by the spring E being sufficient to hold the parts in this position. Inasmuch as the drum is thus disconnected from the driving mechanism, rotation of the hand wheel in either direction is ineffective to operate the brakes. Unauthorized or accidental tightening of the brakes, which might prove very dangerous in service, is thus effectively prevented, inasmuch as turning of the wheel or giving it a spin, as is sometimes done by unauthorized persons, will not drive the chain winding drum.

To again render the brakes operative, the attendant swings the lever 34 from the upper dotted line position indicated by R in Figure 3 to the pendant position shown in full lines in Figure 2 and in dotted lines in Figure 3, thus withdrawing the cam from the clutch and permitting the spring E to project the clutch to its engaged position with the cooperating clutch teeth of the chain winding drum, thereby reestablishing driving relation between the worm wheel B and the drum.

I claim:

In a hand brake mechanism, the combination with a chain winding drum rotatable about a horizontal axis; of a worm wheel rotatable about a horizontal axis and axially aligned with said drum; a horizontally disposed sliding clutch member coaxial with said worm wheel and rotatable in unison with the latter, said drum and clutch member having cooperating locking portions; spring means yieldingly holding said clutch member engaged; a worm member meshing with the worm wheel; a housing enclosing said drum, worm wheel and worm; a hand wheel operatively connected to the worm member for rotating the latter; a cam within the housing supported for rotation about a horizontal axis, said cam having a curved edge face engageable with said clutch member to slide the same out of operative engagement with the drum, and a flat locking edge face adjacent said curved edge face engageable with said clutch to lock the latter in disengaged position; a lever fixed to the cam for actuating the same, said lever being swingable from pendant to raised position to rotate the cam and disengage said clutch member, said flat face, when engaged with the clutch member, holding said lever in raised position; a projecting stop lip on said cam diametrically opposite to said flat locking face; and a fixed stop on the housing in the path of movement of said lip for limiting the throw of said cam and lever in clutch disengaging direction.

HARVEY J. LOUNSBURY.

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