2 Sheets—Sheet 1.

A. F. GUE & G. F. FIELD.

CAR-BRAKES.

No. 184,614. Patented Nov. 21, 1876.

Fig. 1.

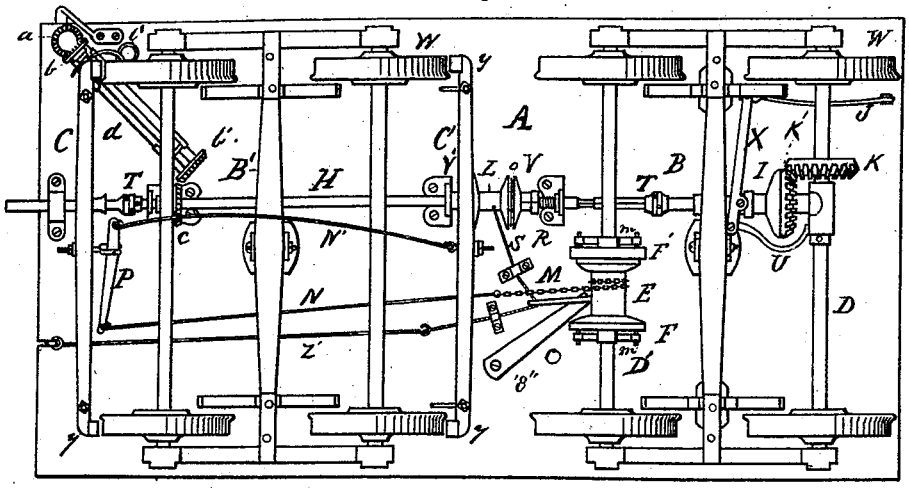


Fig. 2.

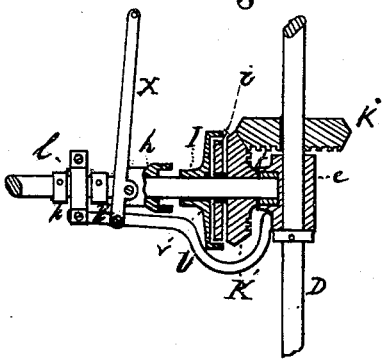
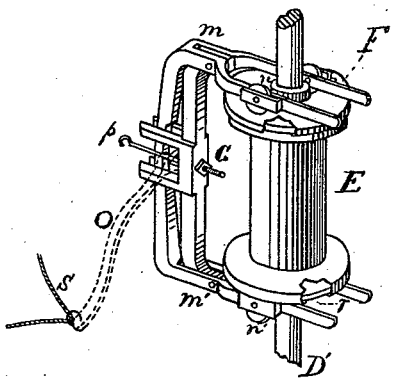


Fig. 3.



Witnesses,
E. C. Renwick
E. McPool

Inventors,
Albert F. Gue
George F. Field
by Alex. G. Hayes
Attorney

2 Sheets—Sheet 2.

A. F. GUE & G. F. FIELD.

CAR-BRAKES.

No. 184,614. Patented Nov. 21, 1876.

Fig. 4.

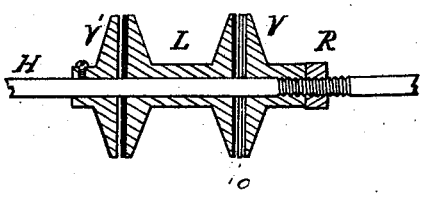


Fig. 5.

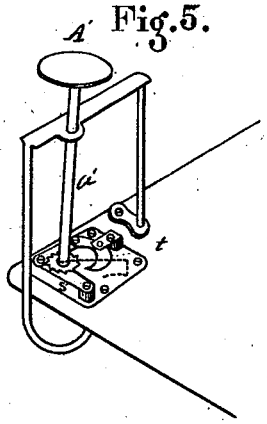
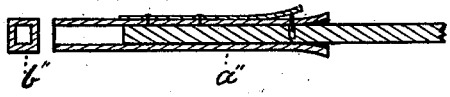


Fig. 6.



Witnesses:
H. E. Renwick
J. M. Poe

Inventors:
Albert F. Gue
George F. Field
Per Alex L. Hayes
Atty.

UNITED STATES PATENT OFFICE.

ALBERT F. GUE AND GEORGE F. FIELD, OF BOSTON, MASS., ASSIGNORS OF ONE-THIRD THEIR RIGHT TO THOMAS N. HART, OF SAME PLACE.

IMPROVEMENT IN CAR-BRAKES.

Specification forming part of Letters Patent No. **184,614**, dated November 21, 1876; application filed April 3, 1876.

To all whom it may concern:

Be it known that we, ALBERT F. GUE and GEORGE F. FIELD, both of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Railroad-Car Brakes, of which the following is a full, clear, and exact description, reference being had to the drawings accompanying and forming part of this specification.

In these drawings, Figure 1 is a plan view, showing the arrangement under the body of a railroad-car of the several parts constituting our invention. Fig. 2 is a sectional view of the mechanism for connecting one of the axles of the locomotive or tender to the longitudinal rod. Fig. 3 is a view, in isometrical perspective, of the sheave upon the axle, and the mechanism for connecting it with the same. Fig. 4 is a view, in section, of the tension-spool on the longitudinal rod. Fig. 5 is a view, in isometrical perspective, of the mechanism for rotating the rod by hand; and Fig. 6 is a sectional view of the manner of coupling the sections of the rod.

Like letters indicate the same parts in these several figures.

This invention relates to that class of power railroad-brakes in which the power for applying the same is derived from the rotation of any one of the axles of the car by means of the arrangement of a loose sheave or drum upon the said axle, which sheave can be made to rotate with the axle by means of suitable friction-clutch mechanism under the control of the engineer, and which sheave has attached thereto a chain, connected to the brake-beams, so that on winding up the chain by the rotation of the axle and sheave all the brakes will be applied.

In railroad-car brakes of this class the drum or sheave is usually placed upon the hind axle of the locomotive, and the brake-beams of the several trucks are connected together by chains. In a train of any length it requires a certain time to take up the slack of these connecting-chains, and consequently all the brakes are not applied simultaneously and with equal force to the forward and rear cars, and it is, therefore, difficult to stop a long train with this power-brake quickly and without shocks and jars.

This invention has for its object the avoidance of this defect in power railroad-brakes of the kind before referred to, and enables all the brakes to be applied simultaneously and with equal force to all the cars, no matter what may be the length of the train, and to be applied either by the engineer or from any other point on the train.

To this end the invention consists, first, in providing one of the axles of one of the trucks of each car in the train with a drum or sheave, loose upon the axle, upon which sheave a chain, connected to the brake-beams of the car, is wound, so as to cause the application of the brakes when the sheave is made to rotate with the axle on which it is placed by friction-clutch mechanism, to be hereafter described; and in providing a rod or shaft made in sections, connected by rigid couplings, and having ball-and-socket joints at intervals, in order to give the necessary flexibility, which extends under each car, and can be rotated by being connected to one of the axles of the locomotive or tender by mechanism under the control of the engineer, and also by hand, from any desired point on the train, and which, when rotated, will, by means of suitable self-regulating tension-spools thereon and chains connected thereto, operate the mechanism which connects the friction-clutches and sheaves on the axle of each car, and thereby cause the simultaneous application of all the brakes on the train; second, in the construction of the mechanism for connecting one of the axles of the locomotive or tender to the longitudinal rod, for rotating the same; third, in the construction of the self-regulating tension-spools on the longitudinal rod; fourth, in a peculiar combination and arrangement of mechanism for rotating the longitudinal rod by hand; fifth, in the mechanism for connecting the friction-collars on the axle of the car to the sheave or drum on the said axle; sixth, in the method of applying the brakes to a single car.

In the accompanying drawing, A shows the under side of the body of a tender having our

improved brake mechanism applied thereto. B and B′ are the front and hind trucks. C C′ are the brake-beams upon the hinder truck, which beams are connected together by the usual lever P and rod N′. *y y y y* are the brake-shoes. D is the forward axle of the front truck, upon which axle is placed the mechanism under the control of the engineer for rotating the rod by the rotation of the axle; and D′ is the hinder axle of the front truck, upon which axle is placed the loose sheave or drum, which, when connected to the axle by a friction-clutch, so as to rotate with it, winds up a chain attached to the brake-beams, and applies the brakes. These two axles and their respective attachments are shown in the figure upon the same truck for the purpose of more conveniently showing the invention; but, in practice, the axle which rotates the longitudinal rod will be any of the axles of the locomotive or tender, and the axle which carries the sheave or drum for applying the brakes will be one of the axles of each car, the principle of our invention being to provide each car with independently-acting mechanism for applying the brakes on each car, and to provide means for operating this mechanism on all the cars simultaneously from any single point on the train.

H is a rod, which extends longitudinally under the body of each car, and is supported under the same in any proper manner, so as to rotate freely. It has universal joints at suitable intervals, which give it the necessary flexibility, so that it will accommodate itself to the movements of the train. The different sections of the rod, when the cars are coupled together, are connected by square ends and sockets, (shown in Fig. 6,) in which *a″* shows the sleeve or socket, and *b″* the squared end of the rod, so that a rigid connection is made between the rods on all the cars. Each section under each car has upon it a loose spool, L, and two fixed collars, V V′, one on each side of the spool. These collars turn with the rod, and bear against the ends of the spool, which are provided with friction-surfaces of wood or leather. The spool consequently turns with the rod until the tension, by the chain S, is so great that the friction-surfaces slip on each other. By means of a nut, R, upon the rod the friction between the collar V and the spool can be regulated, so as to cause the spool to resist any strain upon it which may be desired to insure the application of the brakes. An india-rubber pad is introduced between the end of the spool and the collar V, and by its elasticity compensates for the wear of the friction-surface, so that the friction is always maintained the same.

These adjustable tension-spools are an important feature of my invention, for the reason that, by means of the adjustment, each spool can be adjusted for the tension required to apply the brakes to the car under which it is placed, which tension varies with the weight of the car, and by the slipping of the spool the mechanism will be prevented from being injured by the continued rotation of the rod. Moreover, when a number of cars, each of which requires a different tension or strain to cause the application of the brakes, are coupled together to make up a train, each spool will, on the first application of the brake mechanism, adjust itself to such a position on the rod H that the brakes on all the cars of the train will be simultaneously applied thereafter.

A cord or chain, S, is attached to the spool L, which operates the lever O, and causes the application of the brakes, as will hereafter be described.

The mechanism for rotating the rod H by connecting it with one of the axles of the locomotive or tender is constructed as follows: Upon one of the axles of the locomotive or tender, as at D, is keyed the pinion K, which gears with the pinion K′ on the rod H, both beveled so as to form a miter-gear. The pinion K′ turns loosely on the rod H, but can be connected with the same so as to turn it by means of the flanged collar I, feathered upon the rod. Between the flanged collar and the face of the pinion K is a friction-pad of leather, *i*. A collar, *v*, keeps the pinion K′ in place and prevents it from being thrown back from the pinion K by its movement of rotation. The rod H bears in a journal, *f*, in a T-box, *e*, upon the axle D, as shown in Fig. 2. The collar I is brought against the pinion K′ by means of the clutch *h* sliding on the rod H, which clutch is provided with an anti-friction surface at its bearing upon the hub of the collar I. The clutch *h* is operated by a lever, *x*, under the control of the engineer by suitable connections. This lever is pivoted in the bar U, attached at one end to the T-box *e*, and at the other to a ring, *l*, on the shaft H, placed between the collars *k k′*. When the lever is operated the strain is borne by the collar *k′*, so that the shaft H is prevented from binding in the T-box.

On bringing the collar I against the face of the pinion K′ the friction between the two opposed surfaces causes the collar to turn with the pinion and the rod is thereby rotated, causing the tension-spools on the rod on each section under a car to turn and move their respective levers O, thereby causing the sheaves to be brought into connection with the axles on which they are placed, and producing the simultaneous application of all the brakes.

Instead of so arranging the pinions that they always turn with the axle on which one of them is placed, they might be so arranged as not to receive motion from the axle unless connected with the same by the engineer for the purpose of applying the brakes, and the construction of this mechanism may be otherwise varied without departing from the principle of my invention, which is the rotation of the rod by the axle of the locomotive or tender, at the will of the engineer. It is obvious

that there are various methods of accomplishing this result.

When the lever O is operated by the rotation of the tension-spool on the rod H, as described, the rotation of one of the axles of the car is made to cause the application of the brakes by means of the following-described mechanism: Upon the axle D is a loose sheave or drum, E, and on each side of this drum or sheave is a collar, F F′, feathered on the axle, so as to rotate with it, but capable of sliding laterally on the axle. Each of these collars F F′ is flanged, and has a suitable friction-surface at its bearing against the end of the sheave or drum. The collars are brought against the sheave with force sufficient to cause it to rotate by friction by means of the forked bent levers *m m* on each side of the sheave, provided with the friction rollers *n n′*. The levers *m m′* are pivoted to a frame or bar, G, suspended from the car by a link or hook, *p*. As shown in Fig. 3, the ends of these levers nearly meet and rest against the extremity of the lever O. A spring, *s″*, keeps the extremity of the lever O from pressing against the ends of the levers *m m′*; but on the retraction of the chain S by the rotation of the spool L the end of the lever O forces the ends of the levers *m m′* out, so that the sliding collars on each side of the drum or sheave are brought against it, and by friction cause it to rotate with the axle, and wind up the chain attached to the brake-beams.

The link or hook *p*, from which the frame G is suspended, permits the clutch mechanism to have the necessary lateral motion on the axle, and to accommodate itself to the movements of the axle. The friction-rollers *n n′* permit the bent forked levers to slide up and down freely on the ends of the drum, with the necessary movements of the car. One end of the chain M is attached to the sheave, and the other to the lever P.

Proper means are provided for lubricating the sheave, so that when the collars F F′ are disengaged from it the axle will rotate freely in the loose sheave.

The chains of the ordinary hand-brake mechanism are attached to the lever P, and the brakes can, therefore, be applied in the usual manner by hand. Our invention can be used without interfering with the use of the hand-brakes.

Means are provided for applying all the brakes on the train simultaneously by rotating the longitudinal rod H by hand. This consists of gearing, which can be connected with the rod by the brakeman, when desired, and, when turned by hand, by the ordinary hand-brake wheel, will rotate the rod H. This gearing is shown in Fig. 1; and it consists of a pinion, *c*, on the rod H, gearing, when desired, with the pinion *b′* on the axle *d*. The pinion *b′* is beveled, and the axle *d* is supported under the car, and slides so as to throw the pinions in and out of gear. A spring, *l′*, keeps the pinions disengaged, except when it is necessary to turn the rod. Another pinion, *b*, on the axle *d* gears with a pinion, *a*, on the shaft of an ordinary brake-wheel, A′, as shown in Figs. 1 and 5. The end of the shaft is set in a bent lever, *s′*, (shown in Fig. 5,) which is operated by the foot of the brakeman when he wishes to engage this gearing with the rod, and to turn the rod by means of the brake-wheel. A toothed wheel and pawl are placed on the shaft, for the usual purpose.

There are other methods which might be devised for turning the rod by hand. We have described this mechanism as one method of effecting this result.

The brakes can be applied to a single car without the use of the rod, by means of the chain attached to the lever O. In applying a power-brake to horse-cars this arrangement, in connection with the loose sheave and friction-clutch mechanism, may be made use of.

We are aware that a sheave or drum, loose upon one of the axles of a car, and made to rotate with the same by means of friction-clutches at each end, is not new in railroad-car brakes. We therefore do not claim the same as our invention; but

What we claim as our invention, and desire to secure by Letters Patent of the United States, is—

1. The combination of the following elements, viz: a sheave or drum, loose upon one of the axles of a car; suitable friction-clutch mechanism for connecting said sheave with the axle, so that it will rotate with it; brake-beams connected to said sheave, a rod extending longitudinally under the car, and having thereon a loose spool and fixed friction-collars, as described; mechanism for rotating the rod by means of one of the axles of the locomotive or tender, and also by hand; and devices by means of which the rotation of the rod is made to cause the application of the friction-collars on the axle to the sheave or drum, and thereby operate the brakes, substantially as and for the purpose set forth.

2. A rod, H, extending longitudinally under the car, provided with square ends and sockets for rigidly connecting together rods under different cars, and with universal joints at suitable intervals, and a loose spool, frictionally-connected to the rod, in combination with mechanism by means of which the rod can be rotated by one of the axles of the locomotive or tender, at the will of the engineer, substantially as and for the purpose set forth.

3. In combination with the rod H, the axle D, beveled pinions K K′, friction-pad *i*, collars I *v k k′*, sleeve *l*, lever *x*, and bar *u*, substantially as and for the purpose set forth.

4. The combination of the axle D, T-box *e*, journal *f*, rod H, and clutching and gearing devices, substantially as and for the purpose set forth.

5. The combination of the rod H, sliding axle *d*, bevel-gears *c b′* and *a b*, upright shaft *a′*, and hand-wheel A′.

6. The combination of the rod H, pinion *c*, beveled pinions *b b*, sliding rod *d*, pinion *a*, spring *l*, shaft *a'*, lever *s'*, and brake-wheel A', substantially as and for the purpose set forth.

7. The combination of the axle D, sheave or drum E, bifurcated levers *m m'*, collars F F', bar G, and lever O, substantially as and for the purpose set forth.

8. The combination of the lever O, spring *s''*, chain S, and spool L, substantially as and for the purpose set forth.

9. The combination of the frame or bar G and link or hook *p*, substantially as and for the purpose set forth.

10. The combination of the spool L, collars *v v'*, rubber pad *o*, rod H, and nut *k*, substantially as and for the purpose set forth.

11. The combination of the chain or rod L, lever O, friction-clutch mechanism, as described, sheave E, axle D', and brake-beams C C' and their connections, substantially as and for the purpose set forth.

ALBERT F. GUE.
GEORGE F. FIELD.

Witnesses:
SAMUEL SNOW,
ALEX. L. HAYES.