F. L. BARBER & E. W. WEBB.

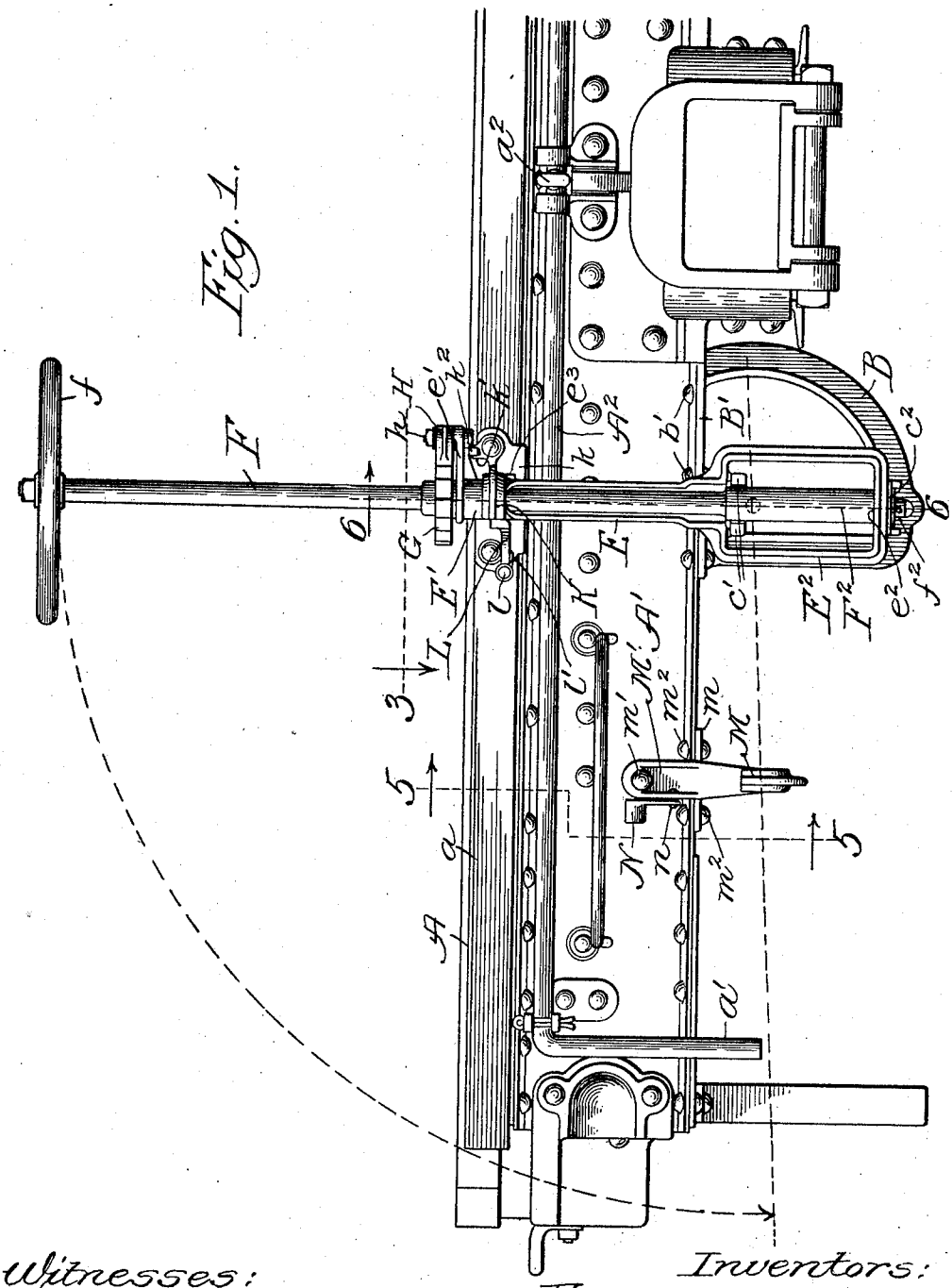
BRAKE STAFF.

APPLICATION FILED MAR. 20, 1911.

**1,003,168.** Patented Sept. 12, 1911.

4 SHEETS—SHEET 1.

Fig. 1.

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4 SHEETS—SHEET 2.

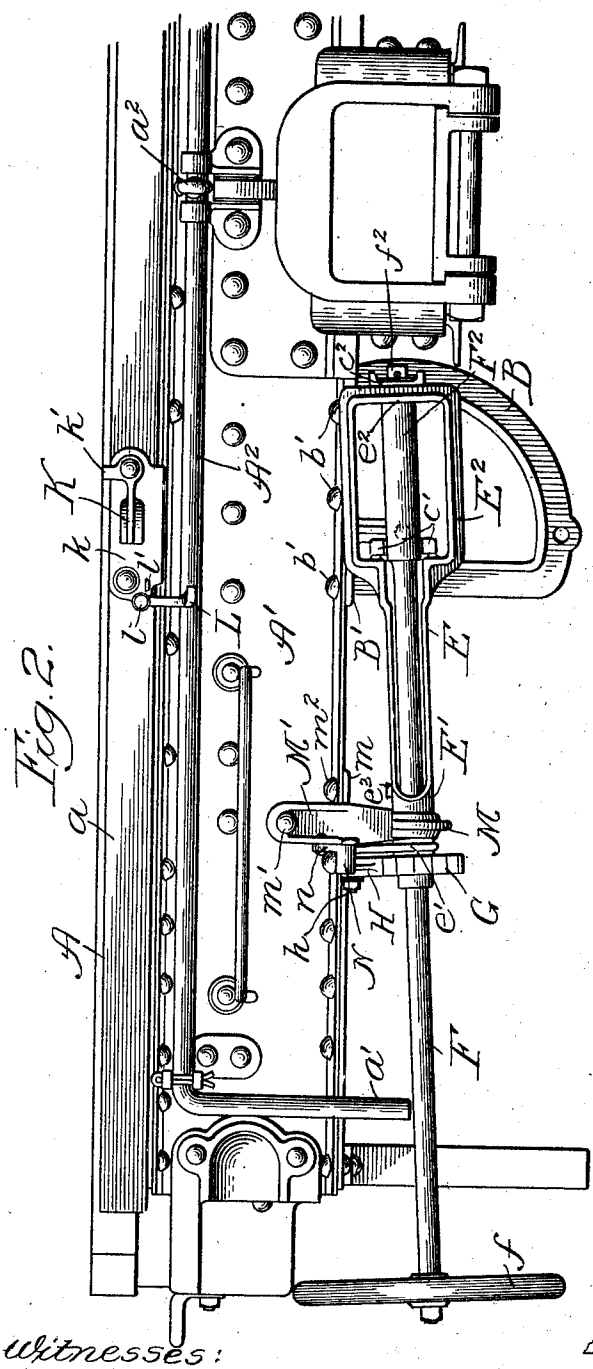

Fig. 2.

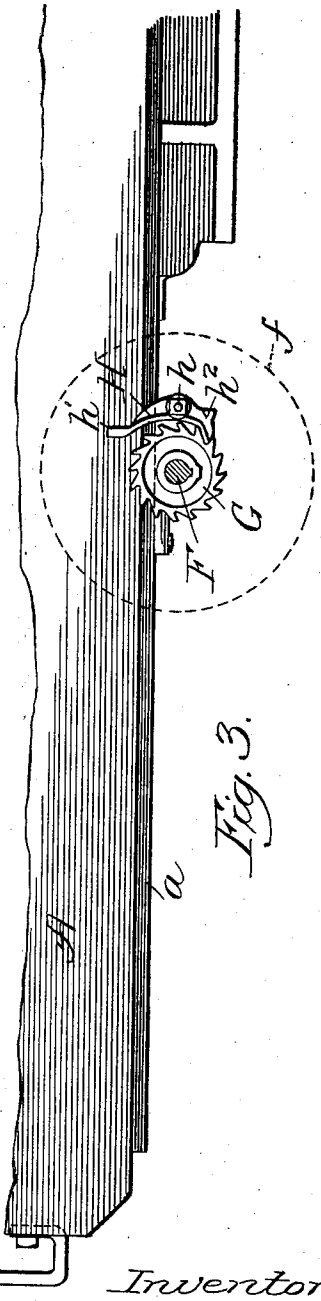

Fig. 3.

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4 SHEETS—SHEET 3.

Fig. 7.

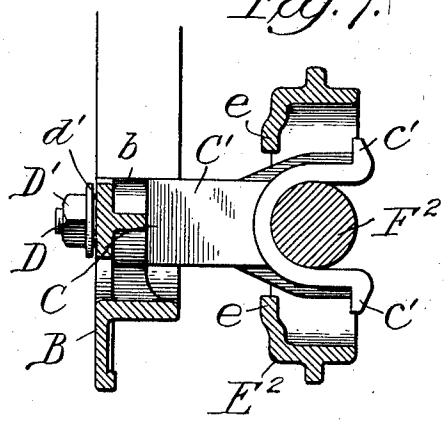


Fig. 4.




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4 SHEETS—SHEET 4.

Fig. 5.

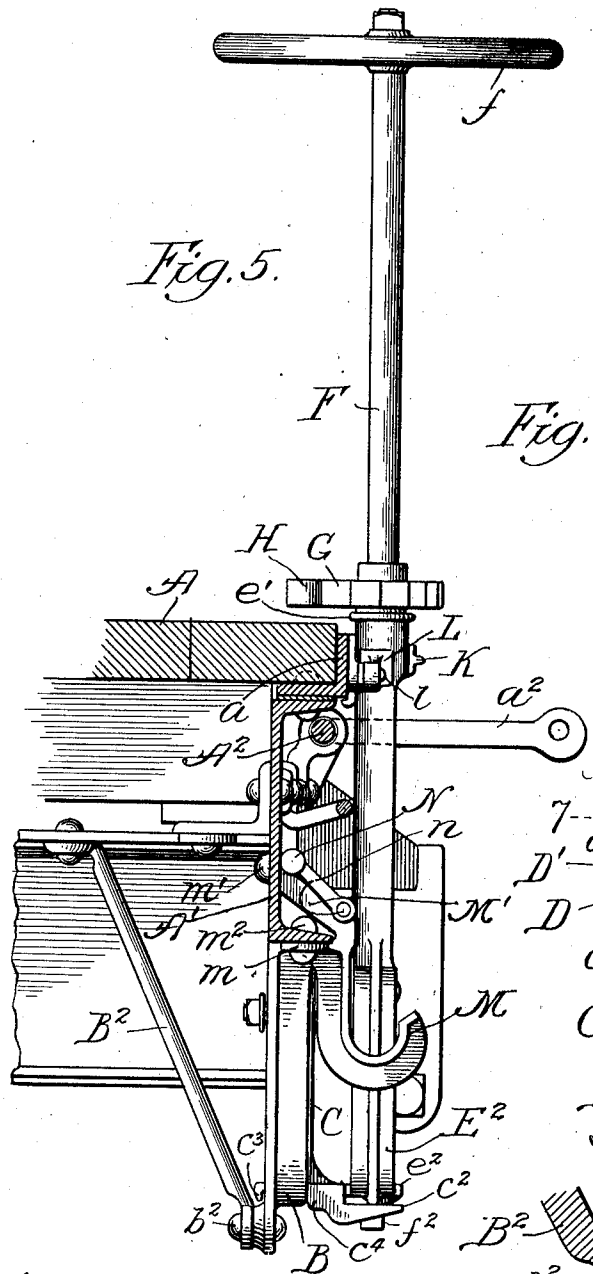
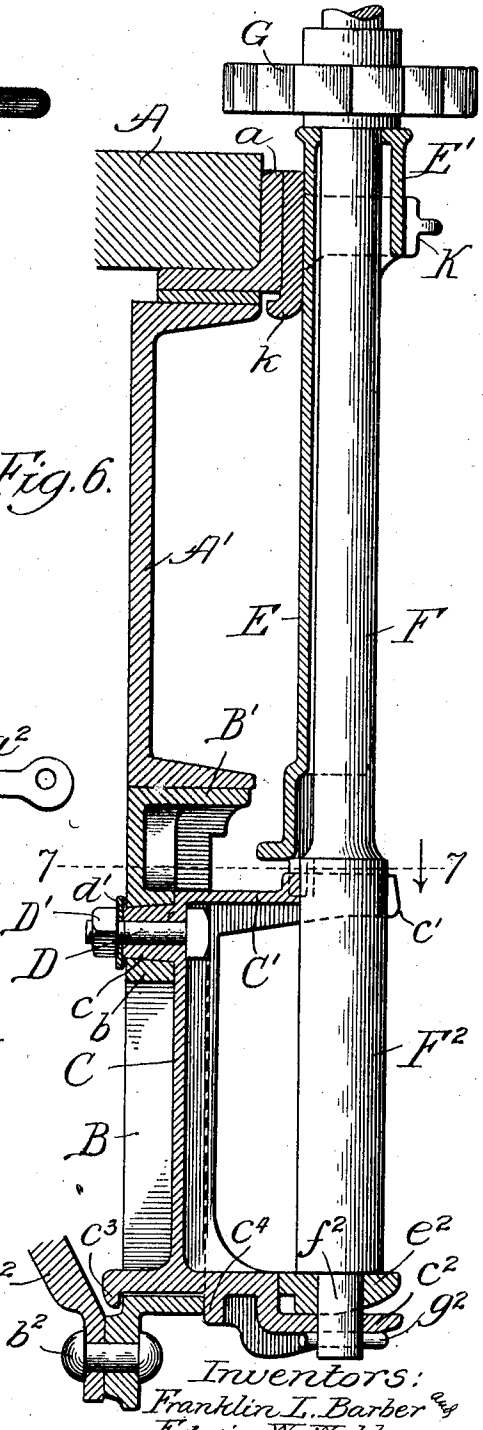



Fig. 6.

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# UNITED STATES PATENT OFFICE.

FRANKLIN L. BARBER AND EDWIN W. WEBB, OF CHICAGO, ILLINOIS, ASSIGNORS TO STANDARD CAR TRUCK COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

## BRAKE-STAFF.

1,003,168. Specification of Letters Patent. **Patented Sept. 12, 1911.**

Application filed March 20, 1911. Serial No. 615,495.

*To all whom it may concern:*

Be it known that we, FRANKLIN L. BARBER and EDWIN W. WEBB, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Brake-Staffs, of which the following is a specification.

Our invention relates in general to brake staffs, and more particularly to an adjustable brake staff capable of assuming either a vertical or horizontal operative position.

In the use of flat bottom freight cars, it is often necessary to remove the vertical brake staffs at the ends of the cars, as, for instance, in unloading heavy machinery from the ends of the cars, or in transporting lading which projects beyond the car ends, or in using a plow for discharging ballast from a train of flat cars. Heretofore it has been customary when a car is to be used for such purpose to remove the brake staff. This practice is objectionable, as it is then impossible to apply the brakes by hand, and hence when the car is disconnected from a locomotive, the brakes cannot be applied. A further objection to this practice is that the brake staffs when removed are frequently lost.

It has heretofore been proposed to provide brake staffs which may be adjusted from their normal vertical positions to horizontal positions when required by the usage of the cars, but such brake staffs have not proved practical, and their construction has been such as to obstruct the necessary clearance between cars required by the regulations of the Interstate Commerce Commission.

The primary object of our invention is to provide a brake staff which will efficiently operate in either a vertical or horizontal position, and which may be readily adjusted from one position to the other according to the desired usage of the car.

A further object of our invention is to provide a brake staff which may be securely supported in a vertical or horizontal position, and which will project a minimum distance beyond the face of the end sill of the car so as to allow the necessary clearance between cars required by the regulations of the Interstate Commerce Commission.

A still further object of our invention is to provide an improved adjustable brake staff which will be simple in operation, strong in construction, and durable in use.

Our invention will be more fully described hereinafter with reference to the accompanying drawings, in which the same is illustrated as embodied in a convenient and practical form, and in which—

Figure 1 is an end elevational view of a portion of a car end equipped with our improved brake staff, the latter being shown in its vertical operative position; Fig. 2, a view similar to Fig. 1, showing the brake staff in its horizontal operative position; Fig. 3, a sectional plan view on line 3, Fig. 1; Fig. 4, a side elevational view, looking from the left of Fig. 1; Fig. 5, a vertical section, taken on line 5 5, Fig. 1; Fig. 6, an enlarged vertical section on line 6 6, Fig. 1; and Fig. 7, a detail sectional view on line 7 7, Fig. 6.

The same reference characters are used to designate the same parts in the several figures of the drawings.

Reference letter A indicates the deck of a flat bottom freight car, the overhanging edge of which is provided with an angle bar *a*.

$A^1$ designates the end sill of the car, which is shown in the form of a channel beam, the top flange of which is riveted to the horizontal flange of the angle bar *a*.

$A^2$ indicates the uncoupling shaft which is provided with the arm $a^2$ adapted to be connected with the lock block of the coupler, and also with the crank arm $a'$ by means of which the shaft may be oscillated to elevate the uncoupling block.

The above described parts of a flat bottom freight car do not in themselves form parts of our invention, but are merely illustrated and described in order that the location of our improvements may be clearly understood.

Our improved brake staff is not limited in its application to a car having the above described specific details of construction, but is applicable to flat bottom freight cars in general.

Reference letter B indicates a bracket in the form of a quadrant depending from and rigidly secured to the end sill A′ of the car. Any suitable means may be provided for securing the quadrant to the end sill, as, for instance, rivets $b'$, $b'$, extending through registering holes in the top flange B′ of

the quadrant and in the lower horizontal flange of the channel bar forming the end sill A′ of the car. In order that the quadrant bracket B may be securely supported, a brace $B^2$ is secured to the lower flange of the quadrant bracket by any suitable means, such, for instance, as a rivet $b^2$, the other end of the brace $B^b$ being rigidly secured to the car underframe.

Mounted upon the quadrant bracket B, and adapted to oscillate relatively thereto, is a bracket C having thereon a conical boss $c$ which fits within a corresponding bearing $b$ on the quadrant bracket B. A bolt D extends concentrically through the conical boss $c$ and is provided with a nut D′ between which and the rear surface of the bearing $b$ is a washer $d'$, the latter serving to prevent the disengagement of the boss $c$ from the bearing $b$, but at the same time to permit the oscillation of the bracket C relatively to the bracket B. The boss $c$ and bearing $b$ are located concentrically with respect to the curved portion of the bracket B, the latter serving as a track upon which the lower end of the bracket C is guided during its oscillation with respect to the bracket B. In order that the lower end of the bracket C may be positively retained in engagement with the curved portion of the bracket B, a lug $c^3$ is provided at the rear lower end of the bracket C which lies within the inner surface of the bracket B, as clearly shown in Fig. 6. A shoulder $c^4$ is also formed on the bracket C which overlies and engages the front edge of the curved track on the bracket B.

The upper end of the bracket C immediately above the boss $c$ is provided with a forwardly projecting bifurcated arm C′, the bifurcations of which are provided with outwardly projecting lugs $c'$, $c'$, as shown in Fig. 7.

E indicates a semi-cylindrical staff guide which is formed integrally with a cylindrical portion E′ at its upper end carrying a laterally projecting ratchet pawl plate $e'$. The staff guide E has also formed integrally therewith an open yoke $E^2$ which supports the winding spool portion $F^2$ of the brake staff.

A brake staff F is supported at its lower end upon the lower portion $e^2$ of the yoke $E^2$ and is provided with a reduced portion forming trunnion $f^2$ extending through an opening in the lower portion $e^2$ of the yoke $E^2$ and also through a registering opening in the underlying forwardly projecting portion $c^2$ of the bracket C. A cotter pin $g^2$ projects through the lower end of the trunnion $f^2$ beneath the portion $c^2$ of the bracket C. The spool portion $F^2$ of the staff F fits between the bifurcations of the arm C′, as will be clearly evident by reference to Figs. 6 and 7. The brake staff immediately above the cylindrical upper end E′ of the guide E has fixed thereon a ratchet G which cooperates with a pawl H, the latter being pivotally supported at $h$ upon the plate $e'$ formed integrally with the upper end E′ of the staff guide. The upper end of the brake staff is provided with the usual hand wheel $f$.

Rigidly secured to the angle bar $a$ is a plate $k$ having thereon a horizontal open hook K. The plate $k$ is provided with an upwardly extending lug $k'$, which, when the brake staff is in its vertical position, is engaged by a depending lug $k^2$ on the pawl plate $e'$ to relieve the staff guide from the torsion imposed thereon by the pawl when the brakes are applied. Pivoted upon the plate $k$ and $l$ is a latch L adapted to close the opening of the hook K. The hook K and latch L serve to closely surround the cylindrical portion E′ of the staff guide when the staff occupies its vertical position. A stop $l'$ is formed on the plate $k$ to support the latch L in position to retain the portion E′ of the brake staff guide within the hook K.

Rigidly secured to the end sill A′ of the car is a hook-shaped bracket M adapted to support the cylindrical portion E′ of the staff guide, when the staff is in its horizontal position, as shown in Fig. 2. The hook bracket M may be rigidly secured to the end sill A′ of the car by any suitable means, such, for instance, as rivets $m^2$ passing through registering holes in the lower flange of the channel beam end sill and in underlying ears $m$ projecting laterally from the opposite sides of the bracket M. As an additional means for insuring the secure attachment of the bracket M to the end sill, a rivet $m'$ may be provided extending through the top portion M′ of the bracket and the web of the channel beam end sill A′.

Pivoted on one side of the bracket M at $n$ is a weighted arm N adapted to engage the pawl H and retain the same in operating contact with the ratchet G when the brake staff is in its horizontal position. It will be observed by reference to Fig. 3 that the pawl H is provided with a tail $h'$ of greater weight than the nose which engages the ratchet teeth, and hence when the brake staff is in the horizontal position shown in Fig. 2, the nose is automatically lifted away from the ratchet G. By swinging the weighted arm N outwardly it engages a shoulder $h^2$ on the short end of the pawl, thereby counterbalancing the weight of the tail $h'$ of the pawl, and retaining the nose of the pawl in engagement with the ratchet G.

In order to prevent any accidental disengagement of the lower end of the staff from the supporting portion $c'$ of the bracket C, a stop lug $e^3$ is provided on the staff guide at a point immediately below the

hook K, so that when the brake staff is in its vertical position the engagement of such lug with the lower surface of the hook K will prevent any lifting of the staff guide, even though the cotter pin $g^2$ might become broken or lost.

In order to limit the outward movement of the staff after it has been disengaged from the hook K, inwardly projecting lugs $e$, $e$ are provided at the top of the open yoke $E^2$ in positions to engage the outwardly extending lugs $c'$, $c'$ on the ends of the bifurcations of the arm C', as shown in Fig. 7.

The manner of assembling and operation of our improved brake staff are as follows: Before the hand wheel $f$ or ratchet G are secured to the brake staff, it is inserted upwardly through the cylindrical portion E' of the staff guide, until its lower end is above the bottom $e^2$ of the yoke $E^2$. The staff is then lowered so that the trunnion $f^2$ thereon will pass through the registering holes in the yoke and underlying portion $c^2$ of the tilting bracket C, after which the cotter pin is inserted through the opening in the post $f^2$ below the portion $c^2$ of the bracket C. Before inserting the cotter pin, the combined staff guide, yoke and ratchet pawl plate have been engaged with the bifurcated arm C' of the bracket C by permitting the inwardly extending lugs $e$, $e$ to pass downwardly back behind the outwardly projecting lugs $c'$, $c'$ on the bifurcations of the arm C'.

It will be observed that the three parts which adjustably support the brake staff so that it may be swung from a vertical to a horizontal position, or vice versa, are all securely united together. The quadrant bracket is rigidly secured to the car, and is in turn positively engaged by the tilting bracket C through the engagement of the boss $c$ with the conical bearing $b$ and through the lug $c^3$ and shoulder $c^4$ which overlie the opposite edges of the truck portion of the bracket B. The combined ratchet pawl plate, staff guide, and yoke, are securely united to the tilting bracket C by means of the trunnion $f^2$ on the lower end of the staff passing through the registering holes in the bottom of the yoke and in an underlying portion of the bracket C, and also by reason of the lugs $c'$, $c'$ on the arm C' extending into the outward path of movement of the inwardly projecting lugs $e$, $e$ at the top of the yoke.

When the brake staff is in its vertical position, the latch L positively prevents any oscillation of the staff guide, while the staff guide is securely supported at its bottom by the underlying portion $c^2$ of the bracket C. The lug $k'$ on the plate $k$ through the engagement therewith of the lug $k^2$ on the pawl plate $e'$ serves to relieve the staff guide from the twisting tendency due to the pressure on the pawl when the brakes are applied. The brake staff may then be operated in a manner similar to the operation of the ordinary brake staffs. The pawl H is so located that it may be readily manipulated at the toe of a trainman to engage or disengage the ratchet G. The rotation of the brake staff winds up the brake chain on the spool portion $F^2$ located within the open yoke $E^2$.

When it is desired to locate the brake staff in a horizontal position so that it may afford no obstruction to such uses of the car as demand a level deck free from projections, the latch L is swung upwardly and downwardly so that it will hang by gravity in the position shown in Fig. 2. The brake staff is then oscillated slightly toward the left in Fig. 1, such oscillation being permitted by the coincident oscillation of the staff guide and tilting bracket C relatively to the quadrant B. When the brake staff is oscillated to the left sufficiently to clear the hook K, it is oscillated forwardly a sufficient distance for the hand wheel $f$ to clear the deck of the car, such forward oscillation of the brake staff being permitted by the play between the lugs $e$, $e$ at the upper end of the yoke and the upwardly projecting lugs $c'$, $c'$ on the arm C' of the bracket C. The curved under surface of the bottom of the yoke $E^2$ permits the slight rocking of the same upon the underlying supporting portion $c^2$ of the bracket C to permit the outward swinging of the brake staff requisite for the hand wheel to clear the car deck.

After the brake staff has been swung toward the left in Fig. 1 until the hand wheel has passed below the deck of the car, it is moved inwardly and engaged with the supporting hook M. During this movement of the brake staff, a corresponding movement is imparted to the staff guide, the ratchet pawl plate and pawl pivoted thereon, the yokes $E^2$, and the tilting bracket C, which is guided during its movement through engagement with the curved quadrant track on the track B. The counterbalancing arm N is then swung forwardly into engagement with the pawl H, after which the brake staff may be operated from the side of the car to apply the brakes. The brakes may be released by swinging upwardly the counterbalancing arm N, which permits the disengagement of the pawl from the ratchet. It will be observed that the downward movement of the brake staff and coöperating parts is limited by the engagement of the lower end of the bracket C with the top flange of the quadrant bracket B, even though the staff guide should not be engaged with the supporting hook M.

In order to adjust the brake staff from a horizontal to a vertical position, the operation above described is reversed. The brake

staff is lifted slightly so as to disengage the cylindrical portion E′ of the staff guide from the hook M, and is then swung outwardly sufficiently for the hand wheel to clear the car deck, after which the staff is swung to a vertical position with the cylindrical part E′ of the guide within the hook K. The latch L is then swung over into position to positively retain the staff guide within the hook K.

From the foregoing description it will be observed that we have invented an improved adjustable brake staff which may be readily located either in a vertical or horizontal operative position; which projects very slightly beyond the end sill of the car, and hence does not interfere with the requisite clearance between cars; in which the same ratchet and pawl are effective in both positions of the brake staff; which does not in any wise interfere with the location and operation of the usual uncoupling lever; which does not require the use of a long brake staff in order to clear the deck of the car and at the same time permits the staff to lie close to the end sill when in a horizontal position; and in which the coöperating parts are securely united so as to prevent accidental disconnection of the brake staff.

While we have described more or less in detail the specific form in which we have illustrated our invention, as embodied, yet we do not wish to be understood as limiting ourselves thereto, as we contemplate changes in form, proportion of parts, and substitution of equivalents, as circumstances may require, or as may be deemed expedient.

We claim:—

1. The combination with a brake staff having a ratchet fixed thereon, of a pawl cooperating with said ratchet, means mounted on the staff for supporting said pawl in operative relation with said ratchet, means for supporting said staff in a vertical position upon the end of a car with said ratchet overlying the car deck, means for simultaneously adjusting said staff and pawl-supporting means into an operative horizontal position, and means for permitting a slight oscillation of said staff transversely to its path of movement to permit the ratchet to pass around the car deck.

2. The combination with a brake staff having a ratchet fixed thereon, of a pawl having a weighted tail coöperating with said ratchet, means mounted upon said staff for supporting said pawl in operative relation with said ratchet, means for supporting said staff in a vertical position upon the end of a car with said ratchet and tail of said pawl overlying the car deck, means for simultaneously adjusting said staff and pawl-supporting means into an operative horizontal position in which the weighted tail of the pawl automatically disengages the pawl from the ratchet, and means for counterbalancing the weighted tail of the pawl to retain the pawl in engagement with the ratchet.

3. The combination with a brake staff having a hand wheel thereon, of means for pivotally mounting said staff upon a car at a point farther from the side of the car than the length of the staff between its pivot and hand wheel, means for supporting said staff in either vertical or horizontal positions, and means for permitting a slight oscillation of said staff transversely to its path of movement from vertical to horizontal positions to permit the hand wheel to pass around the car end sill.

4. The combination with a brake staff, of means for pivotally mounting said staff upon a car, means for supporting said staff in either vertical or horizontal positions, means for permitting a slight oscillation of said staff transversely to its path of movement from vertical to horizontal positions, and means for positively limiting the transverse oscillation of said staff.

5. The combination with a brake staff having a ratchet fixed thereon, of a pawl cooperating with said ratchet, means for supporting said pawl in operative relation to said ratchet, means for simultaneously adjusting said staff and pawl-supporting means into either a vertical or horizontal operative position, whereby the same ratchet and pawl control the rotation of the brake staff in both positions thereof, and adjustable means for holding the pawl in engagement with or permitting its automatic disengagement from the ratchet when the staff is in its horizontal position.

6. The combination with a brake staff having a ratchet fixed thereon, of a pawl cooperating with said ratchet, means for supporting said pawl in operative relation to said ratchet, means for simultaneously adjusting said staff and pawl-supporting means into either a vertical or horizontal operative position, whereby the same ratchet and pawl control the rotation of the brake staff in both positions thereof, and adjustable means for holding the pawl in engagement with or permitting its automatic disengagement from the ratchet when the staff is in its horizontal position.

7. The combination with a brake staff, of a guide within which the staff is rotatably supported, means for pivotally mounting the guide upon the end of a car, means for supporting the guide in either vertical or horizontal positions, and means for permitting a slight oscillation of said guide transversely to its path of movement from vertical to horizontal positions.

8. The combination with a brake staff having a ratchet fixed thereon, of a guide

within which the staff is rotatably supported, a pawl supported upon said guide in operative relation to said ratchet, means for pivotally mounting said guide upon the end of a car with the ratchet overlying the car deck when the staff is in a vertical position, means for supporting said guide in either vertical or horizontal positions, and means for permitting a slight oscillation of said guide transversely to its path of movement to permit the ratchet to pass around the car deck.

9. The combination with a brake staff, of a tilting bracket pivotally mounted upon the end of the car, a guide within which said staff is rotatably supported, and means for securing said guide upon said bracket to move therewith into a vertical or horizontal position.

10. The combination with a brake staff, of a tilting bracket pivotally mounted upon the end of the car, a guide within which said staff is rotatably supported, means for securing said guide upon said bracket to move therewith into a vertical or horizontal position, and means for permitting a slight movement of said guide relatively to said bracket transversely of the path thereof.

11. The combination with a brake staff, of a guide within which said staff is rotatably supported, an open yoke forming part of said guide and supporting the winding spool portion of said staff, a tilting bracket upon which the lower end of said yoke is supported, an arm projecting from said bracket within which said staff is supported, and means for pivotally supporting said bracket upon the end of a car, whereby said guide and staff may be moved therewith into a vertical or horizontal position.

12. The combination with a brake staff, of a guide within which said staff is rotatably supported, an open yoke forming part of said guide and supporting the winding spool portion of said staff, a tilting bracket upon which the lower end of said yoke is supported, an arm projecting from said bracket within which said staff is supported, means for pivotally supporting said bracket upon the end of a car, whereby said guide and staff may be moved therewith into a vertical or horizontal position, and means fixed to the car for positively supporting said guide and the bracket staff therewith in either a vertical or horizontal operative position.

13. The combination with a brake staff, of a tilting bracket, a guide for rotatably supporting the staff upon said bracket, means for permitting a slight oscillation of said staff relatively to said tilting bracket transversely to its path of movement, a bracket rigidly secured to the end of a car upon which said tilting bracket is pivotally supported, and means engaging said guide for positively supporting the staff in either a vertical or horizontal position.

14. The combination with a brake staff, of a tilting bracket, means for rotatably supporting the staff upon said bracket, a quadrant bracket rigidly secured to the end of a car at the vertex of which said tilting bracket is pivotally supported, means for guiding the lower end of said tilting bracket upon the curved portion of said quadrant bracket, and means for positively supporting the staff when adjusted with said tilting bracket in either a vertical or horizontal position.

15. The combination with a brake staff, of a guide within which said staff is rotatably supported, a yoke forming part of said guide and supporting the winding spool portion of said staff, a tilting bracket upon which the lower end of said yoke is supported, an arm on said bracket within which said staff is rotatably supported, a quadrant bracket rigidly secured to the end of the car, means for pivotally supporting said tilting bracket upon said quadrant bracket, means for guiding the lower end of said tilting bracket upon said quadrant bracket, and means for positively supporting said guide and with it said brake staff in either a vertical or horizontal operative position.

16. The combination with a brake staff, of a guide within which said staff is rotatably supported, a yoke forming part of said guide and supporting the winding spool portion of said staff, a tilting bracket upon which the lower end of said yoke is supported, an arm on said bracket within which said staff is rotatably supported, the lower end of the brake staff being reduced and extending through registering openings in the bottom of said yoke and underlying portion of said tilting bracket, stop lugs on said arm, lugs on said guide adjacent the upper end of said yoke adapted to engage the lugs on said arm to limit the oscillation of said guide relatively to said tilting bracket, a quadrant bracket rigidly secured to the end of the car, means for pivotally supporting said tilting bracket upon said quadrant bracket, means for guiding the lower end of said tilting bracket upon said quadrant bracket, and means for positively supporting said guide and with it said brake staff in either a vertical or horizontal operative position.

17. The combination with a brake staff, of a guide upon which said staff is rotatably supported, means for pivotally mounting said guide upon the end of a car, a bracket having an open hook thereon fixed to the car in position to receive said guide when in a vertical position, a gravity latch pivotally mounted on said bracket to retain said guide within said hook, and means fixed upon the ends of the car for directly engag-

ing and for positively supporting said guide in a horizontal position.

18. The combination with a brake staff, of a guide upon which said staff is rotatably supported, means for pivotally mounting said guide upon the end of a car, a bracket having an open hook thereon fixed to the car in position to receive said guide when in a vertical position, a lug on said guide adapted to underlie said hook when the guide is in a vertical position to prevent vertical movement of said guide, and means fixed to the end of the car for directly engaging and positively supporting said guide and with it said staff in a horizontal position.

19. The combination with a brake staff having a ratchet fixed thereon, of a guide upon which said staff is rotatably supported, a plate carried by said guide, a pawl mounted upon said plate in operative relation to said ratchet, means for pivotally mounting said guide upon the end of a car, a bracket having an open hook thereon fixed to the car in position to receive said guide when in a vertical position, a lug on said bracket underlying and supporting said plate when said guide is in a vertical position, and means for supporting said guide and with it said brake staff in a horizontal position.

20. The combination with a brake staff, of a guide upon which said staff is rotatably supported, a tilting bracket upon which said guide is supported, a quadrant bracket rigidly secured to a car upon which said tilting bracket is pivotally mounted and guided, and interlocking means for retaining said guide, tilting bracket, and quadrant bracket in operative engagement with each other.

In testimony whereof, we have subscribed our names.

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EDWIN W. WEBB.

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GEO. L. WILKINSON.