Feb. 13, 1934. P. B. CAMP 1,947,402

SLACK ADJUSTER

Original Filed May 17, 1928 2 Sheets-Sheet 1

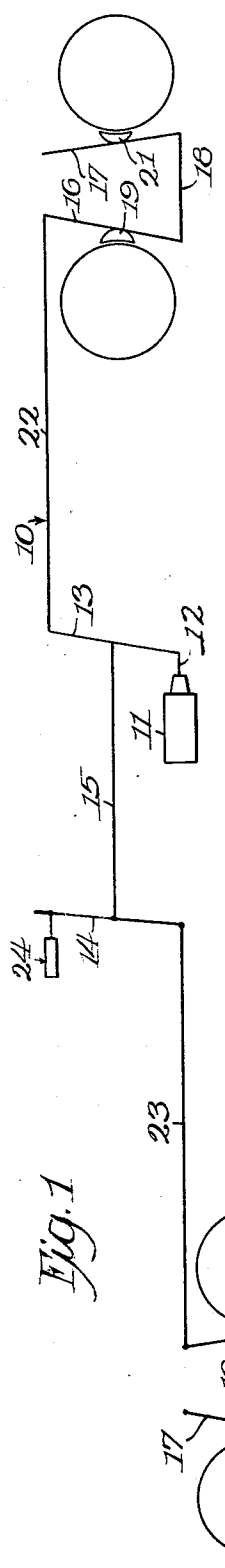


Fig. 1

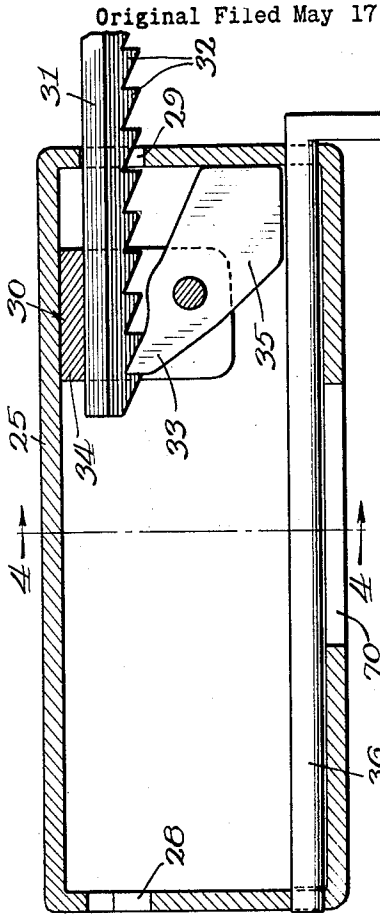


Fig. 3

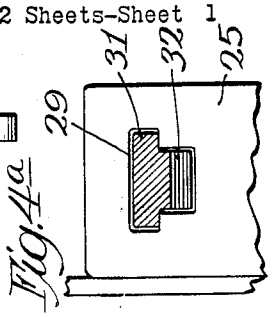


Fig. 4a

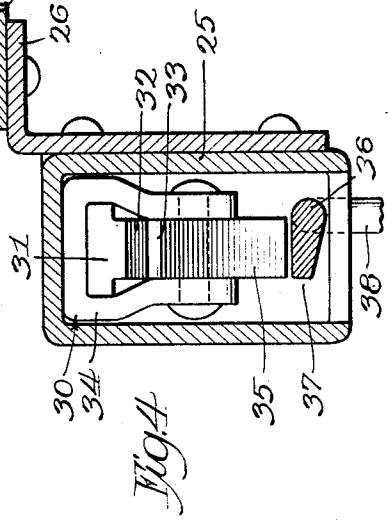


Fig. 4

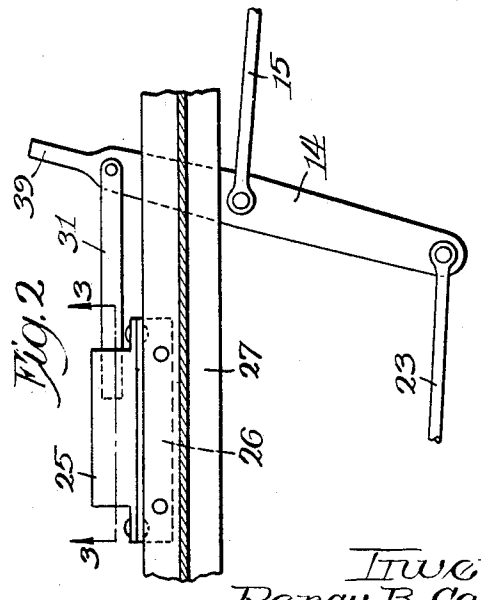


Fig. 2

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SLACK ADJUSTER

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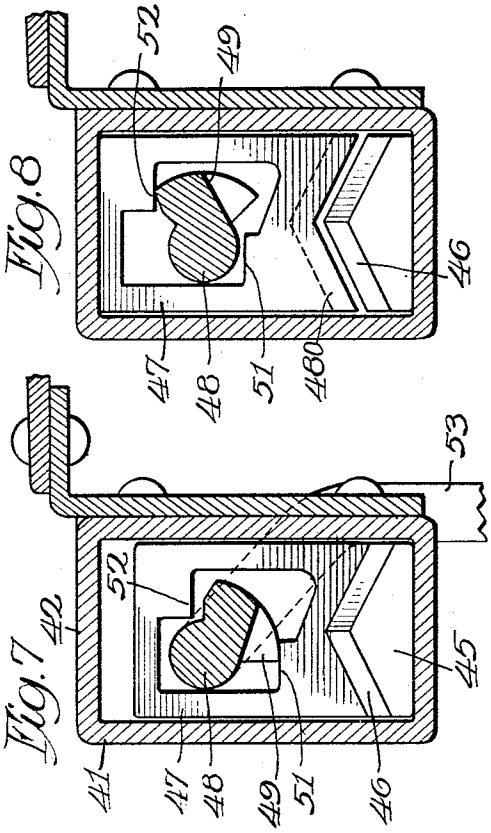


Fig. 8

Fig. 7

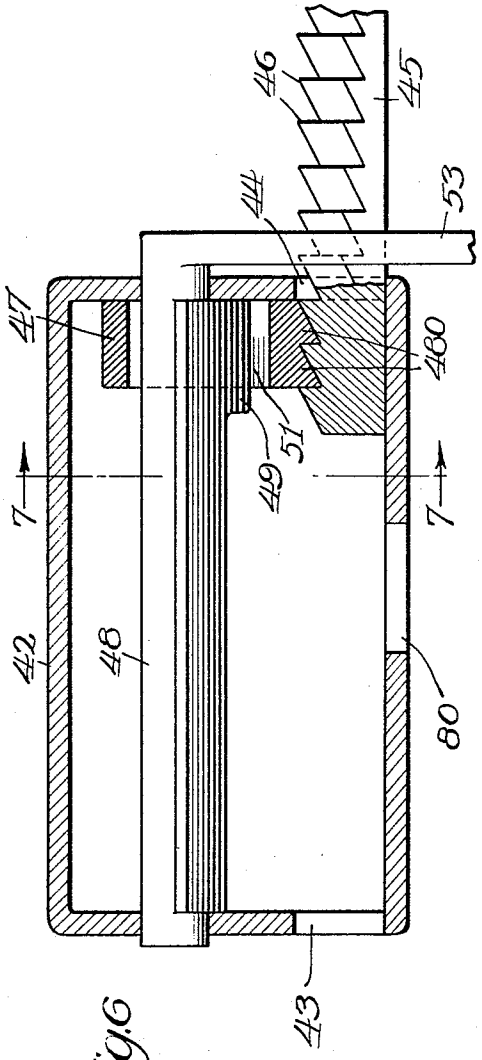


Fig. 6

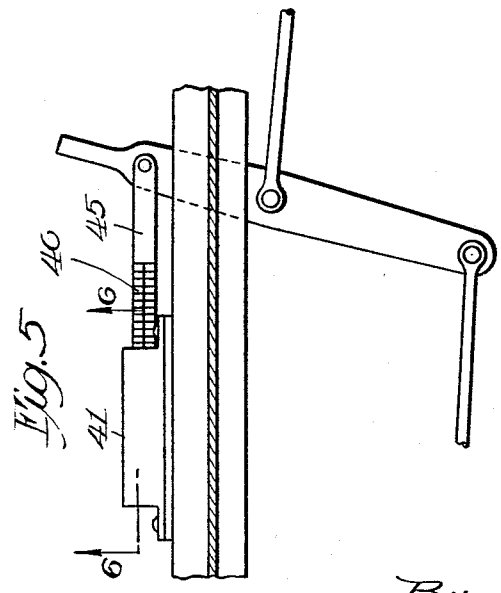


Fig. 5

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UNITED STATES PATENT OFFICE

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SLACK ADJUSTER

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Application May 17, 1928, Serial No. 278,518
Renewed March 3, 1932

10 Claims. (Cl. 188—200)

This invention relates to brakes for railway cars and more specifically to devices for taking up slack in the operating mechanism.

One of the objects of the invention is the provision of new and improved means for taking up slack in the brake operating mechanism together with new and improved means for releasing the take-up mechanism.

Another object of the invention is the provision of new and improved means for adjusting the brake gear to compensate for the wear on the shoes and to accommodate the application of new brake shoes, together with means for predetermining the amount of adjustment in both directions.

A further object of the invention is the provision of a slack take-up device that is cheap to manufacture, easily assembled, simple in construction, efficient in operation, and that is not likely to become broken or get out of order.

Other and further objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings, in which

Fig. 1 is a diagrammatic view of a foundation brake gear, showing my invention in position thereon;

Fig. 2 is a plan view of a portion of a foundation brake gear with the support in horizontal section and showing the invention in position thereon;

Fig. 3 is a vertical section on the line 3—3 of Fig. 2;

Fig. 4 is a section on line 4—4 of Fig. 3;

Fig. 4*a* is a vertical section of the ratchet bar showing the associated casing in elevation, with parts broken away;

Fig. 5 is a view similar to Fig. 2, but showing a modified form of construction;

Fig. 6 is a section on line 6—6 of Fig. 5;

Fig. 7 is a section on line 7—7 of Fig. 6, showing the locking pawl and holding block in operative position;

Fig. 8 is a view similar to Fig. 7 showing the locking pawl and holding block in inoperative position.

In the construction and operation of railway brakes, the parts are so designed that before the brake shoes become worn, the piston of the air brake cylinder will have a predetermined distance of travel, usually about eight inches. As the shoes wear, this distance will gradually increase unless means be provided for taking up the slack caused by the wear of the brake shoes as well as other parts of the gear. When new brake shoes are inserted, it is necessary to readjust the mechanism.

The present invention not only provides means for readily adjusting the gear so that slack will be taken up to compensate for wear on the brake shoes and the parts be readily and easily adjusted to accommodate new shoes, but it also provides means for predetermining the proper adjustments to be made.

Referring now to the drawings, the reference character 10 designates a foundation brake gear comprising an air cylinder 11 having the piston 12 which is connected to the live cylinder lever 13, as shown diagrammatically in Fig. 1. The live cylinder lever 13 is connected to the dead cylinder lever 14, by means of a center connecting rod 15 in the usual manner. The levers 13 and 14 are of the same mechanical ratio and usually of the same length between fulcrum points. The live and dead truck levers 16 and 17 for each truck are connecting together by connecting rod 18 in the usual manner. The levers 16, 17 operate the brake shoes 19, 21 in a manner well known in the art.

The live truck levers 16, 16 are connected to the levers 13 and 14 by the top connecting rods 22 and 23, respectively. Since the specific features of the foundation brake gear mechanism thus far described constitute no part of the invention, it is not thought necessary to further describe the same.

The dead cylinder lever 14 is adapted to be anchored to the underframing of the car by the slack take-up device 24, which will now be described. This device comprises a casing 25 which is adapted to be secured to the underframing of the car in any suitable manner as by means of the strap or angular support 26, one end of which is attached to the car underframing 27 and its other end to said casing. The casing is provided with alined openings 28, 29 through each end thereof for receiving ratchet bar 31 to which the dead cylinder lever 14 is adapted to be pivoted as shown in Fig. 2. Preferably, though not necessarily the ratchet bar 31 is T-shape in cross-section and the openings 28 and 29 are of the same shape whereby the bar 31 will be supported by the laterally extending portions of the bar.

Suitable means, as the holding member 30, are provided for engaging the bar for holding the same in adjusted position. As shown, this member comprises a yoke or U-shaped member 34 slidably mounted on the bar 31 and the pawl 33 carried by said yoke and adapted to engage the teeth 32 of said bar. The pawl 33 is provided with a

weighted end 35 whereby the pawl will be normally held in engagement with the teeth 32 for preventing withdrawal of the bar 31 when the brakes are applied.

From time to time slack must be taken up in the gear to compensate for the wear of the shoes and other parts of the gear. In order that the proper adjustment shall be made in taking up the slack, suitable means are provided for predetermining the amount of slack to be taken up. As shown, the distance between the holding member 30 and the opposite end of the casing is such that the holding member 30 will be properly adjusted on the ratchet bar 31 when the slack adjuster is manually moved to the rear until the brake shoes come into contact with the wheels and the holding device into contact with the rear end of the casing 25, so that the piston 12 will move the predetermined distance thereafter in applying the brakes, the length of this movement being determined by the distance between the holding member 30 and the opposite end of the casing 25.

Suitable means are provided for releasing the pawl 33 when new brake shoes are inserted. As shown, the releasing device comprises a shaft 36 journaled in the casing 25 and extending longitudinally thereof beneath the weighted end 35 of the pawl. The shaft 36 is provided with lateral extension 37 which is adapted to engage beneath the pawl when the shaft 36 is rotated for elevating the weighted end 35 for releasing the pawl. A lateral arm 38 may be provided on the shaft 36 for rotating the same. The arm is adapted to extend downwardly whereby gravity will hold the lateral extension 37 out of engagement with said pawl.

In the operation of the device, when it is desired to take up the slack, the operator grasps the handle 39 and moves the lever 14 rearwardly, thus moving the ratchet bar and holding device 30 to the rear end of the casing. The movement of the lever is continued until the brakes come into contact with the wheels, and if there is sufficient slack the ratchet bar will be moved one or more notches through the holding device 30 past the pawl 33. The parts are so proportioned that if, when the lever 14 is moved rearwardly, the brakes come into contact with the wheels simultaneously with the holding device coming into contact with the rear wall of the casing 25, the parts will be properly adjusted so that on subsequently applying the brakes the air cylinder piston will move the prescribed or desired distance.

This operation will properly position the holding device 30 on the ratchet bar 31 and when the brakes are next applied the holding device will be moved forwardly with the rack to the forward end of the casing 25, to the position shown in Fig. 3. The piston 12 will now have its predetermined movement. When new brake shoes are inserted, the operator turns the shaft 36 for releasing the pawl 33 and the ratchet bar 31 is partially withdrawn from the holding device 30. It is withdrawn at a greater distance than is necessary after which the lever 14 is moved rearwardly as before to properly position the holding device 30 on the ratchet bar 31.

In the form of the device shown in Figs. 5, 6, 7 and 8, the slack take-up device 41 comprises a casing 42 in the lower portion of which are alined openings 43 and 44 through which the ratchet bar 45 is adapted to slide. In order to prevent the accumulation of dirt, cinders and the like, the teeth 46 may be in the form of an inverted V, as clearly shown in Figs. 7 and 8 of the drawings. A suitable holding member is provided for securing the ratchet bar 45 in adjusted position. As shown, this member comprises a ratchet member 47 having teeth 480 for engaging the teeth 46 on the ratchet bar 45. The ratchet member 47 is adapted to engage the forward end of the box 42 for limiting the outward movement of the ratchet bar 45 when the brakes are applied.

Suitable means are provided for holding the ratchet member in engagement with the teeth 46 and for releasing the same therefrom. As shown, this member comprises a shaft 48 journaled in casing 42 and extending longitudinally thereof. The ratchet member is provided with an opening through which the shaft 48 extends. The shaft 48 is provided with a lateral projection 49 which is adapted to engage a shoulder 51 on the ratchet member 47 for holding the same in lowered position in engagement with the ratchet bar 45 and for engaging a shoulder 52 for disengaging the ratchet member from the teeth of the ratchet bar 45. A suitable handle 53 is provided for rotating the shaft 48. The operation for taking up the slack for compensating for the wear of the brake shoes and for accommodating the insertion of new shoes is substantially the same as that described above, and it is not thought necessary to repeat the same.

It is thought from the foregoing taken in connection with the accompanying drawings that the construction and operation of my device will be apparent to those skilled in the art, and that various changes in size, shape, proportion and details of construction may be made without departing from the spirit and scope of the appended claims.

I claim as my invention:

1. In a brake adjusting device the combination of a fixed casing, a rack bar slidable through the casing and connected to the fulcrum of a dead brake lever, a pawl associated with the rack bar for holding the same in adjusted position, means for advancing the pawl along the rack when the latter is manually moved a distance greater than normal brake shoe clearance, and a pawl releasing shaft extending longitudinally of the casing and having a cam surface adapted to disengage the pawl from the rack for inserting new brake shoes.

2. In a brake adjusting device the combination of a fixed casing, a rack bar slidable through the casing and connected to the fulcrum of a dead brake lever, a pawl associated with the rack bar for holding the same in adjusted position, means for advancing the pawl along the rack when the latter is manually moved a distance greater than normal brake shoe clearance, a pawl releasing shaft extending longitudinally of the casing and having a cam surface adapted to disengage the pawl from the rack for inserting new brake shoes, and means for preventing accidental disengagement of the pawl during brake application.

3. In a brake adjusting device a combination of a fixed casing, a movable rack bar having teeth on its lower side extending into and movable longitudinally relative to the casing, a saddle on the rack bar having depending legs straddling the bar, a pawl pivoted between the legs adapted to engage the bar and hold the same in adjusted position, said pawl being adapted to move with the rack bar when the latter is moved a distance corresponding to normal brake shoe

clearance but advancing along the rack upon excess movement, and means for releasing the pawl for the insertion of brake shoes.

4. In a brake adjusting device a combination of a fixed casing, a movable rack bar having teeth on its lower side extending into and movable longitudinally relative to the casing, a saddle on the rack bar having depending legs straddling the bar, a pawl pivoted between the legs adapted to engage the bar and hold the same in adjusted position, said pawl being adapted to move with the rack bar when the latter is moved a distance corresponding to normal brake shoe clearance but advancing along the rack upon excess movement, means for preventing accidental engagement of the pawl during brake application, and means for releasing the pawl for the insertion of brake shoes.

5. In a brake adjusting device a combination of a fixed casing, a movable rack bar having teeth on its lower side extending into and movable longitudinally relative to the casing, a saddle on the rack bar having depending legs straddling the bar, a pawl pivoted between the legs adapted to engage the bar and hold the same in adjusted position, said pawl being adapted to move with the rack bar when the latter is moved a distance corresponding to normal brake shoe clearance but advancing along the rack upon excess movement, and means for releasing the pawl in any position of the pawl.

6. In a brake adjusting device a combination of a fixed casing, a rack bar extending into and slidable relative to the casing, a rotatable shaft journaled in the casing parallel to the rack bar, a pawl member sleeved on the shaft and adapted to engage the rack bar, and cam surfaces on the shaft cooperating with shoulders associated with the pawl for holding the pawl in engagement with the rack during brake application and out of engagement when new brake shoes are to be inserted.

7. In a brake adjusting device a combination of a fixed casing, a rack bar connected to the fulcrum of a brake lever projecting into and slidable relative to the casing, a rotatable shaft journaled in the casing parallel to the rack bar, a pawl splined to the shaft adapted to hold the rack bar in adjusted position, cam means for positively holding the pawl in engagement with the rack during application of the brakes, means for automatically advancing the pawl along the rack when the latter is manually moved a distance greater than normal brake shoe clearance, and means for releasing the pawl to insert new brake shoes.

8. In foundation brake gear including a dead cylinder lever, the combination therewith of a manual adjuster associated with the fulcrum of said lever and adapted to take up excess slack in the gear, said adjuster comprising a rack, a pawl engageable with the rack, means for automatically advancing the pawl along the rack upon manual actuation of the adjuster if and only if there is excess slack in the gear, and means apart from the rack acting directly on the pawl for lifting the pawl from the rack for the insertion of new brake shoes when the parts are substantially at their normal operative position.

9. In combination with foundation brake gear, an adjuster associated with the fulcrum of a brake lever and adapted to be manually actuated to take up excess slack in the gear, said adjuster comprising a rack, a pawl engageable with the rack, means for automatically advancing the pawl along the rack upon actuation of the adjuster if there is excess slack in the gear, and means for locking the pawl and rack in adjustment in their normal operative position and for disengaging them while substantially still in their normal operative position upon release of the locking means.

10. In foundation brake gear including a dead brake lever, the combination therewith of a manual adjuster associated with the fulcrum of said lever and adapted to take up excess slack in the gear, said adjuster comprising a rack, a pawl movable relative to the rack and engageable therewith, means for changing the position of the pawl on the rack to correct for excess slack when and only when excess slack exists, and means apart from the rack acting directly on the pawl for lifting the pawl from the rack for the insertion of new brake shoes when the parts are substantially at their normal operative position.

PERCY B. CAMP.