

W. NAYLOR.  
Car-Brakes.

No. 144,351.

Patented Nov. 4, 1873.

Fig. 1.

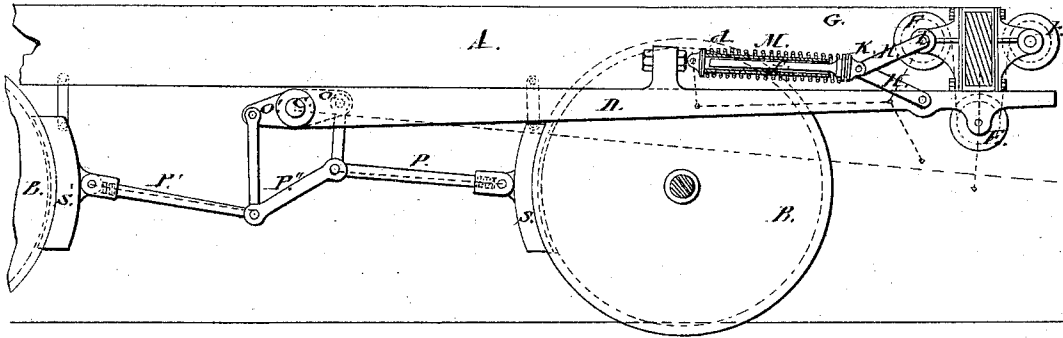


Fig. 2.

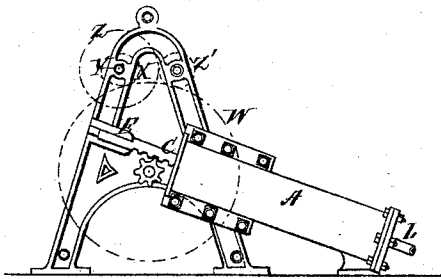


Fig. 3.

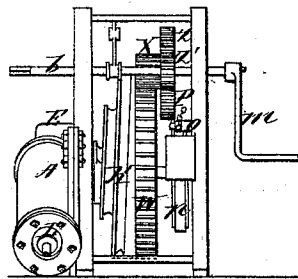
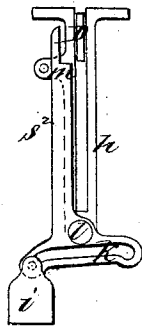


Fig. 4.



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# UNITED STATES PATENT OFFICE.

WILLIAM NAYLOR, OF MILDMAY PARK, ENGLAND.

## IMPROVEMENT IN CAR-BRAKES.

Specification forming part of Letters Patent No. **144,351**, dated November 4, 1873; application filed July 10, 1871.

*To all whom it may concern:*

Be it known that I, WILLIAM NAYLOR, of Mildmay Park, in the county of Middlesex, England, engineer, have invented Improvements in Railway-Brakes and in Apparatus connected therewith, of which the following is a specification:

The essential feature of this invention consists in applying the brakes to the wheels of the rolling-stock of railways by the power of a spring exerted through what are known as knee or toggle joint links, acting directly upon brake-levers, such combination of springs and toggle-joint links being brought into action either by the slackening of a continuous rope or chain, in connection with the several brakes throughout the whole or greater portion of the carriages of a train, which continuous rope or chain serves to lift and hold off all the brakes.

The necessary pull on the continuous rope or chain, for lifting off and maintaining out of action the brakes of continuous railway-brakes, may be obtained in various ways by the force of steam, compressed air, or hydraulic pressure, exerted in a cylinder or cylinders directly against a piston or pistons, caused to rotate a barrel or fusee, on which the said rope or chain is wound; or the said continuous rope or chain may be hauled in, so as to take off the brakes by the aid of an ordinary steam-winch supplied with steam from the locomotive, or by any well-known mechanical contrivance worked by manual labor.

The sheet of drawings hereunto annexed illustrates the mode of carrying out the essential or main feature, hereinbefore set forth, of my said invention, and the subordinate appliances employed in connection therewith.

Figure 1 is a sectional elevation of sufficient of a car-truck and brakes to illustrate my invention; Figs. 2 and 3, views illustrating mechanism for operating the brake-chains; and Fig. 4, a view illustrating a retaining device for the brake-lever.

The spring M may be either attached at one end to the framing A, or to a lug, N, on the brake-lever D; but, in either case, it should be parallel, or nearly so, to the brake-lever. The force of the spring may be adjusted, if desired, by a screw-bolt or otherwise. In practice, one

end of the spring may abut against a shoulder on a tubular spindle, *d*, connected either directly to the lug on the brake-lever, or by a pin to an eye in the end of an adjustable screw-bolt connected to the framing, while the opposite end of such spring bears against another shoulder on a rod or spindle, *f*, which works inside the before-mentioned tubular spindle *d*, and so forms a guide. To the extreme front end of the tubular spindle, at the point K, are jointed the toggle-joint links H H. The opposite end of the upper link is jointed to a fixed center, I, in the framing of the carriage, while the corresponding end of the lower one is jointed to the brake-lever D, so as to obtain a knee-joint action when applying the brakes. On releasing the continuous rope or chain G, which passes over the fixed pulleys F F, and under the pulley E on the brake-lever, the several springs M throughout the train, by their expansive action, will tend to straighten the toggle or knee jointed links H H, thereby forcing downward the brake-levers D, and applying the brakes S S' through the push-rods P P' and toggle-link P'', worked from the weigh-shaft C by the short arms or levers O O'. The greatest force is applied when the blocks are in contact with the wheels, as by that time the knee-jointed links will have approached a straight line. The positions of the several brake-levers and parts connected therewith, when the brakes are applied, are shown by the dotted center lines.

In applying my system of continuous brakes to railway stock arranged and worked on what is known as the Fairlie system—that is to say, wherein each carriage is rigidly coupled up without any buffer or draw-bar play or action between them—the continuous rope or chain may take the form of a continuous rod, extending from end to end of the train, and composed of several lengths connected together between the carriages by right and left threaded screw-couplings. From the continuous rod, rope, or chain, branch other short lengths of rope or chain, each being connected to its own brake-lever, so that on moving or hauling longitudinally the said continuous rod, rope, or chain the several shorter chains will lift off the brakes.

In order to prevent any deflection or dis-

placement of the axles by the lateral pressure of the brakes upon the wheels, the axle-boxes may be stayed by having lugs formed thereon, to which stays are connected extending to similar lugs on the axle-boxes on the same side of the vehicle.

Figs. 2 and 3 represent, respectively, a side and front elevation of a direct-acting lifter, which may be used for elevating or taking off the brakes. In this lifter a single cylinder, A, and piston are employed, operating upon a windlass-barrel or fusee, as I shall now explain, upon which the continuous rope or chain G is wound. The piston-rod forms a toothed rack, which works in the guide E, and gears with a pinion fast on the axis of the grooved fusee H, mounted in bearings in the two standards. This axis may also carry a spur-wheel, W, in gear with a pinion, X, fast on the axis Y of a spur-wheel Z, which gears with another pinion, Z', mounted on the shaft b of the winch-handle m, whereby, if occasion should require, the brakes may be lifted off by the hand of the guard, who will rotate the handle m, and so wind up or haul in the rope or chain G. n is an ordinary brake-strap, embracing a brake-pulley fast on the axis of the fusee, and brought into action by releasing the weighted brake-lever o, to which is attached a chain, p, for the guard to lay hold of when lifting or taking off the brake from the fusee-shaft. L is a pipe opening into the bottom of the cylinder A for the admission of water or other liquid or steam or compressed air below the piston. The continuous rope or chain G which operates upon the several brake-levers is wound upon the fusee-barrel H, so that on rotating the latter by the action of the rack on the pinion the several brake-levers will be lifted and the brakes taken off or applied, as the case may be.

By the use of the fusee the power required to be exerted when lifting the series of brake-levers in succession is equalized. The water, steam, air, or other medium of pressure is supplied through a three-way cock to the brake-lifting cylinder or cylinders A. This three-way cock is fitted on the engine, and in the guard's van, such cocks being connected together by a jointed pipe passing under the tender to the guard's van, and being also at one end connected with the boiler or other source of pressure, and at the other end with

the cylinder of the lifter. By means of these cocks either the driver or the guard, or both together, may turn the water, steam, or other medium of pressure into the brake-lifting cylinder or cylinders A, or allow such medium of pressure to escape therefrom and to take off or apply the brakes as the case may be.

In cases where the brakes are lifted off by turning the fusee by hand, the strap or other brake n applied to the brake-pulley on the fusee-shaft serves to hold them off. By attaching a cord or chain, p, to the fusee brake-lever o the driver or guard can apply the brakes by simply taking off the friction from the fusee-shaft and allowing it to revolve freely, and the brakes to descend by their own gravity or otherwise.

In order to suspend the action of any one or more of the brakes hereinbefore described I employ a weighted trigger or catch, g. This trigger or catch is carried by a bracket or lever-guide, h, bolted to the framing A of the vehicle, and is acted upon by a movable weight, i, which weight, by being moved by the brakeman or attendant along the slot k, can be placed on one or the other side of the fulcrum l of the trigger or catch, thereby bringing the catch m into or throwing it out of action, so as to prop up the brake-lever D in the one case or leave it free to descend in the other case.

Although I have described certain apparatus for operating the chain of my improved braking apparatus, I do not here claim the same, as it may form the subject of a separate application for Letters Patent; but

I claim as my invention—

1. The combination of the chain G extending beneath a series of cars and brake-shoes S, levers H H D P' P'', beam C, and springs M, arranged upon each car so as to be operated, as set forth.

2. The combination, with the braking-lever D, of the trigger s<sup>2</sup> and its movable weight i, to operate as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. NAYLOR.

Witnesses:

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