(No Model.)

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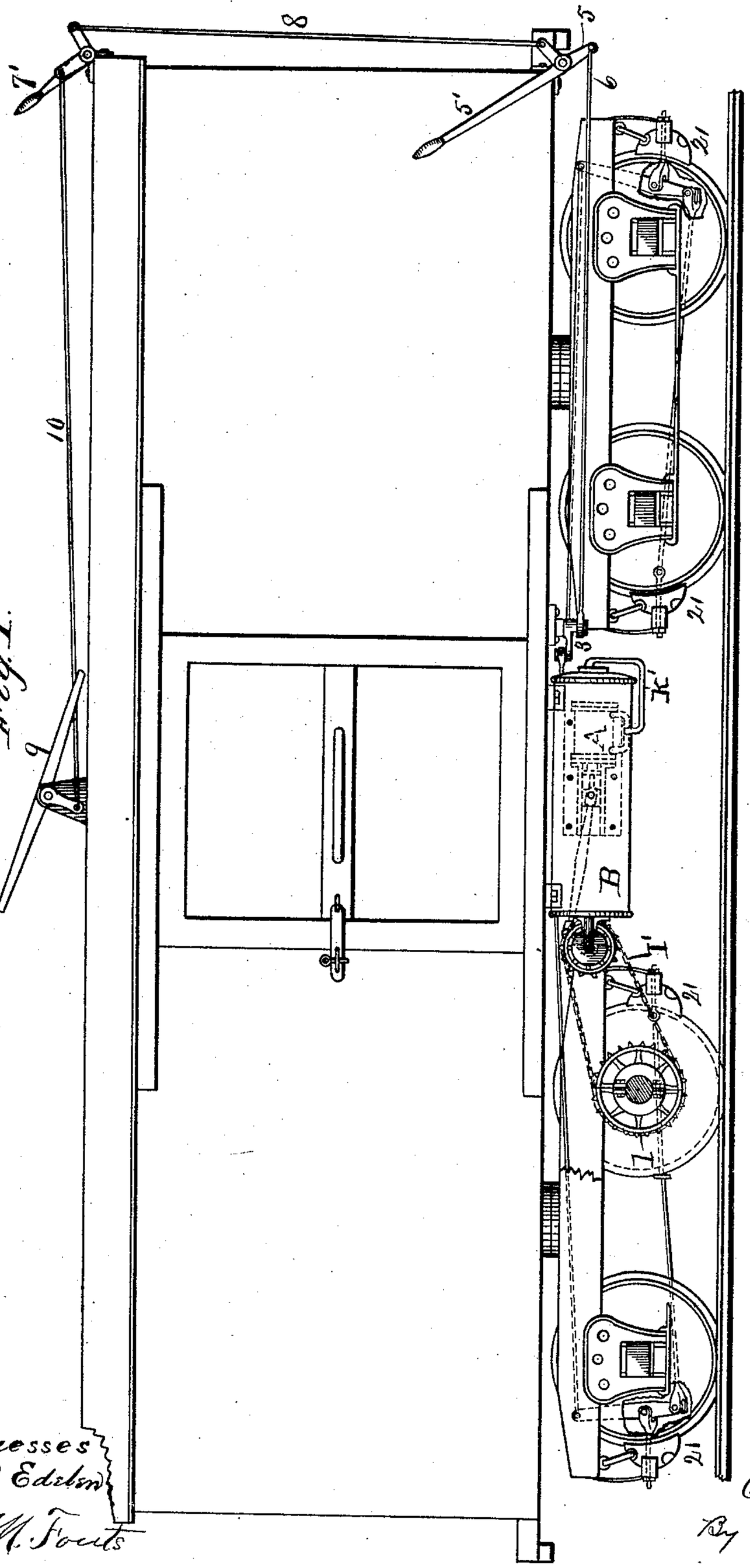
O. B. MARTIN.

AIR BRAKE.

No. 437,218. Patented Sept. 30, 1890.



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(No Model.) 4 Sheets—Sheet 2.

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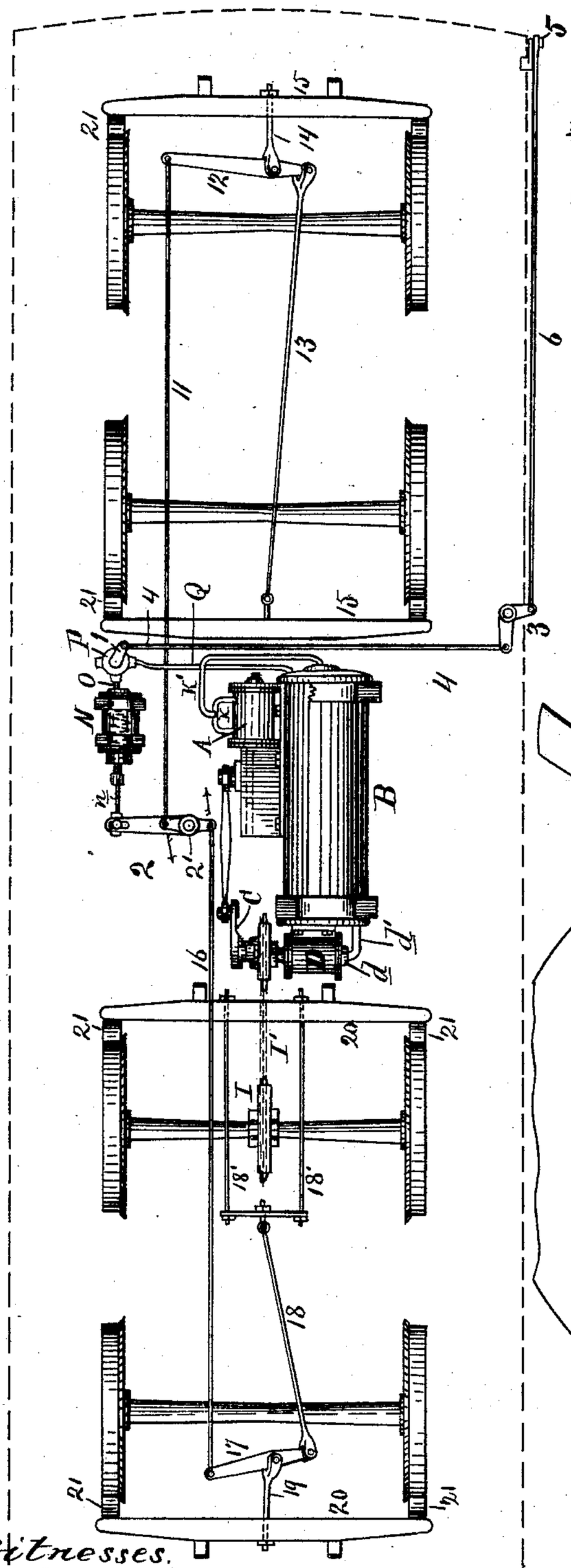

Fig. 2.

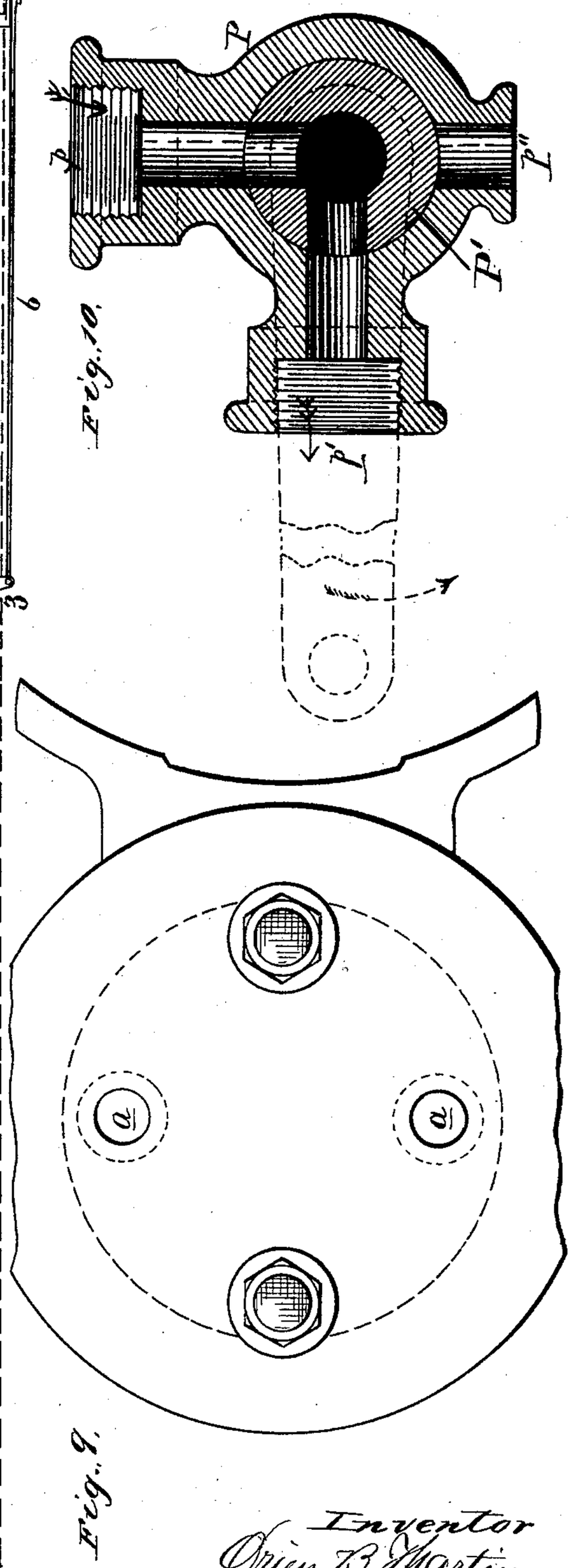

Fig. 10.

Fig. 9.

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Fig. 4.

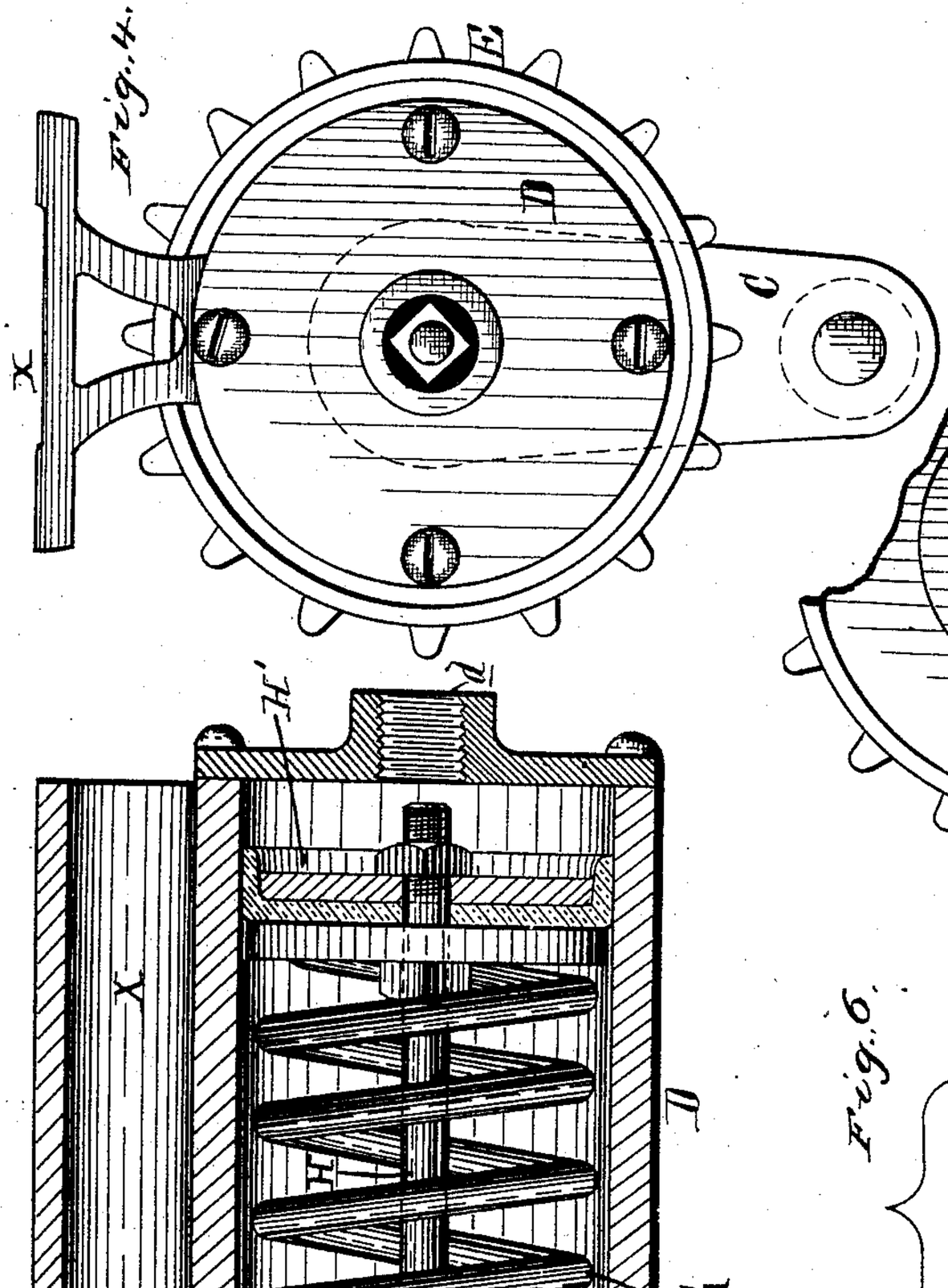


Fig. 7.

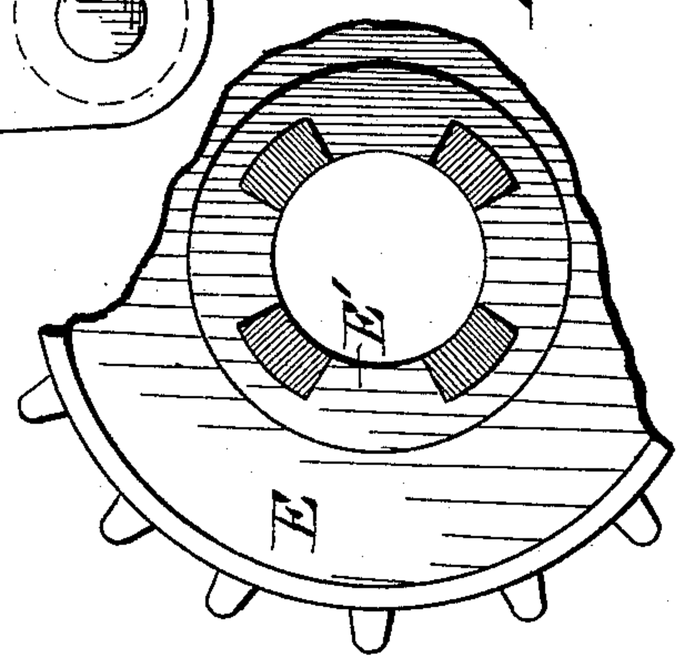


Fig. 6.

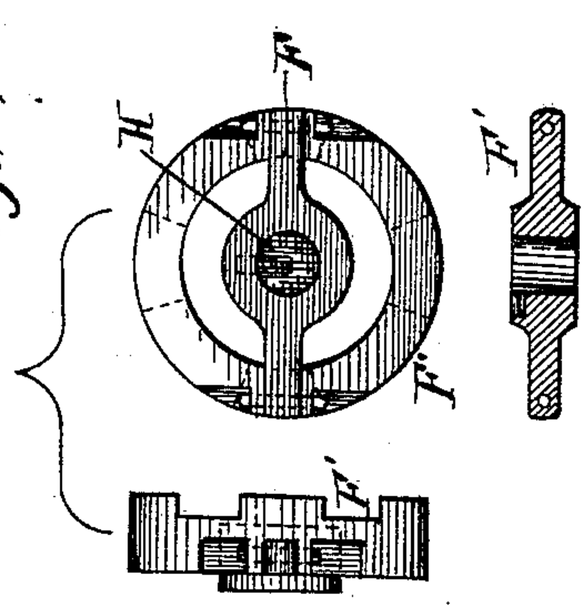


Fig. 5.

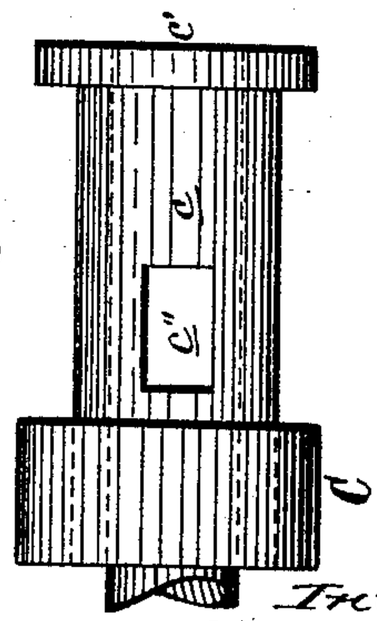
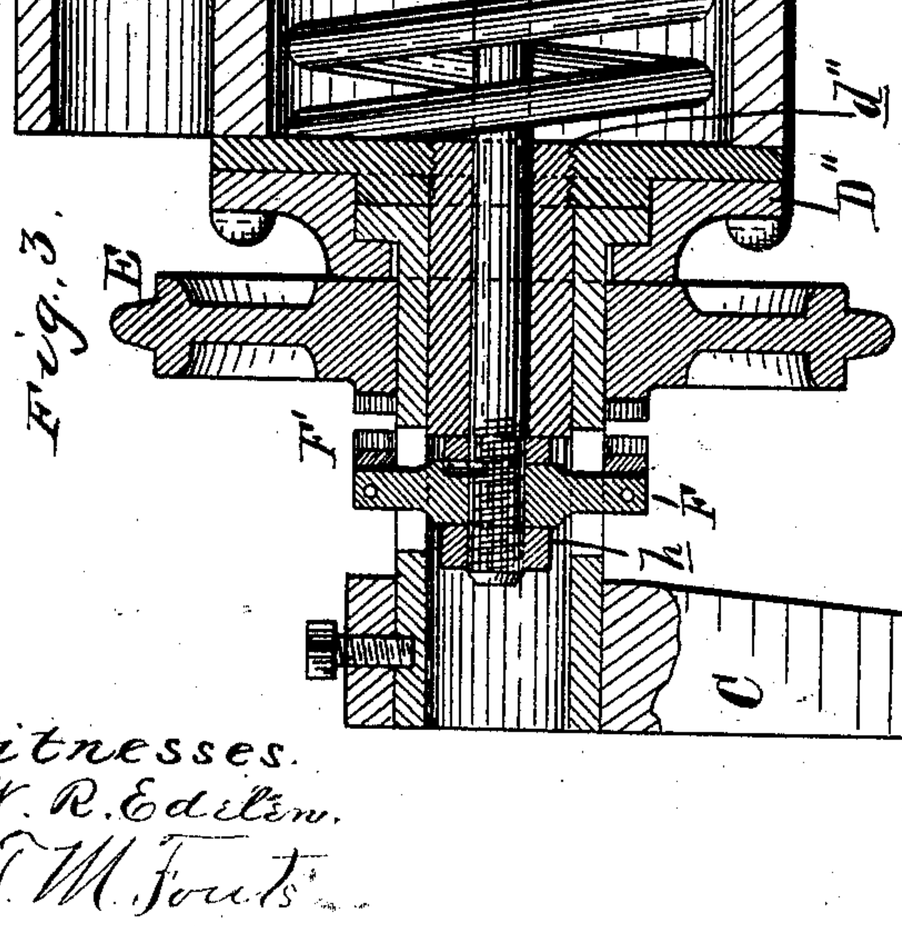


Fig. 3.



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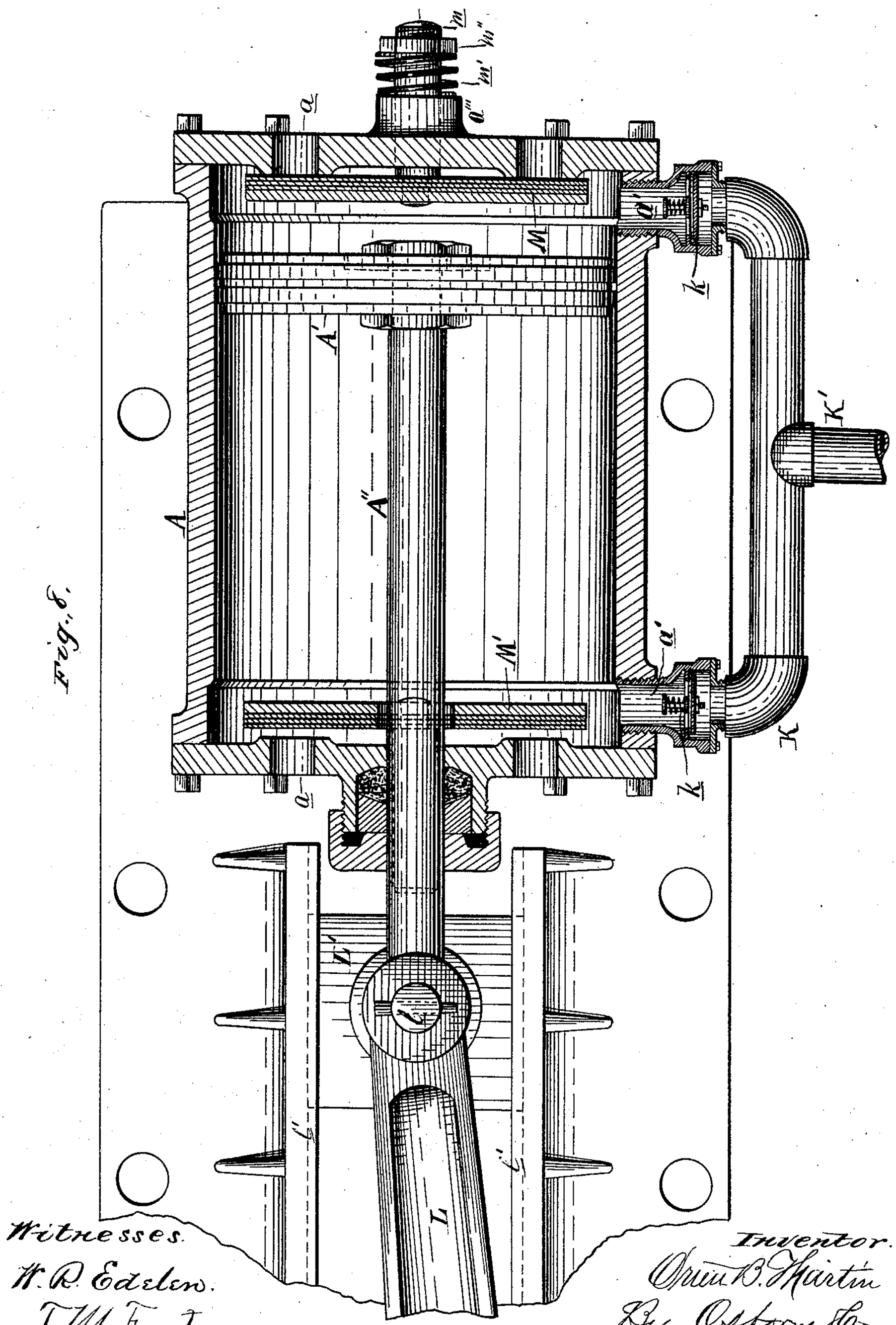

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UNITED STATES PATENT OFFICE.

ORIEN B. MARTIN, OF AKRON, ASSIGNOR OF ONE-HALF TO THOMAS HALE AND JOHN LONGANECKER, OF MOGADORE, OHIO.

AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 437,218, dated September 30, 1890.

Application filed December 16, 1889. Serial No. 333,873. (No model.)

To all whom it may concern:

Be it known that I, ORIEN B. MARTIN, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Air-Brakes, of which the following, with the accompanying drawings, is a specification.

My invention relates to air-brakes for use on railway-cars. Its object is to provide an air-brake which is adapted to freight-cars, and by means of which the brakes can be applied to any car or cars in a train independently of the other cars in the train, and in which compressed air is the actuating agent.

My invention consists in certain new and useful constructions and combinations of parts, described herein, and specifically pointed out in the claims.

Referring to the drawings, Figure 1 is a side elevation of a railroad freight-car with my improved brake, a part of one of the trucks being broken away to more clearly illustrate the application of my improvements to the car. Fig. 2 is a plan view of my improved air-brake in operative connection with the running-gear of a car. Fig. 3 is an enlarged central longitudinal section of the automatic feed-crank, regulating-cylinder, and accompanying mechanism. Fig. 4 is a rear end view of the mechanism shown in Fig. 3. Fig. 5 is a detail of the feed-crank and slotted sleeve. Fig. 6 shows details, in elevation, of the automatic clutch which forms part of the feed-crank mechanism. Fig. 7 is a broken sectional detail of the sprocket-pinion and integral clutch. Fig. 8 is an enlarged central longitudinal section of the charging-cylinder. Fig. 9 is a rear elevation of the charging-cylinder. Fig. 10 is a horizontal central section of the three-way valve.

Like letters and figures of reference refer to like parts in the several figures of the drawings.

To the bottom of the car, preferably at its middle part, is attached by suitable brackets X a charging-cylinder A. At one side thereof is placed a reservoir B for the compressed air, and at one end of the said reservoir is placed an automatic feed-crank C and regulating-cylinder D and accompanying mechanism. To the bottom of the car-frame, at a suitable distance from the charging-cylinder, is attached a brake-cylinder N. To one of the car-axles, preferably at its middle, is rigidly secured a sprocket-wheel I. The preferred placement of said parts is seen by reference to Fig. 2.

The compressed-air reservoir B may be of any desired known form, being connected with the other charging and brake-operative apparatus by suitable pipes provided with any known practical check-valves.

For the purpose of greater clearness I will first describe in detail the construction and operation of the automatic feed-crank C and its accompanying mechanism. (Illustrated by Figs. 3, 4, 5, 6, and 7.) Said crank C is secured to a slotted sleeve *c*, which is formed with a flange *c'* at its inner end, and is provided with a slot *c''*, as seen by reference to Fig. 5. The crank has a crank-pin C'. The regulating-cylinder D is provided with a suitable pipe-connection *d*, by which it is connected with the reservoir B by means of the pipes *d'*. The opposite head of the cylinder D is bored centrally at d^2, through which passes the piston-rod H. To that end of the cylinder through which passes the piston-rod H is secured a centrally-bored cap D', having a flange D^2, which overlaps the flange *c'* of the sleeve *c*. Upon said sleeve *c*, between the cap-flange D^2 and the slot c^2, is loosely mounted a sprocket-pinion E, provided with a clutch E', which is preferably an integral part of said pinion. Said sprocket-pinion and its clutch are illustrated by Fig. 7. At the outer end of said piston-rod H is secured a cross-bar F, whose ends project through the slots c^2 of the sleeve *c*. To the projecting ends of said cross-bar F is secured the automatic clutch F', which engages with the clutch E' of the sprocket-pinion E. The slot c^2 in the sleeve *c* should be large enough to allow sufficient play to the cross-bar F to engage and release the clutch F' with and from its fellow E'. Said cross-bar F is held in place on the piston-rod H by means of nuts *h* or suitable keys. The details of the cross-bar F and clutch F' are seen by reference to Fig. 6.

A compression-spring G is interposed between the piston H′ and the front end of the cylinder D, as seen by reference to Fig. 3. I preferably make this spring stiff enough to resist a pressure of about sixty-five pounds, though any other strength of spring will operate. The pressure which this spring will resist will correspond to the effective power of the brake. This will be more clearly understood from the explanation of the operation of my improved apparatus. The cross-bar F should be strong enough to withstand the strain upon it while the charging-cylinder is in operation.

The sprocket-pinion E is driven from the sprocket-wheel I by means of the drive-chain I′.

The charging-cylinder A is represented in enlarged central longitudinal section in Fig. 8. Through the heads of said cylinder are air-entrance ports *a a*, and the cylinder is provided with discharge-ports *a′ a′*, which open into the pipes K, and are connected with the reservoir B by means of pipes K′. The cylinder A is provided with a suitable piston A′, the piston-rod A″ being linked with the crank C by means of the connecting-rod L. The piston-rod A″ and the connecting-rod L are pivoted together and to the sliding block L′ by means of the pivot-pin *l*. Said block L′ travels in ways B′, so as to prevent lateral strain upon said piston-rod and cylinder. Inside of the heads of said cylinder A are disks M and M′, which are held in place by sliding bolts *m*, which pass through a boss *a‴* formed on the cylinder-heads. A coil-spring M′ is interposed between the nuts M″ and the cylinder-head, said springs operating to bring the disks M and M′ against the cylinder-heads and close the entrance-ports *a*. In the discharge-ports *a′* are placed suitable check-valves *k*. The disk M′ is bored centrally for the piston-rod A″ to operate through it.

N represents the brake-cylinder. This is an ordinary cylinder having a suitable piston, whose piston-rod *n* is pivotally connected to the double-armed lever 2. Within this cylinder there may be a spring interposed between the piston and the front head of the cylinder, for the purpose herein stated. The brake-cylinder N is connected with the reservoir B by the pipes O, three-way valve P, and pipe Q.

The three-way valve referred to is shown in horizontal section in Fig. 10. One of the ways *p* is connected with the pipes O. Another *p′* is connected with the pipe Q, and the other way *p″* is an open discharge. To the valve-center P′ is connected a lever 1. Lever 1 is connected to a bell-crank 3 by a rod 4. The bell-crank 3 is connected to the bell-crank 5 by the rod 6. The bell-crank 5 is connected to the bell-crank 7 at the top of the car by the rod 8. The bell-crank 7 is connected to the rock-lever 9 by the rod 10. The preferred arrangement of said levers is seen by reference to Figs. 2 and 1.

By reference to Fig. 2 will be seen the preferred arrangement of brake-rods and their connection with the air-brake. The two-armed lever 2 is pivoted to the car-frame at 2′, as shown. A rod 11 connects one arm of said lever 2 with the brake-shoes of the forward truck by means of the lever 12, rods 13 and 14, and the cross-ties 15. The rod 16, attached to the short arm of the lever 2, connects the same with the brake-shoes of the rear truck through the lever 17, rods 18 and 19, and the cross-ties 20.

The operation of my brake is as follows: When the car is moving and the air-pressure in the reservoir and its connection with the regulating-cylinder D is less than the spring G will resist or yield to, said spring will force the piston H′ and rod H back, so that the clutch F′ on the cross bar F will engage its fellow E′ on the sprocket-pinion E. The sleeve *c* will then rotate, the crank C will be driven, which will, through the connecting-rod L, operate the charging-cylinder A and force the air into the reservoir B. Whenever the pressure of the air in the reservoir B and its connection is greater than the spring G will resist, the air will force the piston H′ and rod H outwardly and thus disengage the clutches F′ and E′, and no more air will be driven into the reservoir till the air-pressure therein falls below the resistance of the spring G, when said clutches will again engage and operate the charging-cylinder, as herein stated. The operation of said charging-cylinder will be readily understood by persons skilled in the art by reference to Fig. 8.

When it is desired to apply the brakes, the three-way valve P should be so turned that the compressed air in the reservoir will pass through said valve into the brake-cylinder N. This will force the piston of said cylinder outwardly and throw the two-armed lever 2 in the direction indicated by the arrow in Fig. 2. This will pull the rods 11 and 16, which will operate the levers 12 and 17 and their connected rods and the cross-ties and bring the shoes 21 against the peripheries of the car-wheels.

When it is desired to release the brakes, the three-way valve P should be thrown so as to discharge the air from the free opening *p″*. The weight of the car-brakes will be sufficient when released to throw the piston within the brake-cylinder back to its initial position; but, if desired, a spring may be interposed between the piston and cylinder-head of the brake-cylinder, which will insure the throw of the piston of said cylinder back to its position occupied before the air was admitted thereto. The arrangement of said spring may be similar to that seen in Fig. 3, and needs no illustration. This valve P may be changed by the operator's throwing either the levers 5′ or 7′ or by stepping on one end of the rock-lever 9. It will be seen that a brakeman can, while running over the tops of cars, apply or release many brakes almost

as quickly as he can run over the cars in a train, and he can release them as quickly.

It will now be readily understood how the rigidity of the spring G will regulate the air-pressure of the reservoir, and thus also the power of the brake. The rigidity of this spring should therefore be adapted to the pressure required in any service, after which it will require no attention.

It will be observed that other arrangements of connections between the brake-cylinder and the brake-shoes than those herein described may be employed, and that other means of directing the air from the reservoir to the brake-cylinder, and also other arrangements of rods and levers, or other means than those shown may be adopted for operating the three-way valve, and an equivalent for the clutch in the charge-regulating mechanism, as well as other changes, may be adopted without departing from the spirit of my invention.

What I claim as my invention is—

1. In combination, a compressed-air reservoir, a three-way valve, a brake-cylinder, a charging-cylinder, a driving-wheel mounted upon and taking power from an axle of the car-truck, a feed-crank, a pinion-wheel driven by the driving-wheel of the car-axle, said pinion-wheel being adapted to make and break connection with said feed-crank by the pressure of the air from the storage-cylinder, a double-pivoted lever connected with the piston-rod of the brake-cylinder, any suitable intermediate connection between said pivoted lever and the brake-shoes, and means for operating the three-way valve, substantially as specified.

2. In an air-brake, an air-storage reservoir and a charging-cylinder, in combination with a feed-regulating mechanism consisting of a cylinder, a piston, and piston-rod, a spring interposed between the piston and the cylinder-head, a slotted sleeve so secured to the end of the cylinder as to have a rotary motion, said sleeve inclosing the projecting end of the piston-rod, a pinion-wheel loosely mounted upon said slotted sleeve, a crank rigidly secured to said slotted sleeve, and a cross-bar extending through the slotted sleeve and supported by the piston-rod, said cross-bar and pinion-wheel being adapted to make and break connection, substantially as specified.

3. In an air-brake, a feed-regulating device consisting of a cylinder, a piston, and piston-rod, a spring interposed between the piston and the cylinder-head, a slotted sleeve, a cross-bar extending through the slotted sleeve and supported by the piston-rod and carrying a clutch, a pinion-wheel having a clutch adapted to engage the clutch on said cross-bar, and a crank secured to said sleeve, substantially as described.

4. The combination, in an air-brake, of a drive-wheel mounted on an axle of the car-truck, a compressed-air reservoir, a charging-cylinder, and a feed-regulating device consisting of a cylinder, a piston, and piston-rod, a spring interposed between the piston and cylinder-head, a slotted sleeve, a cross-bar extending through the slotted sleeve and supported by the piston-rod, a clutch or its equivalent, a pinion-wheel mounted on said slotted sleeve, and a connecting-rod extending from said crank to the piston-rod of the charging-cylinder, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses, this 11th day of December, 1889.

ORIEN B. MARTIN.

Witnesses:
U. F. MARVIN,
F. M. ATTERHOLT.