

Sept. 14, 1926.

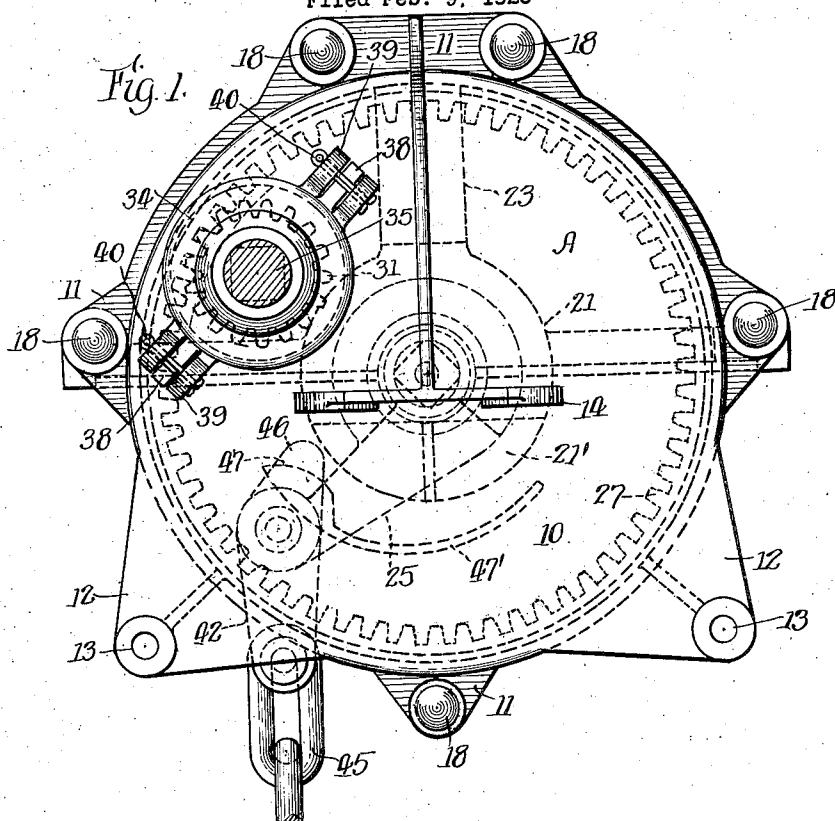
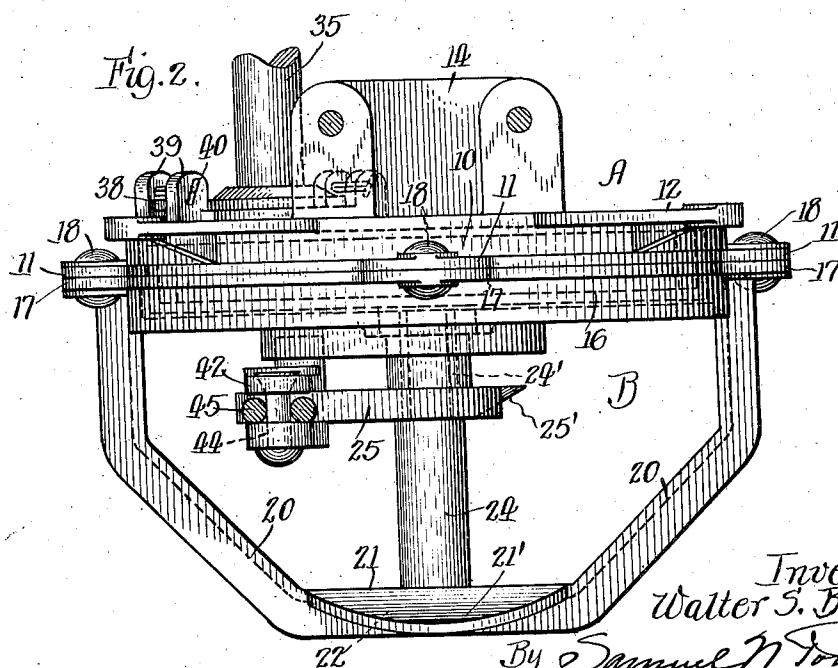
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W. S. BEMIS

HAND BRAKE FOR RAILWAY CARS

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2 Sheets-Sheet 1



Inventor:
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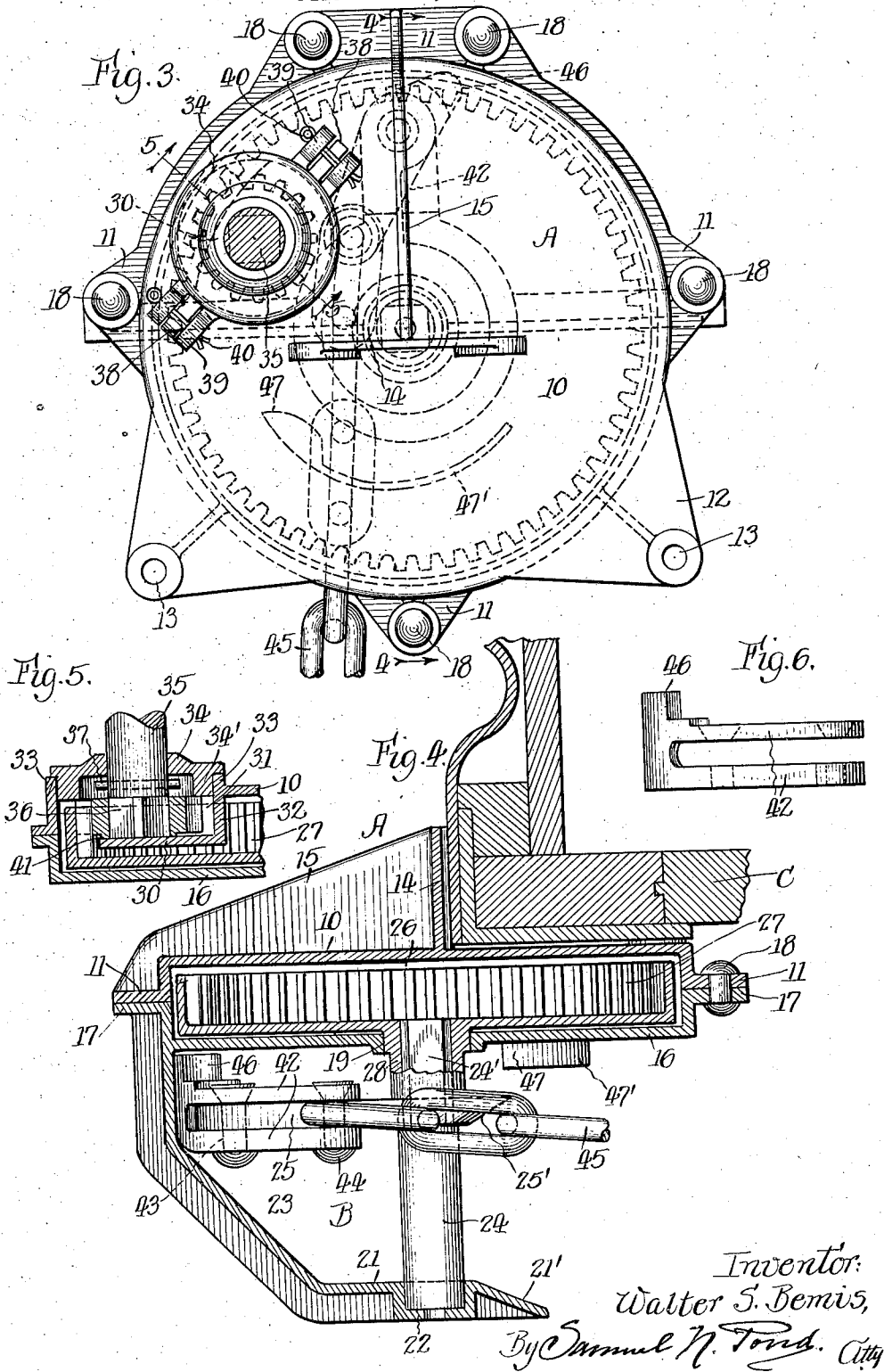
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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HAND BRAKE FOR RAILWAY CARS.

Application filed February 9, 1925. Serial No. 7,774.

This invention relates to hand brakes for freight, trolley and other railway cars, and has reference more particularly to hand brakes of the type shown in my former Patent No. 1,522,608 dated January 13, 1925, being in the general nature of an improvement upon the hand brake disclosed in the aforesaid Letters Patent.

In my former patent aforesaid the winding mechanism of the brake chain is equipped with an automatic device for reducing the slack in the brake chain when the latter is unwound from the brake drum or shaft, thereby correspondingly reducing the subsequent winding movement necessary to take the slack out of the brake chain when applying the brakes. This mechanism comprises essentially a fixed stop on the shaft bracket and a co-operating movable stop member formed on a clevis which connects the brake chain to the free end of the usual radial arm on the brake shaft.

One object of my present invention is to provide an automatic means whereby, should the clevis carrying the movable stop member become temporarily inoperative through freezing, clogging, or any other cause, and allow the movable stop member to get behind the fixed stop member, the proper relation of said stop members may be automatically restored upon the subsequent rewinding of the brake chain. Another object of the invention is to provide an improved construction of geared hand brake of the internal gear type. Another object is to provide an improved housing and mounting for the hand wheel shaft and pinion which drives the internal gear on the chain winding shaft or drum. Other objects are, to provide an improved housing for the gears that will exclude dust and dirt and protect them from the weather, to provide an improved bearing for the large internal gear and an improved connection of the latter to the chain winding shaft that will facilitate assembling of the parts and avoid the necessity of accurate machining, thereby cheapening the cost of production. Other objects and attendant advantages of the invention will be apparent to persons skilled in the art as the same becomes better understood by reference to the following detailed description, taken in connection with the accompanying drawings in which I have illustrated practical and preferred embodi-

ments of the several improved features constituting my invention, and in which—

Fig. 1 is a top plan view of a hand brake of the internally geared type having my improvements applied thereto, and showing the radial arm at the limit of its back turning movement;

Fig. 2 is a side elevation of the same, viewed from the bottom of Fig. 1;

Fig. 3 is a view similar to Fig. 1, but showing the radial arm advanced to a position in which the chain is tangent to the shaft and is beginning to be wound on the latter;

Fig. 4 is a vertical section on the line 4—4 of Fig. 3 with the arm, chain, and fixed and movable stop members appearing in side elevation in the foreground;

Fig. 5 is a vertical section through the combination housing and mounting taken on the line 5—5 of Fig. 3; and

Fig. 6 is a side elevation of the clevis carrying the movable stop member.

Referring to the drawings, A designates as an entirety the top member and B the bottom member of a combined bracket and housing for the chain winding and unwinding mechanism. These members are preferably formed as malleable castings that are riveted together around their peripheries so as to form in effect a single rigid housing and support for the complete winding and unwinding mechanism.

The upper casting A comprises a shallow inverted cup-shaped structure 10, the peripheral rim of which is formed at intervals with outwardly directed lugs 11 suitably apertured for riveting to mating lugs on the lower member. Flush with the top wall of the inverted cup-shaped member are a pair of wings 12 apertured at 13 for bolting to the under side of the car body C (Fig. 4). On and substantially centrally of the plate 10 is an upstanding plate 14 suitably apertured for bolting to the front sill of the car body. From the front of the plate 14 extends a tapered vertical stiffening rib 15 to the front lug or flange 11.

The lower member B of the combined bracket and housing comprises, as herein shown, a shallow upright cup-shaped member 16, the peripheral rim of which is formed with outwardly directed lugs 17 underlying and mating with the lugs 11 of the upper member and united to the latter by rivets

18. In the center of the plate 16 is a round opening forming a bearing 19 for the hub of a large internal gear hereinafter described. Continuous with and depending
 5 from the periphery of the member 16 is a yoke 20, the two ribbed arms of which at their lower ends merge into a central plate 21 that is centrally socketed to form a step bearing 22 (Fig. 4). Midway between the
 10 opposed arms of the yoke 20 is a half yoke or brace 23 (Fig. 4) connecting the periphery of the member 16 with the central plate 21.

Mounted in the step bearing 22 is the
 15 lower end of a vertical chain winding shaft or drum 24. The upper portion of this shaft 24 is squared or otherwise formed of polygonal cross-section, as shown at 24'; and on this polygonal portion of the shaft
 20 is mounted a radially extending chain winding arm 25, the outline form of which is clearly shown by dotted lines in Fig. 1. The hub of the arm 25 is beveled, as shown at 25' to facilitate the laying of the chain
 25 as it is wound on the shaft 24.

From Fig. 4 it will readily be seen that the relatively inverted cup-shaped members 10 and 16 together form a circular chamber 26 in which is mounted and housed a large
 30 cup-shaped internal gear wheel 27. This gear is formed on its lower side with a central bearing hub 28 that fits in the bearing 19 and is itself formed with a polygonal bore telescoping and drivingly connected with
 35 the squared portion 24' of the winding shaft 24; the hub 28 preferably extending the full length of the squared portion 24' above the hub of the arm 25, so as to form a relatively long and strong slip-joint coupling with the
 40 latter. In assembling these parts, before the upper and lower halves 10 and 16 of the housing are riveted together the shaft 24 with the arm 25 thereon is entered from beneath through the bearing opening 19 and
 45 its lower end is then dropped into the step bearing 22, and the internal gear 27 is then placed in the member 16, its hub 28 being telescoped over the squared upper end 24' of the shaft and at the same time centered
 50 and mounted in the bearing 19.

Describing next the hand wheel staff and driving pinion for the internal gear 27, these parts and the manner in which they are mounted in the upper member A of the combined
 55 bracket and housing are shown in Figs. 1 and 3, and in vertical section in Fig. 5. Integral with the plate 10 is a small approximately circular countersunk platform or shelf 30, on which is supported a
 60 pinion 31 that meshes with and drives the internal gear 27. The platform 30 is suspended from the plate 10 by a curved rim or wall 32; and both the platform and its supporting rim are cut away on one side
 65 sufficiently to permit the passage of the teeth

of the internal gear 27. On the upper side of the plate 10 above the platform 30 is an upstanding circular flange 33 which centers and supports a combined pinion housing cover and hand wheel staff bearing 34 that
 70 rests upon the flange 33 and is formed with a thick depending rim 34' that tightly fits within the flange 33 and rigidifies and reinforces the bearing of the hand wheel staff in the member 34. Through a central bearing
 75 opening in the member 34 extends the hand wheel staff 35, having a squared lower end 36 fitting a correspondingly shaped bore in the pinion 31. The staff 35 is locked in place by a cotter pin 37 extending there-
 80 through above the pinion 31 and below the cover 34; while said cover 34 is securely held down on the member 10 by means of a pair of oppositely disposed ears 38 formed there-
 85 on lying between forked upstanding lugs 39 on the plate 10 and fastened to said lugs by cotter pins 40. To reduce friction, the lower side of the pinion 31 is preferably equipped with a narrow low boss 41, shown
 90 in Fig. 5, that has a step bearing on the platform or shelf 30.

The above described construction affords a very easy assembling and disassembling of the driving mechanism of the large internal
 95 gear 27. By merely removing the cotters 40, the staff 35 and cover 34 can be raised either with or without the pinion 31; and by then withdrawing the cotter pin 37, the bearing member 34 can be withdrawn and replaced by a new one when unduly worn
 100 or otherwise requiring renewal. It should also be noted that the described construction entirely relieves the cup-shaped internal gear 27 of the weight of the driving staff and pinion, which is eccentric to the bear-
 105 ing of the internal gear, so that an uneven wear on the bearing 19, due to the eccentrically applied weight of the said parts, is entirely avoided.

The outer or free end of the radial arm
 110 25 extends between the parallel arms of a forked clevis 42, best shown in Figs. 4 and 6, and is pivotally connected with the latter by a pin 43. On one side of the pivot 43 the clevis 42 is connected by a pin or
 115 rivet 44 with the foremost link of the usual brake chain 45. On the other side of the pivot 43 the clevis is equipped with an upstanding stop member 46. On the under
 120 side of the housing plate 16 is a fixed stop member 47, preferably taking the form of an integral lug, that co-operates with the movable stop member 46 in arresting the re-
 125 turn swing of the arm 25 during the final part of the unwinding operation; the fixed stop 47 lying in the path of travel of the movable stop member 46 as the chain approaches the limit of its unwinding move-
 130 ment, and said stop lugs colliding as shown in Fig. 1 to prevent further unwinding move-

ment and thereby reducing the slack in the chain, all as fully described in my aforesaid Letters Patent No. 1,522,608. While under all normal operating conditions the stop mechanism of the aforesaid patent operates satisfactorily, yet occasionally under abnormal conditions and accidental circumstances, the clevis may fail to swing the movable stop member into a position to collide with the fixed stop member during the last half revolution of the unwinding movement of the shaft 24, so that the stop member 46 may pass beyond the fixed stop member 47. To provide for its automatic return, so that it will not block the subsequent winding movement of the brake shaft 24, I have provided automatic means for insuring its return to the proper side of the fixed stop lug upon the rewinding of the chain; this means, in the instance shown, taking the form of an arcuate tail-like extension 47' of the lug 47 that is slidably engaged by the nose of the stop member 46, in case the latter passes the lug 47, and both prevents the member 46 from obstructing the subsequent rewinding movement through collision with the outer side of the lug 47 and serves to guide the member 46 again past and into proper co-operative relation to the lug 47. This feature therefore is in the general nature of a guard or safety device to prevent the failure of the stop mechanism to properly function under abnormal and unusual circumstances.

By reference to Figs. 2 and 4 it will be observed that the rear portion of the central shaft bearing plate 21 is beveled downwardly and outwardly, as shown at 21' below the chain 45; this feature constituting a sort of safety slope or guide for the chain to facilitate its smooth passage onto and around the brake shaft 24.

One practical advantage of the construction hereinabove described lies in the facility and ease with which the parts may be assembled. Another advantage resides in the economy of construction due to avoiding the necessity of accurate machining of the parts. Still another important advantage resides in the described guard or safety device which prevents the possibility of the stop mechanism failing to function properly under abnormal or accidental conditions; and a further important advantage resides in the complete housing and protecting of the gears, which makes it practicable to pack the latter with grease or oil, if desired, and protects them from dirt and rust. Many other advantages will be apparent to persons familiar with the art, without specific mention herein.

While I have herein shown and described one practical embodiment of the several features of improvement making up the present invention, it is manifest that the spe-

cific details herein shown and described for purposes of illustration may be considerably modified without departing from the principles involved or sacrificing any of the recited advantages. Hence, I reserve all such variations and modifications as fall within the spirit and purview of the appended claims.

I claim—

1. In a hand brake for railway cars, the combination of a brake-shaft bracket including a gear housing formed with a bearing in its bottom wall, a gear in said housing formed on its lower side with a hub journaled in said bearing, said hub having a polygonal bore, a brake shaft having a polygonal upper portion fitting into the bore of said hub, a hand-wheel staff extending into said housing and terminating in a polygonal end portion located above the bottom wall of said housing, and a drive pinion meshing with said gear and having a polygonal bore engaged by the polygonal end of said staff.

2. In a hand brake for railway cars, the combination of a brake-shaft bracket including a gear housing formed with a bearing in its bottom wall, an internal gear enclosed by said housing and formed with a hub journaled in said bearing, a brake-shaft coupled to said hub, a hand-wheel staff having its lower end extended into said housing above and out of contact with the web of said internal gear, and a drive pinion on the lower end of said staff meshing with said internal gear.

3. In a hand brake for railway cars, the combination of a brake-shaft bracket including a gear housing formed with a bearing in its bottom wall, and a step bearing beneath said housing, a gear within said housing formed on its lower side with a hub journaled in said gear housing bearing, said hub having a polygonal bore, a brake-shaft at its lower end mounted in said step bearing and formed with a polygonal upper end portion fitting into the bore of said hub, a hand-wheel staff, and a pinion on said staff meshing with said gear.

4. In a hand brake for railway cars, the combination of a brake-shaft bracket including a gear housing formed with a bearing in its bottom wall, and a step bearing beneath said housing, a gear within said housing formed on its lower side with a hub journaled in said gear housing bearing, said hub having a polygonal bore, a brake-shaft at its lower end mounted in said step bearing and formed with a polygonal upper end portion fitting into the bore of said hub, a hand-wheel staff extending into and terminating above the bottom wall of said housing, and a pinion fast on the lower end of said staff meshing with said gear.

5. In a hand brake for railway cars, the

combination of a brake-shaft bracket including a gear housing provided with a pinion supporting member, an internal gear journaled in and enclosed by said housing, a brake-shaft driven by said internal gear, a hand-wheel staff at its lower end extending into said housing, and a drive pinion on the lower end of said staff resting upon said pinion supporting member and meshing with said internal gear.

6. In a hand brake for railway cars, the combination of a brake-shaft bracket including a gear housing, an internal gear journaled in said housing, a brake-shaft driven by said internal gear, a platform suspended from the top wall of said gear housing within and eccentrically of said internal gear, a drive pinion supported on said platform and meshing with said internal gear, and a hand-wheel staff drivingly connected at its lower end to said pinion.

7. In a hand brake for railway cars, the combination of a brake-shaft bracket including a gear housing, an internal gear journaled in said housing, a brake-shaft driven by said internal gear, a pinion housing suspended from the top wall of said gear housing within and eccentrically of said internal gear and open on the side thereof adjacent to the teeth of said internal gear, a drive pinion within and supported on the bottom wall of said pinion housing and in mesh with said internal gear, a cover for said pinion housing formed with a bearing, means for locking said cover in place, and a hand-wheel staff journaled in the bearing of said cover and drivingly connected at its lower end to said pinion.

8. In a hand brake for railway cars, the combination of a brake-shaft bracket including a gear housing, an internal gear journaled in said housing, a brake shaft driven by said internal gear, a pinion housing suspended from the top wall of said gear housing within and eccentrically of said internal gear and open on the side thereof adjacent to the teeth of said internal gear, a drive pinion formed with a central bearing boss on its lower side stepped on the bottom wall of said pinion housing, a cover for said pinion housing formed with a depending rim fitting within said pinion housing, a central bearing, and radial locking lugs, means for locking said lugs to said gear housing, a hand-wheel staff journaled in the bearing of said cover and drivingly connected at its lower end to said pinion, and means locking the lower end of said staff in said pinion housing.

9. In a geared hand brake for railway cars, the combination of upper and lower castings formed respectively with mating inverted and upright shallow cup-shaped members unitedly forming a circular gear housing, means for uniting said cup-shaped

members, an internal gear journaled in said housing, a brake shaft driven by said internal gear, a pinion supported within said housing in mesh with said internal gear, and a hand-wheel staff drivingly engaged with said pinion.

10. In a geared hand brake for railway cars, the combination of upper and lower castings formed respectively with mating inverted and upright shallow cup-shaped members unitedly forming a circular gear housing and with mating radial flanges on said cup-shaped members, means for uniting said flanges, attachment lugs on said upper casting for fastening the same to the car body, a step bearing on said lower casting underlying said gear housing, an internal gear journaled in said housing, a brake-shaft at its lower end mounted in said step bearing and at its upper end connected to said internal gear, a pinion supported within said housing in mesh with said internal gear, and a hand-wheel staff drivingly engaged with said pinion.

11. In a hand brake mechanism for railway cars, the combination of a brake-shaft bracket, a brake-shaft mounted in said bracket, a radial arm on said shaft, a brake-shaft chain connected to said arm, a fixed stop member on said bracket, a co-operating stop member carried by said arm adapted, under the drag of said chain, to be swung to an interfering position with said fixed stop member during the final part of the brake-releasing movement of said mechanism, and means serving to direct said co-operating stop member past said fixed stop member during the initial part of the brake-applying movement of said mechanism.

12. In a hand brake mechanism for railway cars, the combination of a brake-shaft bracket, a brake-shaft mounted in said bracket, a radial arm on said shaft, a brake-shaft chain connected to the free end of said arm, a fixed stop member on said bracket, a co-operating stop member carried by said arm, said last-named stop member being shifted relatively to said arm by the pull of said chain when the latter is being wound on the brake-shaft to a non-interfering position relatively to said fixed stop member, and by the drag of said chain during the last part of the unwinding movement to an interfering position with said fixed stop member, and a fixed guide on said bracket operating through contact with said co-operating stop member to direct the latter past said fixed stop member during the initial part of the brake-applying movement of said mechanism.

13. In a hand brake mechanism for railway cars, the combination of a brake-shaft bracket, a brake-shaft mounted in said bracket, a radial arm on said shaft, a fixed stop member on said bracket located on one

side of the plane of travel of said arm, a clevis swiveled intermediate its ends on said arm and formed with a co-operating stop member on one end thereof, a brake chain 5 connected to the other end of said clevis; said clevis being swung relatively to said arm by the pull of the chain as the latter is wound on the brake-shaft to a position wherein the stop member carried thereby 10 clears said fixed stop member, and normally returned by the drag of said chain during the last part of the brake-releasing movement to a position wherein the stop member carried thereby strikes and is arrested by 15 said fixed stop member, and a guide formed as a rearward extension of said fixed stop member operating through contact with said co-operating stop member to direct the latter past said fixed stop member during the initial part of the brake-applying movement of 20 said mechanism.

14. In a hand brake mechanism for railway cars, the combination of a brake-shaft bracket, a brake-shaft mounted in said 25 bracket, a radial arm on said shaft, a fixed stop member on said bracket located above the plane of travel of said arm, a bifurcated

clevis straddling and swiveled on the free end of said arm and formed with an up- 30 standing stop member on one end thereof, and a brake chain connected to the other end of said clevis; said clevis being swung relatively to said arm by the pull of the chain as the latter is wound on the brake- 35 shaft to a position wherein the stop member carried thereby clears said fixed stop member, and returned by the drag of said chain during the last part of the brake-releasing movement to a position wherein the stop 40 member carried thereby collides with said fixed stop member and arrests further back drag of said chain.

15. In a geared hand brake mechanism for railway cars, the combination with a 45 brake-shaft, and a brake chain, of a bracket including a gear housing, a yoke depending from said gear housing, and a plate carried by said yoke, said plate formed with a bearing for the lower end of said brake-shaft 50 and with a beveled peripheral portion adapted to guide and support said brake chain when being wound on said brake-shaft.

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