(No Model.) 2 Sheets—Sheet 1.

W. L. FITZHUGH.

HYDRAULIC CAR BRAKE.

No. 527,743. Patented Oct. 16, 1894.

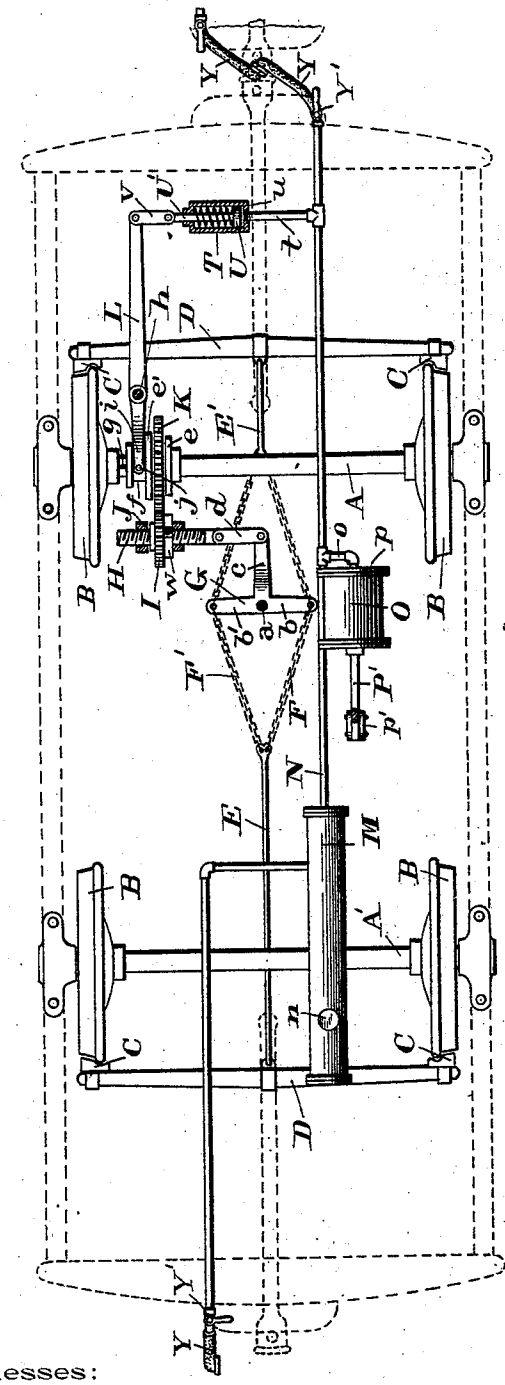

Fig. 1

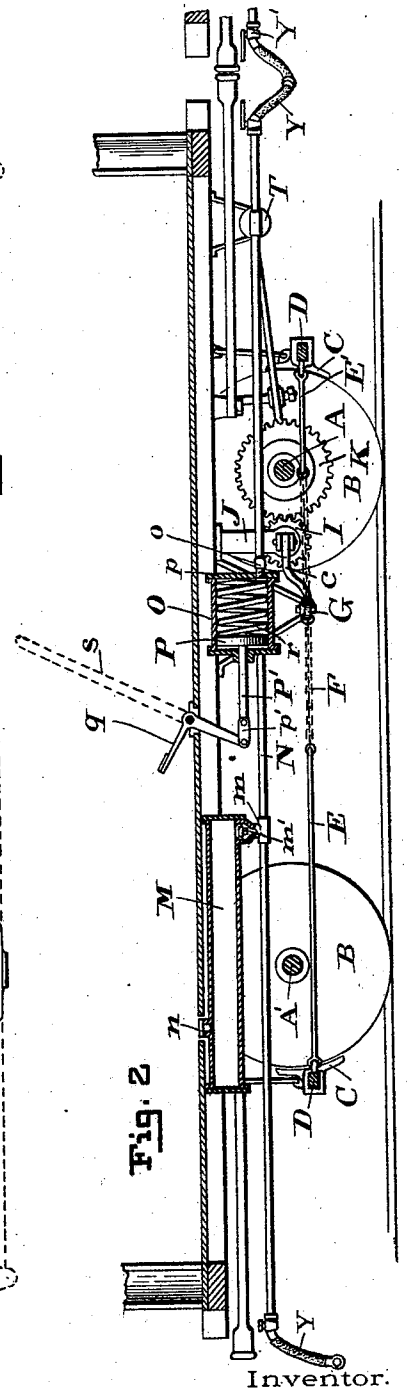

Fig. 2

Witnesses:

L. I. Van Horn

Charles B. Maine Jr.

Inventor.

Wm L. Fitzhugh

By Chas B. Maine

Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

W. L. FITZHUGH.

HYDRAULIC CAR BRAKE.

No. 527,743. Patented Oct. 16, 1894.

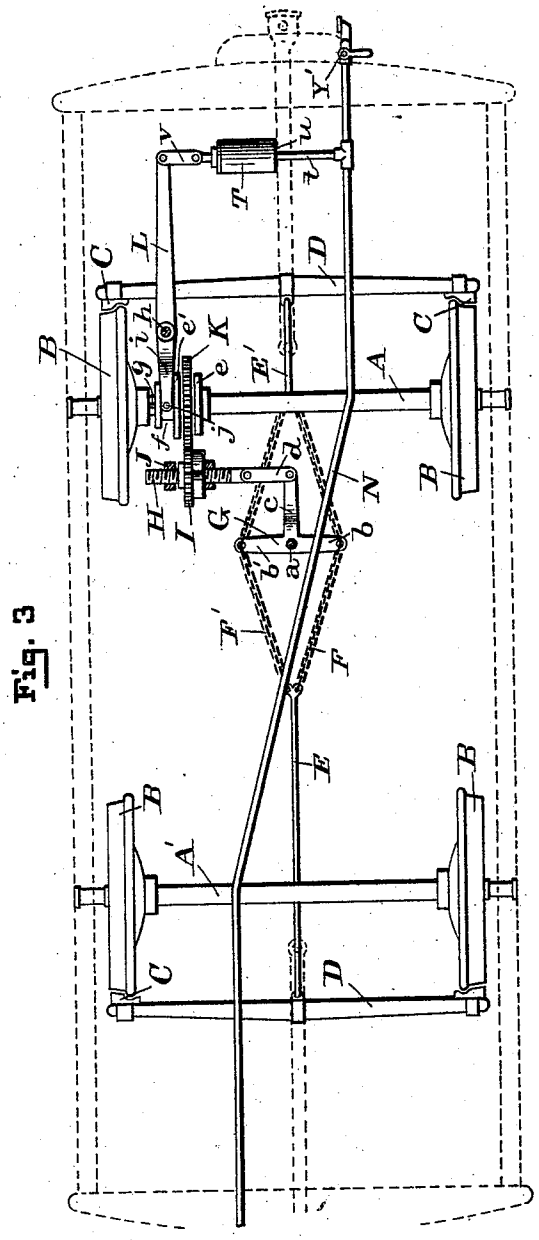

Fig. 3

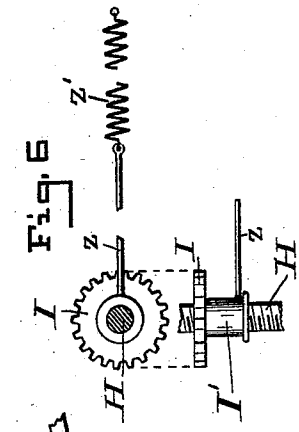

Fig. 6

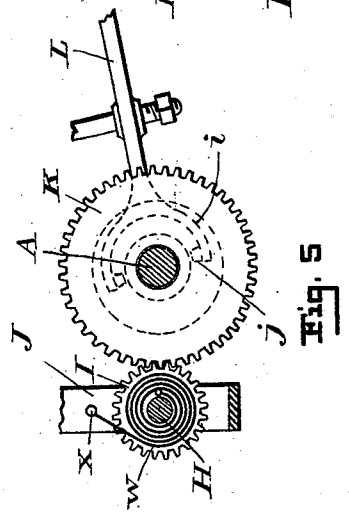

Fig. 5

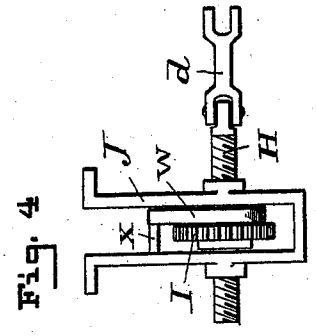

Fig. 4

Witnesses:

L. S. Van Dorn

Charles B. Mann Jr.

Inventor.

Wm L. Fitzhugh

By Chas B. Mann

Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM L. FITZHUGH, OF BALTIMORE, MARYLAND.

HYDRAULIC CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 527,743, dated October 16, 1894.

Application filed April 16, 1894. Serial No. 507,667. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. FITZHUGH, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Hydraulic Car-Brakes, of which the following is a specification.

This invention relates to a car brake to be operated through the medium of a liquid, such as water or oil.

The object of the invention is to provide an operating screw connected with the foundation brake-gear of the car; a clutch mechanism connected with one of the axles of the car and coacting with the said jack-screws; a cylinder and piston for operating the clutch mechanism; and means for using liquid in said cylinder to actuate the piston thereof, all combined to make an operative car-brake.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a top plan view of a car-brake mechanism embodying my invention. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is also a top plan view in which some of the parts shown in Fig. 1 are omitted. Fig. 4 is a detail view of the gearing for operating the jack-screw. Fig. 5 is a detail view of the mechanism for returning the jack-screw to its normal position after the brakes have been applied. Fig. 6 is a modification of the device shown in Fig. 5.

The letters, A, A′, designate the car-axles; B, the wheels; C, the brake-shoes; D, the brake-beams; E, E′, the rods, and, F, F′, the chains. These parts, commencing with the brake-shoes, comprise the ordinary foundation brake-gear of a car, and may be constructed in various ways. By drawing on the chains, F, the brake-shoes will be pressed against the rim of the wheels.

The lever, G, pivoted at, *a*, is connected with the chains, F, F′, in such manner as to draw them. In the present instance this lever is a double bell-crank or T-shaped lever. The two arms, *b*, *b′*, of this lever extend from the pivot, *a*, in opposite directions, and one chain, F, connects one arm, *b*, with the end of the rod, E, while another chain, F′, connects the opposite arm also with the same rod. Thus the two chains, F, F′, connected as described have a V-form. The lever, G, has an actuating arm, *c*, by which it is turned on its pivot, *a*. By this arrangement if the actuating arm, *c*, is pulled in one direction then the chain, F, will be under tension; but if the said arm, *c*, is pushed in the opposite direction then the chain, F′, will be under tension. In either case, however, the effect will be the same,—to draw on the rod, E, and apply the brakes. This statement is also true of the two V-formed chains connected on the opposite side of the lever-arms with the rod, E′.

An operating screw, H, is connected with the actuating arm, *c*, by means of a link, *d*. This operating screw carries a pinion, I, having internal screw-threads which fit and serve as a nut on the said screw, H.

A yoke-hanger, J, has its two arms pendent from the bottom of the car, and the jack-screw, H, passes horizontally through both arms thereof, while the screw-threaded pinion, I, is on the screw and fits snugly between the said two arms of the hanger. Thus the pinion, I, can revolve but cannot move laterally because of said two arms. Consequently when the pinion does revolve the operating screw is moved endwise laterally through the pinion, one way or the other, according to the direction of revolution of the pinion.

The axle, A, carries a loose gear-wheel, K, which is always in gear with the pinion, I. When not employed to apply the brakes the axle, A, will turn without causing the gear-wheel, K, to turn with it.

A clutch device is employed on the axle, A, to hold the wheel, K, rigid with respect to the axle and cause it to revolve when it is desired to apply the brakes. This clutch device comprises a disk, *e*, fixed rigid to the axle at one side of the loose gear-wheel, K, and another disk, *e′*, also on the axle at the opposite side of the said wheel. This latter disk, *e′*, has a collar with a circumferential groove, *f*, and is secured on the axle by means of the well-known groove and spline, *g*, so as to be movable longitudinally on the axle but compelled to revolve with the axle. The fixed disk, *e*, on one side of the wheel, K, and the movable disk, *e′*, on the other constitute the clutch.

A lever, L, is pivoted at, *h*, and has a yoke-end or bifurcated end, *i*, to span the groove, *f*. Each terminal of the said bifurcation has a pin, *j*, to engage in the groove. By moving the lever, L, the disk, *e′*, of the clutch is brought hard up against the loose wheel, K, and thereby this wheel is caused to revolve.

A liquid tank or reservoir, M, communicates with the train-pipe, N, by means of a passage, *m*, which has a check-valve, *m'*, to allow liquid from the tank to run into the train-pipe but to close the passage and prevent any back flow or return of the liquid. This tank is filled with the liquid through an opening, *n*, in the top and in the car-floor.

A main cylinder, O, connects with the train-pipe by means of a branch pipe, *o*, passing through one of its heads, *p*, and through this branch pipe liquid from the train-pipe enters and fills the cylinder. The cylinder has a piston, P, and a piston-rod, P', is connected with a foot-lever, *q*, by a link, *p'*, and this foot-lever is the means by which the piston is actuated to force the liquid out of the cylinder and into the train-pipe under pressure to apply the brakes. A spiral spring, *r*, within the cylinder returns the piston to its normal position when the pressure on the piston-rod is removed. A hand-lever, *s*, may take the place of the foot-lever if desired.

An operating cylinder, T, is connected with the train-pipe by a branch-pipe, *t*, opening through the head, *u*, and is provided with a piston, U, having a piston-rod, U', which is attached to the yoke-lever, L, by a link, *v*. When the liquid is forced through the train-pipe under pressure from the main cylinder, O, said liquid acts on the piston, U, and causes it to operate the yoke-lever, L, which will force the clutch-disk, *e'*, against the loose-wheel, K, causing it to revolve with the axle. The pinion, I, is thereby caused to revolve and move the operating screw endwise laterally in the desired direction and pull or push, as the case may be, on the bell-crank lever, G, and apply the brakes.

To return the operating screw, H, to its normal position and release the brakes it is necessary to reverse the rotation of the pinion, I. This is done by a coil spring, *w*, on the side of the pinion, and which has one end fastened to the pinion by a pin, and the other end fastened to a cross-bar, *x*, on the yoke-hanger, J. When the brakes are applied this spring is to wind up, and its reactive tension will cause the pinion to rotate in a reverse direction and return the operating screw to its original position and release the brakes.

In Fig. 6 is shown a modification of the means for reversing the rotation of the pinion, I, and releasing the brakes. In this instance the pinion, I, has a hub or winding drum, I', and a cord, *z*, is attached at one end to the pinion and at the other end to a spiral spring, *z'*, which latter may be connected with some suitable part of the car-frame or gear. This cord winds around the hub or drum, I', of the pinion one way or the other when the brakes are applied and the reactive tension of the spring, *z'*, will cause said pinion to rotate in a reverse direction and return the operating screw to its normal position and release the brakes.

The train pipe has at each end of the car a pipe coupling, Y, for attachment to the train-pipe of a next adjoining car, and a cock, Y', for closing the pipe and preventing the escape of fluid when the couplings are detached.

While I have described my invention as it is specifically shown in the drawings, it is obvious that certain details of construction may be varied without departing from my invention as hereinafter claimed.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a fluid pressure air brake, the combination of an operating screw connected with the brake rod of the car; a pinion having a threaded hub to turn on the said screw; a loose wheel on the car axle meshing with the said pinion; a clutch mechanism connected with the axle and coacting with the said loose wheel; and means for operating the clutch mechanism.

2. The combination of an operating screw connected with the foundation brake-gear of of a car; a pinion having internal screw-threads which fit and serve as a nut on the said screw; a loose gear wheel on the car-axle which gears with the said pinion; a clutch mechanism to bind the loose wheel against the car axle and cause it to revolve therewith; a cylinder and piston for operating the clutch mechanism; and means for using liquid in said cylinder to actuate the piston thereof.

3. The combination of an operating screw connected with the brake rod of a car; a pinion having a threaded hub to turn on the said screw; a loose wheel on the car-axle meshing with the said pinion; a liquid tank or reservoir; a main cylinder connected with the train-pipe and having a piston to force liquid through said pipe under pressure; clutch mechanism coacting with the said loose wheel; an operating cylinder having a piston which operates the clutch mechanism; and means for moving the main-cylinder piston to force liquid under pressure through the train-pipe to actuate the piston in the operating cylinder.

4. The combination of an operating screw connected with the foundation brake-gear of a car; an internally screw-threaded pinion for moving the said screw; a loose gear-wheel and a rigid disk, *e*, on the car axle at one side of the wheel and a movable disk on the opposite side; a lever, L, acting to move the disk, *e'*, hard up against the loose wheel and cause said wheel and the pinion to revolve; a cylinder and piston for operating the lever; and means for using the liquid in said cylinder to actuate the piston thereof.

In testimony whereof I affix my signature in the presence of two witnesses:

WILLIAM L. FITZHUGH.

Witnesses:
CHAS. B. MANN,
CHARLES B. MANN, Jr.