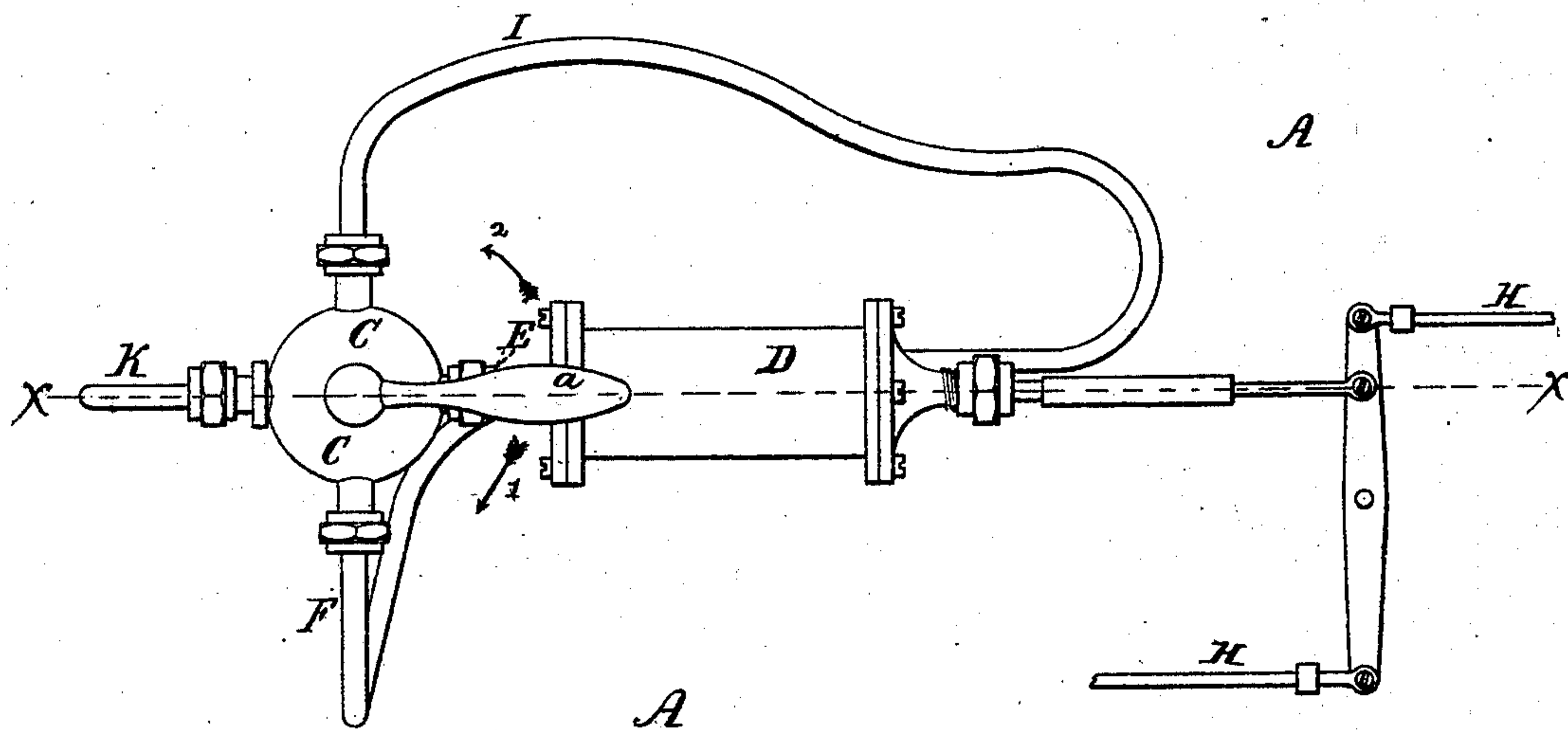
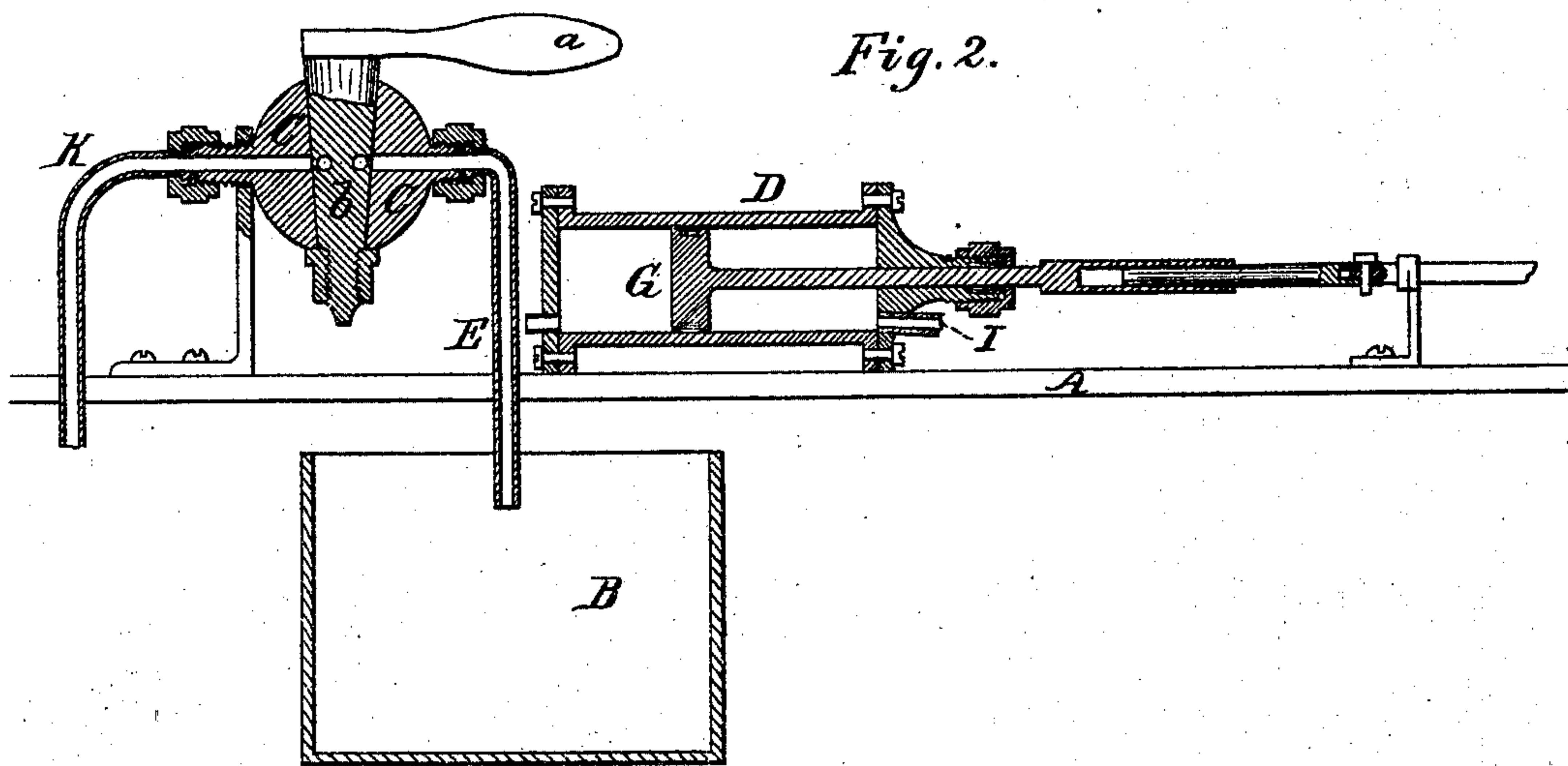


JOHN W. GARDNER.

Improvement in Air and Steam Car Brakes.

No. 122,884.

Patented Jan. 23, 1872.

Fig. 1.*Fig. 2.*

Witnesses.

H. Campbell
Samuel S. Blackford
James H. Mandeville

Inventor.

John W. Gardner

JOHN W. GARDNER.

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Fig. 3.

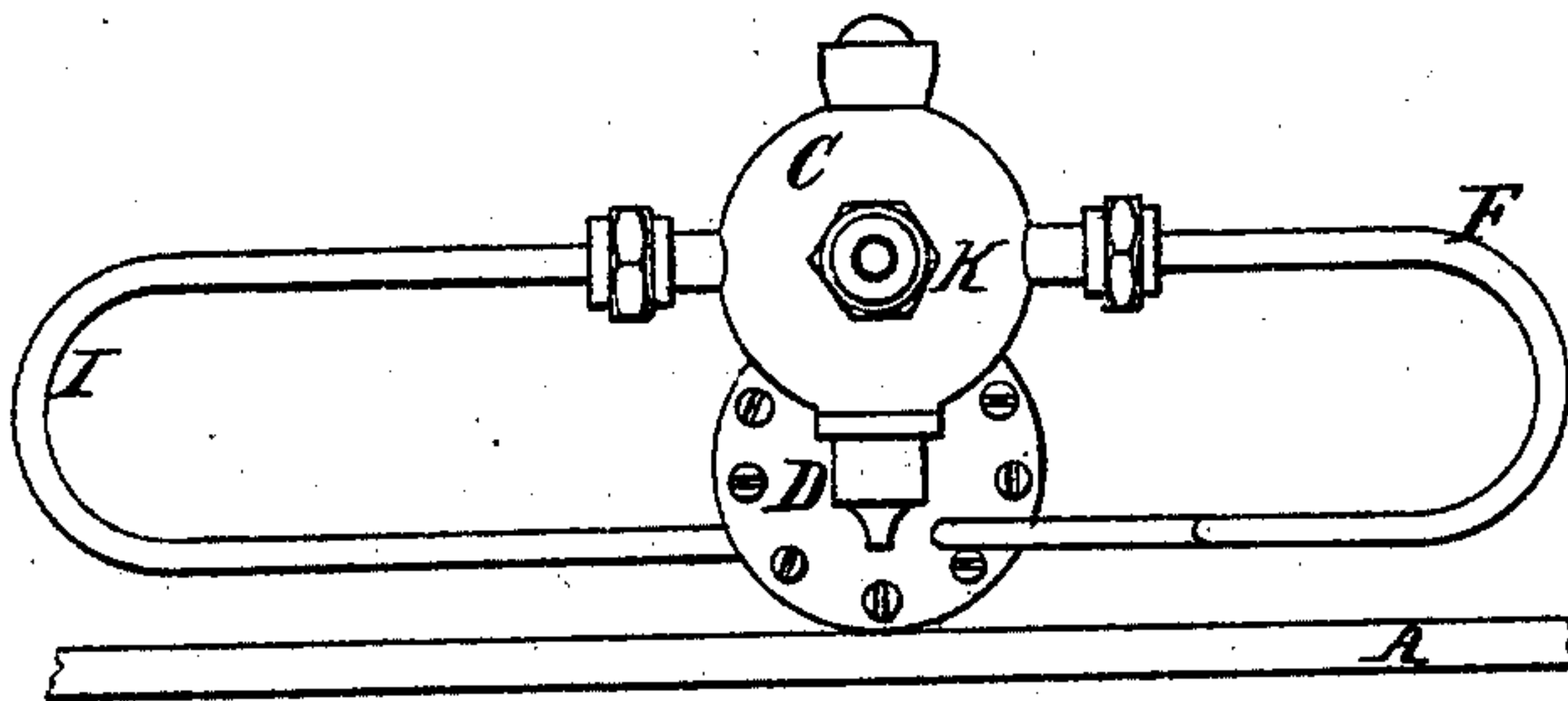


Fig. 4.

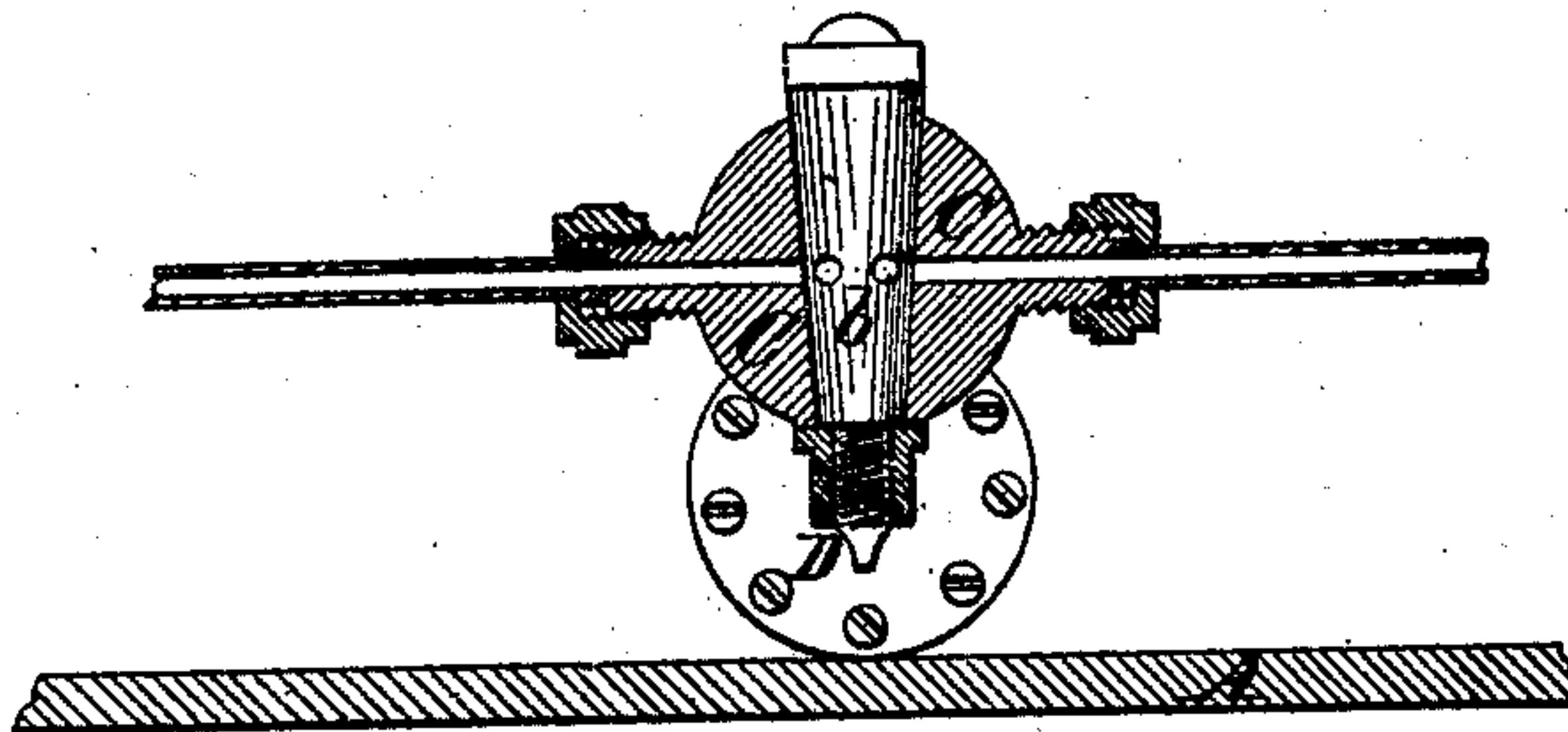
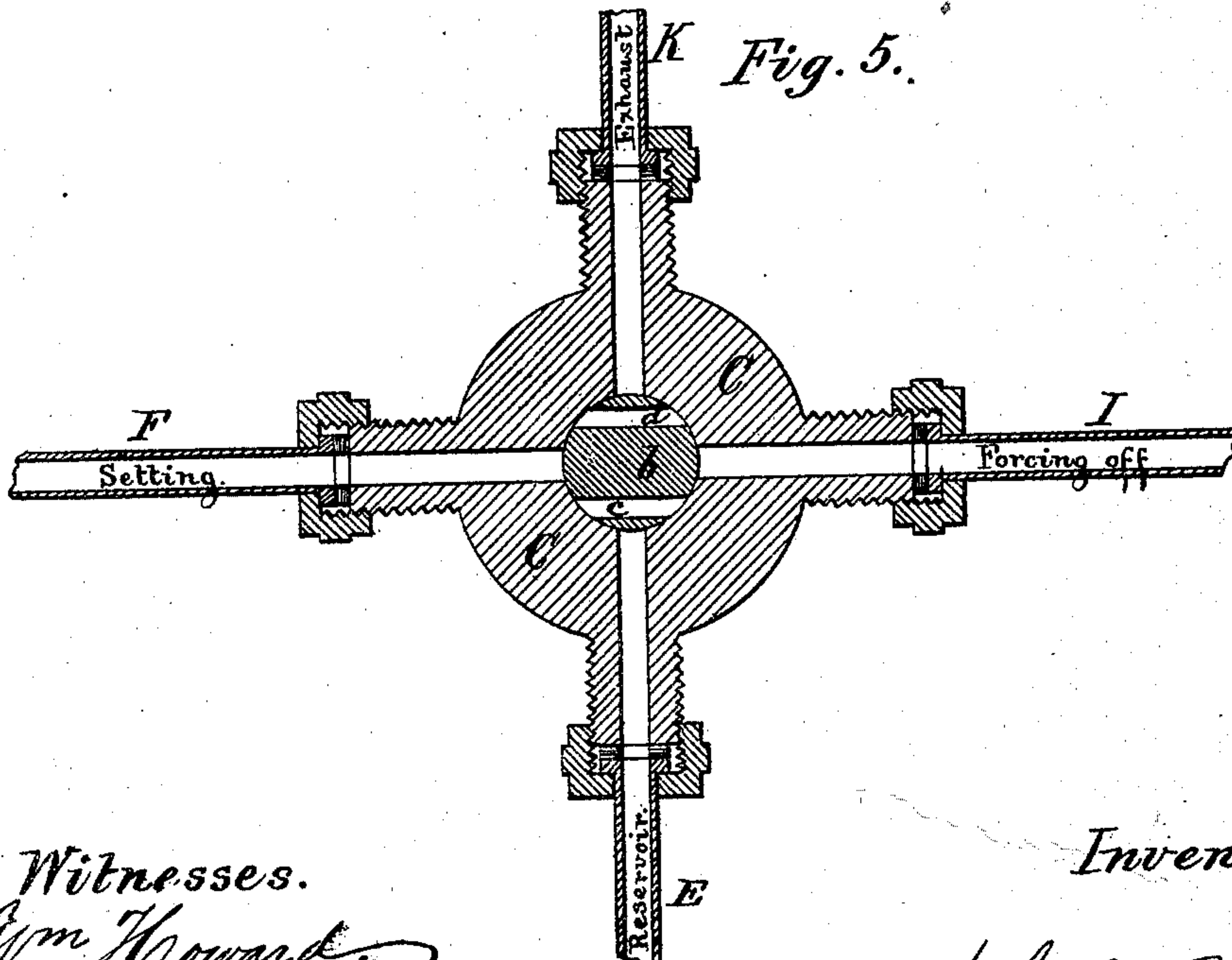


Fig. 5.



Witnesses.

Wm Howard.

James N. Meadeville.

Samuel S. Blackford

Inventor.

John W. Gardner

Reissued Apl. 23rd 1872.

122,884

UNITED STATES PATENT OFFICE.

JOHN W. GARDNER, OF CLEVELAND, OHIO.

IMPROVEMENT IN STEAM AND AIR CAR-BRAKES.

Specification forming part of Letters Patent No. 122,884, dated January 23, 1872.

To whom it may concern:

Be it known that I, JOHN W. GARDNER, of Cleveland, county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Railroad Car Brakes, of which the following is a full, clear, and exact description.

My invention is, first, a combined apparatus, so constructed as to admit of the application with the alteration of a single pipe, either of compressed air or steam, both to "set" and to "force off" railroad car brakes; second, a four-way cock, in combination with an air or steam car-brake, by turning which in one direction, those pipes are placed in communication, through which the air or steam flows to "set" the brakes; and by turning which in an opposite direction those pipes are placed in communication, through which air or steam flows to "force off" the brakes. By turning the cock one way four ports are opened—by turning it a reverse way, four ports are closed simultaneously.

My invention is an improvement on the Goodale steam-brake, and particularly on the Westinghouse compressed-air brake for railroad-cars. In the former patent there is a three-way cock, operated by a lever immediately at the hand of the engineer, whereby steam from the boiler of the locomotive is applied to all the brakes of the train, but which to escape must return to the locomotive. In the latter patent, there is also a three-way cock, by turning which in one direction a one-quarter turn two ports only are opened for the application or admission of compressed air to the brakes of the train; and by turning which in a reverse direction a one-quarter turn, the compressed air which holds the brakes "set" is allowed to escape by its elasticity, (and the aid of a spiral spring at each brake,) into the natural atmosphere, after this air has returned to the locomotive. It will thus be seen that the distinguishing feature between the two inventions cited, is the employment in one of steam and in the other of air to "set" the brakes. But the two inventions are alike in this respect, that they both use the same general machinery, and are to all appearance of the same general construction.

Referring to the drawing annexed to and forming a part of this specification, Figure I

represents a plan view; Fig. II, a sectional elevation, through the line *x x*, Fig. I; Fig. III, an elevation of the four-way cock and cylinder; Fig. IV, a sectional elevation of valves; and Fig. V, a longitudinal section of valves, showing four different outlets and the valve-stem.

A represents the foot-board of a locomotive; B the reservoir for holding compressed air; C the four-way cock; and D, a common cylinder or piston, into which is let either steam or compressed air, both to "set" and to "force off" the car-brakes. This cylinder is placed under the tender and cars of the train, but for convenience of illustration and explanation, it is shown in the drawing above the foot-board. The "setting" of the brakes in this invention is accomplished in the same way as it is done in the inventions of Goodale and Westinghouse, and for that purpose the apparatus employs the same general machinery, the air-reservoir, connection-pipes, and cylinders and pistons which operate the brakes. The compressed air passes from the reservoir B through a pipe, E, and the four-way cock C, and thence through another pipe F into the cylinder D, (of ordinary construction,) where the air works a piston-head, G, outward, and thus applies power to the brake-levers H H, which "set" the brakes to the car-wheels. But when steam is used, the general machinery being the same, of course there is a connection-pipe between the four-way cock and the boiler, not shown. In cold weather steam is impracticable, as it is difficult to protect the pipes and cylinders from freezing; but as steam is far preferable when there is no cold weather to interfere, this apparatus is so constructed that steam may be used at pleasure by simply disconnecting the pipe E from the reservoir and connecting it to the boiler. The main feature of this invention, or the improvement upon the patents of Goodale and Westinghouse—namely, the use either of steam or compressed air both to "set" and to "force off" car-brakes—will now be fully set forth. Supposing that the brakes have been "set," and are in that position when the engineer desires to start the train, he turns the four-way cock a one-quarter turn in a reverse direction, (to the way in which he turned it when he set the brakes,) the air or steam flowing through

the pipe E now passes through the four-way cock, and enters the pipe I which connects with the end of the cylinder D, (under each car,) opposite the pipe F. The same amount of power, or less, which instantly "sets" the brakes, now instantly "forces off" the brakes, and expels the air or steam remaining in the pipe F and cylinder D, through the four-way cock and exhaust-pipe K into the natural atmosphere. It here becomes necessary to describe the four-way cock C; reference is therefore made in this connection to Figs. IV and V. In dimensions it is large enough to cover the diameter of the largest pipe used to conduct the air or steam from the reservoir or boiler to the cylinders under the cars, which will depend on the length of the train and the uses to which the cars are applied; for passenger trains a three-quarter inch ordinary gas-pipe will probably be sufficient, but for heavy trains it might be desirable to use an inch and a quarter pipe. It will be seen in Fig. V, that four pipes are connected to the four-way cock, the pipe E leading from the reservoir or boiler, the two pipes F and I connecting the four-way cock with the cylinders, and the exhaust-pipe K. By turning the handle *a* of the plug or valve *b* from the position shown in Fig. I, (in direction of the arrow 1,) the opening *c* of the plug will make a connection between the pipes E and F, and the opening *d* in the plug will make another connection between the pipes I and K; the brakes are now "set." But by turning the handle *a* in the reverse direction, (as shown by the arrow 2,) the opening *c* will make a connection between the pipes E and I, and the opening *d* will make another between the pipes F and K; this will instantly "force off" the brakes.

In cases of obstruction on the track, by this apparatus a train of cars can be stopped almost instantly. But in danger of collision, where it is not only necessary to stop the train, but speedily to back it out of danger, so as to save the destruction both of life and property, the great and paramount utility of this invention must be apparent to all fair and reflecting minds. It is economical in construction, and owing to its simplicity, none of its parts being subject to undue strain or wear, it may be called void of all complication.

In the patents cited which use steam and compressed air to "set" car-brakes, and which are believed to be leading patents in this class of inventions, the brakes cannot be let off instantly. In a passenger train of ten cars, for example, when the brakes are set there is an estimated pressure upon them of from twenty

to forty pounds per square inch. To relieve the brakes of this pressure there is required, (by the construction of the Goodale and Westinghouse class of patents,) not less than two minutes—often three and four minutes—for the steam or air to expel itself into the natural atmosphere, through the exhaust-pipe K, for it has to return through a common gas-pipe over four hundred feet, propelled only by its elasticity and the assistance of springs upon the brakes and pistons. If a train be running on "short time" for meeting-points, the saving of three minutes at a station, (or an accidental stoppage,) might enable the engineer to make his destination and pass a train; but the loss of three minutes might compel him to delay the train an hour, the approaching train having the right of way, if on a single track, where the next side track is ten miles distant. It is therefore plainly apparent to any one that a large amount of time can be saved by the use of this apparatus. It may be well observed, in addition to what has already been said, that if it be necessary to start a train at a "stand still" before the expulsion of the air or steam has been accomplished, an additional power will be required from the locomotive, it having to overcome the resistance of the brakes. This requires a higher pressure of steam in the boiler, and consequently more fuel to generate it.

I distinctly disclaim the "setting" of car-brakes by the use either of air or steam, as that is the invention of Samuel N. Goodale, as described in his Letters Patent dated May 30th, 1865; and of Westinghouse, as set forth in his patent dated April 13th, 1869; but

What I claim as new, and desire to secure by Letters Patent, is—

1. The method of applying either compressed air or steam for the "forcing off" of car brakes.
2. The combination of the four-way cock C, the pipes E, F, I, and K, and the cylinder D, so as to enable car-brakes instantly to be "set" and to be "forced off" from the wheels by the use of either compressed air or steam.
3. The four-way cock C, as herein described, for changing the air or steam-current to either end of the cylinder D, for the purpose of "setting" and "forcing off" car-brakes.

In witness whereof I hereunto subscribe my name to the foregoing specification, this 1st day of January, 1872.

J. W. GARDNER.

Witnesses:

JAMES H. MANDEVILLE,
F. L. CAMPBELL,
SAMUEL S. BLACKFORD.