(No Model.) 5 Sheets—Sheet 1.

O. W. DEAN.

AIR BRAKE.

No. 511,071. Patented Dec. 19, 1893.

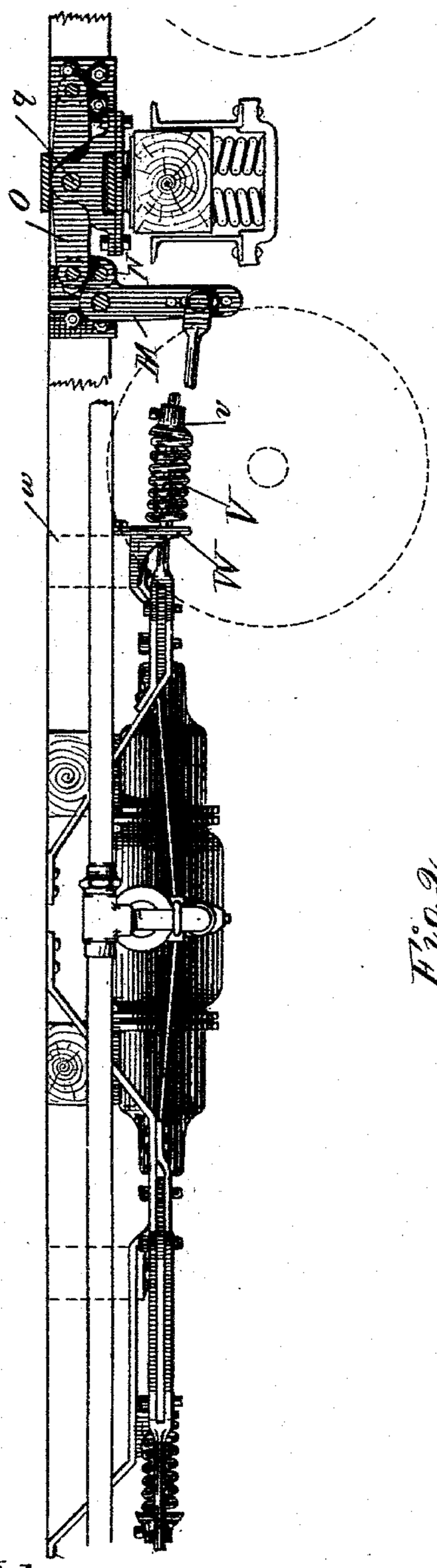

Fig. 1.

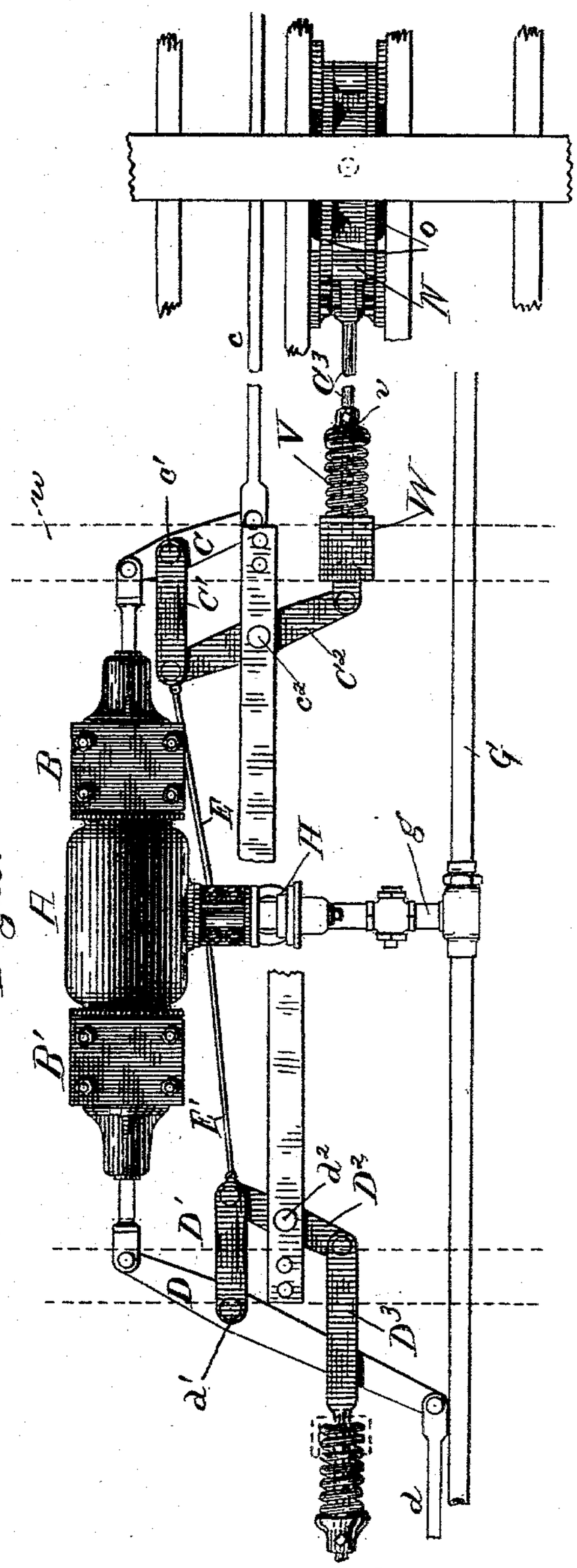

Fig. 2.

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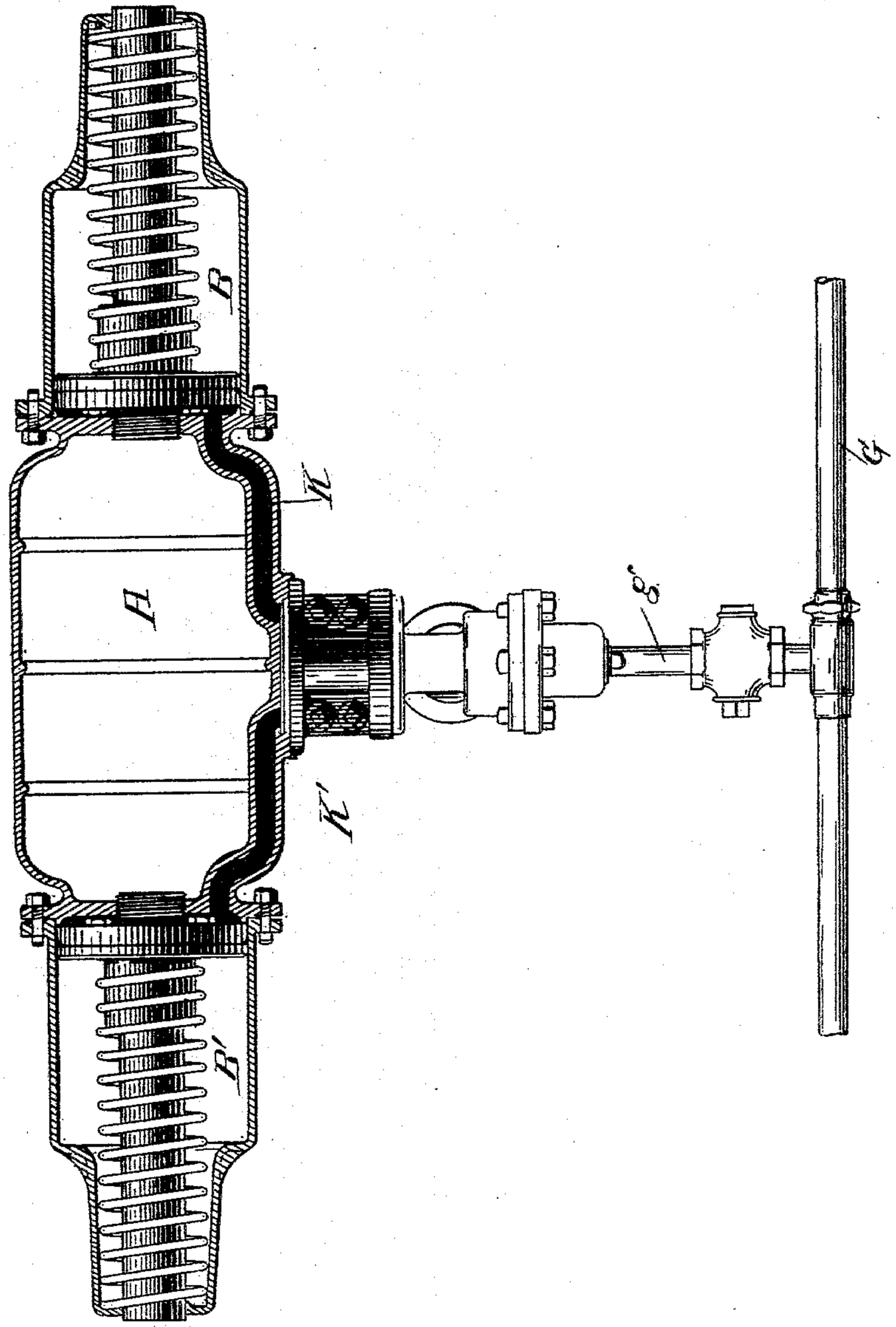
Fig. 3.



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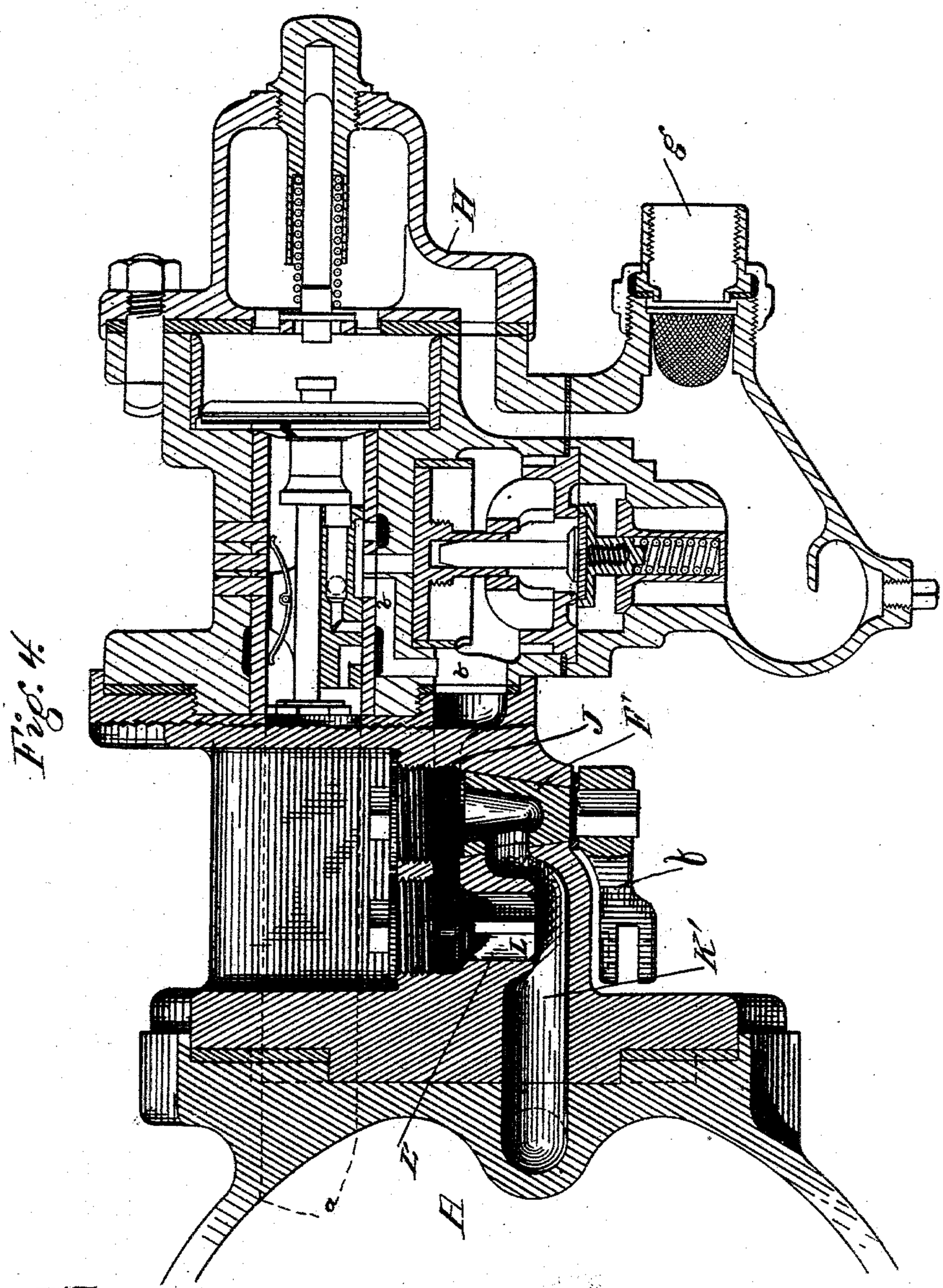

Fig. 1.

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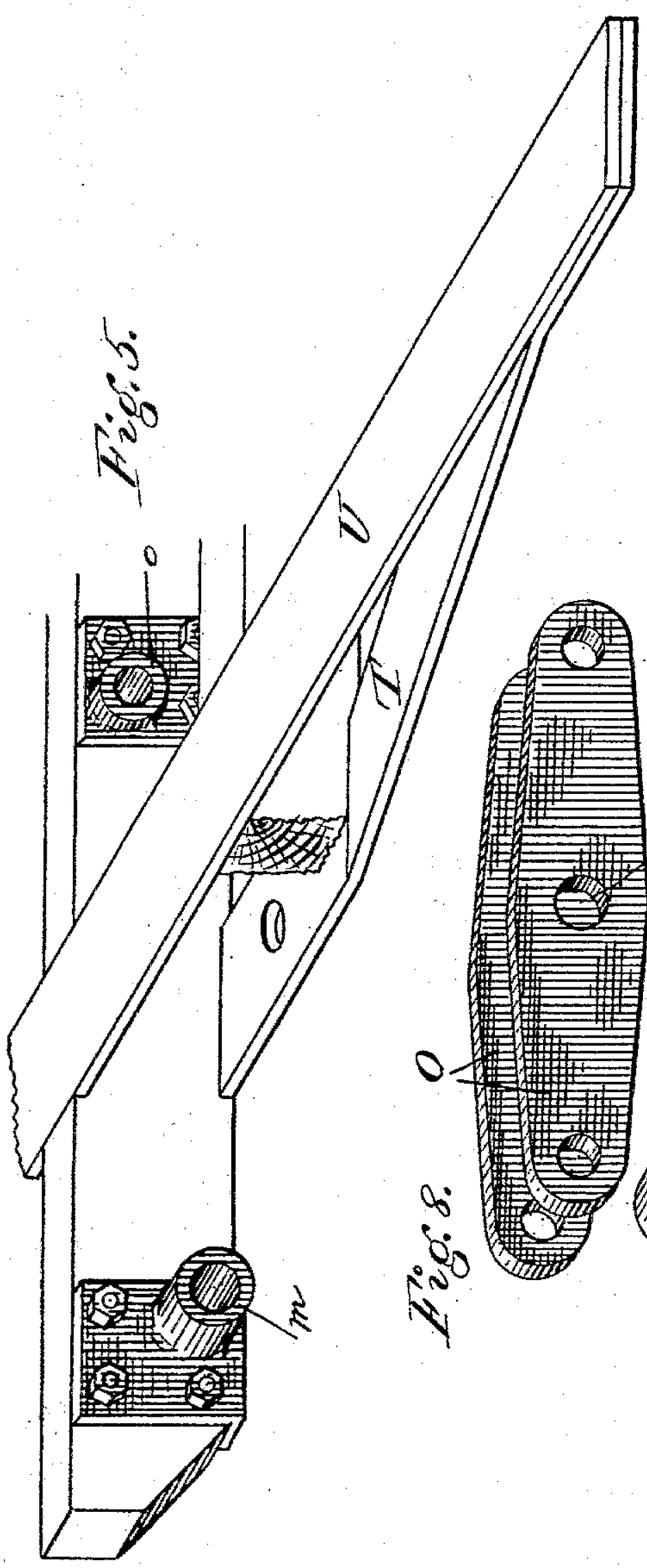

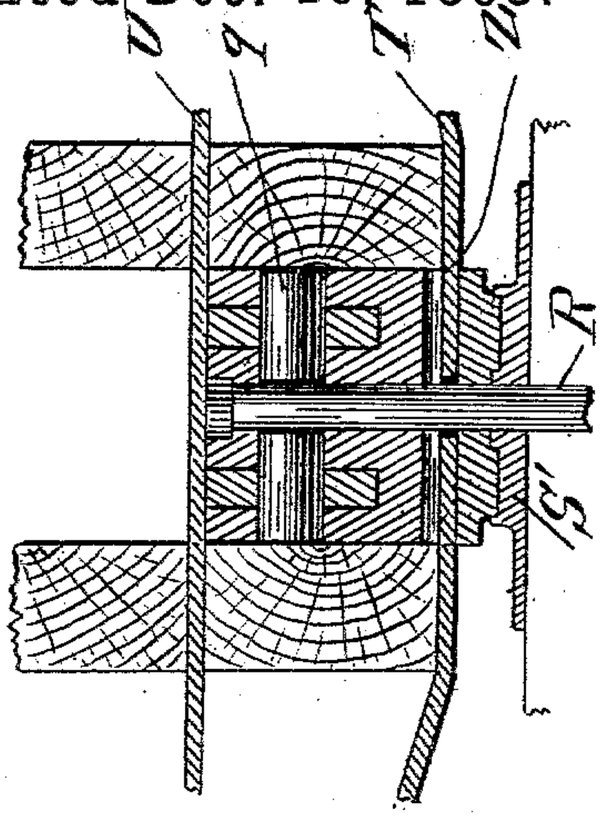

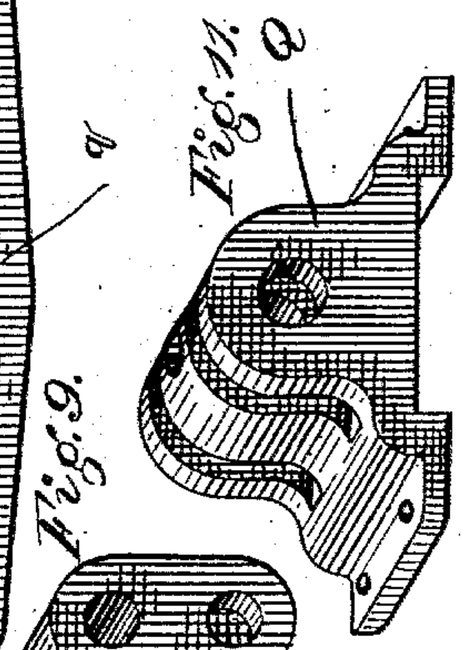

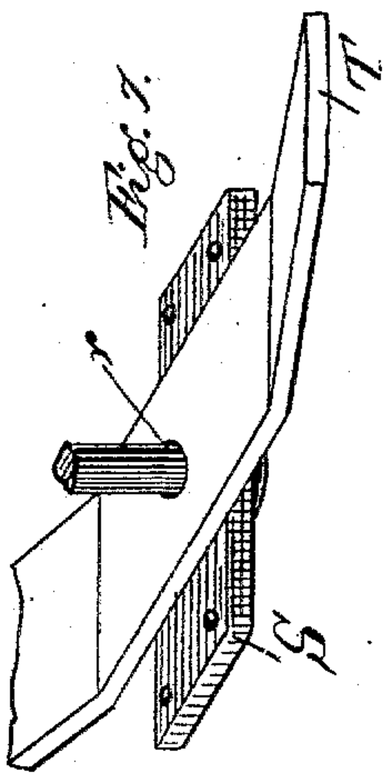

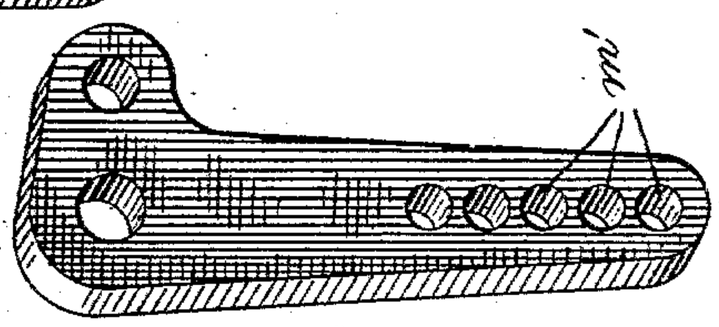

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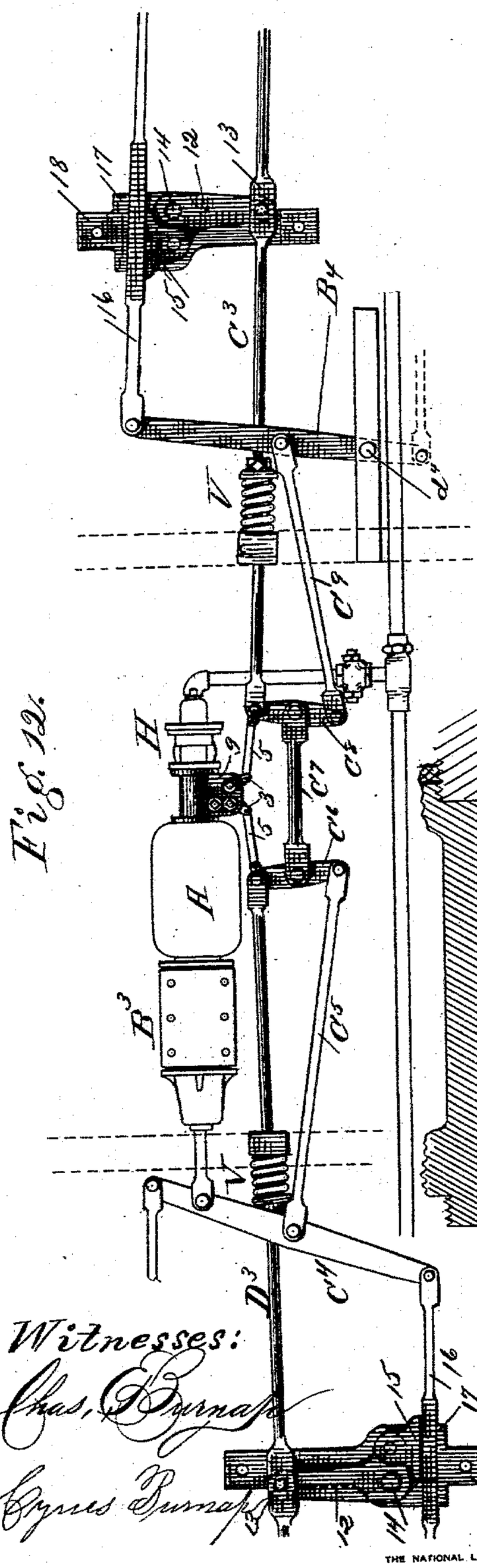

Fig. 12.

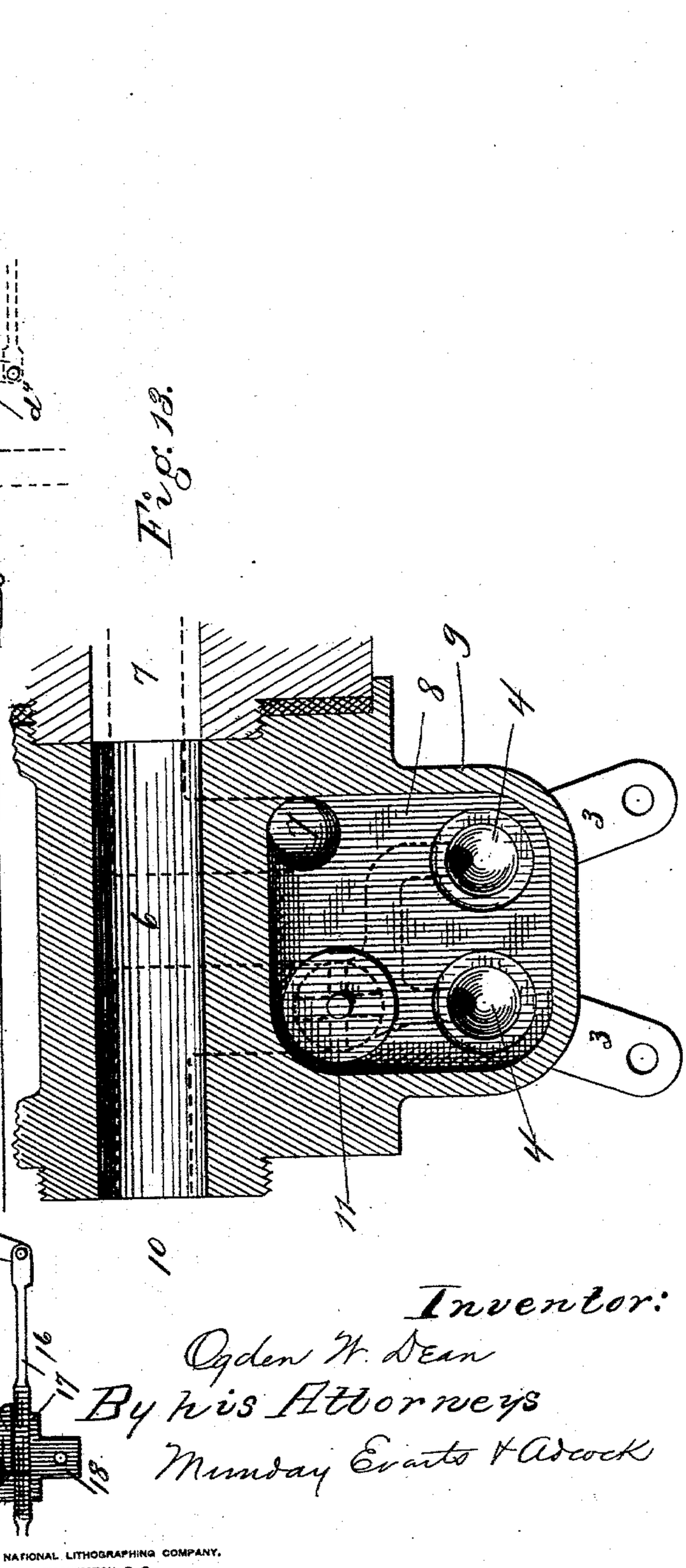

Fig. 13.

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UNITED STATES PATENT OFFICE.

OGDEN W. DEAN, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-TENTH TO THE AIR BRAKE PRESSURE REGULATOR COMPANY, OF SAME PLACE.

AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 511,071, dated December 19, 1893.

Application filed July 17, 1891. Renewed May 12, 1893. Serial No. 474,030. (No model.)

To all whom it may concern:

Be it known that I, OGDEN W. DEAN, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Air-Brakes, of which the following is a specification.

In an application filed by me on the 12th day of January, 1891, I have shown the combination with a car and its air brake apparatus of automatically acting governor or regulating mechanism, designed to prevent the exertion of any such pressure by the brake as will cause the wheels to slide upon the track, the governing mechanism referred to consisting of means for lifting the car body, an air piston and cylinder for actuating said lifting devices, and a governing valve, which is automatically set in operation upon the lifting of the car and serves to shut off the air from the brakes.

In my present invention I have simplified the mechanism shown in my said application, and I have also otherwise improved its operation.

In my former invention the lifting of the car body did not take place until the pressure upon the piston actuating the lifting devices became great enough to lift the entire car body. Inasmuch however as the load carried by the car is quite apt to be unevenly distributed throughout the car, one end being often loaded when the other is empty, I have conceived that an advantage will be obtained if the lifting devices at the two ends of the car are made independent, or measurably so, of each other, so that they will act separately as soon as the pressure becomes great enough to overcome the weight at their respective ends of the car, and either shut off all additional air pressure from the brake as soon as they act or set in operation devices whereby the superfluous air pressure may be neutralized, and thus more perfectly prevent the evil designed to be overcome by my previous invention. Herein lies the main feature of my present invention.

Another feature of value consists in connecting the lifting devices to the brake piston so that they may be actuated thereby, thus enabling me to dispense with the additional cylinder and piston provided for the operation of the lifting devices in my former invention.

A third feature of the invention consists in applying to the lifting devices a resistance, such for instance as a spring, the power of which is regulated so as to be about equal to the weight of the truck and which must also be overcome before the lifting can take place, thus graduating the action of the apparatus according to the weight of the car and truck upon the track.

These several features I have illustrated in the accompanying drawings, in which is shown the best construction now known to me for accomplishing the result sought, and in which—

Figure 1 is a partial side elevation of a car to which my present improvements have been applied. Fig. 2 is a bottom view of the same. Fig. 3 is an enlarged horizontal section of the auxiliary reservoir and brake cylinders. Fig. 4 is a section also enlarged of the triple valve and adjacent parts of the apparatus and showing the air passages and valves. Figs. 5 to 11, inclusive, are details of the lifting devices and their supports. Fig. 12 is a view similar to Fig. 2, of a modified construction, and Fig. 13 is an enlarged section of the governing valve case of the modified construction.

In all the drawings A represents the auxiliary reservoir of the brake apparatus, and in the preferred construction I employ with the reservoir a separate brake cylinder for operating the brake and lifting apparatus at each end of the car. These cylinders are shown at B B′, and may be located at the opposite ends of the reservoir. The piston of cylinder B is connected to the braking devices at one end of the car by lever C and rod *c*, and the piston of cylinder B′ is connected with the braking devices at the other end of the car by lever D and rod *d*.

The lifting devices which are located at the center pins of the trucks are connected to and actuated by the levers C and D, as follows: In the case of the lifting devices illustrated at the right end of the car, the con-

nections consist of the link C′, lever C^2 pivoted to a stationary point c^2 at its center, and rod C^3 extending to the lifting devices, the lever C^2 being jointed to both link C′ and rod C^3, and the link being pivotally jointed to lever C at c'. At the other end, the lever D is pivotally jointed to a link D′ at d'. Said link is jointed to a swinging lever D^2 pivoted centrally at a stationary point d^2, and said lever is jointed to the rod D^3 extending to the lifting devices. In this construction it will be noticed that the pivots c' and d' will remain stationary until the pressure has become great enough to swing the lever C^2 and actuate the lifting devices, and that until that time said pivots c' and d' act as stationary fulcrums to levers C and D, and that when said levers swing and actuate the lifting mechanism the joints between them and the brake rods become temporarily the fulcrum points.

Each brake cylinder is provided with a governing valve, and such valves are mechanically connected to the lifting mechanism, or preferably to some portion of the lever system by which power is carried from the brake cylinder to said mechanism, and in the drawings such connections for the valves consist of the rod E joined to one end of lever C^2, and rod E^3 joined to lever D^2. The valves which are indicated at F and F′ are each provided with crank arms $f f'$, and such arms are joined to the rods E and E′. The construction of the valves and the air passages to the cylinder, their location and mode of operation will now be described.

G is the main train pipe, having a branch g. This branch g opens into the triple valve casing H, a section of which is given at Fig. 4, and is of the usual construction. From the triple valve the air is fed to the reservoir by the passage a, and in entering the brake cylinders it passes first through a port b into a chamber J in which are located the governing valves F and F′, already referred to. These valves are similar in construction and hence but one is shown in detail. They are preferably plug valves made hollow with lateral openings to register with the air passages K and K′ leading to the respective cylinders, as seen at Fig. 4, and each is operated by its crank arm and the mechanical connections above described. Check valves L in short passages or openings L′ leading from cylinder J to the passages K and K′ respectively, and located between the governing valves and the cylinders, are designed to give vent to the air in either cylinder whenever the pressure in chamber J is reduced below that in the cylinders.

The lifting devices are different in construction from those shown in my prior application, and I believe are an improvement thereon. They consist of the following: The rods C^3 and D^3, which are actuated from the brake levers, as already seen, are each jointed to an elbow lever M pivoted to the car frame at m. A link N connects lever M with one end of a lever or pair of levers O, stationarily supported upon the pivot o projecting from the car frame. Located centrally between the ends of levers O and joined thereto by pivots q is the supporting block Q, which is recessed vertically to receive the center pin R of the truck, and is bolted at its ends to the bearing plate S which rests upon a corresponding plate S′ secured upon the truck beam. The center pin also passes through the enlarged opening r of the usual transom iron T which passes under the block Q. Another transom iron U, also commonly employed, passes over the block Q. The lower end of lever M is provided with a series of openings m' for the attachment of the rods C^3 and D^3, which enable the throw of the lever to be varied to suit circumstances.

At V upon each of the rods C^3 and D^3 is shown a resistance spring, confined between the collar v on the rods and a suitable opposing bracket W located upon or supported from some stationary part of the car, as for instance the cross beams w. These springs exert a resistance upon the rods C^3 and D^3 equal to the weight of the truck upon the track, and hence in effect they add the weight of the truck to the weight of the car, and such united weight must be overcome before the lifting takes place and the governing valve is closed.

With this construction the operation is substantially as follows: When it is desired to set the brakes, the engineer reduces the pressure in the train pipe and triple valve in the usual manner. The air from the reservoir then charges the two cylinders and actuates the pistons thereof to set the brakes. The pressure thus put upon the pistons may be continued until it becomes great enough to overcome the resistance caused by the weight of one end of the car and until the resistance of spring V at the same end is also overcome. The brake lever will then move so as to carry link C′ or D′, and swing lever C^2 or D^2 thereby giving motion through rod C^3 or D^3 to the elbow lever M located at the end of the car when the resistance is overcome. The swinging movement of lever M thus imparted depresses the link N and the ends of levers O to which said link is attached. The farther ends of levers O are thus caused to rise and lift the car body, acting in so doing as levers of the first kind with the pivots q as the fulcrum. Inasmuch as pivots q are sustained from the truck by plates S and S′ and block Q, it will be seen that the body of the car will rise slightly under the lifting action of levers O. The lifting can be very limited so far as the extent of the movement is concerned, and it is only requisite that at the time the resistance is overcome the governing valve at the end of the car which may be lifted shall be closed so as to shut off the surplus air pressure from the brake. In the construction given in the drawings this is done by the rod E. The operation described will occur simultaneously at both ends of the car

if they are equally loaded, but if unequally loaded then it will occur at the lighter end first in point of time. Each brake mechanism in this construction is independent of the other, and should either become disabled the other may still be used.

It will be noticed that space is left between the block Q and transom T, as indicated at Z, so as to allow the parts sustained from the car body to rise.

In the modification shown at Figs. 12 and 13, I accomplish substantially the same results, so far as the lifting of each end of the car separately is concerned, but I employ only a single brake cylinder and the braking mechanisms are not wholly independent of each other. In this modified construction A represents the auxiliary reservoir and H the triple valve casing, B^3 the brake cylinder, C^4 the brake lever at one end and B^4 the brake lever at the other end, and the latter is connected to lever C^4 by the rod C^5, swinging lever C^6, connecting rod C^7, swinging lever C^8 and rod C^9. The brake lever B^4 is also pivoted at a stationary point d^4. It will be seen that this system of levers causes the transmission of power from one brake lever to the other, whenever the first one is actuated. The lifting rods are shown at C^3 and D^3 as before, and they are provided with similar resistance springs V, and each of said rods is joined to the crank arm 3 of an air valve 4, each of which valves controls in part the admission of air to the brake cylinder, as hereinafter more particularly set forth. The connections between the lifting rods and the valve cranks are shown at 5, 5. The air from the triple valve passes into the reservoir through the passage 6, and it enters from the same valve to the cylinder first through passage 7 into a chamber 8 in casing 9, and thence by way of the valves 4, 4 into a passage 10, each valve having a separate entrance into such passage 10 as indicated by broken lines. Between the passage 10 and chamber 8 is an opening closed by the check valve 11, intended to operate in the same manner as the previously described construction. In this modified construction the valves 4, 4 can neither of them shut off the entire supply of air to the brake cylinder, but both must close in order to effect this. Hence I provide in the case of each brake lever a locking device which shall be actuated at each operation of the lifting rod, and which shall effectually prevent the putting of any further pressure upon the brake. A simple and efficient construction of this locking device is illustrated in Fig. 12. It consists of a swinging elbow lever 12, joined to the lifting rod at 13, and pivoted at 14. This lever carries a rocking shoe 15 which frictionally engages with the brake rod 16 and clamps it against a shoulder 17 formed upon the supporting plate 18. It will now be seen that as soon as either of the lifting rods is actuated such rod will cause its elbow lever 12 to rock and clamp the brake lever 16 of the brake upon the same end of the car, and thus lock the rod so that whatever pressure may be subsequently put upon the brake piston, no increase of pressure will come upon the brake at this end of the car. While the brake at one end of the car is thus locked and its air valve closed the pressure upon the piston will be transmitted to the brake at the other end of the car, and such pressure may increase until that end is also lifted and its valve is closed, so that the admission of further air is entirely stopped. In this construction as in the other the lifting may take place simultaneously at both ends of the car, or at different times, and in the latter case although the air is not wholly shut off from the brake cylinder it is prevented from further action upon the brake at the end which has been lifted by the lock put upon the brake rod.

I claim—

1. The combination with a car and its braking apparatus of independent lifting devices for lifting the ends of the car, such devices being mechanically connected to and receiving power from the lever of the braking apparatus, substantially as specified.

2. The combination with a car and its braking apparatus of lifting devices connected directly to and receiving power from the lever of the braking apparatus, substantially as specified.

3. The combination with a car and its atmospheric brake apparatus, of lifting devices located at the centerpin and receiving power from the brake apparatus, and a valve controlling the air passage to the brake apparatus connected to and operated by said lifting devices, substantially as set forth.

4. The combination with a car and its atmospheric brake apparatus embodying a brake cylinder and triple valve, of mechanism for lifting the car and a valve actuated from said lifting mechanism and located in and controlling the air passage leading from the triple valve to the cylinder, substantially as set forth.

5. The combination with a car of a cylinder and braking apparatus for each truck, lifting mechanism located at each truck, a valve for each cylinder controlling the air passage thereto and mechanical connections between the respective valves and lifting mechanisms, substantially as set forth.

6. The combination with a car of a cylinder and braking apparatus for each truck, lifting mechanism located at each truck, a valve for each cylinder controlling the air passage thereto and mechanical connections between the respective valves and lifting mechanisms, the lifting mechanisms being connected to and receiving power from the brake levers of the apparatus, substantially as set forth.

7. The combination with a car of brake cylinders B B′, separate lever systems operated by said cylinders respectively, separate lifting mechanisms connected one to each of said lever systems, and governing valves one for

each of said cylinders, operated from said lifting devices, substantially as specified.

8. The combination with a car and its braking apparatus, of lifting devices adapted to lift the car body, mechanical connections whereby power is carried from the braking apparatus to the lifting devices and means for increasing the resistance to the lifting to the extent of the weight of the truck, substantially as specified.

9. The combination with a car and its braking apparatus, of separate lifting devices located at the ends of the car body, mechanical connections from the braking apparatus to the lifting devices whereby the latter are actuated, and means applied to each of such lifting devices for increasing the resistance to the lifting to the extent of the weight of the trucks, substantially as specified.

10. The combination with the car and its braking apparatus of lifting devices adapted to lift the car body, connections between the braking apparatus and the lifting devices whereby the latter may be actuated, and a spring acting on the lifting devices and increasing the resistance to the lifting to the extent of the weight of the truck, substantially as specified.

11. The combination with the brake lever and the lifting devices, of the connections whereby power is carried from one to the other, consisting of link C′, lever C^2 and rod C^3, and a resistance spring V acting on said connections, substantially as set forth.

12. The combination with the brake lever and the lifting devices, of the connections whereby power is carried from one to the other consisting of link C′, lever C^2 and rod C^3, substantially as specified.

13. The combination with a car and its truck of elbow lever M, lever or levers O connected to said elbow lever and pivoted to the car frame and also fulcrumed in block Q supported from the truck and said block and its supports, the braking apparatus and a lever system carrying power from said apparatus to said elbow lever, substantially as specified.

14. The combination with the triple valve, of a brake cylinder, a chamber J located between the triple valve and the cylinder, and opening from the former, a valve controlled passage such as K leading from said chamber to the cylinder, and an opening between the passage and said chamber, provided with a check valve substantially as specified.

15. The combination with the brake cylinder and triple valve of a valve located between and controlling the passage of air from one to the other, and lifting devices deriving power from the brake apparatus and having a connection to and serving to close said valve when said devices are themselves actuated, substantially as set forth.

16. The combination with the brake apparatus and lifting devices of a car, of means set in operation by the lifting devices for locking the brake and preventing additional pressure upon the wheels thereby, substantially as specified.

17. In an air brake apparatus, the combination of the brake cylinder, the lifting devices, the valve F controlling the entrance of air to the cylinder and mechanical devices whereby said lifting devices operate said valve, substantially as set forth.

18. In an air brake apparatus the combination of the brake cylinder, the triple valve, the lifting devices, the valve F controlling the entrance of air to the cylinder and mechanical devices whereby said lifting devices operate said valve, substantially as set forth.

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