Oct. 4, 1938. S. N. NICKLISS 2,132,080

BRAKE APPLYING DEVICE

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Fig. 1.

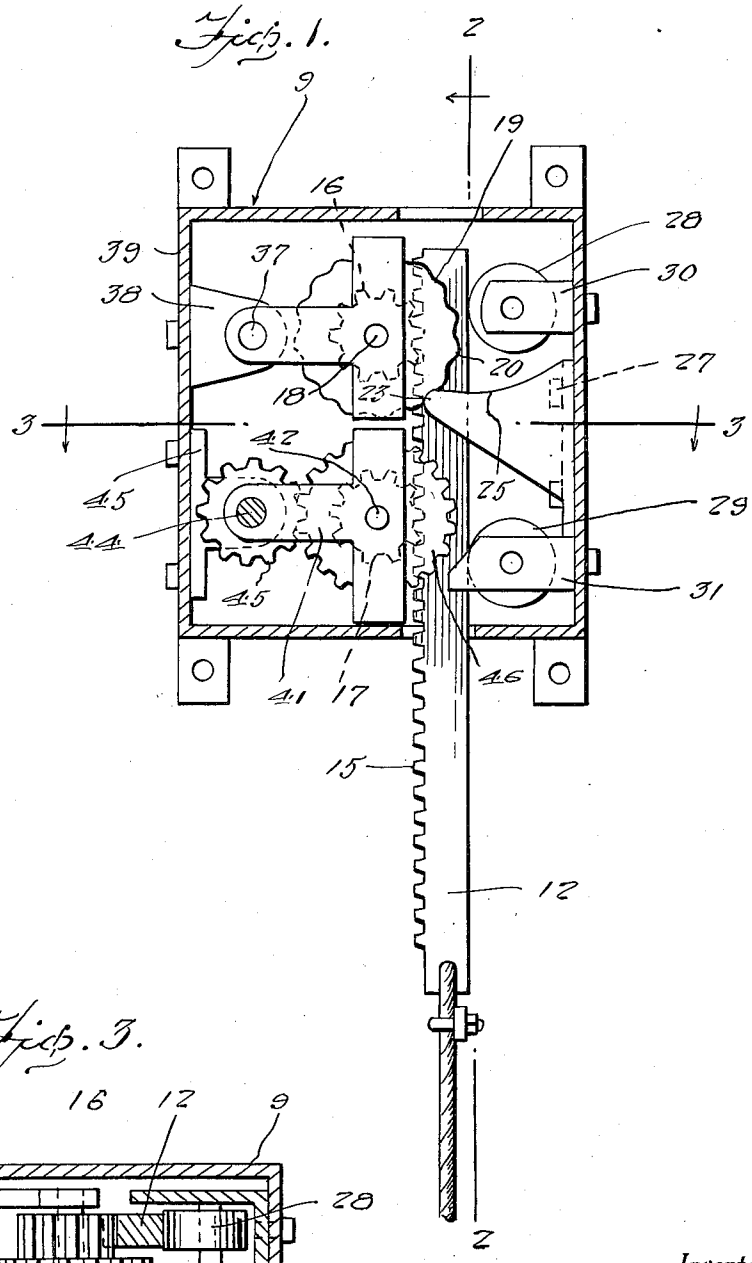
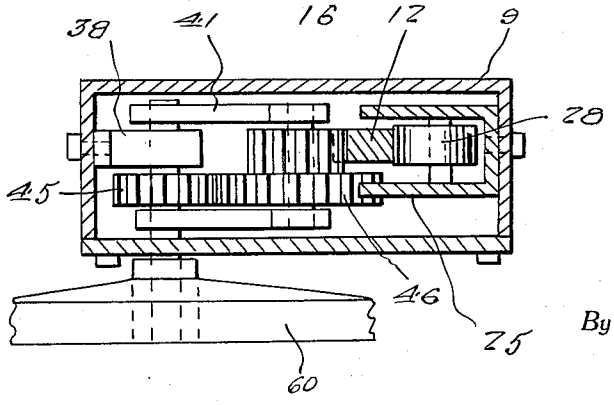


Fig. 3.



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Fig. 2.

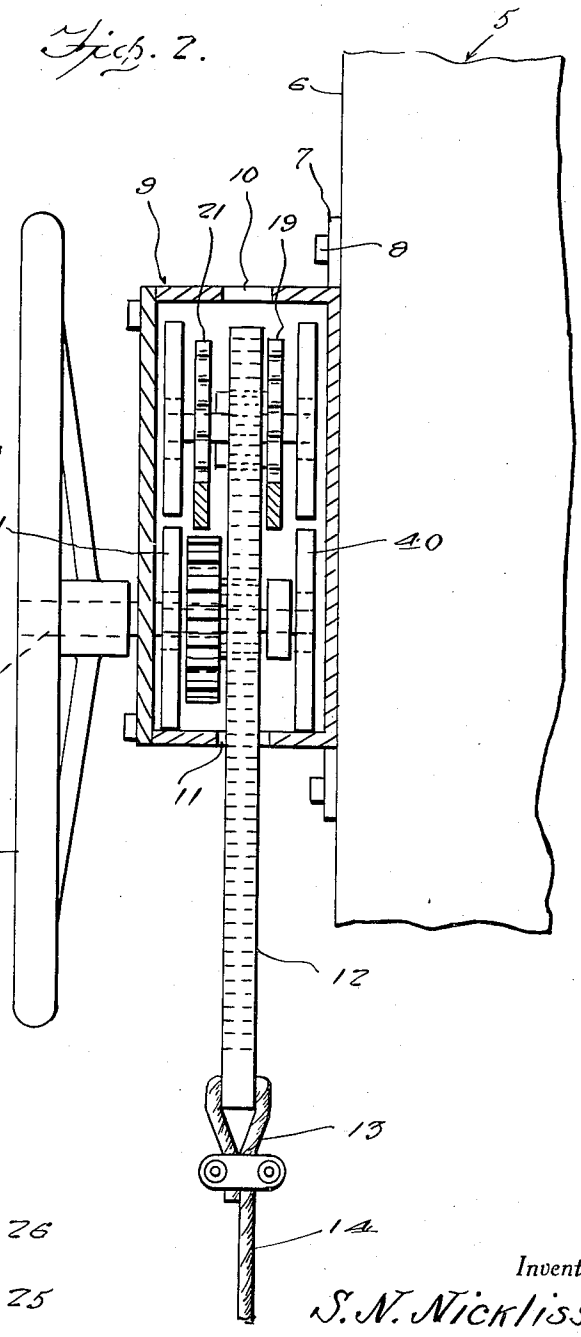


Fig. 4.

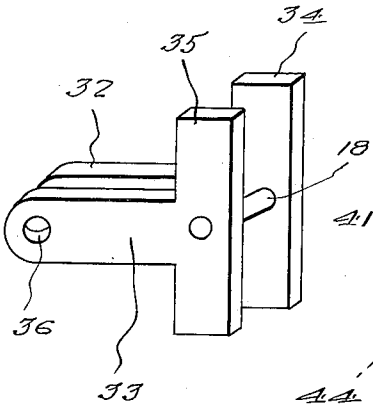
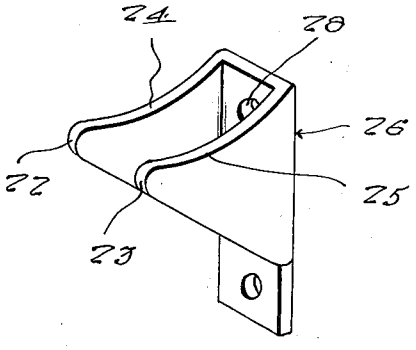


Fig. 5.



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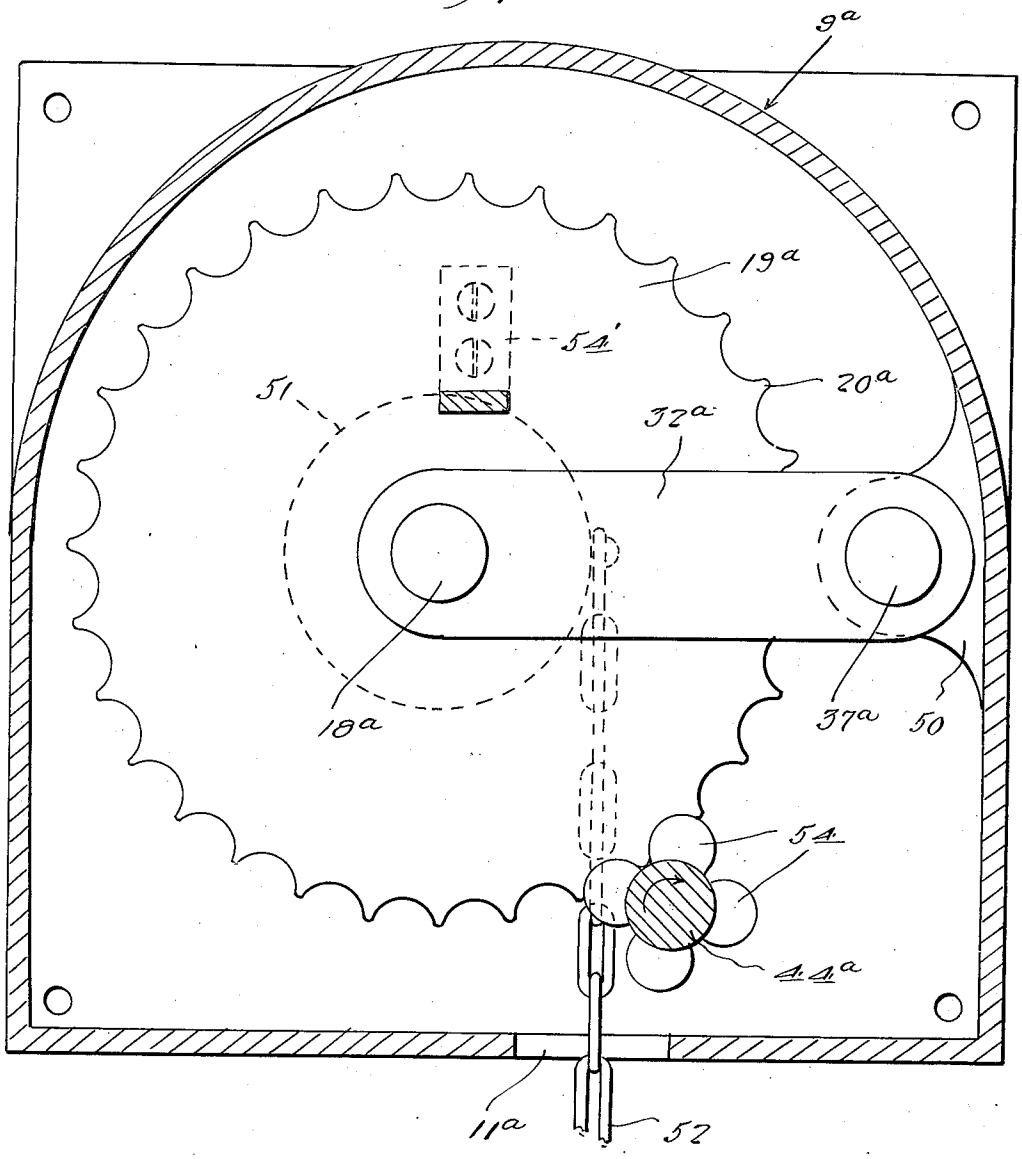
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Fig. 6.



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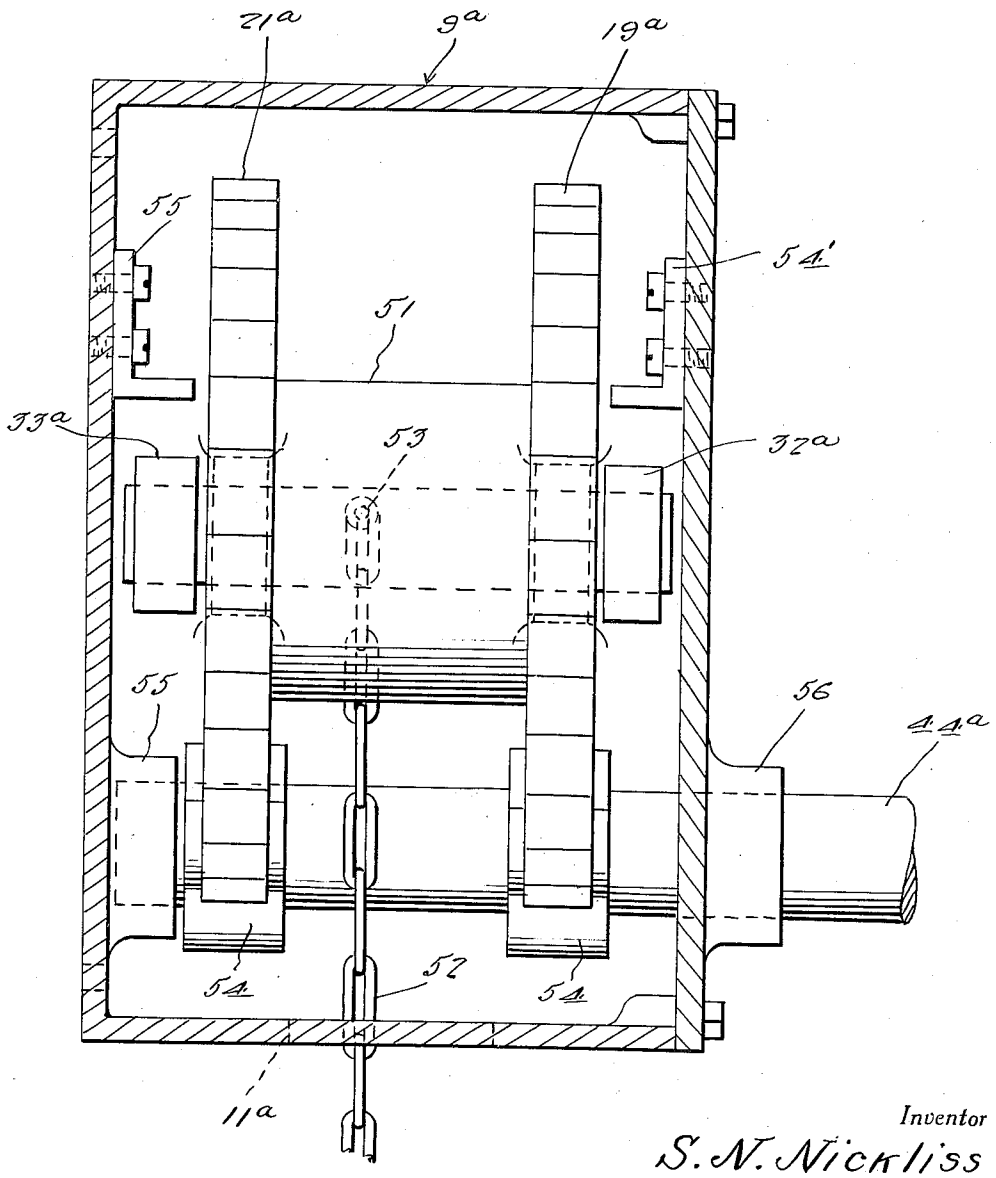
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Fig. 7.



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UNITED STATES PATENT OFFICE

2,132,080

BRAKE APPLYING DEVICE

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Application October 3, 1936, Serial No. 103,951

5 Claims. (Cl. 74—507)

My invention relates generally to brake applying devices, and in particular to handwheel-operated devices for applying the brakes of railway freight cars and the like, and an important object of the invention is to provide brake applying devices of this class which involve features of operation and release which eliminate the difficulties and dangers incident to the operation and release of present types of brake operating devices.

Another important object of my invention is to provide in a brake applying device of the character indicated, mechanism providing relocation of the brake applying device from the top of the freight car or the like to a side or end wall thereof, thereby permitting operation and release of the brake applying device by the trainmen from a more protected and less hazardous position on the freight car or the like.

Another important object of my invention is to provide railway freight car brake applying devices of the character indicated above which are smooth in operation and which eliminate the hard operations and kick-backs which are incident to the usual wheel-operated brake applying devices now in use.

Other important objects of my invention will be apparent from the reading of the following description taken in connection with the drawings, wherein for purposes of illustration I have shown preferred embodiments of my invention.

In the drawings:

Figure 1 is a general transverse vertical sectional view taken through one embodiment of the invention.

Figure 2 is a transverse vertical sectional view taken through Figure 1, approximately on the line 2—2, and looking toward the left in the direction of the arrows.

Figure 3 is a horizontal sectional view taken through Figure 1 approximately on the line 3—3 and looking downwardly in the direction of the arrows.

Figure 4 is a perspective view of one of the link assemblies.

Figure 5 is a perspective view of the duplex dog.

Figure 6 is a transverse vertical sectional view taken through another embodiment of the invention; and

Figure 7 is a transverse vertical sectional view taken through Figure 6.

Referring in detail to the drawings, the numeral 5 generally designates an end portion of a freight car or the like having the vertical wall 6 upon which is mounted by means of ears 7 and bolts 8 the casing which is generally designated 9 and which may suitably be of rectangular box form of suitable strength and size and be provided in its top with an opening 10 and in its bottom with an opening 11 through which the substantially perpendicular rack bar 12 works and to whose lower end is attached, and generally indicated by the numeral 13, the brake-operating cable 14 which leads to the freight car brakes (not shown).

The teeth 15 of the rack bar 12 are in mesh with the teeth of the upper pinion 16 and the lower pinion 17.

The upper pinion 16 is fixed on a shaft 18 and alongside the pinion 16 and fixed to this shaft is the wheel 19 which is formed in its circumference with equally circumferentially spaced toothed lugs 20. A similarly formed wheel 21 is located on the axle 18 at the opposite side of the pinion 16, and the lug-equipped peripheries of these wheels 19 and 21 engage the rounded noses 22 and 23, respectively, of the arms 24 and 25 of the duplex dog which is generally designated 26 and which is fastened by means of bolts 27 passing through openings 28 in the web thereof, as clearly indicated in Figures 1 and 5.

Running against the smooth side of the rack bar 12 to hold the rack bar's teeth in mesh with the pinions 16 and 17 are the upper and lower rollers 28 and 29 which are mounted in the U-shaped brackets 30 and 31 fastened to the same wall of the casing 9 to which the duplex dog 26 is fastened, as clearly shown in Figure 1.

The shaft 18 is carried by and between the crossheads 34 and 35 on the links 32 and 33 of the upper link assembly, and the foot portions of the links are provided with openings 36 seating a rock shaft 37 which is mounted by a bracket 38 on the wall 39 of the casing 9.

Below the upper link assembly is the lower link assembly which is comprised by T-shaped links 40 and 41 similar in form to the links 32 and 33 and carrying the shaft 42 in a manner similar to the manner in which the shaft 18 is carried, and the foot portions of these links are pivoted on the rock shaft 44 which is supported by a bracket 45' fastened to the wall 39 of the casing below the bracket 38, as clearly shown in Figures 1 and 2.

Fixed to the shaft 44 is a pinion 45 which is meshed with a gear 46 which is in fixed relation to the pinion 17, the pinion 17 being in mesh with the teeth 15 of the rack bar, as already indicated.

The shaft 44 extends from the front of the

casing, as indicated in Figure 2, and thereat is provided with the handwheel 60.

When the handwheel 60 is rotated by the trainman in a direction to cause the rack bar 12 to move upwardly and tighten the brakes of the freight car, the engagement of the rack teeth with the pinion 16 will cause rotation of the shaft 18 and consequently of the lug-equipped wheels 19 and 21 in a counterclockwise direction so that the lugs 20 on these wheels will tend to push up and away from the noses 22 and 23 of the duplex dog 26. Since the movement of the rack bar 12 is in an upward direction, and the curvature of the lugs 20 is adequate to the purpose, the upper links 32, 33 will move upwardly sufficiently under the cam action of the lugs 20 and the noses 22 and 23 to permit the wheels 19 and 21 to rotate and become comparatively free of impeding engagement with the dog 26, so that the rack bar 12 may move upwardly freely in the brake applying direction. When the operating wheel 60 is stopped when the brakes have been adequately applied, the downward pull of the cable 14 on the rack bar 12 will cause the rack bar to subside slightly or sufficiently to pull the upper link assembly downwardly and engage the lugs 20 on the wheels 19 and 21 with sufficient force against the noses 22 and 23 on the duplex dog 26, to positively prevent clockwise rotation of the wheels 19 and 21, and consequently prevent the rack bar 12 from being pulled downwardly; so that the brakes are positively kept applied.

To release the applied brakes, it is necessary simply to turn the handwheel 60 sufficiently in the counterclockwise direction to rotate gears 46 and 47 in a clockwise direction. This will cause an upward reaction of the links 40 and 41. During this reaction the links 40 and 41 engage and lift the links 32 and 33, thereby releasing the wheels 19 and 21 from the noses 22 and 23. It is to be noted that this manner of releasing the brakes does not put any kick-back on the operating wheel 60 and the trainman is protected against any kick-back or rough action which might injure his hands or throw him from the car. The abutting ends of the cross-heads on the link assemblies are so arranged that the proper spaced relation of the link assemblies will be positively maintained in any independent action of the link assemblies.

Referring now to the embodiment of the invention shown in Figures 6 and 7, and employing the same general principle as the already described embodiment, the slightly modified casing is generally designated 9a, and this has hinged to one end wall thereof by means of a bracket 50 at the point designated 51 the link assembly which comprises the links 32a and 33a corresponding to the links 32 and 33 in the already described embodiment, and a shaft 18a corresponding in function to the shaft 18 is carried by the free ends of the links and on this shaft are axially spaced lug-equipped wheels 19a and 21a corresponding to the wheels 19 and 21, and between these wheels is located a drum 51 to which is attached a linked chain 52 at the point designated 53, which chain is adapted to be wound on this drum during the operation of the device and from which the chain is unwound during the releasing of the device. Stop brackets 54' and 55 are fastened to the front and back of the casing 9a to limit the upward movement of the links 32a and 33a. The chain 52 depends through an opening 11a in the bottom of the casing 9a and is connected to the brakes (not shown).

The drum is fixed for rotation with the wheels 19a and 21a. A slightly modified form of lug 20a is provided on the circumferences of the wheels 19a and 21a, having a function similar to the lugs 20 in the already described embodiment.

These lugs 20a are spaced and arranged and formed to cooperate with a substantial portion of the peripheries of lugs 54 which are arranged in circumferentially spaced groups of four on the shaft 44a which is mounted in bearings 55 and 56 on the front and back walls of the casing 9a and projects from the front thereof for accommodation of the handwheel (not shown).

As indicated in Figure 6, the contour of the lugs 54 and the spacing thereof are such that two adjacent lugs 54 will be on opposite sides of a respective one of the lugs 20a and in full engagement with the trough between adjacent ones of the lugs, so that clockwise rotation of the wheels 19a and 21a will be positively prevented while there is a brake holding or operating pull on the chain 52, which, as shown in Figure 6, is attached to pull the wheels in a clockwise direction.

To release the brakes by feeding the chain 52 down through the opening 11a, the chain being wound on the drum 51, all that is required is to rotate the shaft 44a in counterclockwise direction which will cause the lobes 54 by their engagement with the lugs 20a and the spaces between such lugs to rotate the wheels 19a and 21a in a clockwise direction to unwind the chain 52 from the drum and during this movement the wheels and the links 32a and 33a will move upwardly and downwardly so that the lugs 20a can pass the lobes 54, but as one lobe will engage a recess between a pair of lugs 20a before the other lobe passes from the recess there will be no free movement of the wheels. As will be seen in both directions of rotation of the shaft 44a the lobes 54 and the wheels 19a and 21a act as gearing, except that the parts are so formed that the wheels will swing upwardly with the links 32a and 33a in certain positioning of the lobes in order to permit the lobes to pass but one lobe is always in engagement with a recess before another lobe leaves the recess so that there is no slipping of the wheels. As in the case of the first described embodiment, there is no jerk or kick-back in this releasing action, but the action is smooth and regular throughout the entire range of brake application and brake release.

Although I have shown and described herein preferred embodiments of my invention, it is to be definitely understood that I do not desire to limit the application of the invention thereto, and change or changes may be made in the materials, and in the construction and arrangement of the parts, within the spirit of the invention and the scope of the claims.

What is claimed is:

1. A brake applying device of the character described comprising a handwheel-equipped shaft, a vertical rack bar adapted to rise for applying the brake and subside in releasing the brake, toothed wheel means operatively connecting said shaft and said rack bar, a carrier pivoted adjacent said rack bar and said toothed wheel means, second toothed wheel means carried by said carrier and operatively connected to said rack bar, said second means having a wheel having cam action teeth, and third means en-

gageable by said cam action teeth whereby said wheel and said second wheel means are normally prevented from operating in a rack bar subsiding direction while said shaft is stationary, said carrier is depressed, and the rack bar is under the load of applied brakes, said cam teeth being conditioned to slide over said third means to enable releasing action of second wheel means and permitting subsiding of the rack bar only when said shaft is sufficiently rotated in brake applying direction to release said cam teeth from said third means by elevating said rack bar and said carrier.

2. A brake applying device of the character described comprising a casing, a handwheel-equipped shaft mounted in said housing, a brake applying flexible member leading upwardly from the brake into said housing and arranged to be drawn upwardly to apply the brake and to subside for releasing the brake, a lug-equipped wheel, means connected to said casing and swingably carrying said lug-equipped wheel, said flexible member being operatively connected to said wheel, a relatively non-swingable member including projections cooperable with the lugs on the wheel, said projections acting to prevent brake releasing rotation of said wheel while said means is in a depressed position and while a downward pull is being exerted by applied brakes on said flexible member.

3. A brake applying device of the character described comprising a casing, a handwheel-equipped shaft mounted in said housing, a brake applying flexible member leading upwardly from the brake into said housing and arranged to be drawn upwardly to apply the brake and to subside for releasing the brake, a lug-equipped wheel, means connected to said casing and swingably carrying said lug-equipped wheel, said flexible member being operatively connected to said wheel, a relatively non-swingable member including projections cooperable with the lugs on the wheel, said projections acting to prevent brake releasing rotation of said wheel while said means is in a depressed position and while a downward pull is being exerted by applied brakes on said flexible member, said projections being circumferentially arranged on said handwheel-operated shaft.

4. A brake applying device of the character described comprising a casing, a handwheel-equipped shaft mounted in said housing, a brake applying flexible member leading upwardly from the brake into said housing and arranged to be drawn upwardly to apply the brake and to subside for releasing the brake, a lug-equipped wheel, means connected to said casing and swingably carrying said lug-equipped wheel, said flexible member being operatively connected to said wheel, a relatively non-swingable member including projections cooperable with the lugs on the wheel, said projections acting to prevent brake releasing rotation of said wheel while said means is in a depressed position and while a downward pull is being exerted by applied brakes on said flexible member, said projections being stationarily mounted on said casing.

5. A device of the class described comprising a wheel having spaced lugs on its periphery forming spaces between the lugs, pivoted links supporting the wheel for swinging movement in a vertical plane, a rotary shaft, means for operating the same and lobes on the shaft engaging the spaces between the lugs, said shaft being located under a portion of the wheel, whereby the wheel will rest on the lobes when in lowered position and the lobes being constructed and arranged to provide a lifting motion of the wheel during the rotary movement of the shaft, as the lobes pass the lugs.

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