J. HARRIS.

Car Brake.

No. 25,825.

Patented Oct. 18, 1859.

Fig. 1.

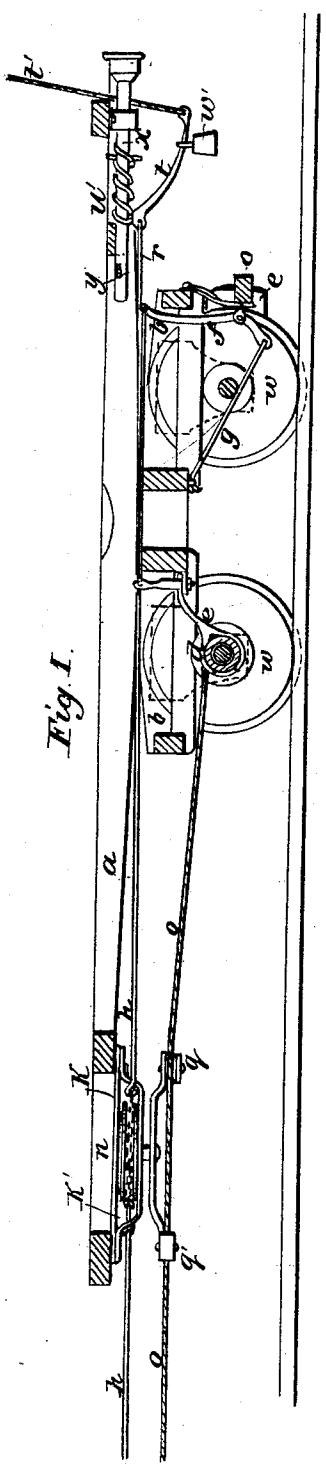


Fig. 2.

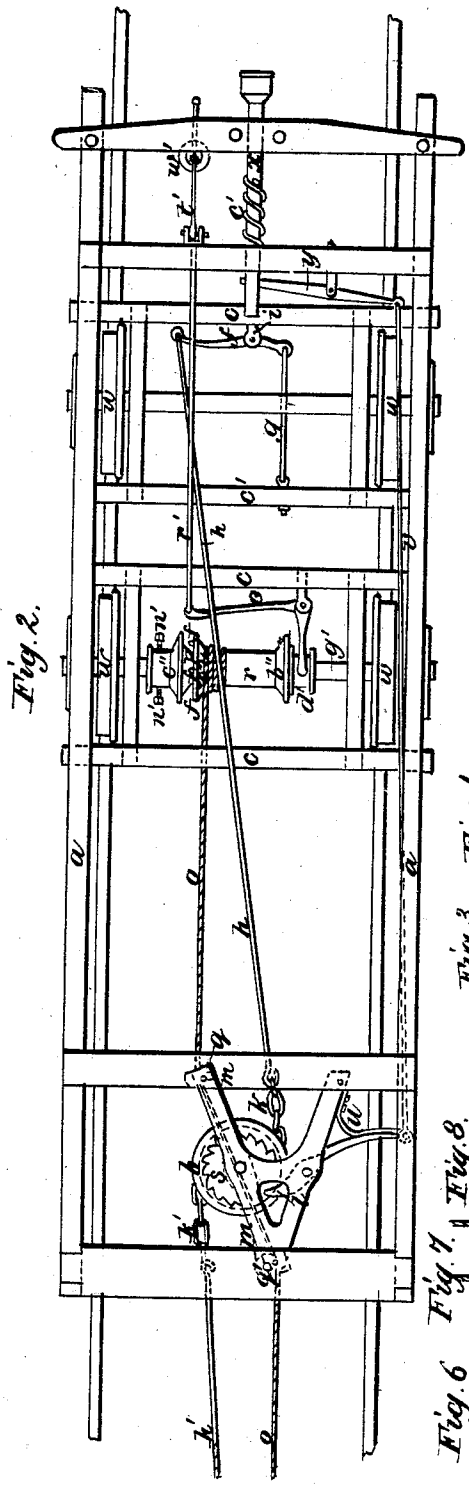


Fig. 5.

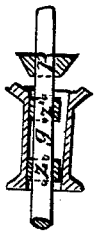


Fig. 4.



Fig. 3.

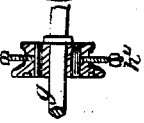


Fig. 8.

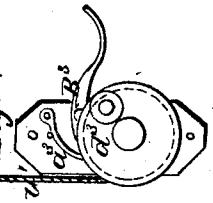


Fig. 7.

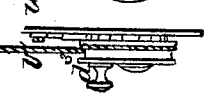
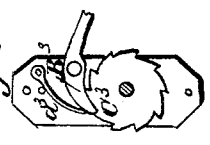


Fig. 6.



N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON D. C.

UNITED STATES PATENT OFFICE.

JOSEPH HARRIS, OF ALLEGHENY, PENNSYLVANIA.

RAILROAD-BRAKE.

Specification of Letters Patent No. 25,825, dated October 18, 1859.

To all whom it may concern:

Be it known that I, JOSEPH HARRIS, of the city of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Railroad-Brakes, being an improvement on the railroad-brake for which Letters Patent of the United States were granted to me on the 25th day of May, A. D. 1858, and it is also an improvement on the lever or hand brake, which is at present in common use and is operated at the extremity of each car by wheels on the platform; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings, forming part of this specification, in which—

Figure 1 is a side elevation of the rear half of a railroad car frame, showing the hind truck, with my improved brake attached thereto. Figure 2, is a vertical plan of the truck and brake shown in Fig. 1. Fig. 3, is a transverse section of the collar, of my improved winding apparatus showing the friction and spring plates, pressed on the running axle, by the screws at opposite sides of the circumference of the collar. Fig. 4, is a face view of the collar, with the friction and spring plates, pressed on the running axle by the screws shown in Fig. 3. Fig. 5, is a longitudinal section of the running axle and sleeve of the winding apparatus, with the antifriction rings placed between the axle and sleeve. Fig. 6, is a front section of the reel, showing the spring pawl and ratchet, in gear, with the large pulley detached. Fig. 7, is a side or edge elevation of the reel as shown in Fig. 6. Fig. 8, is a front view, showing the reel complete, and in working order as shown in Fig. 7.

In the several drawings like letters of reference denote similar parts of my brake and the truck to which it is attached.

The most material difference between my present brake, and that for which I procured Letters Patent on the 25th of May, 1858, is that by placing my winding apparatus on the axle of one of the ordinary running wheels of a truck, and by the use of a self detaching clutch of peculiar construction, I dispense with the extra wheels for winding up the continuous chain, when the brakes are to be applied, and the arrangement of levers and ropes for lowering those wheels, to contact with the rails, and raising them again, which not only simplifies the construction of my brake, but permits it to operate equally well, whichever way the cars are running.

Another great improvement, is, that my braking apparatus as herein described, is equally applicable to the automatic spring brake described in the specification to my patent, and to the ordinary lever or hand brake, and in the drawings and specification, I shall represent it as applied to the latter brake, its mode of adaptation to the former, (*i. e.* to my automatic spring brake) being simple and obvious.

To make my improvement perfect and easy, to the engineer when operating the brakes, I place a reel or winding pulley on the engine, by which the cord is wound up for operating the brakes.

In my improvement the brakes are operated and the strain retained at the center of each and every car, instead of at the ends. This is accomplished by means of my improved arrangement, of a pawl and ratchet with a drum and arm attached thereto, forming a combined machine and being stationed at the center underneath each car. A continuous chain or rope passes underneath the cars through the arms on each of the cars; thence throughout the train. The power of applying the brakes is placed in the hands of the engineer. He has also the power of releasing the brakes and setting them free. Either of those operations he has the power of performing almost instantaneously or in very rapid succession. The use of brakemen is therefore entirely dispensed with. The conductor has also the power of applying the brakes and signaling the engineer at the same moment. Should any of the cars in the train become detached, from the couplings breaking or becoming loose, the fact of being so would tighten the continuous chain or rope, which would turn the arms on each car and thereby apply all the brakes of its own accord.

The brakes are applied from the rear end of the last car in the train, thereby causing a retarding motion of the train, or they can be applied from the front end of the train, by placing my improved apparatus for winding the chain or rope on one of the running axles of the tender. In the drawings it is represented on the rear truck of the last car in the train.

To enable others skilled in the art to construct and use my improved brake, I will

proceed to describe its construction and mode of operation.

In the drawings, Figures 1, 2, *a a* are the bottom sills of the car body, which rest on the trucks.

b b are the longitudinal and *c c* the cross pieces forming the frame of the truck.

The brake beam *d*, extends across the truck frame outside of the wheels *w w*, and to the extremities of the brake beam are attached the blocks and shoes *e e*, in the usual manner. In the truck shown in the drawings, only one set of blocks and shoes is represented, and those applied only to the hind wheels because the winding apparatus is attached to the axle of the fore wheels of this truck; but as only one winding apparatus is needed on each train the brakes are applied to all the four wheels of each of the other trucks in the train.

The brake beam is operated by the lever *f*, which is pivoted at *i*, to the brake beam *d*, the extremity of the short arm of the lever *f* being fastened by a connecting rod *g* to one of the cross pieces *c'* of the truck frame. The long arm of the lever *f* is operated by a connecting rod *h* which extends under the car body to the center of the car, where it terminates in the short chain *k*, which winds around a horizontal pulley or drum *l*, rigidly attached to, and operated by the arm *m*. In the other trucks, where there are two sets of blocks and shoes, one for each pair of wheels, the levers *f* which operate the brake beams, are connected, as is usual in the ordinary hand brake, in such a manner, that the operating of one brake lever *f*, will also operate the lever which works the brake beams of the other pair of wheels in the same truck. The brake levers *f* on each truck, may be also connected by a chain and rod to an ordinary brake wheel on the platform at each end of each car, so that if desired at any time in switching the cars, or when one or more cars are temporarily detached from the train, the brakes may be applied in the old way, this application of the old brake, which is well known, and its adaptation so obvious as to render it unnecessary to exhibit in the drawings.

The arm *m* turns freely at *n* which is situated in the center of the car frame, midway from either end, and just under the floor of the car. At the end of each arm is a pulley *q*, *q*, over which the rope or chain *o* passes, by which the brakes are applied. One end of this chain is attached to the sleeve *r*, and thence it passes over one side of the pulley *q* at the other end of the arm *m* and thence in a continuous line, under every car in the train and through the pulleys *q*, *q*, on each arm, until it reaches the front car, to the front end of which it is securely fastened. There is one arm *m* with cam pulley or drum *l* in the center of each car, and each drum *l* has attached to it on opposite sides of its circumference, a short chain *k*, *k*, to one of which *k* is hooked the extremity of the connecting rod *h*, which works the brakes at the rear end of the car, and to the other *k* is attached the rod *h*, which works the brake at the other end. When the arm *m* is in an inverted position that is standing at right angles to the sides of the car, or nearly so, the brakes are loose, the chains *k*, *k*, not being wound around the drum *l*, but when by the operation of the winding of the chain *o*, around the sleeve *r* the arm *m* is drawn into a straight position, or nearly parallel to the sides of the car, the drum *l* being thereby turned about one fourth around, in the direction indicated by the arrows in Fig. 2, winds the chains *k*, *k*, around the drum *l*, drawing the connecting rods *h*, *h*, toward the center of the car, and thus tightening the brakes on the running wheels of the cars, as before explained. As the chain *o* runs through the whole of the cars in the train, and through the arm *m* in the center of each, it is manifest that the effect of the winding of the chain on the sleeve *r*, will be equally to affect all the brakes on the train.

In order to retain the power applied to the brakes by means of the sleeve *r* and chain *o*, after the requisite degree of pressure is attained, I place a ratchet wheel *s* on top of the drum *l* which is rigidly attached to, and concentric with it. This is combined with a pawl *t* working in the ratchet teeth of the wheel *s*, the pawl being pressed home by the spring *u*. This pawl has an arm or lever extending beyond its pivot or center, to which lever is attached a rod *v*, which is connected directly to the shaft *x* of the bunter, or (as shown in the drawing) connected by an intermediate lever *y*. The bunter shaft *x* is set in the frame of the car, so as to have a slight backward and forward motion, and pressed forward by a spiral spring *a*. The effect of either of these arrangements is to release the pawl from the ratchet teeth, and relieve the pressure from the brakes, by means of the bunter. If the rod *v* is connected immediately to the inner extremity of the bunter shaft *x*, the pawl is released after the cars have been stopped or retarded, by the forward motion of the train causing an outward pull on all the bunters; or if the rod *v*, is connected immediately by the lever *y*, the pawl is disengaged by backing the train slightly, thus causing the bunters to press together.

It remains to explain the construction and operation of the winding apparatus, by which the chain *o*, is wound up or strained so far as to draw the arms from their inverted to a straight position, and thereby apply the brakes.

In the drawings, Fig. 2, *r*, is an iron cylin-

der or sleeve, placed on one of the axles of the wheels of the car. It has a flange b' b'' at each end to prevent the chain running off at either end. The diameter of the bore of the cylindrical sleeve r, is greater at the end of the sleeve nearest to the collar c'' than at the other end, which fits the axle rather loosely. There are two antifriction rings z' and z'' fitting easy on the axle g to prevent the sleeve r, from cutting on the axle g by its own weight when out of gear with collar c. (See drawings Fig. 5.)

Immediately back of the flange b'', on the axle is placed a sliding ring d, which is operated by a bent lever e' pivoted at i', to one of the cross pieces e of the truck, by which the ring is slid up against the end of the sleeve r so as to force it to gear into the collar c''. This is accomplished by points or teeth f' projecting horizontally around the face of the flange b', toward the collar c'', which teeth, when the sleeve r is forced by the lever e', and ring d', against the collar c'', enter corresponding holes around of the face of collar c'', thus forming a clutch to draw the sleeve in gear, or (by reversing the lever) out of gear with the collar c''. The collar c'', turns with the axle g', of the wheels w, being fastened to the axle in such a manner (as hereinafter described) that when the sleeve is geared into the collar c'', the revolution of the axle g, will cause the collar and sleeve to revolve in either direction that the wheel may happen to be turning, and wind up the chain o, on the sleeve, straining it tight throughout the whole length of the train of cars. Now it is manifest, that if this revolution of the sleeve r, and collar c'', were continued, either the chain or axle must break, or the revolution of the wheels w, cease, as a violent strain is put on the chain. To relieve this strain at a point within the capacity of the chain to endure, and yet allow sufficient force to be applied to the brakes, the following arrangement is made in collar c'':—There are recesses at opposite sides of the inner circumference of the collar next the axle, in which are placed friction plates or brasses a', and a'', fitting on the axle g behind, and next the said friction plates, are stiff spring plates b', and b'', being plates curved in opposite forms to each other, and are pressed against the friction plates by screws n', and n'', as shown in Figs. 3 and 4, which permits axle g, to turn in collar c'', after the motion of the sleeve r, and collar c'', has ceased, which is caused by the violent strain of the chain o, in applying the brakes. After the sleeve r, is ungeared and the strain removed from chain o, the collar c'', reassumes its former power on the axle g, thereby possessing an inexhaustible power on axle g, whether it is caused to turn in collar c, or not. This precaution is taken to avoid the accidental breaking of the chain in case the person applying the brakes should continue the sleeve r, for too long a time in gear with the collar c.

In order to relieve the strain on the chain o, immediately when the lever e, is released, an arrangement is made to cause the sleeve r, to fall out of gear of itself, which consists of a conical center piece p, placed on the inner face of the collar c, the base of which is inside of holes made to receive the clutch teeth f, f, and the apex of which surrounds the axle g'. It will be recollected, that the inner diameter of the sleeve r, is larger at the end near the collar c'', than at the other end, which causes that end of the sleeve to hang down naturally, by its own weight, and that of the chain o, and the inner edge of the sleeve resting on the conical face of center piece p, causes it to slide down it, the sleeve r, at the same time receding, as it is permitted to do by the withdrawal of the sliding ring d, thus so soon as the pressure is removed from the lever e, the sleeve r', falls out of gear with the collar c''.

The long arm of the lever e, which operates the sleeve r, is connected by a rod r', with a lever arm t', by which it is operated. The lever arm t', is pivoted at u', to one of the end sills of the car frame, so that by raising the lever arm by means of a cord v', which may be operated from any part of the train, the lever e', is drawn back, and the sliding ring d', forced up to gear the sleeve r, with the collar c'', but when the cord v', is slackened, a weight w', (see Fig. 1) hung on the lever t', insures the withdrawal of the sliding ring d', and the ungearing of the sleeve and collar. The weight w', on the lever t', is so arranged, that when the cord v', is tightened and the lever t', raised, the weight slides toward the fulcrum of the lever t', and offers very little resistance to the raising of the lever t'.

For operating the cord v', which raises lever t', I have the following contrivance, arranged on the engine, for the convenience of the engineer, being very simple in its construction, and mode of operation: being a reel, (see Figs. 6, 7 and 8) composed of a pulley d^3, having a handle on its face for winding, a ratchet c^3, on the inner side, attached to and concentric with the same, also a lever pawl b^3, which is pressed home in the ratchet c^3, by a spring a^3, to maintain the strain of the cord v', which extends from lever t', of the winding apparatus to pulley d^3, of the reel on the engine, it not only operates the cord v', but maintains a certain amount of power on the lever t', of the winding apparatus, which insures the gearing of the sleeve r, into the collar c'', and thereby keeping it in gear until the engineer sees fit to release it, after the brakes are applied and the train stopped.

The reel is secured on the engine, handy to the engineer. When he wants to apply the brakes, he has only to wind around the pulley d^3, by the handle on its face, which tightens cord v', and immediately spring a^3, presses lever pawl b^3, into ratchet c^3, and maintains the strain on cord v', which applies the brakes; to set the chain sleeve out of gear, lever pawl b^3, is pressed by its long handle out of gear with ratchet c^3, which sets cord v', free and thereby throwing sleeve r, out of gear.

I have represented the winding apparatus as being placed on the hind truck of the last car of the train, which I regard as the most convenient position in the train; or on the truck of the "tender," in which case a simple lever, raising through the bottom of the tender immediately over the lever e', or over the sliding ring d', on the axle g, will serve to operate the brakes simultaneously on all the cars of the train.

The operation of my improved brake is very simple, if the conductor desires to brake down the train, he has only to pull the cord v', which is accessible at any part of the train, and immediately the sleeve r, gears into the collar c'', begins to revolve and winds up the chain o, this brings the arm m, into a parallel position thereby winding up the short chains k, k, on the drum l, the brakes are at once applied with great force, on the hindmost car first, but in rapid succession throughout the whole train, this pressure of the brakes is continued or retained by the drum l, through the ratchet s, and pawl t, notwithstanding that the lever e', is released, and the sleeve r, disengaged from its connection with the collar c'', when it is desired to relieve the brakes, a slight reversal of the engine, and backing of the cars, causes the bunters to strike each other and recede, which frees all the brakes at once.

Having thus described the construction of my improved brake and its mode of operation, what I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the winding apparatus the weight w', lever t, rod r', bent lever e', sliding ring d', sleeve r, antifriction rings z' and z'', conical center piece p, collar c'', with friction plates a' and a'', and spring plates b' and b'', also screws n' and n'', arranged in the manner and for the purpose substantially of operating a railroad brake.

2. The combination of the pawl t, and spring u, with ratchet s, and drum l, with short chains k, k, and rods h, h, the arm m m, with pulleys q, q, connected by chains, rods or ropes, for applying and maintaining the strain of a railroad brake, at the center of each car substantially as hereinbefore described and set forth.

3. The combination of the rod v, with the long arm of pawl t, and the cross lever y, connecting the shaft of the bunter x, to pawl t, for the purpose of setting the brakes free. The whole substantially as hereinbefore described and set forth.

JOSEPH HARRIS.

Witnesses:
JAMES M. ROSS,
J. R. DIEHL.