Nov. 14, 1939. F. J. STOLPE 2,179,674

HOLDING AND RELEASING MECHANISM FOR HAND BRAKES

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Fig. 1.

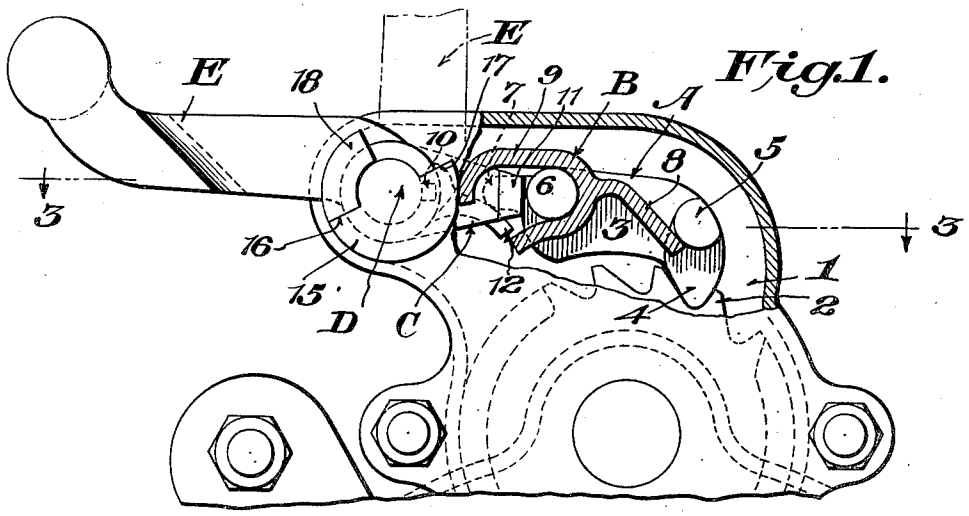


Fig. 2.

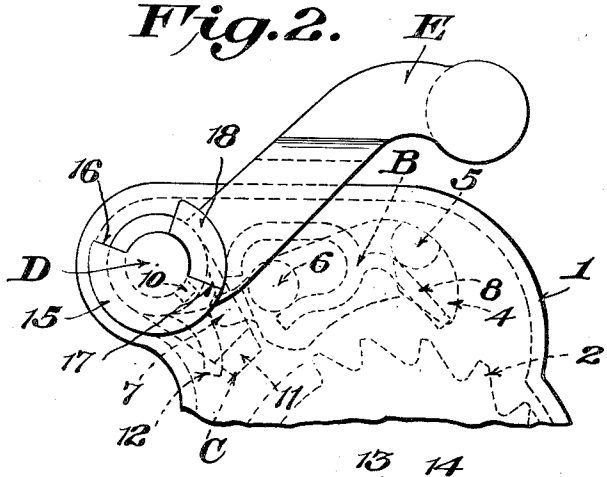


Fig. 4.

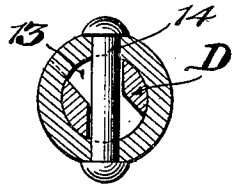
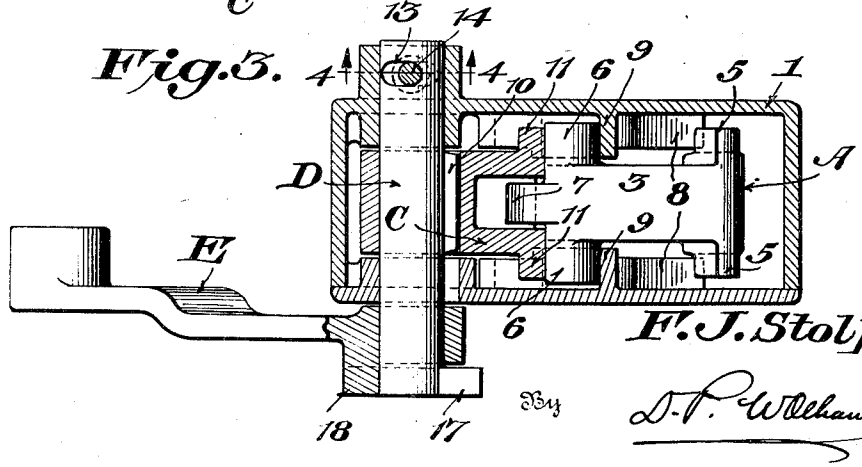


Fig. 3.



Inventor

F. J. Stolpe,

By D. P. Wilhaus

Attorneys

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HOLDING AND RELEASING MECHANISM FOR HAND BRAKES

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Fig. 5.

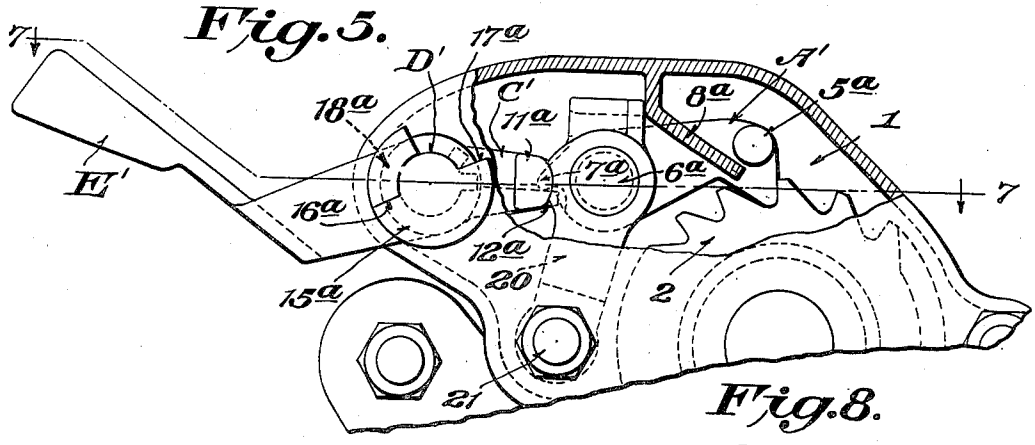


Fig. 8.

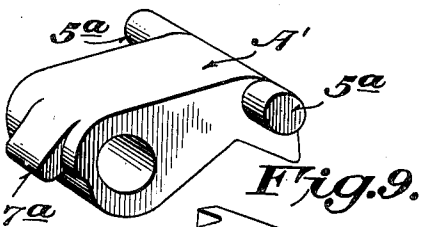
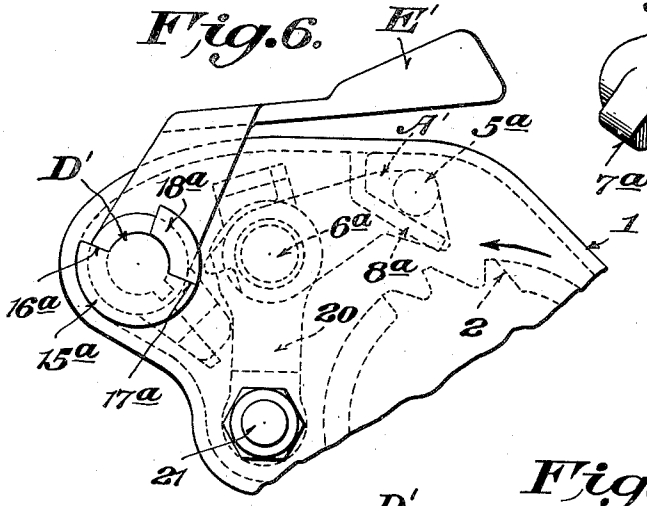


Fig. 9.

Fig. 6.



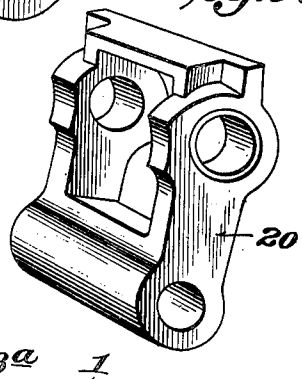


Fig. 7.

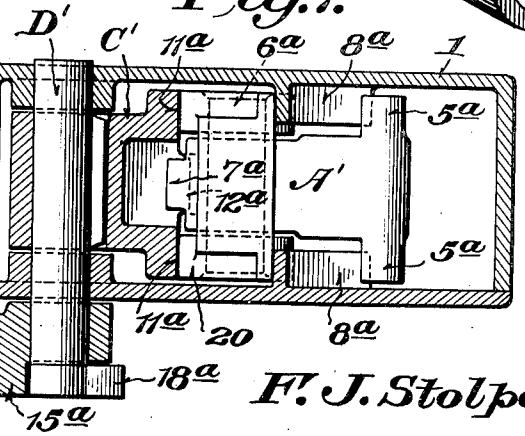
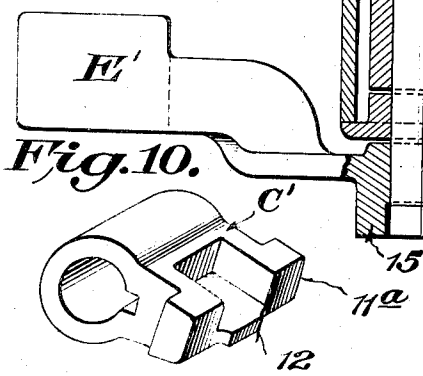


Fig. 10.



Inventor

F. J. Stolpe,

By D. T. Wilcox & Co

Attorneys

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UNITED STATES PATENT OFFICE

2,179,674

HOLDING AND RELEASING MECHANISM FOR HAND BRAKES

Frederick J. Stolpe, Chicago, Ill., assignor, by mesne assignments, to Poor & Company, Chicago, Ill., a corporation of Delaware

Application March 18, 1939, Serial No. 262,686

12 Claims. (Cl. 188—81.1)

This invention relates to hand brakes of the type used on freight cars, or other railway rolling stock and more particularly to a novel holding and releasing mechanism for the winding means.

A primary object of the invention is to provide a simple, practical and reliable holding means in the form of a relatively floating pawl, that is, a pawl which is mounted for tilting and sliding movement in such a way that there is no positive or direct connection between the pawl and its control means, except that when the pawl is in locking or holding position a portion of the control means, namely, a cam, is in obstructing or blocking relation to rearward shifting of the pawl. That is to say, the present invention contemplates a pawl which is mounted to tilt or lift and shift when released, due to force of the ratchet in unwinding the chain or cable from the drum, while, on the other hand, when it is desired to lock the entire winding mechanism it is simply necessary to throw the trip handle in a direction to bring the cam into play and then tend to shift and rock or tilt the pawl in such a way as to cause it to firmly engage the ratchet.

A further object of the invention is to provide a construction including the features above set forth which is capable of embodiment in more than one form, and which in either form utilizes parts which lend themselves to standard manufacturing practices and which are susceptible of facile assembly, thus, providing a strong, practical, and reliable holding and releasing means in an economical manner.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings, in which:

Figure 1 is a side elevation of a portion of a hand brake mechanism embodying the present improvements, the pawl and trip handle shown in set position.

Figure 2 is a detail elevation of the construction shown in Figure 1 with the pawl and the trip handle in released position.

Figure 3 is a horizontal cross sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a vertical sectional view taken on the line 4—4 of Figure 3.

Figure 5 is a front elevation of a modified form of construction illustrating the pawl and trip handle in set position.

Figure 6 is a view similar to Figure 5 with the pawl and trip handle in released position.

Figure 7 is a horizontal cross-sectional view taken on the line 7—7 of Figure 5.

Figure 8 is a perspective view of the pawl.

Figure 9 is a perspective view of the pawl rocker.

Figure 10 is a perspective view of the cam.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

Referring to Figure 1, it will be observed that the invention includes in its organization a casing designated generally as 1 and having the ratchet wheel 2 journaled therein. This ratchet wheel is, as is well known, associated with suitable winding mechanism or gearing, not shown because it forms no essential part of the present invention which is mainly concerned with a holding and releasing mechanism, as previously set forth.

The said holding and releasing mechanism essentially includes a pawl designated generally as A; means for shiftably and tiltably supporting the pawl designated generally as B; and a cam C keyed to a rock shaft D, and controlled by a trip lever E.

Referring first to the pawl A it will be observed that the same includes a body portion 3 having a nose or toe 4 for engaging with the teeth of the ratchet wheel 2. Adjacent the toe 4, the pawl is provided with oppositely extending lugs 5—5 and adjacent the heel of the body 3, the pawl is provided with the oppositely extending trunnions 6—6. The rear face of the body 3 is also provided with an intermediate offset tilting lip 7.

The lugs 5—5 adjacent the toe of the pawl are adapted to slide on the obliquely disposed guide flanges 8—8 formed to project inwardly from the inside face of the casing 1, as will be clear from Figure 3, thereby to guide the toe of the pawl out of the teeth of the ratchet. The trunnions 6—6 are supported and guided by the opposite elongated relatively enclosed flange portions 9—9, also formed integral with the inside face of the casing or housing, and serving to pivotally and shiftably support the trunnions 6—6, as will be apparent from Figure 2.

The cam C is provided with an opening for receiving the rock shaft D and is keyed to said shaft by the key or spline 10. The said cam is formed with the oppositely disposed shoulder

portions 11 and is recessed at its intermediate portion to form a depressed web 12, preferably curved or arched as shown in Figure 2 and intended to cooperate with the tilting lip 7 of the pawl to rock or turn the same on the trunnions 6 when the latter rest in the forward circular portions of the guide flanges 9—9. The rock shaft D is formed with a radial opening 13 for receiving a pin or key 14 to lock the rock shaft in the bearings provided in the casing and yet permit it to be manually rocked within the desired limits. The end of the rock shaft opposite the pin 14 is provided with a mutilated head 15 which presents opposite shoulders 16 and 17. The trip lever or handle E is journaled on the rock shaft D adjacent the head 15 and is provided with an abutment segment 18 adapted alternately to engage the shoulders 16 and 17 of the head 15 depending on whether or not the mechanism is in its set or released position. As shown in Figure 1, the segment 18 engages the shoulder 16, thereby to rock the shaft D in a counter-clockwise direction to maintain the cam in a position to force the trunnions 6 to the closed end of the flange 9.

On the other hand, when the trip lever E is moved to the position shown in Figure 2, the segment 18 will engage the shoulder 17 and turn the rock shaft D in a clockwise direction and cause the cam C to move out of obstructing relation to the path of shifting movement of the pawl A.

As will be apparent from the foregoing description, when the mechanism is in its set position, that is, when the lever E assumes the position shown in Figure 1, the shoulders 11 of the cam will engage or back-up the rear portions of the trunnions 6 and thus hold the pawl in the closed ends of the flanges 9. At the same time, the web 12 of the cam will engage the tilting lip 7 of the pawl and force the toe 4 thereof downwardly into engagement with a tooth of the ratchet. As long as the trip handle E remains in the position shown in Figure 1, the gearing associated with the ratchet wheel 2 is locked. On the other hand, if it is desired to release the pawl from the ratchet, it is only necessary to manually shift the trip handle to the position shown in Figure 2 and the force of unwinding will cause the ratchet wheel 2 to kick the toe 4 out of the ratchet tooth with which it is engaged so that, with the assistance of the lugs 5 and the oblique guiding members 8, the pawl will be shifted rearwardly and the trunnions 6 will move toward the open end of the enclosed flanges 9.

In the modification of the invention shown in Figures 5–9, inclusive, all of the foregoing essential features of the invention are preserved. In this form, the shifting or sliding movement of the pawl A' is made possible by connecting the pawl with a rocker arm 20 through a pin whose ends 6a serve as trunnions for mounting the pawl on the arm. This arm comprises a frame which receives the trunnions 6a at its upper end while its lower end is pivoted as at 21 on one of the bolts which hold the opposite walls of the casing together.

As shown in Figure 5, the mechanism is in its locked position, that is, the toe of the pawl A' is in engagement with one of the teeth of the ratchet. In this position, the lugs 5a of the pawl have a slight clearance from the guide flanges 8a carried by the inner walls of the casing, and the rocker arm 20 supports the trunnions 6a at the heel of the pawl. Thus, the pawl moves rearwardly slightly during the releasing operation before the lugs 5a strike the flanges 8a and start lifting the pawl out of engagement with the ratchet. The cam C' has shoulder portions 11a engaging the sides of the rocker arm, while the web 12a engages the lip 7a on the rear of the pawl. The cam C^1 is keyed to the shaft D' which is controlled by the trip lever E' in the same manner as the rock shaft D previously referred to. When the trip handle E' is in the position shown in Figure 5, the segment 18a will engage the shoulder 16a of the mutilated head 15a to hold the cam D' in obstructing or blocking relation to the pawl A'. When it is desired to release the pawl A', the trip handle E' is moved to the position shown in Figure 6. From the latter figure it will be observed that the segment 18a of the trip handle is in engagement with the shoulder 17a of the head 15a of the rock shaft.

From the foregoing it will be apparent that in both forms of the invention the pawl, having the oppositely extending lugs adjacent its nose, and the oppositely extending trunnions adjacent its heel, is free to tilt and shift rearwardly under the force of the unwinding movement of the ratchet, and likewise free to shift forwardly and tilt downwardly under the influence of the cam, when it is desired to set the brake mechanism. The latter is accomplished by merely throwing the trip handle to such a position as to bring the cam into obstructing relation to backward shifting of the pawl. When the cam holds the pawl forward, that is, to the right, as shown in Figures 1 and 5, it will, of course, be understood that the pawl may rock on its trunnions against the weight of the trip handle imposed on the cam, thereby to trail over the teeth of the ratchet while the winding of the chain or cable is effected. Moreover, it will be aparent that the present construction makes the pawl in effect a sliding bolt which may be shifted in one direction automatically when released, by the force of unwinding, and on the other hand may be shifted manually in the other direction for setting, and, while in this position the pawl can sufficiently turn or pivot to ride the teeth of the ratchet. In both cases, the heel of the pawl is shiftably supported by means connected to or carried with the casing.

I claim:

1. A holding and releasing mechanism for hand brakes, including, a casing having the ratchet wheel of the winding mechanism journaled therein, a pawl having a toe at one end for engaging the ratchet, lugs on the pawl adjacent said toe, guide means on the casing cooperating with said lugs for lifting and lowering said toe relative to the ratchet, trunnions at the heel of the pawl, means carried by the casing and engaging said trunnions to permit the pawl to shift relatively tangentially to the ratchet teeth, a rock shaft journaled in the casing, a cam keyed to said rock shaft and having means thereon to engage the pawl to prevent shifting thereof, and a trip handle having a lost motion connection with said shaft.

2. A holding and releasing mechanism for hand brakes, including, a casing having the ratchet wheel of the winding mechanism journaled therein, a pawl having a toe at one end for engaging the ratchet, lugs on the pawl adjacent the toe thereof, guide means carried by the casing for slidably supporting said lugs during the lifting and lowering of said toe relative to the ratchet, trunnions carried by the heel of the pawl, a lip carried by the rear face of the pawl, means carried by the casing to shiftably support the

trunnions of the pawl whereby the same may move relatively tangentially to the ratchet teeth, a rock shaft journaled in the casing, a cam keyed to said rock shaft and having spaced shoulder portions and an intermediate lip portion, said shoulders adapted to be interposed in the path of rearward movement of the trunnions, and said lip on the cam being adapted to engage the lip on the pawl when the pawl is in holding position, and a trip handle having a lost motion connection with said shaft for controlling the cam between holding and releasing positions.

3. A holding and releasing mechanism for hand brakes, including, a casing having the ratchet wheel of the winding mechanism journaled therein, a pawl having a toe at one end for engaging the ratchet, lugs on the toe of the pawl, obliquely disposed guides carried by the casing for slidably supporting said lugs to control the toe of the pawl in its lifting and lowering movements relative to the ratchet, trunnions formed on the rear of the pawl, a lip on the pawl between the trunnions, means on the casing for supporting said trunnions whereby the pawl may shift relatively tangentially to the teeth of the ratchet wheel, a rock shaft journaled in the casing, a cam carried by the rock shaft and keyed thereto, said cam having spaced abutment shoulders and an intermediate depressed portion terminating in a forwardly projecting lip, said abutment shoulders being disposed in the path of rearward movement of the pawl, and said lip of the cam engaging beneath the lip on the pawl when said cam is in set position thereby to hold the toe of the pawl in engagement with the ratchet, and a trip handle having a lost motion connection with said shaft.

4. A holding and releasing mechanism for hand brakes, including, a casing having the ratchet wheel of a winding mechanism journaled therein, a pawl having lugs adjacent the toe thereof, obliquely disposed guides projecting inwardly from opposite sides of the casing to slidably support said lugs for raising and lowering the toe of the pawl relative to the ratchet, trunnions carried by the heel of the pawl, trunnion guiding members projecting from opposite inner side walls of the casing, a tilting lip carried by the rear end of the pawl, a rock shaft journaled in the casing, a cam keyed to said rock shaft, said cam having spaced abutment shoulders and an intermediate web, said abutment shoulders being adapted to engage the trunnions on the pawl and said web being adapted to engage the tilting lip on the pawl when the cam is in set position, and a trip handle having a lost motion actuating connection with said shaft.

5. A holding and releasing mechanism for hand brakes, including, a casing having the ratchet wheel of the winding mechanism journaled therein, a pawl having oppositely extending lugs adjacent its toe and oppositely extending trunnions adjacent its heel, means carried by the casing for supporting said pawl for tilting and sliding movement, said means comprising oblique guide members formed at opposite inner sides of the casing for supporting the lugs and relatively enclosed flange means projecting inwardly from the sides of the casing to receive said trunnions, and a rock shaft actuated cam having means for engaging the trunnions of the pawl.

6. A holding and releasing mechanism for hand brakes, including, a casing having the ratchet wheel of the winding mechanism journaled therein, a pawl having oppositely disposed lugs adjacent its toe and oppositely disposed trunnions adjacent its heel, a tilting lip on the rear face of the pawl, and means on the casing for slidably and shiftably mounting said pawl, said means comprising obliquely disposed guide members projecting inwardly from opposite inner faces of the casing to support said lugs, relatively enclosed flange means projecting from the inner faces of the casing to receive the trunnions for sliding and tilting movement, and a rock shaft actuated cam having spaced abutments and an intermediate lip respectively for engaging the trunnions and the tilting lip on the pawl when the cam is in set position.

7. A holding and releasing mechanism for hand brakes, including, a casing having the ratchet wheel of the winding mechanism journaled therein; a pawl, oppositely extending lugs adjacent the toe of the pawl, oppositely extending trunnions adjacent the heel of said pawl; obliquely disposed guide flanges projecting inwardly from the inner sides of the casing to slidably support said lugs, a rocker arm pivotally receiving said trunnions at its upper end and having its lower end pivoted in the casing, and a rock shaft controlled cam having spaced shoulders for engaging the rocker arm, when the cam is in set position.

8. A holding and releasing mechanism for hand brakes, including, a casing having the ratchet wheel of the winding mechanism journaled therein; a pawl, oppositely extending lugs adjacent the toe of the pawl, oppositely extending trunnions adjacent the heel of the pawl, and a tilting lip carried by the rear of said pawl; obliquely disposed guide flanges projecting inwardly from the sides of the casing to slidably support said lugs, a rocker arm pivotally receiving said trunnions, a pivot in the casing for pivotally supporting said rocker arm, a trip handle controlled rock shaft journaled in the casing, and a cam keyed to said rock shaft, said cam having abutment shoulders adapted to engage the sides of the rocker arms and also having an intermediate transverse web for engaging the tilting lip of the pawl when the cam is in set position.

9. In a hand brake, a chain winding mechanism including a ratchet wheel, a cooperating pawl, fixed means mounting said pawl for longitudinal shifting movement substantially tangentially relative to the ratchet wheel between advanced and retracted positions relative to the ratchet wheel, said mounting means supporting the pawl in its advanced position for pivotal cooperation with the ratchet wheel and including fixed guide means for effecting disengagement of the pawl from the ratchet wheel in response to longitudinal movement of the pawl toward its retracted position, a rock shaft, and means carried by said rock shaft for shifting said pawl from its retracted to its advanced position relative to said ratchet wheel.

10. In a hand brake, a chain winding mechanism including a ratchet wheel, a cooperating pawl, fixed means mounting said pawl for longitudinal shifting movement substantially tangentially relative to the ratchet wheel between advanced and retracted positions relative to the ratchet wheel, said mounting means supporting the pawl in its advanced position for pivotal cooperation with the ratchet wheel and including fixed guide means for effecting disengagement of the pawl from the ratchet wheel in response

to longitudinal movement of the pawl toward its retracted position, a rock shaft, and means carried by said rock shaft for shifting said pawl from its retracted to its advanced position relative to said ratchet wheel and also for locking said pawl in its advanced position.

11. In a hand brake, a chain winding mechanism including a ratchet wheel, a cooperating pawl, fixed mounting said pawl for longitudinal shifting movement substantially tangentially relative to the ratchet wheel between advanced and retracted positions relative to the ratchet wheel, said mounting means supporting the pawl in its advanced position for pivotal cooperation with the ratchet wheel and including fixed guide means for effecting disengagement of the pawl from the ratchet wheel in response to longitudinal movement of the pawl toward its retracted position, a rock shaft, and means carried by said rock shaft for shifting said pawl from its retracted to its advanced position relative to said ratchet wheel and also for subjecting said pawl to a pivoting force tending to maintain same operatively engaged with the ratchet wheel.

12. In a hand brake, a chain winding mechanism including a ratchet wheel, a cooperating pawl, fixed means mounting said pawl for longitudinal shifting movement substantially tangentially relative to the ratchet wheel between advanced and retracted positions relative to the ratchet wheel, said mounting means supporting the pawl in its advanced position for pivotal cooperation with the ratchet wheel and including fixed guide means for effecting disengagement of the pawl from the ratchet wheel in response to longitudinal movement of the pawl toward its retracted position, a rock shaft and means carried by said rock shaft for shifting said pawl from its retracted to its advanced position and for locking same in its advanced position and also for subjecting same to a pivoting force tending to maintain same operatively engaged with the ratchet wheel.

FREDERICK J. STOLPE.