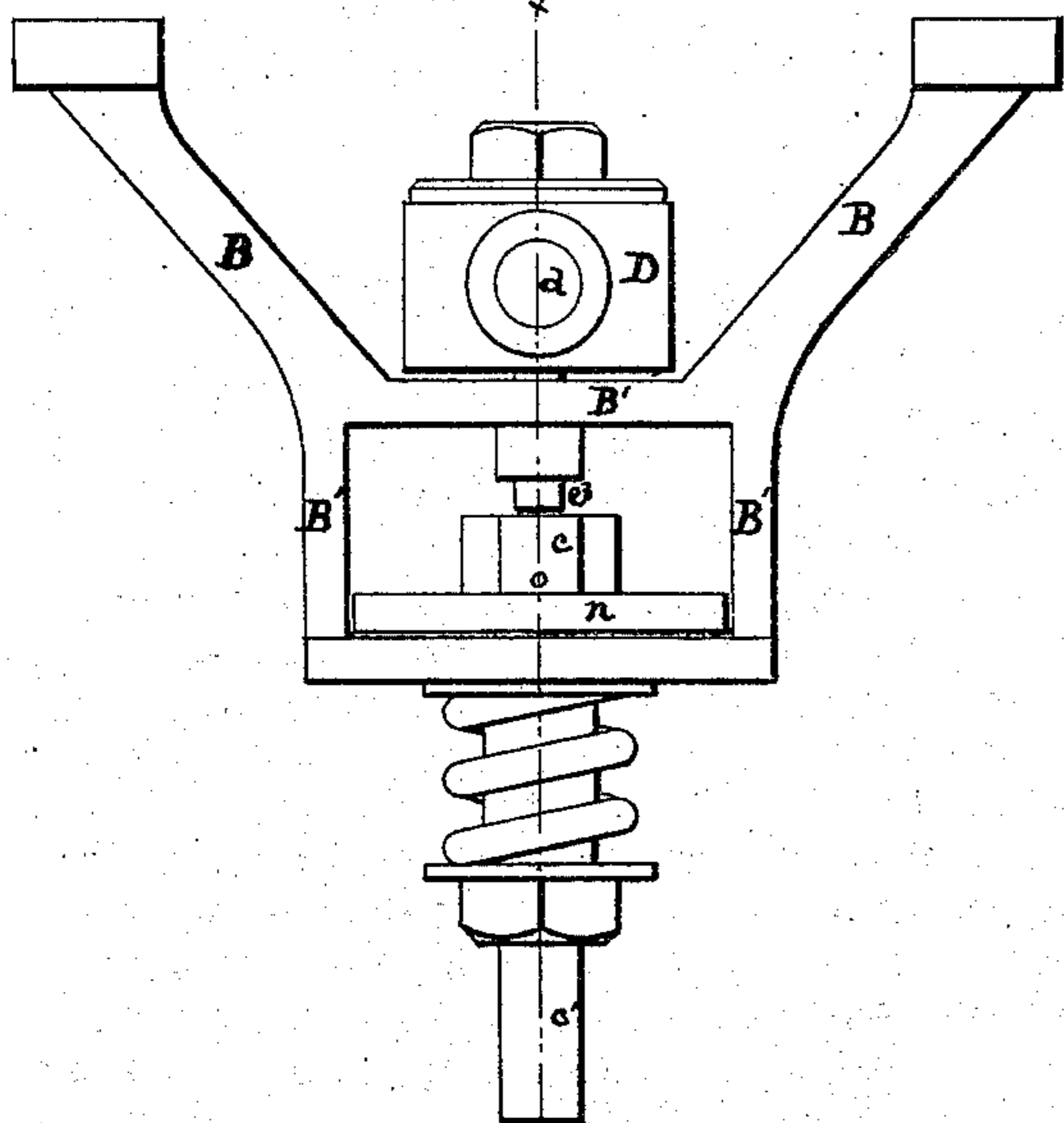


**G. WESTINGHOUSE, Jr.**  
**Discharge-Valves for Fluid-Brakes.**

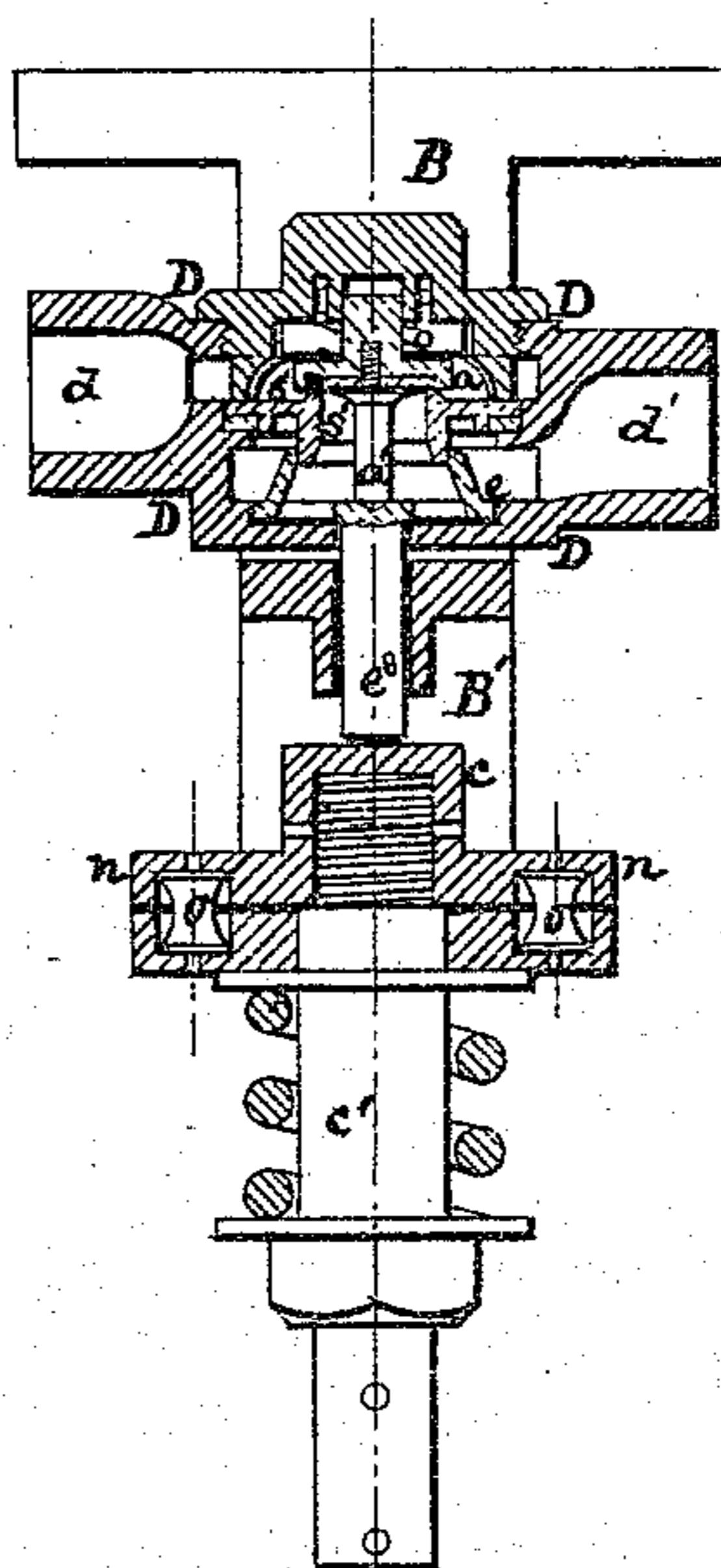
No. 156,322.

Patented Oct. 27, 1874.

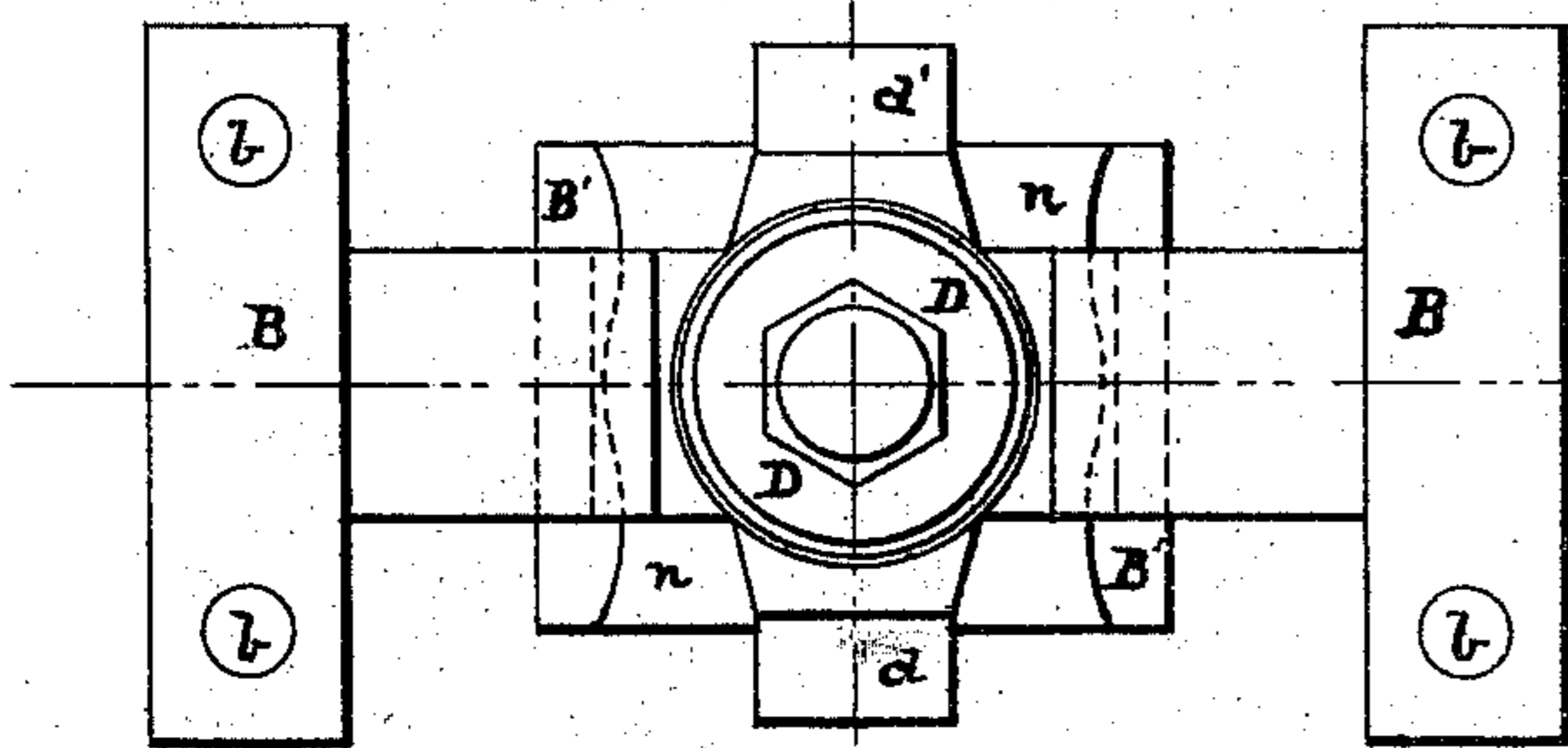
*Fig 1*



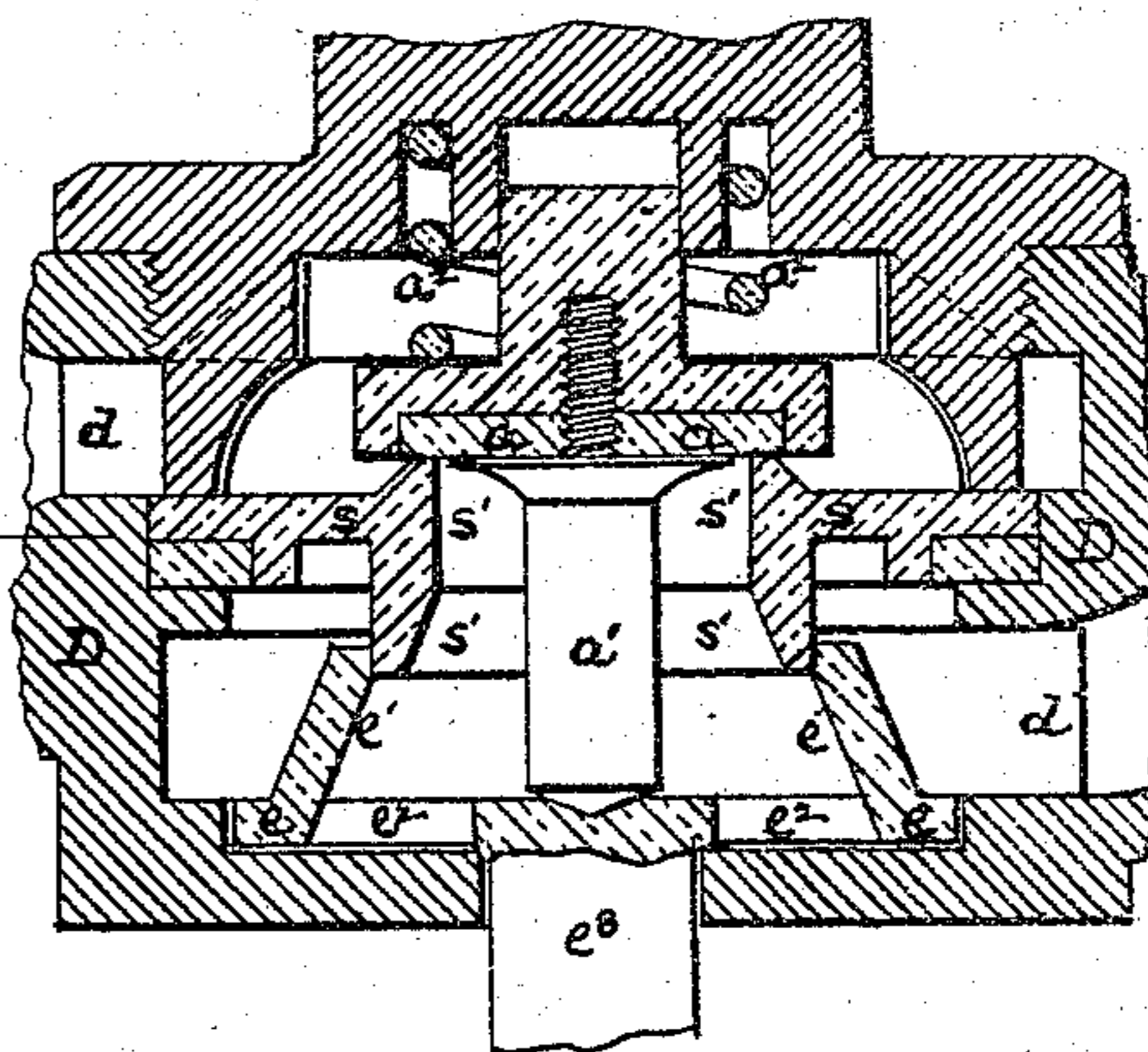
*Fig 3.*



*Fig 2.*



*Fig 4.*



*Witnesses:*  
*Edward Sprague*  
*Sam'l H. Clain*

*Inventor:*  
*George Westinghouse Jr.*  
*by George H. Christy*  
*his atty.*

# UNITED STATES PATENT OFFICE.

GEORGE WESTINGHOUSE, JR., OF PITTSBURG, PENNSYLVANIA.

## IMPROVEMENT IN DISCHARGE-VALVES FOR FLUID-BRAKES.

Specification forming part of Letters Patent No. **156,322**, dated October 27, 1874; application filed June 27, 1874.

*To all whom it may concern:*

Be it known that I, GEORGE WESTINGHOUSE, Jr., of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Discharge-Valve for Fluid-Brakes; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which—

Figure 1 represents a side elevation of my improved apparatus. Fig. 2 is a top or plan view. Fig. 3 is a sectional view through  $x x$  of Fig. 1, and Fig. 4 is an enlarged view of the valve-case of Fig. 3 and its contained devices.

Like letters of reference indicate like parts in each.

My present invention relates to an improvement in the construction of escape-valve and port devices, to be used in connection with and as a part of an automatic air-brake apparatus for railway-cars and other moving structures, such apparatus being somewhat of the nature of that described in patent granted to me March 5, 1872, No. 124,404. In such apparatus as now in common use, the brake pipe or pipes are kept continually charged with compressed air, and the greater or less pressure of air therein affects the movement of the valve arrangement so as thereby to release or apply the brakes. By reducing the air-pressure in the pipe, the brakes are applied, and vice versa. By my present improvement I not only provide a better means for doing this when a car leaves the track or passes over a dangerous obstacle, but also so construct the devices that after the brakes are thus automatically applied, and the air-pressure in the brake-pipe has all or nearly all escaped, the valve and trip will automatically resume their proper positions, and then, the air-pressure being restored, the brakes will again be ready for use.

The bracket B is by the bolt-holes  $b$  fastened to the under side of the car. Its lower end B' is of box-form. On top of the box B' is a valve-case, D, having ports  $d d'$ . A flat annulus or ring,  $s$ , suitably packed and secured in place, but made with a central tubular valve opening or port,  $s'$ , is arranged across the inside of the case in such position that one

port,  $d$ , shall enter the chamber above it, and the other,  $d'$ , below. In the upper part of this chamber is a valve,  $a$ , seating downward, as shown, and backed by a spiral or other suitable form of spring,  $a^2$ , to keep it down. In the bottom of the lower chamber, and in a recess of corresponding shape is a piston,  $e$ , from which a tubular flange,  $e^1$ , projects up, so as to work like a sleeve or telescopic joint on the lower end or extension of the tubular valve-port  $s'$ . This piston has one or more ports,  $e^2$ , in its flat or disk part, and to this end it can be made in a spider or skeleton form. A stem,  $a^1$ , extends down from the valve  $a$ , and abuts on or against the piston  $e$ , and a stem,  $e^3$ , extends down from the latter with or without suitable packing, where it passes through the box B', and abuts against the upper end or head  $c$  of the tripping stem or arm  $c'$ . To this head  $c$  is affixed a tilting-plate,  $n$ . The arm  $c'$  extends down to within convenient proximity to the track, and there carries a cross-bar extending across or cross-wise of the track. Though such features, as well as the other devices appertaining to the arm  $c'$  and head  $c$ , will be included in a separate application. Between the plate  $n$  and the lower plate of the box B' is a series of posts,  $o$ , in any desired number, so made and arranged that by the rotation of the plate  $n$  they will be inclined or tilted from a vertical, and in tilting they will raise the plate  $n$ , and with it the head  $c$ .

The operation of my present improvement is as follows: When the head  $c$  is raised either by the tilting or rotating of the plate  $n$ , or otherwise, the stem  $e^3$  is raised, the disk or piston  $e$  is moved vertically upward out of its recess, so as to uncover the port  $d'$ , and at the same time, acting through the valve-stem  $a^1$ , lifts the valve  $a$  off its seat. The compressed air then escapes from the brake-pipe through the ports  $d s' e^2 d'$ , and the brakes are, as the result of the action of the compressed air on other devices not here shown, applied to the wheels. As soon as the pressure is exhausted, or nearly so, the different devices named fall to their places by their own weight, or are brought back by the spring above the valve, so as to require no readjustment by hand. Then, as soon as the air-pressure is restored

in the brake-pipe, the brakes are released, and are in condition for the running of the train. While the valve *a* is seated, it is held down by the pressure of the compressed air acting through the port *d*, and at the same time the piston *e* is subject only to atmospheric pressure. After the piston *e* is raised and the valve *a* is opened, the pressure of the compressed air escaping, acting against the lower side of the piston *e* (where the area subject to such pressure is greater than it is above) tends to hold the piston up and the valve open, so as to secure such a reduction of the air-pressure in the brake-pipes as will render certain the setting of the brakes on the wheels before the automatic closing of the escape-ports can be effected.

As the tripping apparatus shown constitutes no part of the invention herein claimed, other suitable means may be employed for shifting the piston *e*, for the purpose of applying the brakes; and the apparatus herein claimed may be employed for other than brake purposes with useful result, especially where the intermittent release of fluids under pressure is desired, either as a means or an end; also, in a brake apparatus, the escape-port *d'*, instead of opening into the external air, may be con-

nected with a signal device or other agency direct or intermediate for the use of the escaping air.

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

1. In combination with a relief or escape valve, *a*, a piston, *e*, constructed and arranged substantially as set forth, whereby the piston being shifted and the valve opened, the piston, under the escaping fluid-pressure, will hold the valve open till the pressure is sufficiently reduced.

2. The spring *a*<sup>2</sup>, valve *a*, and piston *e*, arranged in connection with a system of ports, *d s' e<sup>2</sup> d'*, with reference to the automatic reclosing of the escape after and only after the pressure is reduced, substantially as set forth.

3. As a means of guiding the piston *e*, the tubular flange *e*<sup>1</sup>, in combination with the tubular extension of the port-opening *s'*, substantially as described.

In testimony whereof I, the said GEORGE WESTINGHOUSE, Jr., have hereunto set my hand.

GEORGE WESTINGHOUSE, JR.

Witnesses:

JOHN D. MORELAND,  
GEORGE H. CHRISTY.