

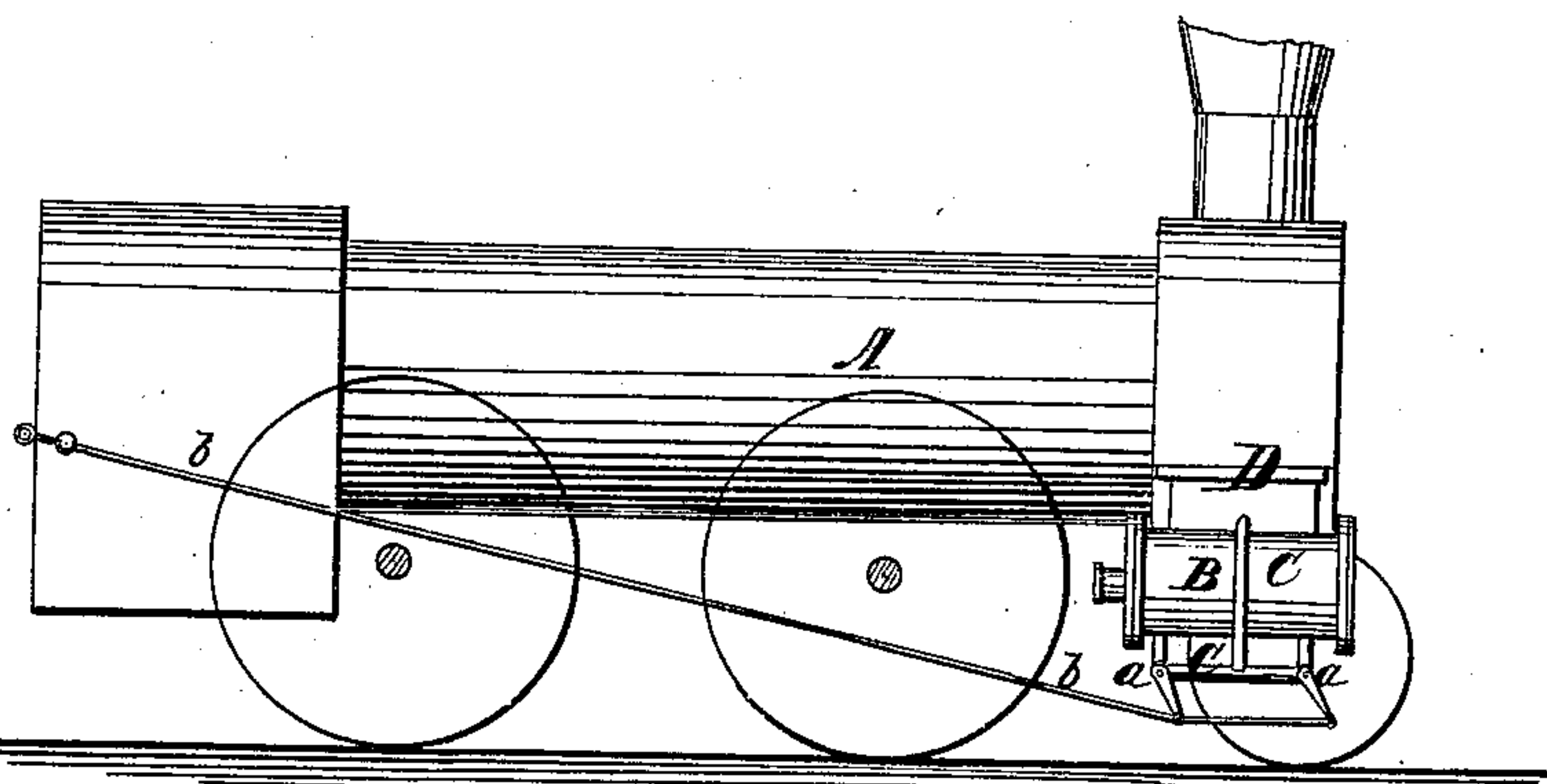
*E. Bourson,*  
*Steam Brake.*

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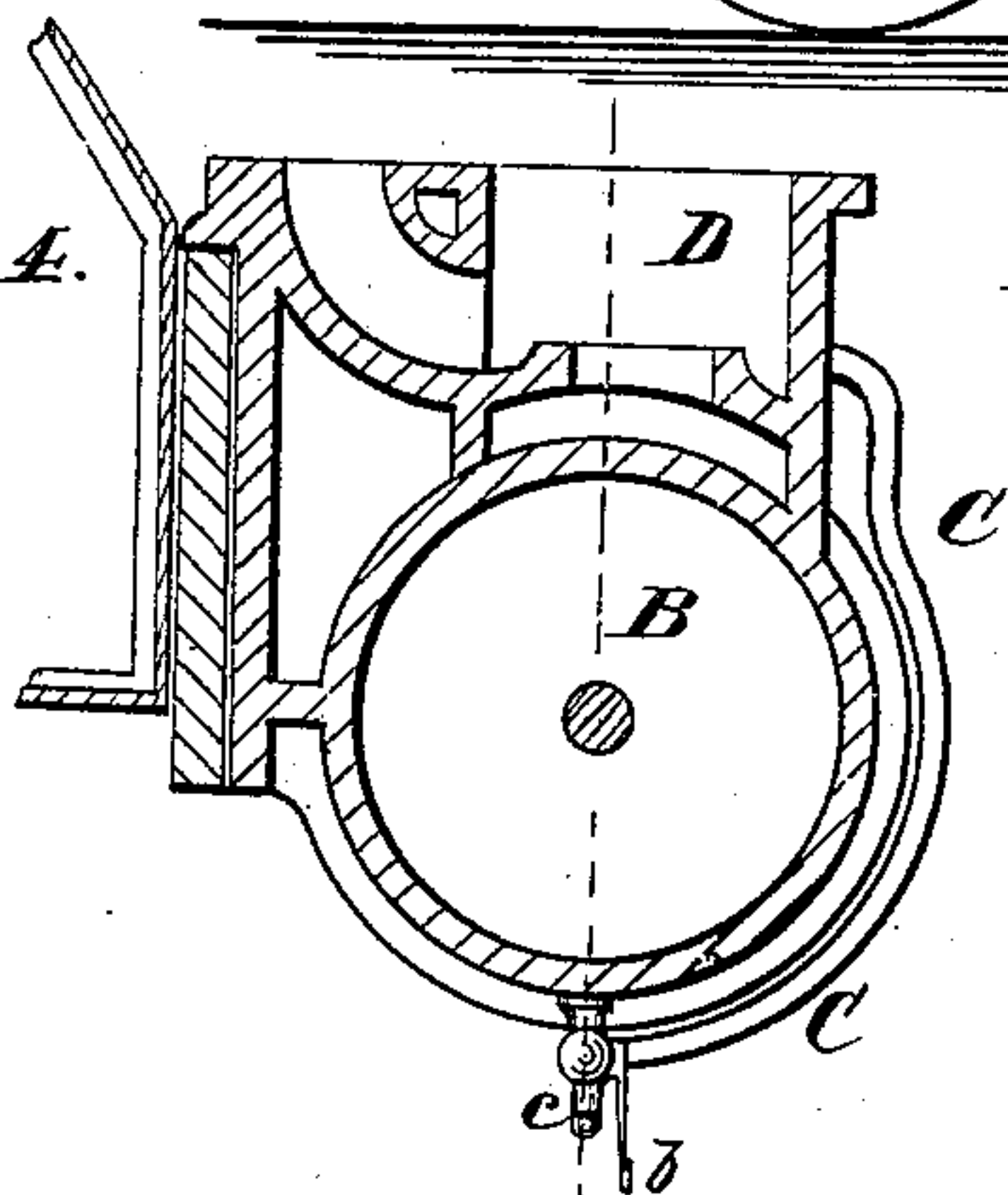
*No 70,948.*

*Patented Nov. 19, 1867.*

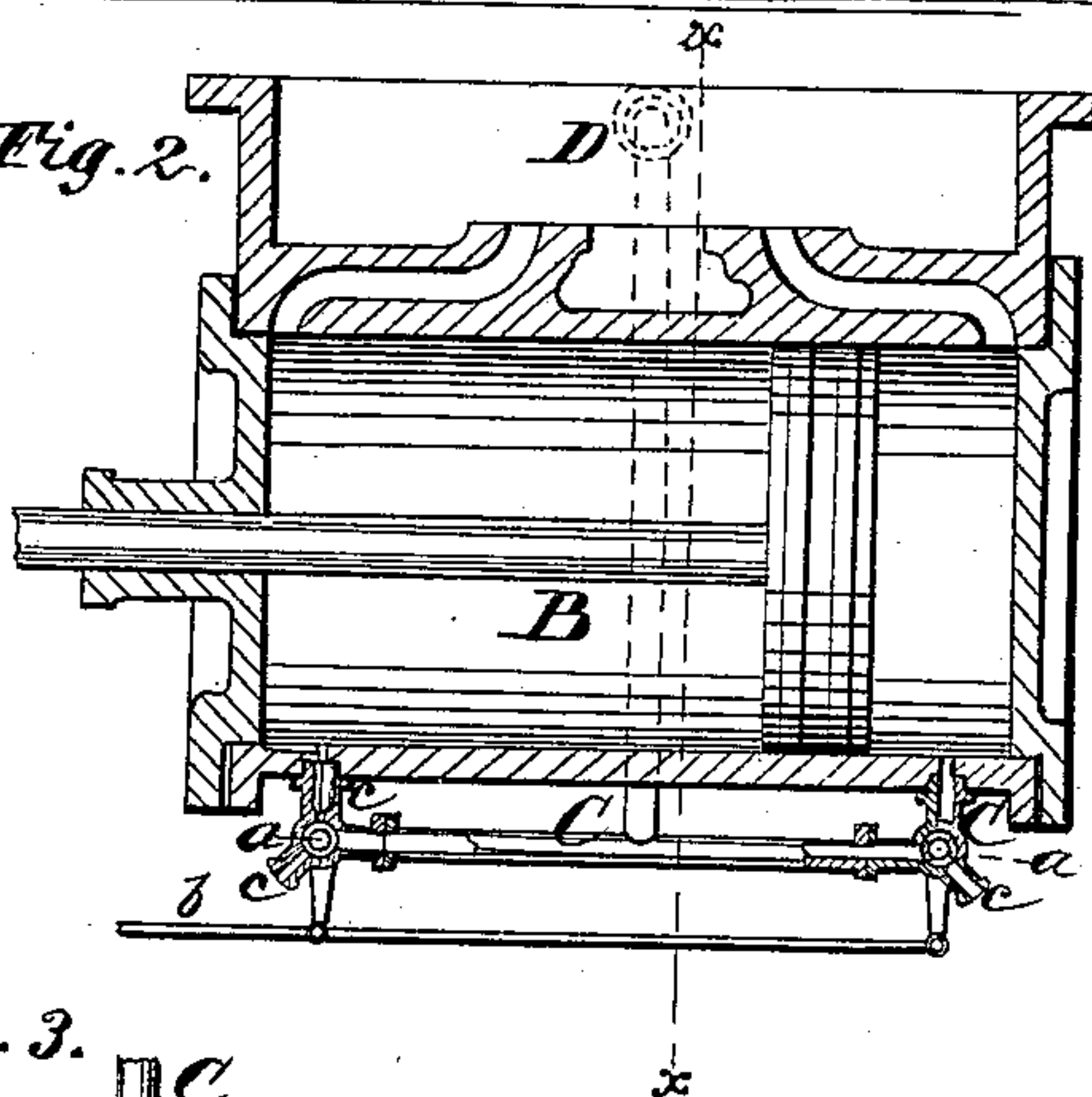
*Fig. 1.*



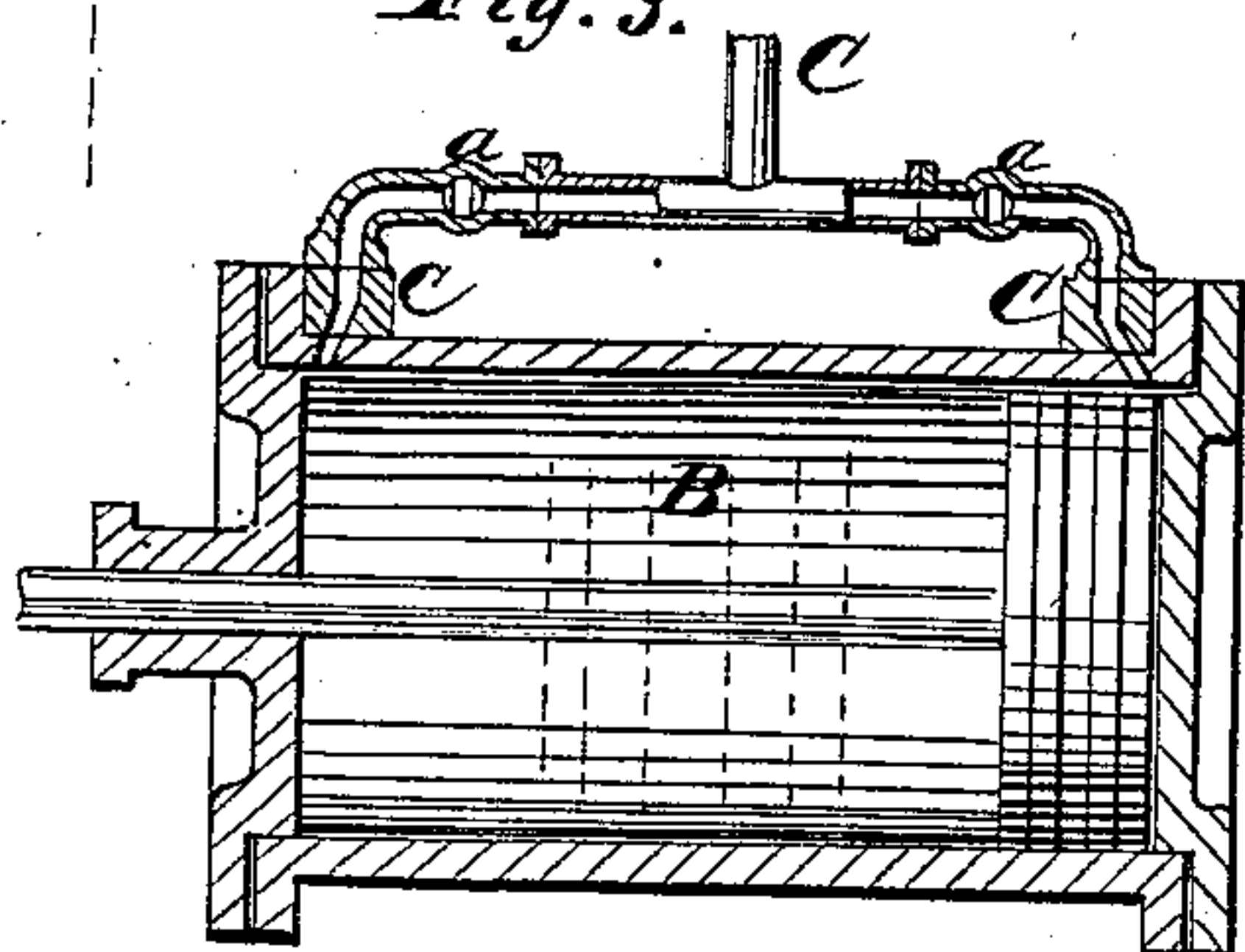
*Fig. 4.*



*Fig. 2.*



*Fig. 3.*



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*Theo Insehe*  
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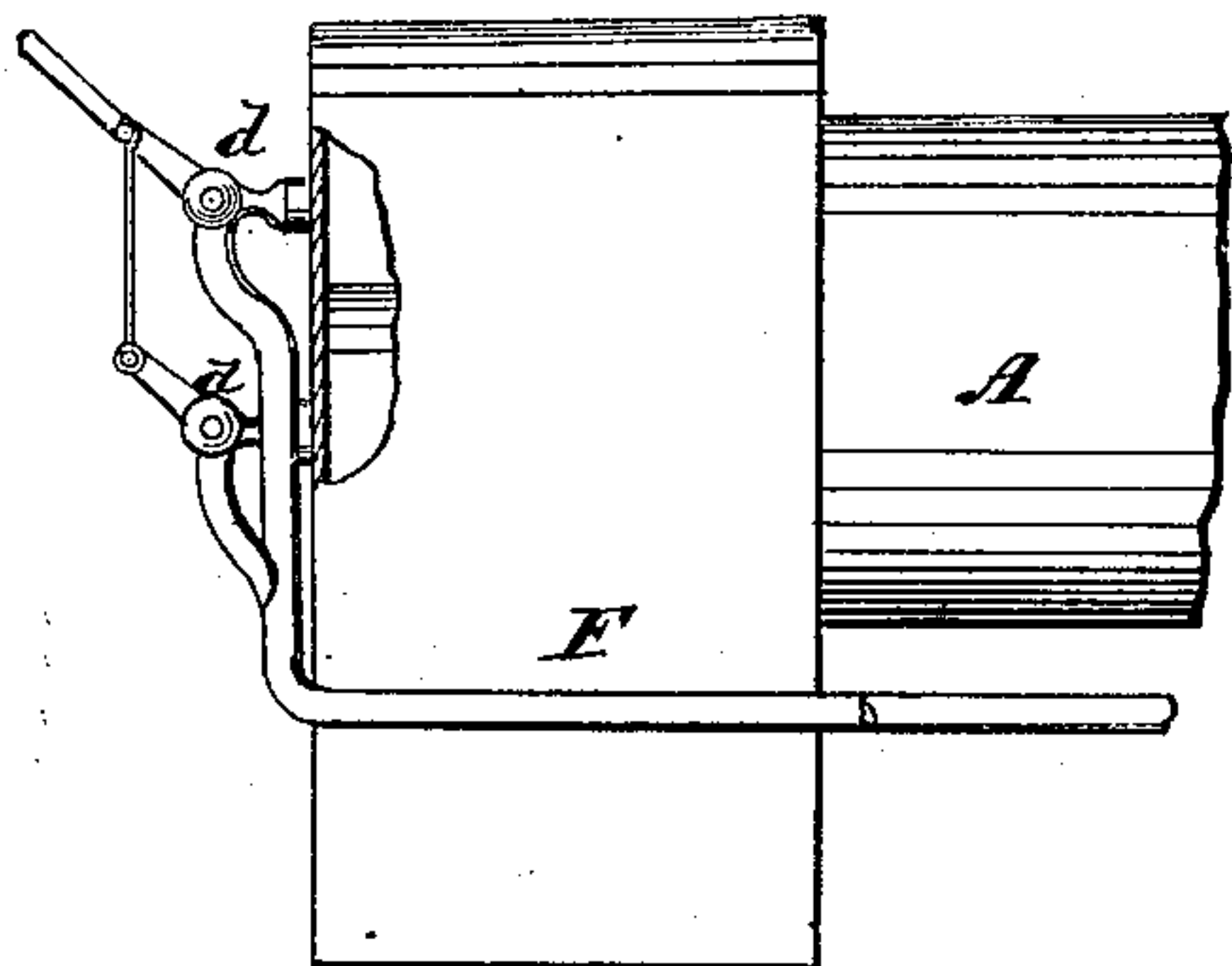
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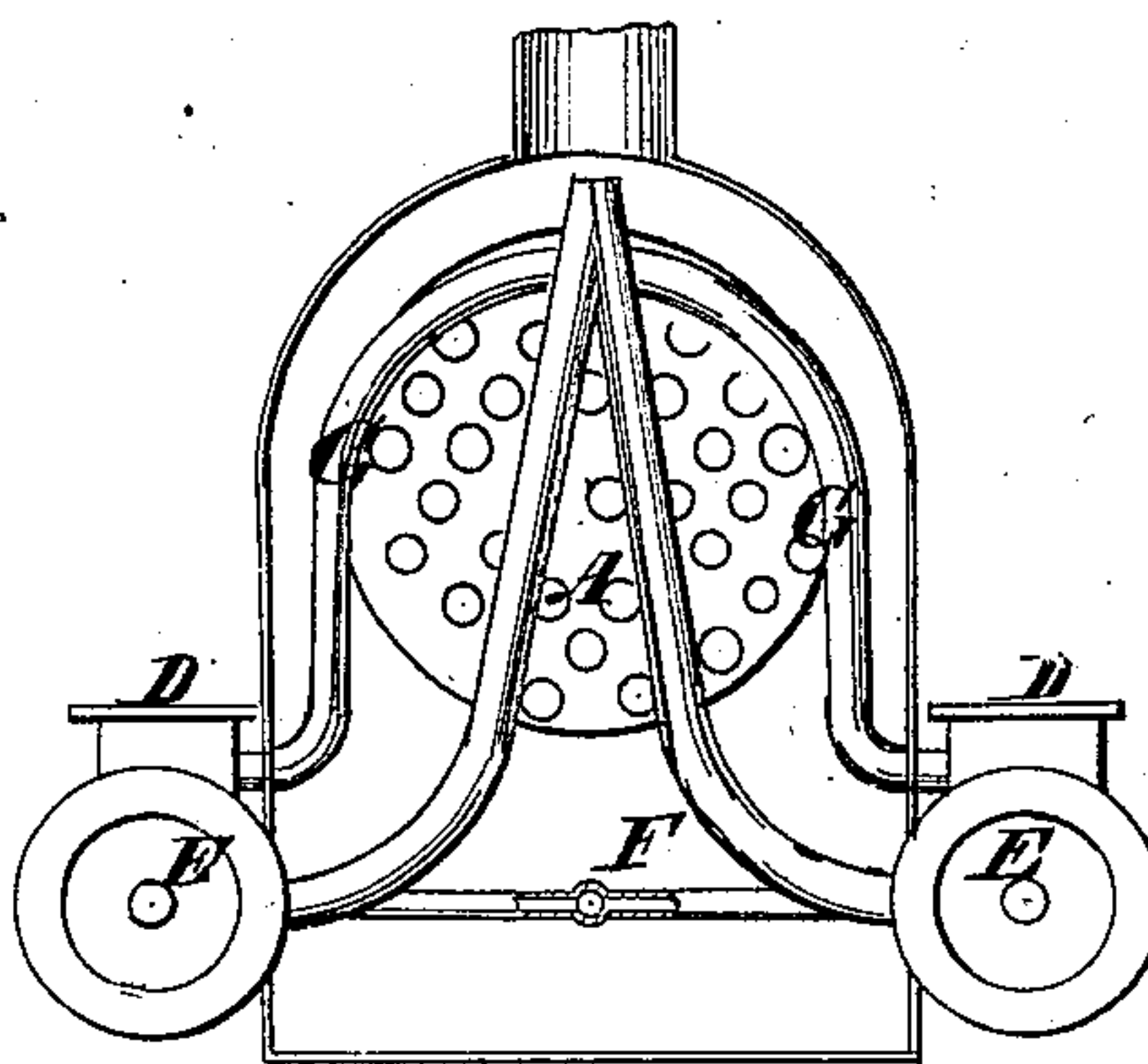
*N<sup>o</sup> 70,948.*

*Patented Nov. 19, 1867.*

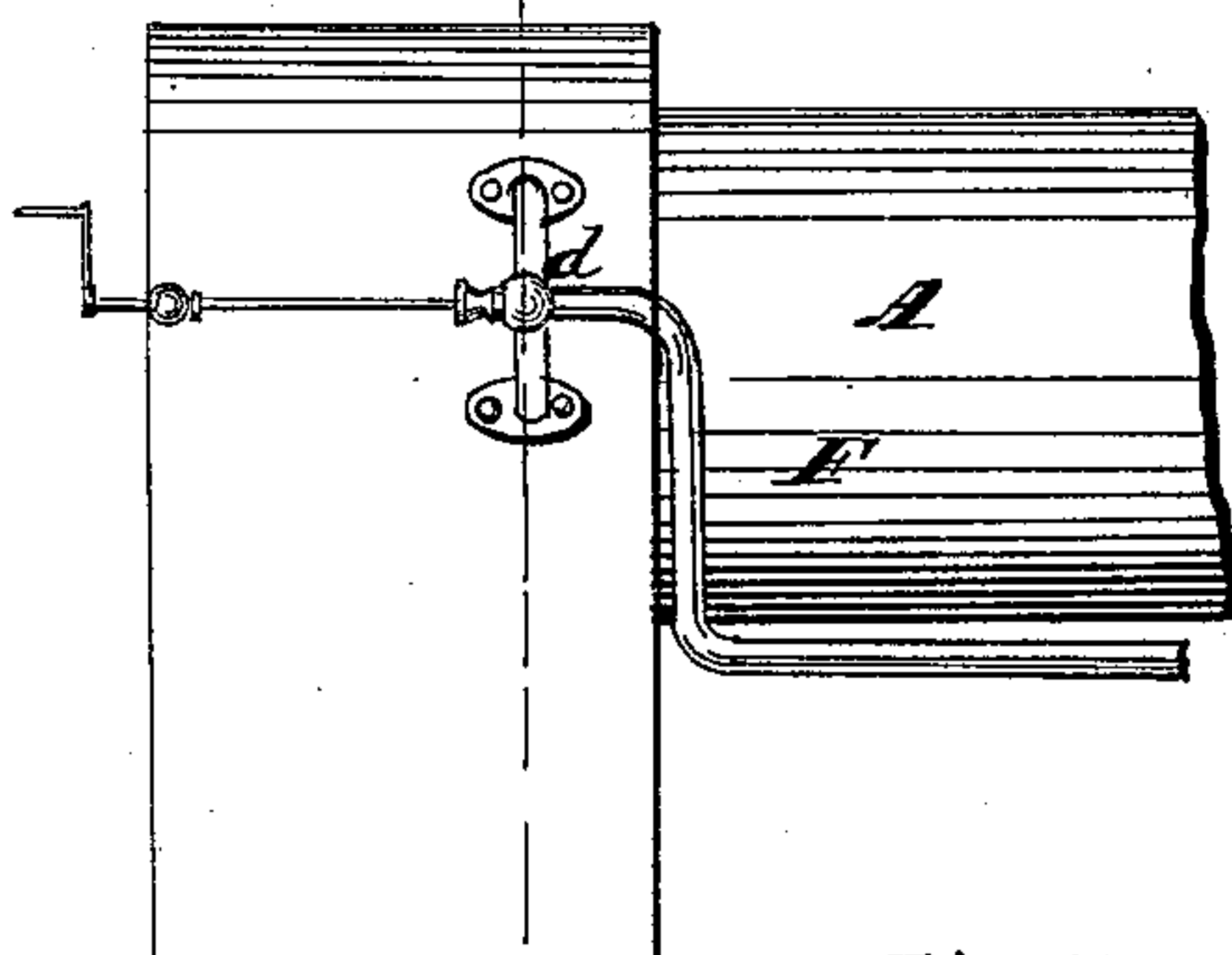
*Fig. 5.*



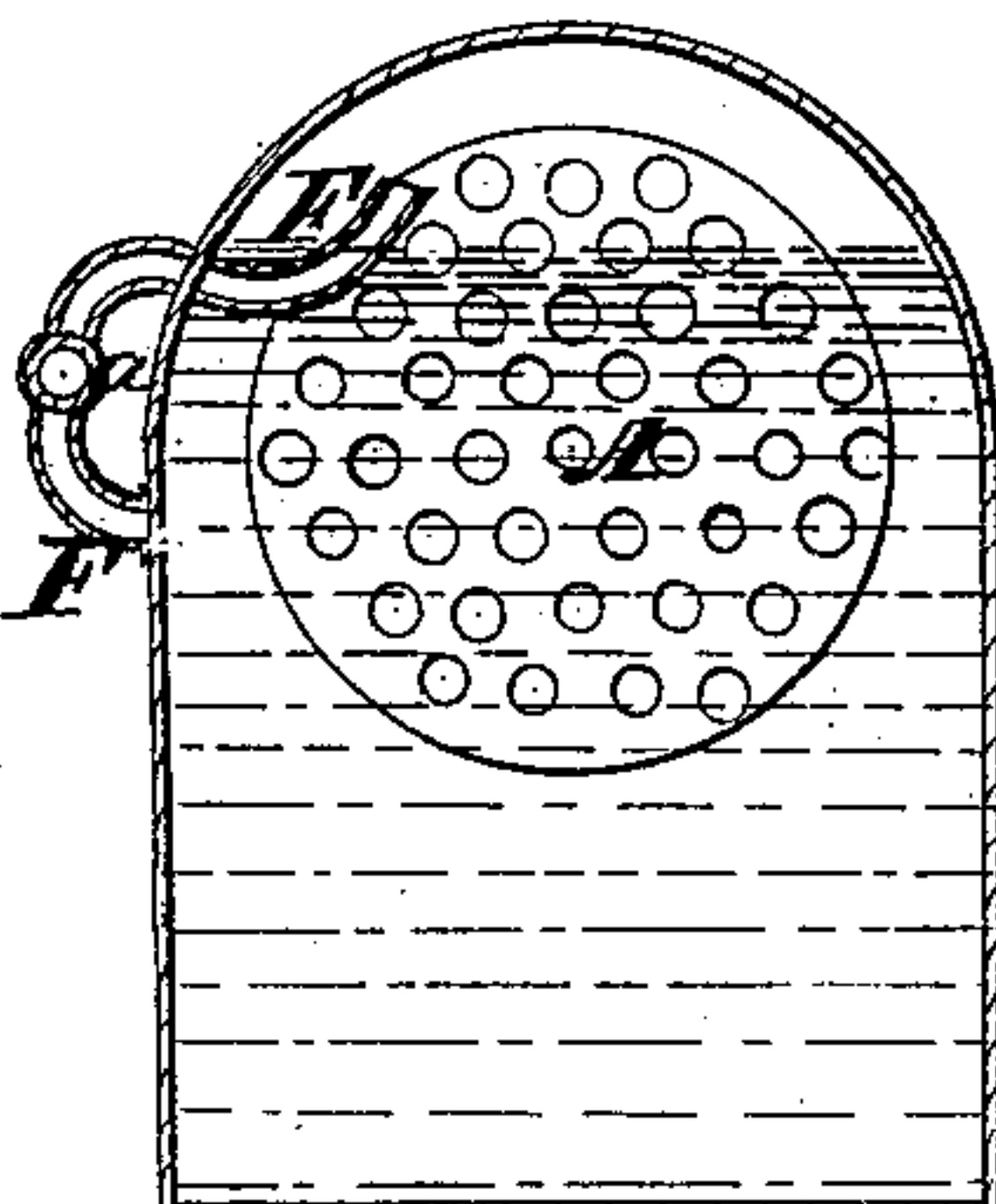
*Fig. 6.*



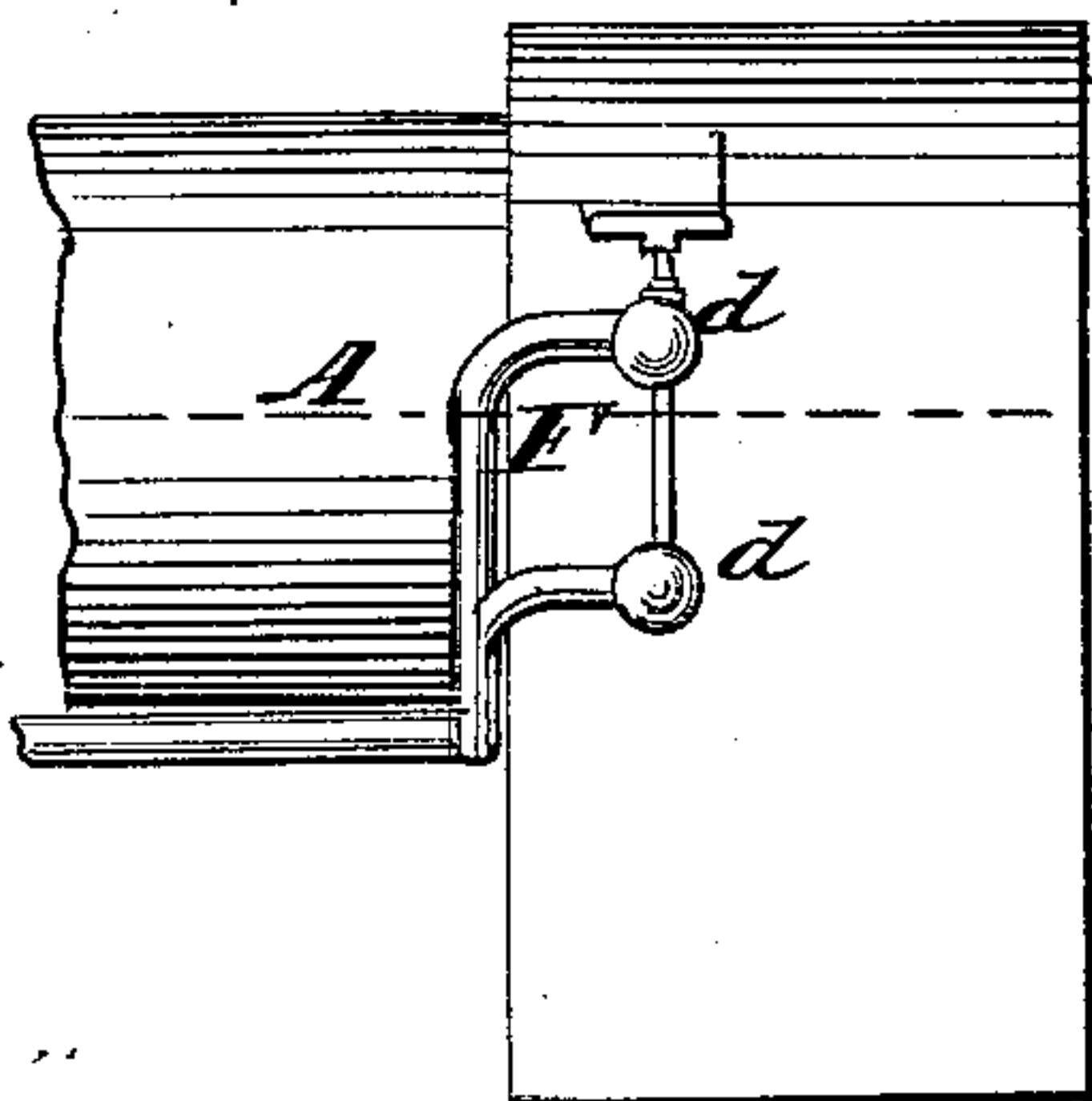
*Fig. 6.*



*Fig. 9.*



*Fig. 7.*



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EUGENE BOURSON, OF BRUSSELS, BELGIUM.

Letters Patent No. 70,948, dated November 19, 1867.

IMPROVEMENT IN STEAM ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, EUGENE BOURSON, of Brussels, in the Kingdom of Belgium, have invented a new and improved Steam-Brake; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a side elevation of a locomotive provided with my improved apparatus.

Figures 2 and 3, sheet 1, are longitudinal sectional views of cylinders provided with my improved apparatus.

Figure 4, sheet 1, is a vertical cross-section of a cylinder, the plane of section being indicated by the line *x x*, fig. 2.

Figures 5, 6, and 7, sheet 2, are detail side views of locomotive boilers provided with my improved attachment.

Figure 8 is an end view of a locomotive boiler and cylinders provided with my invention.

Figure 9 is a vertical cross-section of a boiler, the plane of section being indicated by the line *y y*, fig. 6.

Similar letters of reference indicate corresponding parts.

This invention relates to a new apparatus for using the steam from the boilers without loss, in order to regulate the motion of the piston and the speed of trains on steep grades, and to slacken or stop the progress of a train without resorting to the ordinary brakes.

The invention consists in conducting steam directly from the boilers to both ends of the cylinders, so as to form a steam-cushion on each side of the pistons, whereby the motion of the piston is either materially retarded or positively stopped, as may be desired. The steam is conducted, by means of a suitable pipe, to both ends of the cylinder, said pipe being connected with one or more suitable stop-cocks, whereby the volume of steam let into the cylinder can be regulated at will. The aforesaid pipe may, instead of connecting the boiler directly with the ends of the cylinder, conduct the steam from the steam-chest to the two ends of the cylinder.

The invention also consists in connecting the two cylinders of a locomotive engine by means of a steam pipe, for the purpose of producing an equal amount of counteraction on both pistons. Instead of using steam only as a means of stopping or retarding the motion of a piston, water, or steam and water, may be used for the purpose.

A represents a steam-boiler, B a steam-cylinder. The two ends of the cylinder are connected by means of a pipe, C, which communicates with the steam-chest D, as shown in figs. 1, 2, and 4, or with the steam-boiler direct, as in fig. 3. The pipe C is provided with one or two taps or steam-cocks *a a*, which, when there are two, are connected, as shown, so that they can be simultaneously opened or closed, when desired.

It will be clearly understood that when the cocks *a a* are opened, the steam is let into the ends of the cylinder, acting as an elastic brake for the piston, gradually stopping the motion of the same.

When the apparatus is arranged on a locomotive engine, the cocks are connected, by means of a rod, *b*, with the pilot-house, so as to be within reach of the engineer. The pipe C may, on locomotive engines, be provided with blow-off pipes *c c*, for discharging the water from the cylinder, as shown in fig. 2. In that case the cocks *a* must be so arranged as to bring the cylinder ends either in communication with the pipe C, or with the pipes *c*.

On locomotive engines it may be found advisable to connect both cylinders, E E, with a pipe, F, as shown in fig. 8, in which case the pipe F would not necessarily require to be branched off at its end, as it will suffice to apply the steam-brake to the outer (or inner) ends of both cylinders. The pipe F is in that case provided with a suitable stop-cock, and leads directly into the steam-boiler, or to the steam-chests, or takes its steam from the main steam-supply pipe G.

It may be found desirable to lead steam and water combined to the cylinders, in which case the ends of the pipe F are branched, as shown in figs. 5, 6, and 9, so as to receive a supply of both steam and water, when the cock or faucet *d* is opened.

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

1. Connecting both ends of a steam-cylinder by means of a pipe, C, having one or more stop-cocks *a*, sub-

stantially as described, so as to enable the engineer to stop or retard the motion of the piston, by conducting steam or water, or both, into the ends of the cylinder, substantially as herein shown and described.

2. The pipe C, connecting the ends of the cylinder, when provided with the stop-cocks *a a*, and when combined with the blow-off pipes *c c*, all made and operating substantially as herein shown and described.

3. Connecting the two cylinders of a locomotive engine with each other by means of a pipe, F, whereby steam, water, or both, can be conducted into the ends of the cylinders, substantially as and for the purpose herein shown and described.

The above specification of my invention signed by me this twenty-eighth day of May, 1867.

E. BOURSON.

Witnesses:

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PIERRE CHATEAU.