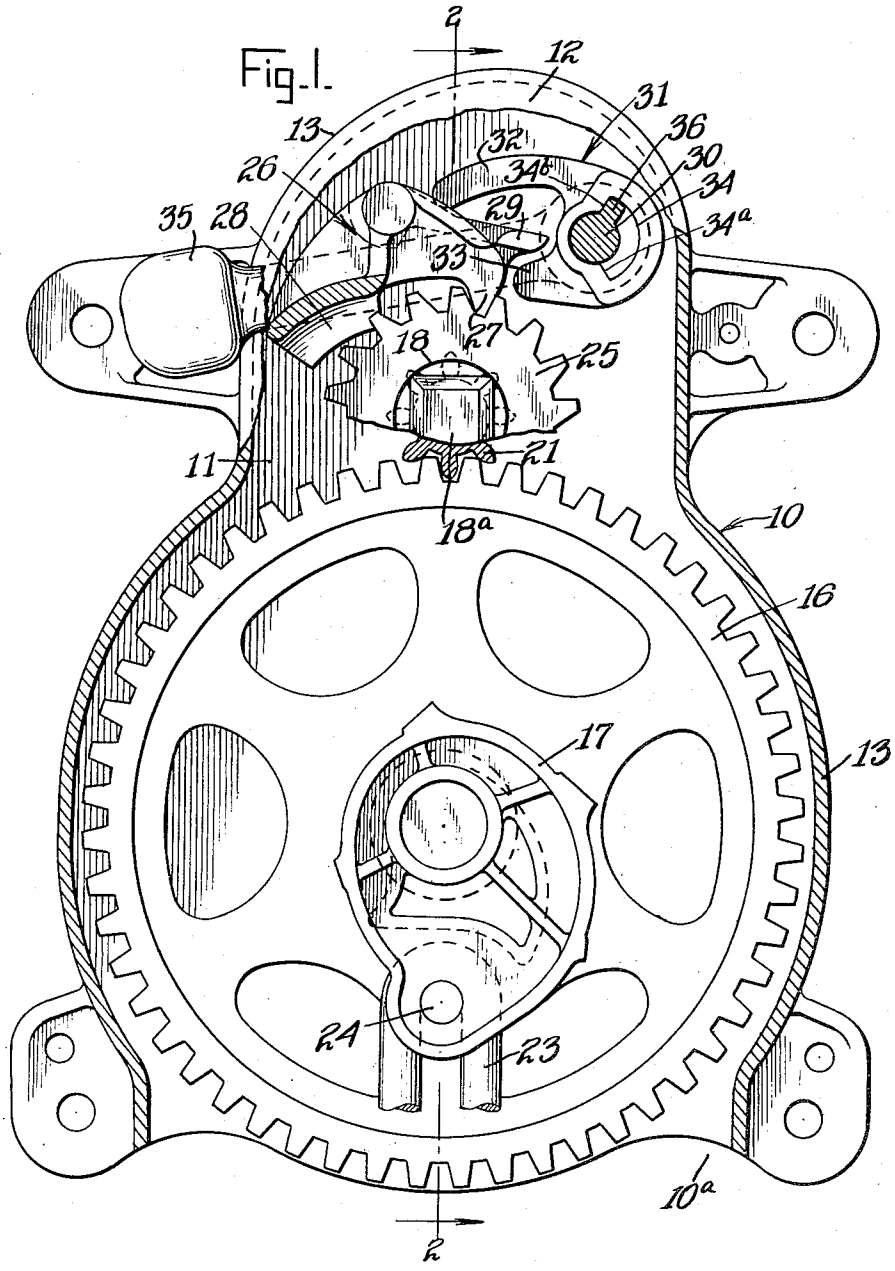
May 16, 1939. R. W. BURNETT 2,158,055

HAND BRAKE

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Fig. 1.



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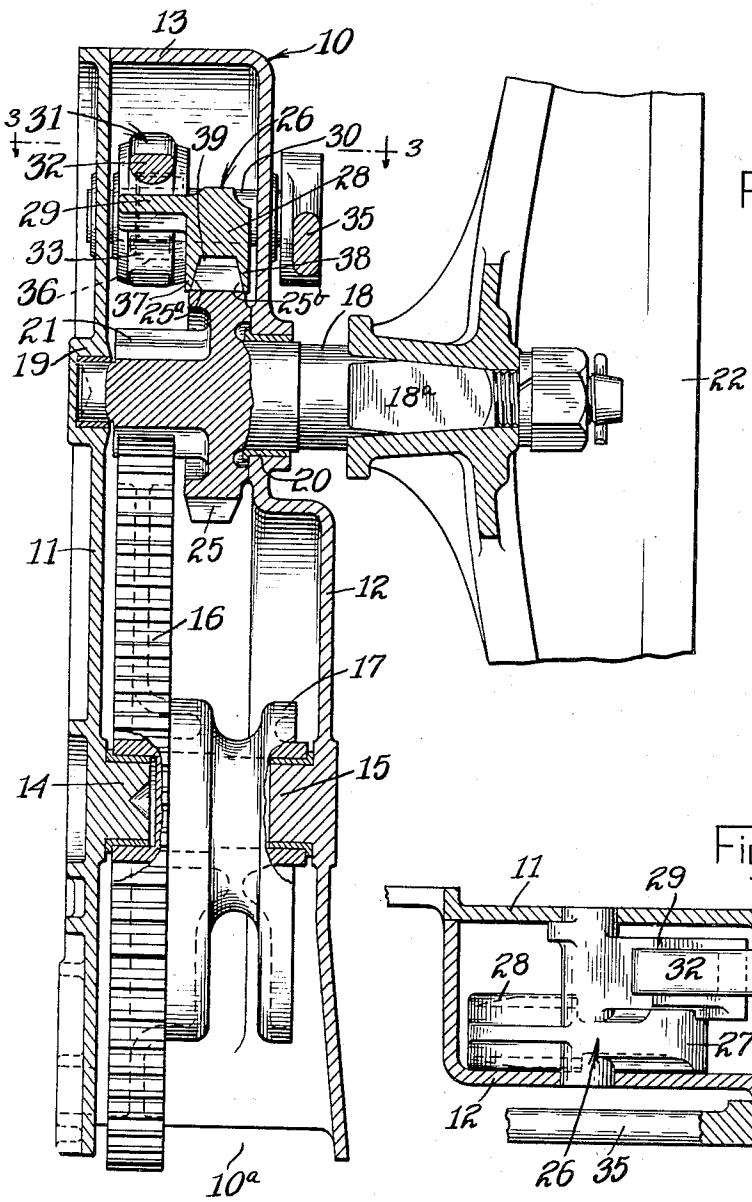


Fig. 2.

Fig. 3.

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Fig. 4

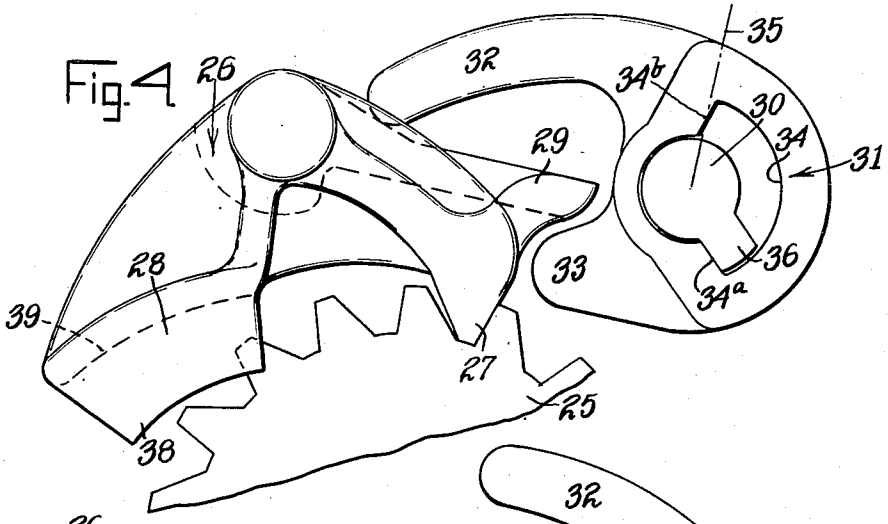


Fig. 6.

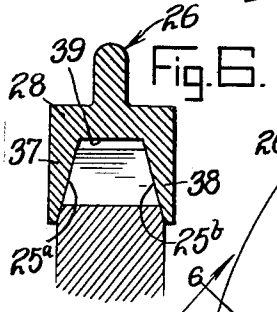


Fig. 5.

Fig. 8.

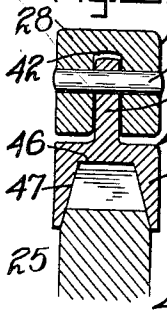
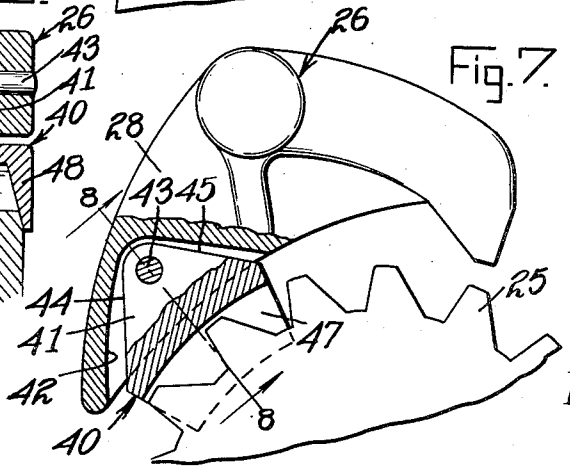


Fig. 7.



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UNITED STATES PATENT OFFICE

2,158,055

HAND BRAKE

Richard W. Burnett, Chicago, Ill.

Application July 17, 1936, Serial No. 91,059

11 Claims. (Cl. 188—81.1)

This invention relates to railway car hand brakes.

One of the objects of this invention is to provide a simple, inexpensive and practical hand brake mechanism which is well adapted to meet the varying conditions of practical use. Another object is to provide a hand brake mechanism of the above character which is efficient, durable and reliable under conditions of rigorous use. Another object is to provide a hand brake mechanism of the above character which is compact and relatively light in weight and which may be easily operated with a maximum of safety. Other objects will be in part obvious and in part pointed out hereinafter.

This invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, as will be exemplified in the structure to be hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which is shown one of the various possible embodiments of my invention,

Figure 1 is a front plan view of the mechanism positioned within the housing, of which portions are broken away;

Figure 2 is a vertical sectional view taken along line 2—2 of Figure 1;

Figure 3 is a horizontal sectional view of the housing taken along line 3—3 of Figure 2;

Figure 4 is an enlarged plan view of some of the parts shown in Figure 1;

Figure 5 is an enlarged plan view similar to Figure 4 but showing the parts in different positions;

Figure 6 is a sectional view taken along line 6—6 of Figure 5;

Figure 7 is an enlarged front plan view, similar to Figure 5, of a modification of my construction; and,

Figure 8 is a sectional view taken along line 8—8 of Figure 7.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now to the drawings in detail and to Figure 2 in particular, the hand brake mechanism is mounted in a housing generally indicated at 10 which preferably comprises a back plate generally indicated at 11 and a front plate generally indicated at 12. Front plate 12 preferably has a rearwardly extending flange 13 (see also Figure 1) formed thereon which abuts against back plate 11 and extends around the outer edges thereof, having an opening 10a along the lower edge of the housing, as may be seen in Figure 1. Front plate 12 is attached to back plate 11 in any suitable manner and the housing is suitably secured to the side wall of a railway car.

In the lower portion of the housing, and preferably mounted upon machined lugs 14 and 15 (Figure 2) which are preferably integral with and project from plates 11 and 12 respectively I provide a large gear 16 which is preferably formed integrally with a winding drum 17. Positioned in the upper part of the housing above gear 16 is a shaft 18 preferably supported in the housing by a journal 19 and a bearing 20 formed in plates 11 and 12 respectively. Shaft 18 preferably has integrally formed therewith a pinion gear 21 which meshes with drum gear 16; shaft 18 preferably having one end 18a extending through front plate 12 of the housing to provide a mounting for a hand wheel 22. Hand wheel 22 is so secured to shaft 18 that rotation thereof is transmitted through pinion gear 21 and gear 16 to the winding drum 17. The winding drum in turn is operatively connected to the brake rigging (not shown) of the railroad car by a chain, the end link 23 of which is shown as connected to winding drum 17 by a pin 24 (Figure 1). Thus the power generated in the hand brake mechanism by movement of the hand wheel is transmitted directly to the brakes of the railway car.

Also formed integrally with shaft 18 (Figure 2) and positioned between pinion gear 21 and front plate 12 of the housing is a ratchet wheel 25. Positioned above ratchet wheel 25 and pivotally mounted upon housing 10 is a pawl member or the like generally indicated at 26. Member 26 comprises a pawl 27 (Figure 2) adapted to engage ratchet wheel 25, and a tail portion 28 also adapted to engage ratchet wheel 25 to retard reverse movement thereof, as will be described more fully hereinafter. Member 26 has a web 29 (Figures 1 and 2) preferably formed integrally therewith, which is positioned above pawl 27 and extends rearwardly or to the left of member 26 as viewed in Figure 2.

To the right of part 26, as viewed in Figure 1, is a shaft 30 which is mounted in housing 10 parallel to the pivotal axis of member 26. Secured to shaft 30 and positioned externally of the housing 10 is a tripping lever 35 (Figures 2 and 3). Pivotally mounted upon shaft 30 is a tripping cam generally indicated at 31 which has a pair of jaws 32 and 33 extending to the left of its axis as viewed in Figure 1, these jaws be-

ing positioned above and below web 29. Thus, if tripping cam 31 is moved clockwise (Figure 1) jaw 33 engages the lower surface of web 29 moving the pawl 27 out of engagement with ratchet wheel 25. If the tripping cam is moved counterclockwise, jaw 32 engages the upper surface of web 29 to move the pawl into engagement with the web.

A recess 34 is provided in tripping cam 31, adjacent shaft 30, and integral with shaft 30 I provide a lug 36 which moves freely in recess 34 until it abuts against one end 34a or the other end 34b thereof. Thus when tripping lever 35 is moved clockwise, as viewed in Figure 1, there is a certain amount of free or lost movement before lug 36 abuts recess end 34a to cause lower jaw 33 to engage web 29. Similarly if the tripping lever were moved counter clockwise to effect an abutment between lug 36 and recess end 34b causing the pawl and ratchet to disengage, there would be a certain amount of free or lost movement of the lever before the upper jaw of the tripping cam forced the pawl into engagement with the ratchet, all of which is for a purpose to be more fully disclosed hereinafter.

Referring to Figure 6, the sides 25a and 25b of ratchel wheel 25 are preferably beveled and the tail portion 28 of pawl member 26 has two downwardly extending lugs 37 and 38, the inner surfaces of which are preferably beveled to substantially the same angle as the beveled sides 25a and 25b of ratchet wheel 25. Preferably lugs 37 and 38 are so positioned upon part 26 that they engage a substantial portion of the beveled edges of the ratchet wheel while at the same time the under surface 39 (Figure 6) of member 26 is preferably spaced from the ratchet teeth. Accordingly, referring to Figure 1, when pawl 27 is moved out of engagement with ratchet 25 by upward movement of jaw 33, the tail portion 28 of part 26 moves downwardly upon ratchet wheel 25. If this movement is continued, lugs 37 and 38 are forced into frictional engagement with the sides of the ratchet teeth thus retarding reverse movement thereof.

Member 26 is preferably so proportioned that its natural tendency is to assume the balanced position shown in Figure 5 i. e., to move in a clockwise direction when neither of jaws 32 or 33 engages its web portion 29. In this position there is no engagement between the ratchet teeth and pawl 27 and either no engagement or very loose engagement between the ratchet teeth and beveled lugs 37 and 38. In this connection, it should be noted that the lost motion referred to hereinabove and the various parts whereby it is achieved coact with the pawl in effecting efficient and advantageous operation thereof. For example, when a brakeman is drifting the car over a hump, the car brakes are generally set a certain amount. Under certain circumstances, however, the brakeman might desire the car to roll faster, in which event at least a partial release of the brake would be necessary. Such partial release is readily effected by moving lever 35 in a clockwise direction as viewed in Figure 1, to release pawl 27 from its ratcheting engagement with the ratchet wheel. In view of the fact that member 26 is out of balance when engaged with the ratchet 25 and tends to move counterclockwise (Figure 5) when released therefrom, there is no tendency for the pawl to drop back into ratcheting engagement subsequent to release therefrom, and the car brakes thus may be readily released to any desired extent. A further advantage of such a pawl lies in the fact that it will not readily drop into either its ratcheting or braking position without actuation by the brakeman.

It should be further noted in connection with the lost motion feature that when pawl 27 is set in ratcheting engagement with ratchet 25, disengagement from this position is greatly facilitated by the momentum built up during the lost or ineffective movement of weighted lever 35. That is, with reference to Figure 1, when weighted lever 35 is flipped over in clockwise direction, lug 36 on lever shaft 30 is free to travel throughout the entire extent of recess 34 before engaging end 34a of the recess. During this movement there is, of course, no engagement between jaw 33 and web 29. However, when lug 36 abuts recess end 34a, the potential energy built up by the inertia of the weighted lever during its free travel is immediately effective upon the engagement between jaw 33 and web 29 to snap pawl 27 out of its ratcheting engagement with ratchet wheel 25.

The combined features of the pawl and the above-noted lost motion mechanism effect the further advantage of definite and immediately ascertainable control in that the brakeman can immediately determine not only whether weighted lever 35 is in a position to set or release the pawl, but also the exact point at which such release or engagement may be effected.

In operation, if the user desires to set the brakes, he throws lever 35 to the position shown in Figure 1. When in this position, jaw 32 presses downwardly upon web 29 forcing and holding the pawl in engagement with ratchet wheel 25. Then hand wheel 22 is whirled in a clockwise direction as viewed in Figure 1, causing gears 21 and 16 to rotate the winding drum 17, and operate the brake rigging (not shown) through chain 23. The pawl 27 (Figure 1) at this time is held in engagement with ratchet wheel 25 by the weight of lever 35 acting through cam 31 to prevent reverse movement of the parts. When the user decides to instantaneously release the brakes, the lever is moved clockwise (Figure 1). Referring now to Figure 4, lever 35 moves freely to the right until lug 36 engages end 34a of recess 34. At this time the lever is positioned as shown in Figure 4. Further movement of the lever in this direction causes jaw 33 to engage web 29, forcing pawl 27 out of engagement with ratchet wheel 25. It should be noted that by continuing the movement of the lever in this same direction, jaw 33 continues to bear upwardly upon web 29 causing beveled lugs 37 and 38 on the tail portion of part 26 to frictionally engage the ratchet wheel.

Thus the user by swinging the lever to the right as viewed in Figure 2 releases the mechanism and immediately controls the amount of release thereof by means of the frictional engagement of the lugs with the ratchet wheel. This extremely short interval between the releasing and braking action prevents the parts from attaining any great speed of rotation before the braking action of member 26 takes effect, and also prevents the hand wheel from spinning. In other words, the user at all times has complete control of the releasing of the hand brake.

Because part 26 is unbalanced when pawl 27 is engaged with ratchet 25 as described hereinabove, the pawl can not drop into engagement with the ratchet wheel after it has been released therefrom, without manual actuation. Thus,

excessive shock to the engaging parts is avoided. In order to re-engage the pawl and the ratchet wheel after release thereof, lever 35 is moved to the left, as viewed in Figure 1, and when lug 36 engages the upper end 34b of recess 34 in the cam, jaw 32 engages web 29 to force the pawl into engagement with the ratchet wheel. When in this position, the hand brake mechanism is conditioned for operation of hand wheel 22 to set the brakes.

Referring now to Figures 7 and 8 the tail portion 28 of member 26 may have a brake shoe generally indicated at 40 pivotally mounted therein which serves as the brake. Shoe 40 preferably has an upwardly extending projection 41 (Figure 8) formed thereon which extends into a recess 42 formed in the tail portion 28 of member 26. A pin 43 extends through the tail portion and pivotally mounts upwardly extending projection 41 therein. Referring now to Figure 7 the upper portion of projection 41 has slanting sides 44 and 45 which are in substantial registry with the sides of recess 42 which also slant but preferably at a greater angle. The brake shoe 40 freely pivots about pivot pin 43 but its pivotal movement is limited by the sides of recess 42.

The lower portion 46 of part 40 has lugs 47 and 48 formed thereon which are substantially similar to lugs 37 and 38 (Figure 6) and which engage beveled sides of the ratchet wheel 25 in a manner substantially similar to that described hereinabove. It may now be seen that braking shoe 40 is readily replaceable and, in use, adjusts itself to the beveled sides of ratchet wheel 46.

Thus I have provided a construction including efficient means for retarding the brake-releasing movement of the mechanism. Further, the mechanism has been so constructed that the possibility of shock due to uncontrolled engagement of some of the parts has been eliminated. This feature further permits a lighter construction of the various parts which reduces the weight and cost of the mechanism as a whole. Also, the user of this mechanism, when releasing the brakes, always has complete control over release and engagement of the mechanism.

Thus I have provided a thoroughly durable and efficient construction in which the several objects hereinabove referred to, as well as many others, are successfully accomplished.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matters hereinabove set forth, or shown in the accompanying drawings, is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In hand brake mechanism, in combination, means for preventing reverse movement of said mechanism comprising a ratchet and a detent, means for moving said detent out of engagement with said ratchet, and means formed upon said detent to engage the sides of said ratchet, said last-mentioned means being adapted to be moved by said second-mentioned means into position to retard reverse movement of said mechanism.

2. In hand brake mechanism, in combination, a housing, a member pivotally mounted in said housing, a ratchet wheel, a pawl formed upon said member adapted to engage said ratchet wheel to prevent reverse movement of said mechanism, a pair of beveled lugs formed upon said member, said beveled lugs being adapted to engage the sides of said ratchet wheel, and means adapted to move said beveled lugs into and out of engagement with said ratchet wheel.

3. In hand brake mechanism, in combination, a member, a detent formed upon said member, means adapted to be engaged by said detent to prevent reverse movement of said mechanism, a lever, a cam positioned between said lever and said member and operatively connected to said lever and said member, whereby movement of said lever moves said detent into and out of engagement with said means, and means formed on said member adapted to engage the sides of said first-mentioned means upon movement of said lever to retard reverse movement of said mechanism.

4. In hand brake mechanism, in combination, a detent, a member engaged by said detent, means for moving said detent into and out of engagement with said member, and means pivotally connected to said detent adapted to engage the sides of said member to retard reverse movement of said mechanism.

5. In hand brake mechanism, in combination, means to set a brake, means to release said brake, a braking device comprising a pivotally mounted member having a part pivotally mounted thereon, a rotating member, said part being adapted to engage said rotating member, and means to force said part into engagement with said rotating member when said brakes are released.

6. In hand brake mechanism, in combination, means for preventing reverse movement of said mechanism comprising a ratchet and a pawl, means for moving said pawl out of engagement with said ratchet, the center of mass of said pawl being so positioned with respect to its axis of movement that upon release the pawl moves of its own accord out of engagement with said ratchet, and means formed on said pawl to engage the sides of said ratchet when the pawl is moved in ratchet releasing direction to retard reverse movement of the ratchet.

7. In hand brake mechanism, in combination, means for preventing reverse movement of said mechanism comprising a ratchet and a pawl, means for moving said pawl out of engagement with said ratchet, said pawl being movable through an arc of less than 90° from its ratchet holding to ratchet releasing positions, and means formed on said pawl to engage the sides of said ratchet when the pawl is moved in ratchet releasing direction to retard reverse movement of the ratchet.

8. In hand brake mechanism, in combination, means for preventing reverse movement of said mechanism comprising a ratchet and a pawl, means for moving said pawl out of engagement with said ratchet, said pawl being movable through an arc of less than 90° from its ratchet holding to ratchet releasing positions, means formed on said pawl to engage the sides of said ratchet when the pawl is moved in ratchet releasing direction to retard reverse movement of the ratchet, and operating means for said pawl including a hand lever movable through an arc greater than 90° to force said pawl into ratcheting position in one direction of movement and to effect said reverse retarding movement of the ratchet in its other direction of movement.

9. In hand brake mechanism, in combination, means for preventing reverse movement of said mechanism comprising a ratchet and a pawl, means for moving said pawl out of engagement with said ratchet, means formed on said pawl

to engage the sides of said ratchet when the pawl is moved in ratchet releasing direction to retard reverse movement of the ratchet, and operating means for said pawl including a hand lever swingable through an arc greater than 90°.

10. In hand brake mechanism, in combination, a detent, a member engaged by said detent, means for moving said detent into and out of engagement with said member to selectively alter the operative condition of said mechanism, and means formed on said detent having at least one portion adapted to engage a side of said member to retard reverse movement of said mechanism.

11. In hand brake mechanism, in combination, a detent, a member engaged by said detent, means for moving said detent into and out of engagement with said member to selectively alter the operative condition of said mechanism, and spaced portions formed on said detent adapted to be moved into engagement with the sides of said member by said means to retard reverse movement of said mechanism.

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