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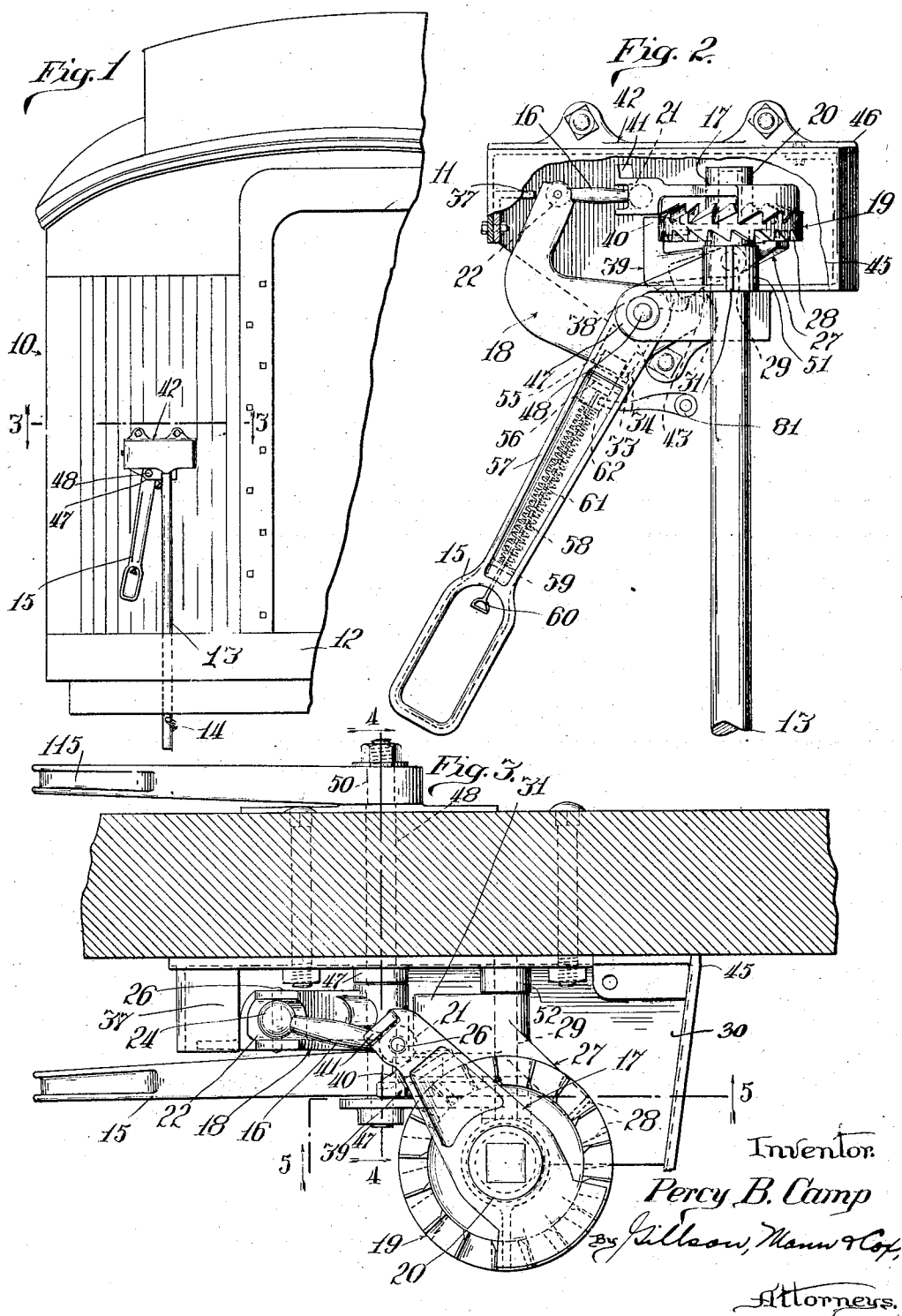
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BRAKE MECHANISM FOR RAILWAY CARS

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3 Sheets-Sheet 1



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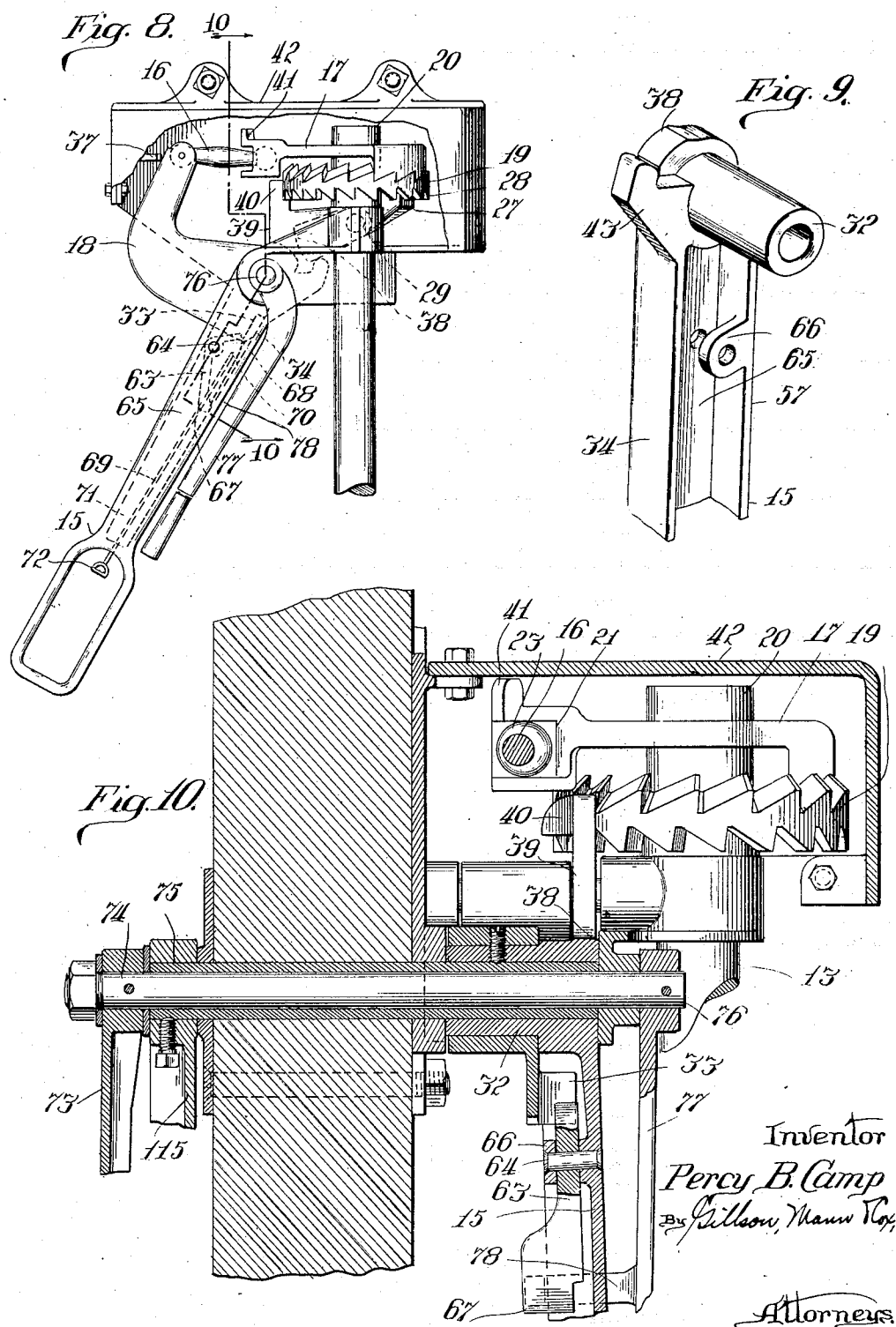
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UNITED STATES PATENT OFFICE

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BRAKE MECHANISM FOR RAILWAY CARS

Application filed November 7, 1925. Serial No. 67,611.

This invention relates to hand brakes and has for its principal object to provide a simple shaft winding mechanism that will operate efficiently in the limited space available on the ends of baggage and mail cars, in the motorman's booth of electric cars and the like places.

A further object of the invention is to provide mechanism for rotating an upright brake shaft by means of a hand lever operating through a short oscillating movement similar to that given to a pump handle.

Further objects and advantages of the invention will be revealed as the disclosure proceeds and the description is read in connection with the accompanying drawing illustrating the preferred form of the invention, and in which

Fig. 1 is an elevation of part of the end of a baggage or mail car;

Fig. 2 is an enlarged elevation of the shaft driving mechanism with a portion of its casing broken away;

Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 1 with the cover of the casing removed;

Figs. 4 and 5 are sectional views taken on the lines 4—4 and 5—5 respectively of Fig. 3;

Fig. 6 is a perspective view of one end of the hand lever;

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 4;

Figs. 8, 9 and 10 are views similar to Figs. 2, 6 and 4 respectively, illustrating a modification.

In Fig. 1, 10 indicates the end of a baggage or mail car which may or may not have a door 11 by which the end sill 12 may be reached from within the car. 13 is an upright brake shaft conforming generally to the usual construction, suitably mounted on the car and equipped with a brake chain 14 by which the power applied to the shaft is communicated to the foundation brake gear. 15 is a hand lever mounted to permit a man standing on the end sill to easily give it a short oscillating movement similar to that used in operating a water pump.

The mechanism illustrated in detail in the other views represents the preferred embodiment

of this invention for converting the oscillating motion of the hand lever into rotary motion and communicating it to the brake shaft and also for permitting a convenient movement of the hand lever to effect the release of the brakes.

Briefly stated, the driving mechanism consists of an overrunning clutch of the ratchet type and a driving link 16 connecting one element of the clutch 17, which, for convenience, will be called a ratchet lever, with a driving arm 18 on the hand lever 15. The other element 19 of the clutch may consist of a ratchet wheel fixed against rotation relative to the shaft 13, as by providing the two with complementary polygonal sections, as indicated in Fig. 3.

The ratchet lever 17 is preferably mounted to rotate and to rise and fall on a skein or sleeve 20 secured to the squared upper end of the shaft 13. The ratchet lever and the arm 18 are provided with globular sockets 21 and 22 which receive balls 23 and 24 on the driving link 16. The balls are provided with openings 25 converging inwardly and pins 26 secure them in the sockets.

With this connection, an up and down movement of the lever 15 will cause the ratchet lever to oscillate back and forth about the skein 20 on the shaft 13 and through the engagement with the ratchet wheel 19 it will communicate a rotary movement to that shaft. The teeth on the ratchet wheel and the lever are undercut to insure engagement during the power stroke and to give the teeth a tendency to interlock across their full width.

Reversal or unwinding of the shaft 13 is controlled by a pawl 27 engaging teeth 28 on the ratchet wheel 19. This pawl is pivoted on a short shaft 29 mounted in the bracket 30 in which the upper end of the shaft 13 is journaled. The weighted heel 31 of the pawl serves to keep the toe constantly engaged with the teeth 28.

In order to release the brakes it is necessary to disengage the ratchet clutch and release the pawl 27. According to this invention a simple movement of the hand lever is sufficient to effect this result.

The hand lever is provided with a hub 32,

(Fig. 4) and the arm 18 is journaled on the hub, but relative rotation is normally restrained by a fixed stop formed by a lug 33, (Fig. 4), engaging a flange 34 on the hand lever and a yielding stop formed by spring pressed ball 35 carried by the hub of the arm 18 and normally seating in a hole 36 in the hub of the lever 15.

The normal movement of the hand lever in winding the shaft 13 is from approximately the position shown in Fig. 2, clockwise through a small angle and back again to that position. A stop 37 limits the motion of the arm 18 in a counter clockwise direction to the position shown in Fig. 2, but due to the connection between the arm and the hand lever the latter can rotate further in a counter clockwise direction. In doing so a short arm or cam 38 (Figs. 2 and 6) on the hand lever 15 lifts a finger 39 (Fig. 2) pivoted on the shaft 29 and having its free end 40 located just beneath the ratchet lever at a point between the socket 21 and its bearing on the skein 20. An upwardly projecting lug 41 on the end of the ratchet lever comes in contact with the casing 42 and prevents that end from rising. The upward movement of the finger 39 under the pressure of the cam 38 will, therefore, lift the ratchet lever out of engagement with the ratchet wheel.

Further rotation of the lever 15 in a counter clockwise direction will cause an arm 43 to lift the weighted heel 31 of the pawl 27 and swing the toe out of engagement with the teeth 28. In order to facilitate this movement the face of those teeth is cut at a slight angle to the axis of the shaft, as best illustrated in Fig. 4.

Lifting the ratchet lever away from the ratchet requires sufficient force to prevent it taking place accidentally in the normal operation of winding the shaft, and since the release of the pawl 27 requires still further downward movement, resisted first by the ball 35, resting in the hole 36, and finally by the friction of the pawl against the teeth, there is no likelihood that the brakes will be released until it is the intent of the brakeman to accomplish that result.

However, in certain applications the hand lever will be exposed to accidental or careless blows that might effect the release of the brakes when it was desired to have them remain applied. In order to provide against this contingency a releasable positive stop may be added to cooperate with the stop 34 and prevent relative movement of the hand lever 15 and the arm 18 until the stop is intentionally released.

As illustrated in Figs. 2, 4 and 6, this stop takes the form of a block 55, slidably mounted in a thickened portion 56 on the hand lever 15, and normally projecting in the path of the lug 33, on the arm 18, and it may extend between that lug and the flange 57, on the oppo-

site side of the hand lever from the flange 34.

The block is equipped with a rod 58 extending through a guide 59 on the hand lever and provided with a thumb piece 60, located in convenient position adjacent to the free end of the hand lever. A spring 61 extending between the guide 59 and a stop 62 on the rod will serve to normally hold the block 55 in position to cooperate with the flange 34 and the lug 33 to prevent relative rotation of the hand lever 15 and the driving arm 18.

Where springs are seriously objected to, this releasable positive stop may be replaced, by a triangular stop 63 (Fig. 8) pivoted at 64 between the web 65 of the handle 15 and a wing 66 extending inwardly from the flange 57. The longer portion 67 of the triangular stop will act as a weight to normally hold the edge or face 68 against the lug 33, opposite to its contact with the flange 34.

This stop may be released by pulling the rod 69 pivoted to the stop at 70 and extending through a guide 71 to present a thumb piece 72 in convenient relation to the free end of the hand lever 15.

This stop may also be released from the inside of the car by rotating an arm 73 fixed to a shaft 74 journaled in a hollow shaft 75 on which the handles 15 and 115 are secured. The outside end 76 of the shaft 74 is equipped with an arm 77 having a finger 78 adapted to strike the long portion 67 of the triangular stop and swing the face 68 away from engagement with the lug 33. A similar arrangement may be made to permit the sliding block 55 to be retracted from the inside of the car. The bell crank 81 will serve this purpose.

The yielding stop formed by the spring pressed ball 35 may be used or omitted when the stops 55 and 63 are used.

The casing 45 is in the form of a box open at the top and the front side, and equipped with a cover 46. The bottom of the casing is extended downwardly and formed with bearings 47 for a shaft 48 which has one polygonal portion 49 to receive the hub 32 of the hand lever 15 and another polygonal portion 50 within the car to receive a second hand lever 115 to permit the device to be operated from within the car as well as from without.

The bottom of the casing is also provided with a bearing 51 for the shaft 13 and bosses 52 and 53 in which the pin 29 is mounted.

Use has been made of specific description and illustration in order to disclose the invention, but it is intended that nothing contained herein shall unnecessarily limit the following claims, or require a construction thereof that would permit the substance of the invention to be used without infringement.

I claim as my invention:

1. In a railway hand brake of the type wherein the hand power for applying the

brakes is transmitted thru an upright brake shaft which is rotatably mounted in a position that cannot advantageously accommodate the conventional hand lever devices, the combination of an overrunning clutch including a subsequently horizontal shaft element in driving relation with the upright-brake shaft and a horizontal ratchet lever element making driving engagement with the brake shaft element when moved in one direction and running idly relative to the shaft element when moved in the opposite direction, an upright hand lever mounted to oscillate on a horizontal axis transverse to the shaft and a horizontal driving connection between the hand lever and the ratchet lever element of the clutch whereby when the former is oscillated about its axis, the latter is given an oscillating motion.

2. In a railway hand brake of the type wherein the hand power for applying the brakes is transmitted thru an upright brake shaft which is rotatably mounted in a position that cannot advantageously accommodate the conventional hand lever devices, the combination of an overrunning clutch including a horizontal shaft element in driving relation with the upright brake shaft and a horizontal ratchet lever element making driving engagement with the shaft element when moved in one direction and running idly relative to the shaft element when moved in the opposite direction, an upright hand lever mounted to oscillate on a horizontal axis transverse to the shaft and a link operatively connecting the hand lever and the ratchet lever element of the clutch.

3. In a railway hand brake of the type wherein the hand power for applying the brakes is transmitted thru an upright brake shaft which is rotatably mounted in a position that cannot advantageously accommodate the conventional hand lever devices, the combination of an overrunning clutch including a horizontal shaft element in driving relation with the rotatable shaft and a horizontal ratchet lever element making driving engagement with the shaft element when moved in one direction and running idly relative to the shaft element when moved in the opposite direction, an upright hand lever mounted to oscillate on a horizontal axis transverse to the shaft, a link, a universal joint between the link and the hand lever and another universal joint between the link and the ratchet lever element of the clutch.

4. In a railway hand brake of the type wherein the hand power for applying the brakes is transmitted thru an upright brake shaft which is rotatably mounted in a position that cannot advantageously accommodate the conventional hand lever devices, the combination of an overrunning clutch including a horizontal shaft element in driv-

ing relation with the upright brake shaft and a horizontal ratchet lever element making driving engagement with the shaft element when moved in one direction and running idly relative to the shaft element when moved in the opposite direction, an upright hand lever mounted to oscillate on a horizontal axis transverse to the shaft, a link having balls at its ends and a socket in the hand lever receiving one of said balls and a socket in the ratchet lever element of the clutch receiving the other of said balls.

5. In a railway hand brake of the type wherein the hand power for applying the brakes is transmitted thru an upright brake shaft which is rotatably mounted in a position that cannot advantageously accommodate the conventional hand lever devices, the combination of an upright brake shaft, a hand lever mounted for brake-operating oscillating movements about a horizontal axis transverse to the brake shaft and a driving connection between the lever and shaft for rotating the shaft by the oscillating movements of the lever, said connection including an overrunning clutch, one element of which is horizontal and is oscillated by the lever and another element of which rotates with the shaft, ratchet means for restraining the shaft from unwinding, and means for disengaging the overrunning clutch and the ratchet means to release the brakes.

6. In a railway hand brake, the combination of an upright brake shaft, an upright hand lever mounted to oscillate about a horizontal axis transverse to the shaft, and a subsequently horizontal driving connection between the lever and the shaft, including a ratchet clutch, one element of which is oscillated upon a vertical axis by the lever and another element of which rotates in a horizontal plane with the shaft, ratchet means for restraining the shaft from unwinding and means operated by the hand lever for successively disengaging the ratchet clutch and the ratchet means.

7. In a device of the class described, the combination of a rotatably mounted shaft, a ratchet wheel fixed to rotate with the shaft, a ratchet lever mounted to rotate relative to the shaft and to engage the ratchet wheel, a hand lever mounted to oscillate on an axis transverse to the shaft, an operative connection between the ratchet lever and the hand lever whereby the former is given an oscillating motion, a pawl for holding the shaft against unwinding, and means operated by the hand lever to disengage the ratchet lever from the ratchet wheel and release the pawl.

8. In a railway hand brake, the combination of an upright brake shaft, a ratchet wheel fixed to rotate with the shaft, a horizontal ratchet lever mounted to rotate relative to the shaft and to engage the ratchet wheel, an upright hand lever mounted to

oscillate on a horizontal axis transverse to the shaft, an arm on the hand lever mounted to rotate relative to the hand lever, means normally preventing such rotation, a link connecting the arm and the ratchet lever where-
 5 by the latter may be oscillated by the hand lever, a pawl for holding the shaft against unwinding, a second arm on the hand lever, a movable member associated with the ratchet
 10 lever and said second arm for actuation by said second arm to disengage the ratchet lever, and a third arm on the hand lever to disengage the pawl.

9. In a railway hand brake, the combination with the wall of a car, of an upright
 15 brake shaft to be driven, a horizontal drive shaft extending through the wall, a crank handle for each end of the drive shaft, a driving crank arm for one of the crank handles and in operative relation with the drive
 20 shaft, and a driving connection between the driving crank arm and the brake shaft including a ratchet clutch, one element of which is connected to and oscillated by the
 25 driving crank arm and the other element of which is connected to and rotates with the brake shaft.

10. In a railway hand brake, the combination of an upright brake shaft, a ratchet
 30 wheel fixed to rotate with the shaft, a horizontal ratchet lever mounted to rotate relative to the shaft and to engage the ratchet wheel, an upright hand lever mounted to oscillate on a horizontal axis transverse to
 35 the shaft, an arm on the hand lever mounted to rotate relative to the hand lever, a driving connection between the arm and the ratchet lever, a pawl for holding the shaft against unwinding, means operated by the hand lever
 40 in cooperation with the pawl for tripping the same for releasing the shaft, and a releasable stop normally preventing relative rotation of the hand lever and the arm.

11. In a railway hand brake, the combination of an upright brake shaft, an upright
 45 hand lever mounted to rotate about a horizontal axis transverse to the shaft, a horizontal driving connection between the lever and the shaft, including an upright crank arm rotatably mounted with respect to the
 50 hand lever, and means carried by the hand lever for engaging the crank arm to normally prevent relative rotation.

12. In a railway hand brake, the combination of an upright brake shaft, an upright
 55 hand lever mounted to rotate about a horizontal axis transverse to the shaft, a horizontal driving connection between the lever and the shaft, including an upright crank arm rotatably mounted with respect to the
 60 hand lever, a fixed stop on the hand lever limiting the relative rotation, and a movable stop on the hand lever cooperating with the fixed stop to prevent their relative rotation.

65 13. In a railway hand brake, the combina-

tion of an upright brake shaft, a hand lever mounted to rotate about a horizontal axis transverse to the shaft, a horizontal driving connection between the lever and the shaft, including an upright crank arm rotatably
 70 mounted with respect to the hand lever, a lug on the crank arm, a fixed stop on the hand lever for engagement with the lug at one side and a movable stop on the hand lever, normally engaging the lug on the opposite
 75 side.

14. In a device of the class described, the combination of a rotatably mounted shaft, a hand lever mounted to oscillate about an
 80 axis transverse to the shaft, an arm rotatably mounted with respect to the hand lever, a driving connection between the arm and the shaft, means to limit the movement of the arm in one direction, a releasable stop controlling relative rotation of the arm and
 85 hand lever, a pawl adapted to prevent unwinding of the shaft, and means operated by movement of the hand lever independent of the arm for releasing the driving connection between the arm and the shaft and disengag-
 90 ing said pawl.

15. In a device of the class described, the combination with the wall of a car, of a shaft rotatably mounted adjacent to said wall,
 95 hand levers on opposite sides of said wall mounted to oscillate about an axis transverse to the shaft, a driving connection between said hand levers and the shaft including an arm rotatably mounted with respect to the hand
 100 levers, a movable stop carried by one of said hand levers for controlling relative rotation of the levers and the arm, and means operable at either side of said wall for releasing said stop.

16. In a device of the class described, the
 105 combination of a shaft mounted to rotate about an upright axis, a hand lever adapted to oscillate about an axis transverse to the shaft, a driving connection between the hand lever and the shaft including an arm adapted
 110 to oscillate with the hand lever, a ratchet rotatable with the shaft and a ratchet lever engaging the ratchet and operatively connected with the arm, means operated by excess movement of the hand lever for disengaging the
 115 ratchet lever from the ratchet, and means operated by additional movement of the hand lever for releasing the shaft and permitting it to unwind.

17. In a railway hand brake of the type in
 120 which an upright brake shaft is rotatably mounted close to the car end and must be operated from a position below the top of the car end, the combination of an upright hand lever mounted for brake-operating oscillating
 125 movements about a horizontal axis transverse to the shaft and a horizontal driving connection between the lever and the shaft for rotating the shaft by the oscillating movements of the lever, said connection including an over-
 130

running clutch adapted to rotate about an upright axis, one element of which is given a driving impulse by the oscillating movement of the lever and another element of which rotates with the shaft.

18. In a railway hand brake of the type in which an upright brake shaft is rotatably mounted close to the car end and must be operated from a position below the top of the car end, a clutch adapted to rotate about an upright axis and including two elements one of which is horizontal and in driving relation to the shaft and the other of which is horizontal and makes driving engagement with the first when moved in one direction and runs idle relative to the first when moved in the opposite direction, an upright hand lever mounted for brake-operating oscillating movements about a horizontal axis transverse to the shaft and a driving connection between the hand lever and the second element of the clutch for rotating the shaft by the oscillating movements of the lever.

19. In a railway hand brake of the type in which an upright brake shaft is rotatably mounted close to the car end and must be operated from a position below the top of the car end, a ratchet wheel fixed upon and to rotate with the brake shaft, a horizontal ratchet lever mounted to rotate relative to the shaft and to engage the ratchet wheel, an upright hand lever mounted to oscillate on a horizontal axis transverse to the shaft after the fashion of a pump handle, and a horizontal driving connection between the ratchet lever and the hand lever whereby when the latter is oscillated about its axis, the former is given an oscillating motion about the axis of the shaft.

20. In a railway hand brake, the combination of an upright rotatably mounted brake shaft, a ratchet wheel fixed upon and to rotate with the shaft and having undercut teeth, a horizontal ratchet lever fulcrumed upon the shaft and having complementary undercut teeth to engage the teeth of the ratchet wheel, an upright hand lever mounted to oscillate about a horizontal axis transverse to the shaft, and a horizontal driving connection between the ratchet lever and the hand lever whereby the latter is oscillated about the axis of the shaft when the former is given an oscillating motion about its axis.

21. In a railway hand brake, the combination with an upright brake shaft, of an operating hand lever mounted for up and down swinging brake operating movements upon a horizontal axis, a ratchet wheel fixed upon the brake shaft, a substantially horizontal ratchet lever fulcrumed upon the brake shaft in cooperative relation with the ratchet wheel, and an operating connection between the hand lever and the ratchet lever.

22. In a railway hand brake, the combination with an upright brake shaft, of an oper-

ating hand lever mounted for up and down swinging brake operating movements upon a horizontal axis, a ratchet wheel fixed upon the brake shaft, a substantially horizontal ratchet lever fulcrumed upon the brake shaft in cooperative relation with the ratchet wheel, an operating connection between the hand lever and the ratchet lever, and means actuated by the hand lever for lifting the ratchet lever out of engagement with the ratchet wheel.

23. In a railway hand brake, the combination with an upright brake shaft, of an operating hand lever mounted for up and down swinging brake operating movements upon a horizontal axis, a ratchet wheel fixed upon the brake shaft, a substantially horizontal ratchet lever slidably fulcrumed upon the shaft in cooperative relation with the ratchet wheel, an operating connection between the hand lever and the ratchet lever, means actuated by the hand lever for lifting the ratchet lever out of engagement with the ratchet wheel, and a pawl in cooperative relation with the ratchet wheel to prevent reverse rotation thereof, the hand lever being provided with means for tripping the pawl from the ratchet wheel.

24. In a railway hand brake, the combination with an upright brake shaft, of an operating hand lever mounted for up and down swinging brake operating movements upon a horizontal axis, a ratchet wheel fixed upon the brake shaft and provided with ratchet teeth upon the top and bottom thereof, a substantially horizontal ratchet lever slidably fulcrumed upon the shaft and in cooperative relation with the teeth upon the top of the ratchet wheel, an operating connection between the hand lever and the ratchet lever, and a pawl cooperating with the ratchet teeth on the underside of the ratchet wheel, the hand lever having means for tripping the pawl.

In testimony whereof I affix my signature.
PERCY B. CAMP.