

(No Model.)

C. A. T. SJÖGREN.
AUTOMATIC AIR BRAKE.

No. 300,401.

Patented June 17, 1884.

Fig. 1.

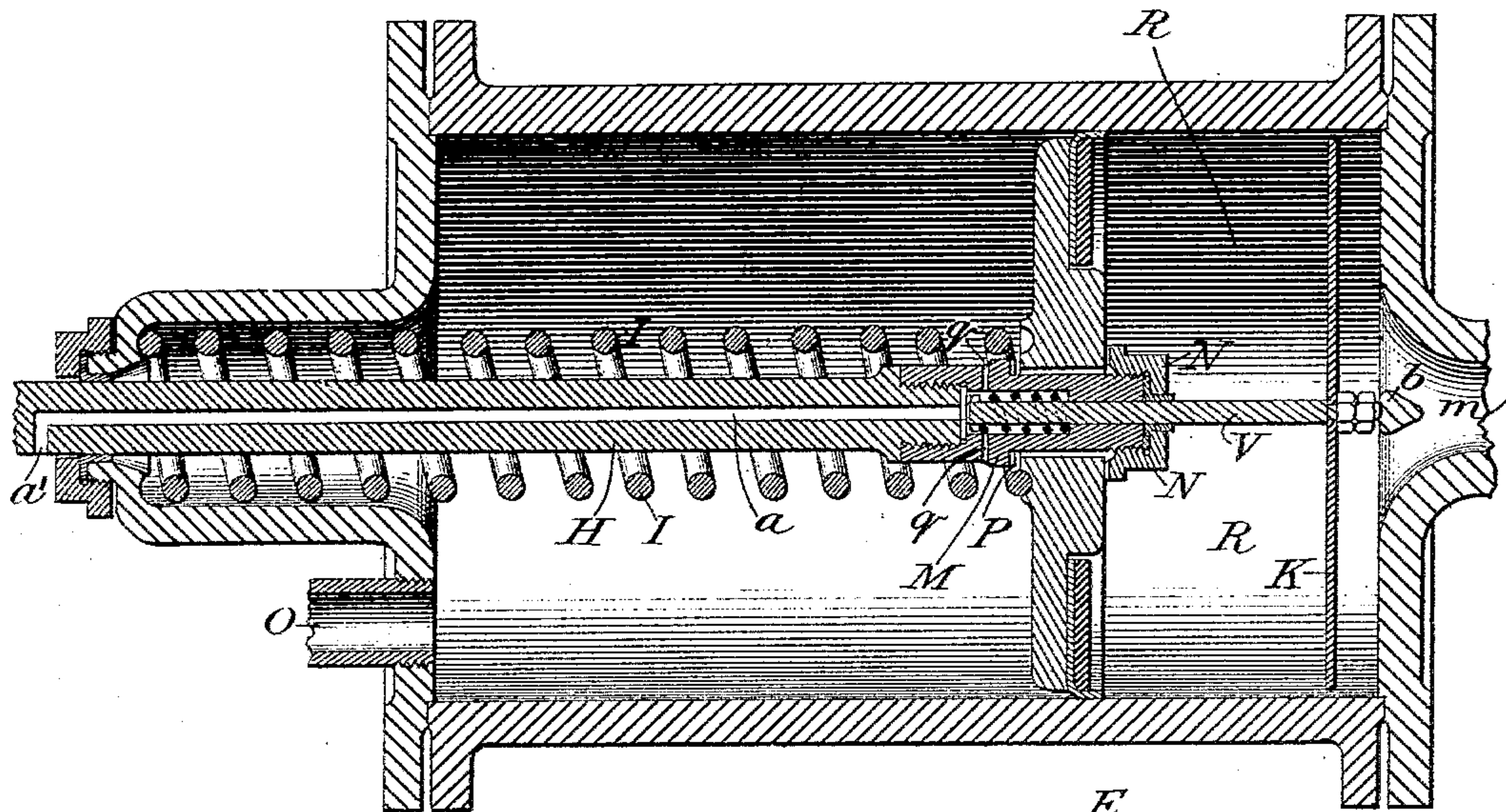


Fig. 2.

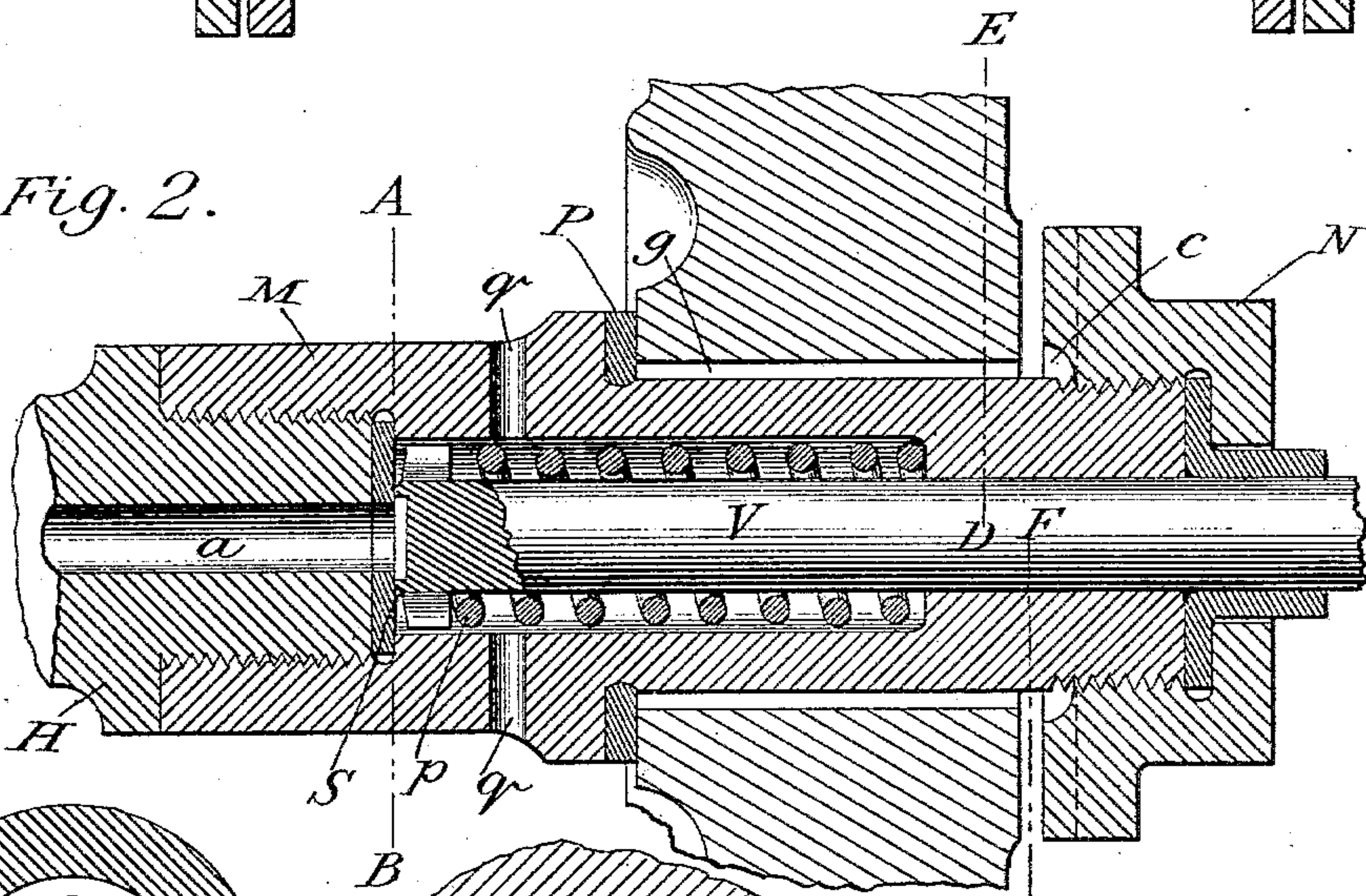


Fig. 3.

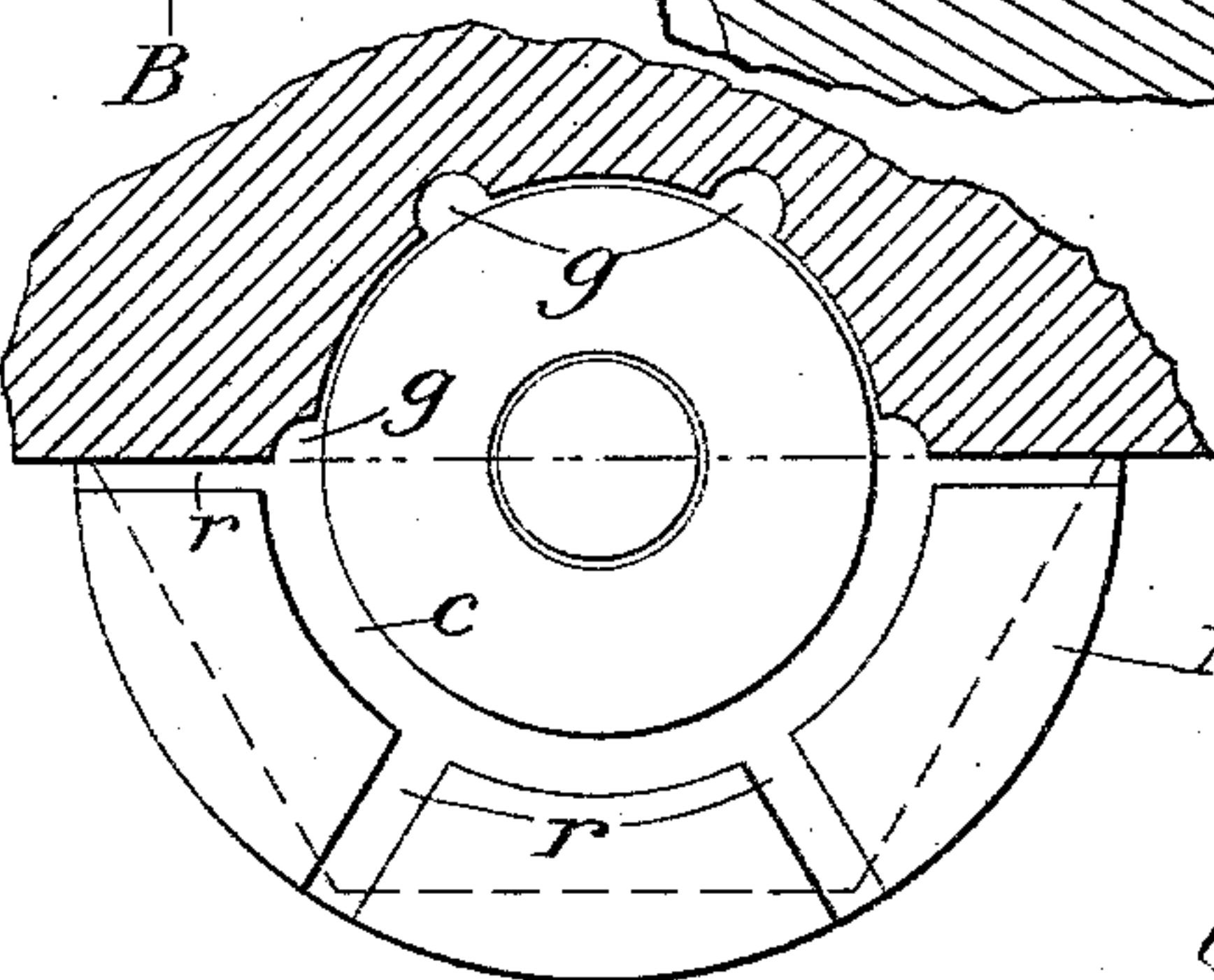
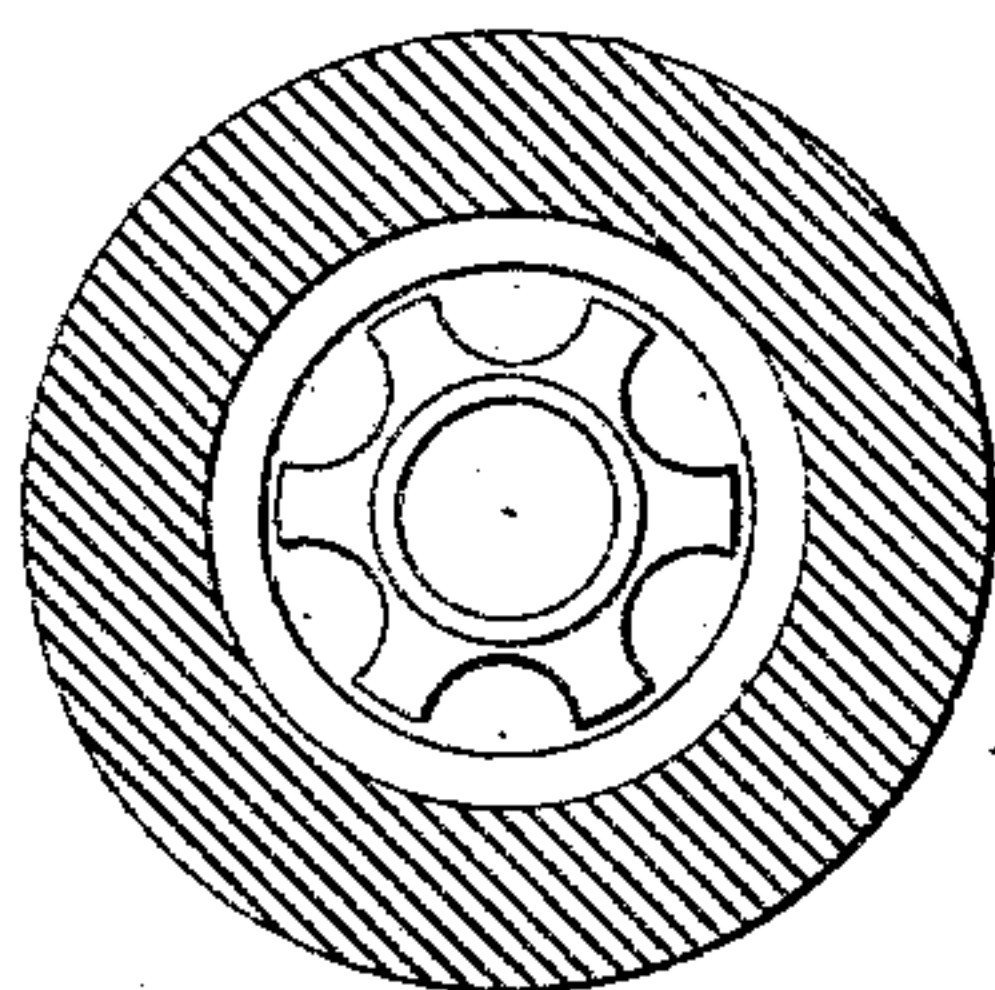


Fig. 4.

Witnesses:

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UNITED STATES PATENT OFFICE.

C. AXEL T. SJÖGREN, OF DENVER, COLORADO.

AUTOMATIC AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 300,401, dated June 17, 1884.

Application filed October 1, 1883. (No model.)

To all whom it may concern:

Be it known that I, C. AXEL T. SJÖGREN, alien, having made oath of my intention to become a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented a new and useful Automatic Air-Brake for Railway and other Vehicles, of which the following is a specification.

My invention relates to an automatic air-brake of that class which uses compressed air furnished from an air-pump on the locomotive and distributed through the train by a pipe to a working or brake cylinder under each vehicle; and the object of my invention is to provide a brake-cylinder simple and strong in construction, automatic, quick, and sure in its action. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section through the center of brake-cylinder. Fig. 2 is a full-size section through the center of the piston-rod, where it goes through and is connected with the piston. Fig. 3 is a cross-section through the piston-rod at A B. Fig. 4 is a cross-section through piston and piston-rod on the line D E F G.

Similar letters refer to similar parts throughout the several figures.

The piston-rod consists of three pieces—the piston-rod proper, H, the piston-rod head M, and the piston-rod end nut, N. The end nut, N, is screwed down only so far as to allow the piston a longitudinal motion or play of about one-sixteenth of an inch between said end nut and a valve seat or projection, P, provided on the piston-rod head M. The piston fits snugly but not tight on the piston-rod head, and the cylindrical surface of the piston-rod hole in said piston is provided with grooves *g g* longitudinally with the hole. The end nut, N, is also provided with grooves—one circular, *c*, and a number of radial, *r r*. The piston-rod proper, H, is tapped into the piston-rod head M, and is perforated longitudinally by the hole *a*, communicating at *a'* with the open air. The end of the piston-rod H forms a valve-seat, *s*, for the valve and valve-stem V, which is pressed down against it by the spiral spring *p*. Holes *g g* are bored through the piston-rod head M, said holes forming an open communication

with the outer air through the hole *a* when the valve at *s* is open. In order to give the air free exit, the spring-seat on the valve-stem V is formed as shown in Fig. 3. The spiral spring I tends to press the piston against the piston-rod end nut, and it will be seen that when the piston is up against the end nut, as in Fig. 1, there is free communication between the air on each side of the cylinder, whereas when the piston is against the valve-seat P said communication is closed. At the end of the valve-stem is secured a circular disk, K, the diameter of which is a little smaller than that of the cylinder. Compressed air from the air-pump enters the brake-cylinder at O, Fig. 1, and feeds in through the grooves *g, c*, and *r* to the space R, around the edge of the disk K, and through the opening *m* to the reservoir, which may either be cast in one piece with the cylinder or in a separate piece.

In order to apply the brakes, the pressure in the train-pipe is lowered, when the piston, actuated by the air-pressure in the reservoir and in the space R, moves forward up against the valve-seat P, and then, moving the piston-rod along, applies the brake. When this takes place, the air in the reservoir and in the space R expands, and consequently some of the air in the space R must go around the edge of the disk K toward the reservoir, or the disk K must move away from the piston. If the expansion is sudden, or, which is the same, if the reduction of pressure in the train-pipe and cylinder is sudden, the air between the piston and the disk K will not have time to expand over the edge of said disk, but will retain a higher pressure in the space R than in the reservoir, and, if this overpressure is large enough, move the disk K away from the cylinder, and thus open the valve V and establish through the holes *g, a*, and *a'* communication between the air in the cylinder and the open air. This communication being open, the brakes will be applied instantly and with fullest force. The smaller difference there is between the diameter of the disk K and the inner diameter of the cylinder the more sensitive is the valve V, and it will open for the least reduction of pressure in case the disk were fitting air-tight in the cylinder. Thus by regulating the space between the disk K and the wall of the cylinder, or, in other words, the communication-

opening between the space R and the reservoir, either by holes through the disk or by decreasing its diameter, it is possible to get a valve V of desired sensitiveness. By reducing the
 5 air-pressure in the train-pipe and cylinder slowly and gradually, the air in the space R will have time to expand over the edge of the disk K unless an overpressure takes place strong enough to overcome the resistance of
 10 the spring *p* and open the valve V, in which case the brakes are applied gently. In order to release the brakes, the air-pressure in the brake-pipe has to be increased to the same pressure as the air in the reservoir. When
 15 this pressure is reached, the spring I will move the piston up against the nut N, and thus restore the communication between both sides of the piston, when the piston, actuated by the spring I, will go backward until the end of the
 20 valve-stem strikes the stop *b*. The piston-rod end nut, N, serves also as a packing-box for the valve-stem V by inserting a piece of leather or other packing material. The same kind of packing is used where the piston-rod goes
 25 through the cylinder-head. Both valve-seats *s* and P are also provided with leather rings to insure an air-tight fit.

From the above it will be seen that with this brake-cylinder it is possible to apply the
 30 brakes instantly and with full force or gradually and with any desired pressure, and to change the brake-force, decrease or increase it when the brakes are applied without it being necessary to take it off altogether. By
 35 having a piston movable on the piston-rod a quicker release is effected.

I am aware that prior to my invention automatic compressed-air brakes have been made with an air-pump on the locomotive and train-pipe and brake-cylinder under the cars. I
 40 therefore do not claim such a combination, broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a brake-cylinder with
 45 a piston movable on the piston-rod, the disk K, attached to the valve, and valve-stem V, the valve-seat P, the valve-seat *s*, the grooves *g*, *c*, and *r*, the spring *p*, and the holes *g*, *a*, and *a'*, for purpose set forth, and substantially
 50 as described.

2. The combination, in a brake-cylinder for automatic air-brakes, of a piston and piston-rod with a valve-stem, V, valve-seat *s*, spring
 55 *p*, spring-seat, and disk K, substantially as described.

3. In a brake-cylinder, the combination of a piston-rod with a piston movable on the same between the valve-seat P and the end nut, N, forming a valve which is open when the pis-
 60 ton is up against the nut N by means of the grooves *g*, *r*, and *c*, and which is closed when the piston is up against the valve-seat P, substantially as described.

4. In a brake-cylinder, the combination of
 65 a disk, K, with the valve-stem V, valve-seat *s*, spring *p*, and spring-seat, all substantially as set forth.

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Witnesses:

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