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J. F. O'CONNOR

1,683,396

HAND BRAKE

Filed Oct. 9, 1922

Fig. 1

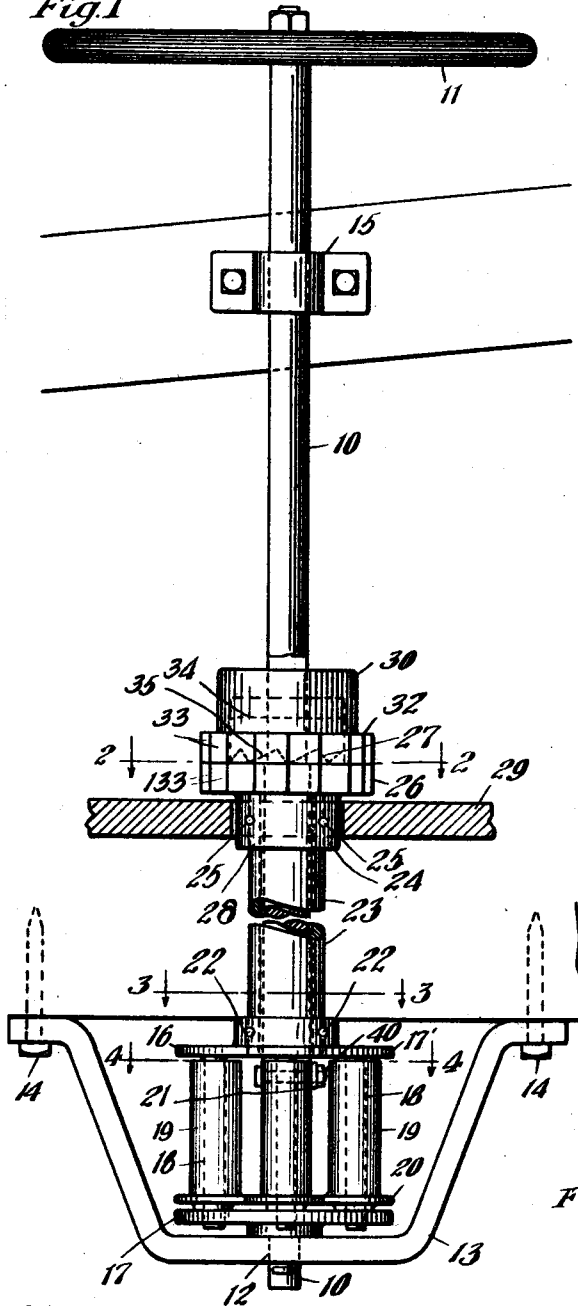


Fig. 2

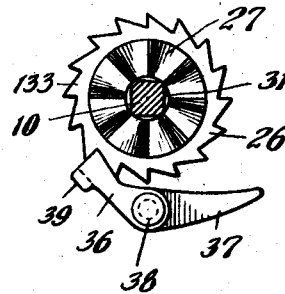


Fig. 3

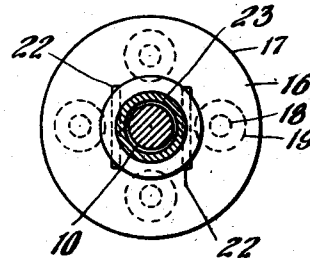


Fig. 4

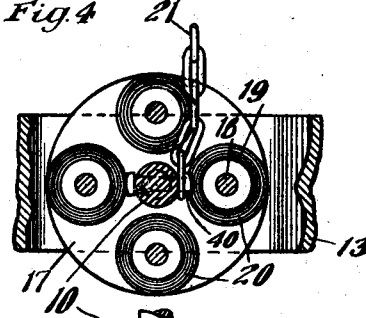
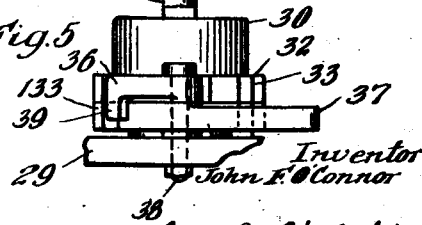


Fig. 5



Witnesses

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His Atty

UNITED STATES PATENT OFFICE.

JOHN F. O'CONNOR, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
W. H. MINER, INC., A CORPORATION OF DELAWARE.

HAND BRAKE.

Application filed October 9, 1922. Serial No. 593 187.

This invention relates to improvements in car hand brakes.

One object of my invention is to provide a simple and efficient hand brake wherein means is provided for rapidly taking up the slack in the brake chain and subsequently automatically increasing the ratio of the leverage, to exert greater force in the final application of the brakes.

Another object of the invention is to provide, in a hand brake of the vertical staff type, automatically operated means for multiplying the effective ratio of leverage of the chain winding means as the resistance offered during the final application of the brakes increases.

In the drawings forming a part of the specification, Figure 1 shows a side elevation of my improved hand brake. Fig. 2 is a section taken substantially on the line 2—2 of Fig. 1. Fig. 3 is a sectional view taken substantially on the line 3—3 of Fig. 1. Fig. 4 is a sectional view taken substantially on the line 4—4 of Fig. 1. And Fig. 5 is a detail elevation of the locking dog arrangement.

In said drawings, 10 indicates a vertical brake staff having suitably secured thereto at its upper end, the hand wheel 11 and journaled at its lower end in an opening 12 of the stirrup 13, secured to the bottom of the car by bolts or other means 14. The upper end of the staff 10 is suitably journaled in the usual bracket member indicated by 15, secured to the upper portion of the end of the car.

A winding reel 16 is rotatably mounted on the lower end of the brake staff 10, said winding reel comprising upper disc 17 having short posts 18 rigidly attached thereto, a lower disc 17 mounted on the staff and engaging the ends of posts 18, and spools 19 rotatably mounted upon the posts 18. Four spools 19, are provided in the specific embodiment herein disclosed and each spool has a lower guiding flange 20, radially projecting therefrom to properly guide the brake chain 21 during the final application of the brakes. The upper disc 17 is provided with a vertically extending boss, within which is secured by pins 22, a sleeve 23 which is also rotatably mounted on the staff 10.

A combined clutch and ratchet element 24 is secured to the upper end of the sleeve 23 by suitable pins 25. Said combined clutch and ratchet element comprises a ratchet wheel

26 rotatably mounted upon the staff 10 and provided on its upper face with clutch teeth 27, and a lower cylindrical hub 28 rotatable within a recess in the usual platform or step 29, mounted on the wall of the car.

A combined clutch housing and ratchet member 30 is non-rotatably mounted on the staff 10 to always rotate therewith. The driving connection between the staff 10 and the housing 30 comprises a squared portion 31 on the staff and a co-acting squared recess in the upper end of the housing. The lower end of the housing is provided with a radially projecting flange 32 resting upon the ratchet wheel 26. The periphery of the flange 32 is provided with suitable ratchet teeth 33 corresponding in number and spacing to the peripheral ratchet teeth 133 on the ratchet wheel 26.

A clutch element 34 is vertically slidably mounted upon the squared portion 31 of the staff 10 within the housing 30 so as to have rotary movement with the staff. The lower face of the clutch element 34 is provided with clutch teeth 35 co-acting with the clutch teeth 27.

To lock the staff 10 and the reel 16 against rotation in an unwinding direction, locking pawls 36 and 37 are provided engaging respectively the ratchet teeth 33 and 133. The pawls 36 and 37 are pivotally mounted on the pivot bolt 38, suitably secured to the platform 29. The pawl 36 is provided with a downwardly projecting lug 39 engaging with the outer face of the pawl 37, so that when the pawl 37 is moved out of engagement with the ratchet wheel 26, the pawl 36 will necessarily be moved therewith and be disengaged from the ratchet teeth 33. It will be noted that the pawls are so mounted that the pawl 36 may ratchet over the teeth 33, while the pawl 37 remains in fixed engagement with the ratchet teeth of the wheel 26.

One end of the chain 21 is suitably connected to the brake rigging while the opposite end is anchored to the staff 10 by means of the bolt 40.

In the operation of my improved hand brake, the parts are normally in the position shown in Fig. 1, with the teeth of the clutch elements 24 and 34 interlocked. Upon rotation of the hand wheel 11 in a direction to apply the brakes, the staff 10 and the reel 16 will be rotated in unison, by the clutch element 34 rotating with the staff 10 and en-

gaging the clutch element 27 connected to the reel 16. During this operation, the brake chain 21 will be wound about the spools 19 of the reel, thus taking up the slack and bringing the brake shoes in engagement with the car wheels rapidly.

The inclination of the inter-engaging teeth of the clutch elements is such as to offer sufficient resistance to prevent disengagement of the clutch elements during the operation of taking up the slack in the brake chain, but the inclination of said teeth is not sufficient to prevent the teeth from ratcheting or slipping over each other upon a greater or predetermined resistance being offered to the turning movement, such as results when the brake shoes are forced firmly into engagement with the car wheel.

During the further rotation of the hand wheel 11 in final application of the braking pressure, the resistance offered will therefore be sufficient to cause the teeth on the clutch element 34 to ride upwardly on the teeth of the co-acting clutch element connected to the reel, thus rendering the clutch elements ineffective, with the result that the reel 16 will remain stationary while the brake staff 10 is further rotated, causing the chain 21 to be wound upon the staff 10 direct. During the winding of the chain 21 on the staff 10, the rotatably mounted spools acting as anti-friction rolls, will allow the chain to travel freely around the reel, and the pawl 37 will be held in locking engagement with the teeth of the ratchet wheel 26, to prevent backward rotation of the reel, while the pawl 36 will ratchet over the ratchet teeth of the housing 34.

From the preceding description taken in connection with the drawing, it is evident that the winding power is greatly multiplied during the final application of the braking pressure, due to the fact that the chain is then wound directly upon the staff, the diameter of which is only a fraction of the diameter of the reel upon which the chain is first wound.

To release the brakes, the pawls 36 and 37 are simultaneously disengaged from the ratchet wheels by pushing the free end of the pawl 37 inwardly, the ratchet engaging end of the pawl 36 being moved outwardly by means of the lug 39 engaging with the pawl 37.

I have herein shown and described what I now consider the preferred manner of carrying out my invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In a hand brake for railway cars; the combination with a manually operable vertical staff about which the brake chain is adapted to be wound; of a member rotatable

on said staff about which the brake chain is adapted to be wound also; a clutch interposed between said member and staff; a ratchet secured to said staff; a ratchet secured to said member; and pawl mechanism coacting with each of said ratchets, said pawls being relatively movable, and being engageable with one another so as to be operable in unison to disengage from said ratchets.

2. In a hand brake for railway cars and the like; the combination with a manually operable vertical staff about which the brake chain is adapted to be wound; of a reel member rotatable on said staff, said reel member including a plurality of rotatable spools arranged for orbital movement around said staff; and means for normally connecting said member for rotation with said staff, said means being adapted to be automatically disconnected when a predetermined resistance is reached in the final application of said brake mechanism.

3. In a hand brake for railway cars and the like; the combination with a manually operable vertical staff about which the brake chain is adapted to be wound; of a reel member rotatable on said staff, said reel member including a plurality of rotatable spools arranged for orbital movement around said staff; means for normally connecting said member for rotation with said staff, said means being adapted to be automatically disconnected when a predetermined resistance is reached in the final application of said brake mechanism; and means for securing the brake chain to the staff.

4. In a hand brake for railway cars and the like, the combination with a brake-staff about which a brake chain is adapted to be wound; of a reel member rotatable on said staff, said reel member including a plurality of rotatable spools spaced radially from the rotational axis of said staff; and means for normally connecting said member for rotation with said staff, and automatically operable to disconnect the same when a predetermined resistance is reached in applying the brakes.

5. In a hand brake for railway cars, the combination with means adapted to removably engage the brake chain so as to deflect the same and take up the slack therein; of mechanism connected to said chain for tensioning the same, said means and said mechanism being arranged for operative movements one within the other; and means permitting cessation of taking up movement of said first named means when said mechanism is tensioning the chain.

6. In a hand brake for railway cars, the combination with mechanism connected to one end of brake chain for tensioning the same, the opposite end of said chain being connected with the brake rigging proper; of means adapted to engage the chain between

its ends to take up the slack therein; and co-operable means for rendering said means quiescent when said mechanism is tensioning the chain, said co-operable means being automatically controlled through predetermined resistance in the brake rigging.

7. In a hand brake for railway cars, the combination with means about which the brake chain is wound, said means including elements automatically operable to take up variable amounts of slack in the brake chain; of mechanism about which said chain is wound for tensioning said chain; and means for actuating said first named means and mechanism, said chain being connected at one end to said tensioning mechanism and at its other end to the brake rigging proper, said chain having its slack taken up intermediate its ends.

8. In a hand brake for railway cars, the combination with means for winding up the slack in the brake chain; of mechanism for tensioning said chain so as to tighten the same during the application of the brakes; and means automatically controllable by the resistance in said brake chain for rendering said first named means inoperative to wind said chain when said mechanism is tensioning the chain, said chain being arranged to travel with respect to said first named means when the latter is rendered inoperative.

9. In a hand brake for railway cars, the combination with a winding element having one end of a brake chain connected thereto,

the opposite end of said chain being connected with the brake rigging proper; of a rotatable winding member engaging said brake chain between its ends and adapted to wind variable amounts of said chain thereon dependent upon the degree of rotation; and mechanism for driving said rotatable member and permitting cessation of rotatable movement of said rotatable member, continued movement of said winding element causing travel of said chain with respect to said rotatable member.

10. In a hand brake for railway cars, the combination with a winding element having one end of a brake chain connected thereto, the opposite end of said chain being connected with the brake rigging proper; of a rotatable winding member engaging said brake chain between its ends and adapted to wind variable amounts of said chain thereon dependent upon the degree of rotation; and mechanism for driving said rotatable member and permitting cessation of rotatable movement of said rotatable member, continued movement of said winding element causing travel of said chain with respect to said rotatable member, said mechanism being automatically controllable by difference in tension in said brake rigging.

In witness that I claim the foregoing I have hereunto subscribed my name this 22nd day of September 1922.

JOHN F. O'CONNOR.