

(No Model.)

F. W. GORDON.
DASH POT.

No. 541,351.

Patented June 18, 1895.

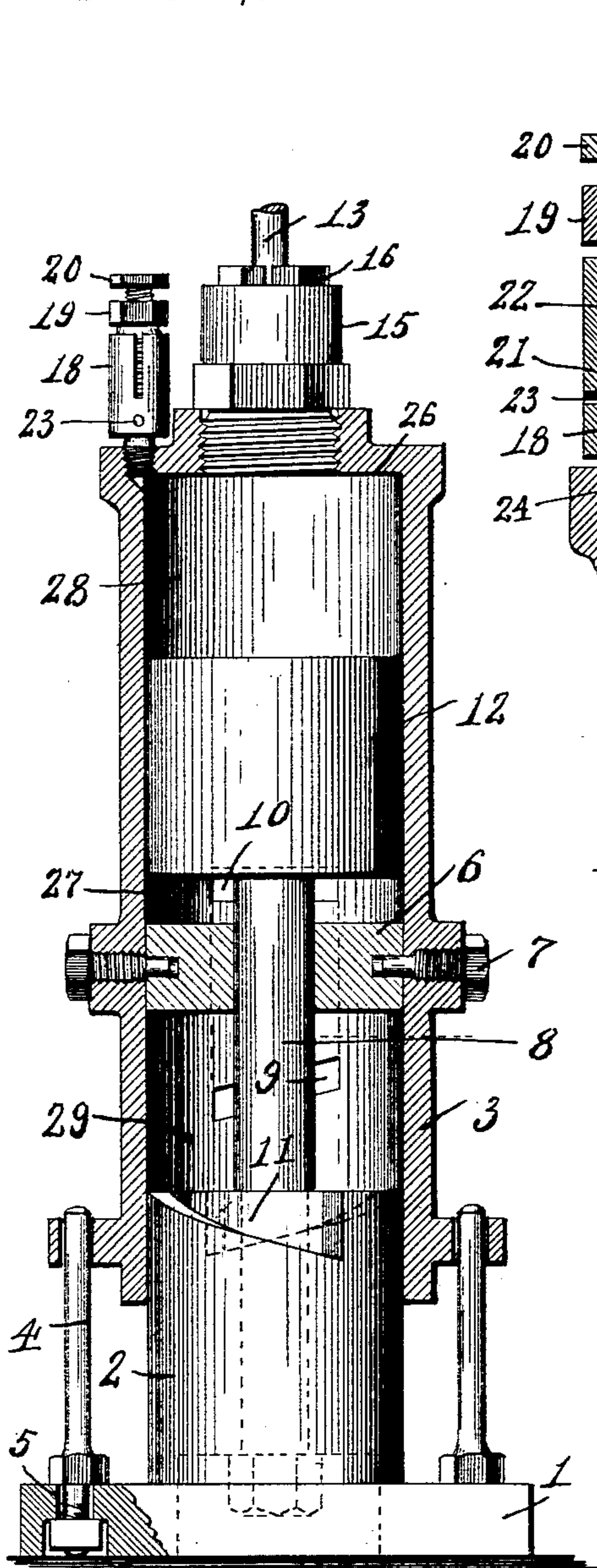


Fig. 1.

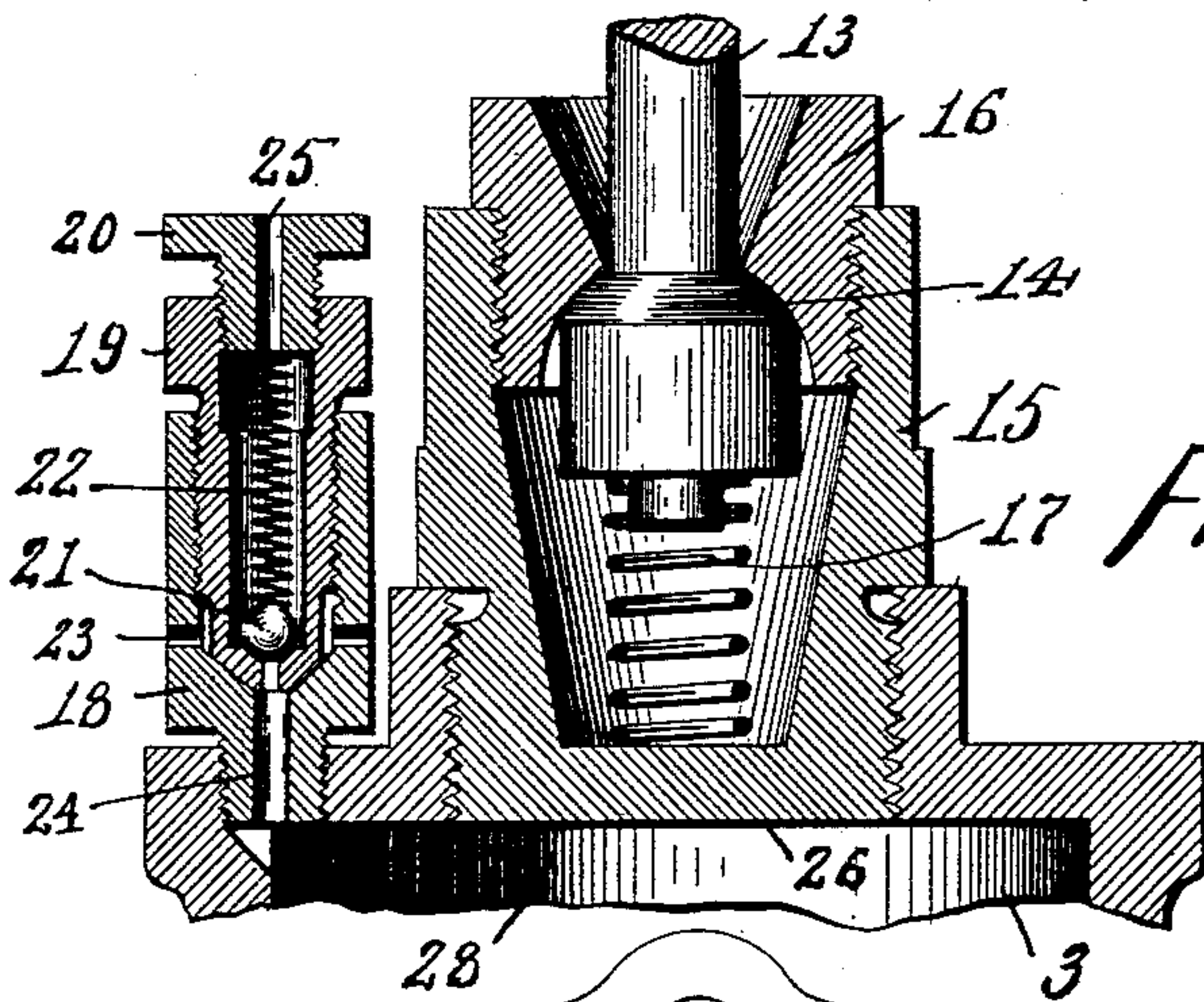


Fig. 2.

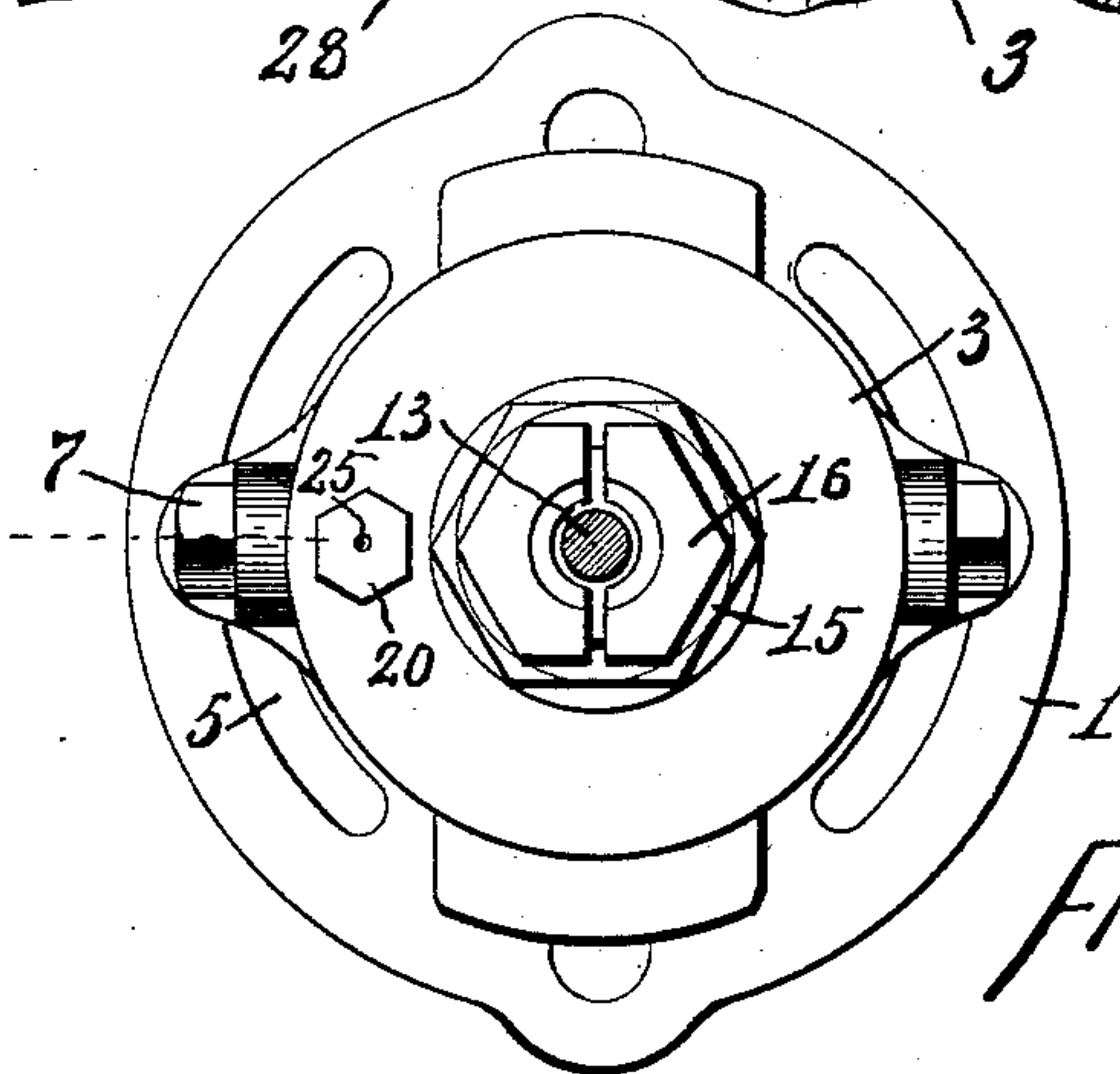


Fig. 3.

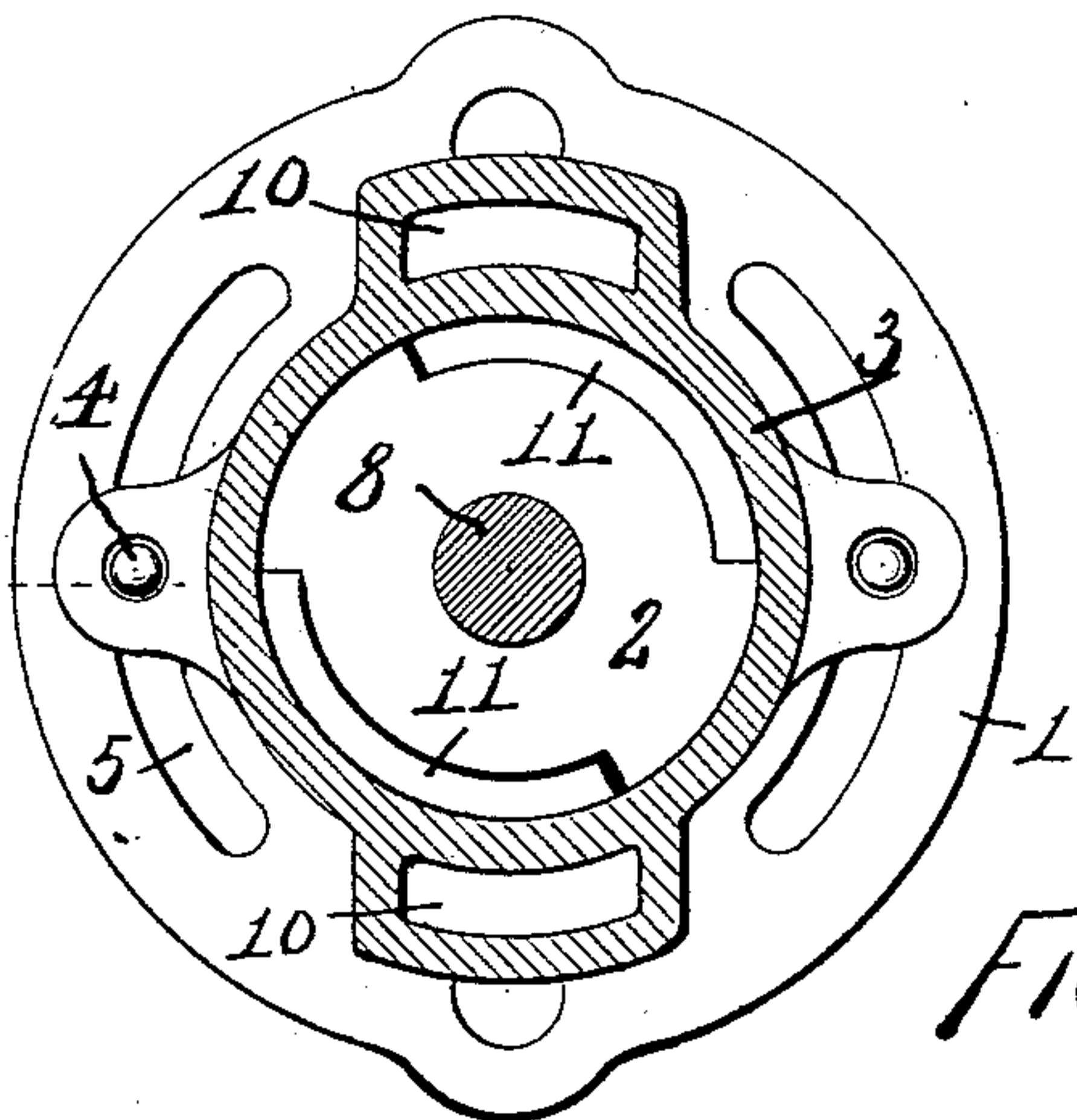


Fig. 4.

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UNITED STATES PATENT OFFICE.

FREDERICK W. GORDON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
THE PHILADELPHIA ENGINEERING WORKS, LIMITED, OF SAME PLACE.

DASH-POT.

SPECIFICATION forming part of Letters Patent No. 541,351, dated June 18, 1895.

Application filed May 19, 1894. Renewed April 20, 1895. Serial No. 546,533. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. GORDON, of Philadelphia, Philadelphia county, Pennsylvania, have invented certain new and
5 useful Improvements in Dash-Pots, of which the following is a specification.

This invention pertains to improvements in dash-pots for use in connection with valve gear of releasing type such, for instance, as
10 the well known Corliss gear, the objects of the improvements being to enhance the accuracy of the performance at specially high speeds and to secure noiselessness of action.

My improvements will be readily understood from the following description, taken
15 in connection with the accompanying drawings, in which—

Figure 1 is a vertical section of a dash-pot, exemplifying my invention; Fig. 2, a similar
20 section, enlarged, of the upper portion; Fig. 3, a plan, and Fig. 4 a horizontal transverse section and plan.

In the drawings, 1, indicates a base-plate adapted to be secured, as usual, to a solid floor
25 or foundation; 2, a piston rigidly secured thereto and projecting upwardly therefrom, this piston being hereinafter termed the cushion-piston, its office being to furnish the cushioning arrest for the valve gear parts which the
30 dash-pot operates; 3, a cylinder fitting upon this stationary piston and reciprocating upon it and closed at the top; 4, guide-studs standing rigidly up from the base-plate and engaging guide holes in lugs on the cylinder to keep
35 the cylinder from turning upon the piston; 5, segmental slots in the base-plate engaged by the studs 4 and permitting of those studs being adjusted around so as to put the cylinder in selective angular relations to the piston;
40 6, a partition in the cylinder forming the top for that portion of the cylinder in which the cushion-piston works, this partition being separably inserted into the cylinder; 7, screws going through the wall of the
45 cylinder and engaging the partition 6 and holding that partition in a fixed position in the cylinder; 8, piston-rod projecting upwardly from the cushion-piston, the partition 6 sliding on this rod; 9, diagonal or spiral
50 ports in the wall of the cylinder below the

partition 6; 10, passages from the ports 9 to the cylinder space just above the partition 6, these passages being formed by side pipes cast upon the cylinder and ported at their upper ends; 11, diagonal or spiral notches in
55 the upper face of cushion-piston 2, the bases of these notches corresponding with the spirality of the ports 9 which they engage; 12, a second piston in the cylinder, above the partition 6, and fast on the piston-rod 8, this second
60 piston being hereinafter termed the "suction-piston," it being its office to furnish the vacuum for moving the valve gear parts controlled by the dash-pot; 13, the usual rod coming down from the valve gear and to operate upon the
65 valve gear by downward motion, this rod being attached to the cylinder 3 so that as the valve part in question rises the cylinder will be raised, and as the cylinder is sucked down
70 again the rod and valve part will be pulled down; 14, a segment of a ball on the lower end of rod 13; 15, a socket secured in the top of the dash-pot cylinder, the ball-end of rod 13 being disposed within this socket; 16, a gland
75 screwed into the socket 15 over the ball-segment 14 so that the rod may freely rock or turn, this gland being split diametrically so that it may be gotten into place notwithstanding the enlargement formed on the end of the rod by the ball-segment, and such enlargement
80 as might be at the upper end of the rod for permitting of its convenient attachment to a valve-gear part; 17, a spring within the socket 15, resting on the floor of that socket and pressing up upon the enlarged end of rod
85 13 and holding the ball-segment nicely to its bearing; 18, a cylindrical valve body screwed into the top of the cylinder; 19, a valve screwed down into a threaded socket in this valve body and having a bearing-seat in the
90 base thereof; 20, an adjusting screw screwed into the top of a socket in valve 19; 21, a ball valve in the base of the socket in valve 19, closing an aperture leading through the base of valve 19; 22, a light spring holding the ball
95 to its seat and adjusted in tension by means of screw 20; 23, holes leading from the atmosphere into the socket in valve-body 18; 24, hole from the base of the socket in valve-body
100 18 communicating with the interior of cylinder

der 3 above the suction-piston 12, valve 19, when screwed down tight, cutting off communication between this hole and holes 23, the seating of valve 21 then closing all upward
5 passage from hole 24; 25, hole through adjusting screw 20 for the escape of air passing up through hole 24 and leaving the ball-valve; 26, the upper end of cylinder 3; 27, cylinder space between partition 6 and suction-piston
10 12; 28, cylinder space between piston 12 and the top of the cylinder, and 29, cylinder space between partition 6 and top of piston 2.

The cylinder 3 is the vertically reciprocating part and it comes down so far that
15 partition 6 will strike the top of piston 2, the top 26 of the cylinder then coming down to the top of piston 12. Cylinder space 27 will then have its full extent, equal to the full stroke of the cylinder, and it is immaterial
20 how much more length that space has. With the cylinder in such position, clear down, the steam valve controlled by the dash-pot will be shut. The opening of the steam valve, in the usual manner, pulls on rod 13 and quickly
25 lifts the cylinder, and enlarges the space 28, producing more or less of a vacuum therein, and upon the release of the valve gear the suction exerted by this vacuum will quickly pull the cylinder down to former position and
30 close the steam valve sharply. Should there be sufficient air in cylinder space 28 to produce, under compression, a pressure above that of the atmosphere plus the weight of the ball-valve 21, the ball valve will lift and the
35 air will escape at hole 25, spring 22 being designed, not to increase the load upon the valve but merely to insure its seating. By opening valve 19 the vacuum may be relieved when desired.

40 As the cylinder starts down from the top of its stroke the air in cylinder space 29 transfers freely into enlarging space 27 through ports 9 and passages 10. In the course of the down stroke of the cylinder ports 9 will pass
45 the face of cushion-piston 2, the transfer of air then becoming arrested and the air that is then confined in cylinder space 29 becoming compressed between the cushioning-piston and the partition, this compressed air forming
50 the arresting cushion. The degree of compression will be dependent upon the time in the stroke at which ports 9 become cut off by the cushioning piston, and the cushioning effect of this compression will be dependent
55 upon the weight of the parts and the speed at which the descent takes place. The cylinder can be turned upon the cushioning piston by adjusting the studs 4, thus causing the cushioning piston to close ports 9 earlier or later in
60 the stroke, thus altering the amount of air pent up in the cylinder space 29. This adjustment can be so made that the cylinder may descend at any practicable engine speed for release gear engines and permit of the
65 sharp descent of the cylinder and of its proper cushioning at the foot of the stroke, it being quite practicable to let the partition 6

come right down on top of the cushioning piston, the possible adjustment of the air cushion providing for a cushioning film of air
70 under such compression as will insure silence in operation. On the up stroke of the cylinder after ports 9 open, air simply transfers from cylinder space 27 to space 29, the air action being entirely silent.
75

It being possible, in this device, to work with clearances so small as to be virtually metal to metal contacts, provision is made for conveniently constructing the device with small clearance. Before drilling for screws 7
80 the parts are assembled and the cylinder pushed down to piston 12, loose partition 6 being allowed to rest on top of piston 2. Then the drilling is done for screws 7 whereby the partition becomes fixed in the proper position,
85 thus avoiding the necessity for such close workmanship as will be called for by ordinary methods for securing accuracy in two separate clearancespaces. The employment of the partition 6, as a separable part, also permits
90 of the cylinder being bored through as a single cylinder, the hole in which socket 15 is screwed into the top of the cylinder permitting the use of a strong boring bar in the operation of boring the cylinder, there thus
95 being an insurance that the cylinders of the two pistons will be truly in line with each other.

Dash-pot rod 13 has only tensional work to do, and spring 17 keeps it up to its seat in
100 gland 16. The split in gland 16 permits of its application to the dash-pot rod when the rod is enlarged at both ends. Valve-body 18 is split, as seen in Fig. 1 so as to grip valve 19 and prevent its adjustment being disturbed
105 by shock. By slacking up valve 19 a trifle an air way is opened from holes 23 to cylinder space 28.

It is to be understood that the structure illustrated is merely exemplifying in character and that the invention may find its embodiment in variously modified forms.

I claim as my invention—

1. In a dash-pot, the combination, substantially as set forth, of a cylinder having an outlet-port, a cushion-piston arranged to overrun
115 said port and having a spiral face, and means for adjusting the angular relation of the piston to the cylinder.

2. In a dash-pot, the combination, substantially as set forth, of a cylinder having a spiral outlet-port, a cushion-piston arranged to overrun
120 said port and having a spiral face, and means for adjusting the angular relation of the piston to the cylinder.

3. In a dash-pot, the combination, substantially as set forth, of a cylinder having a spiral outlet port, a cushion-piston arranged to overrun
125 said port and having a spiral face, and circumferentially adjustable guide-studs connecting the cylinder and piston and holding the two in selected angular relation.

4. In a dash-pot, the combination, substantially as set forth, of a pair of cylinders con-

5 nected by ports and side-pipes, and a pair of
connected pistons, one in each of said cylin-
ders, one of said pistons being arranged to
overrun its cylinder-port, whereby air is trans-
ferred from one cylinder to the other and then
the flow cut off by such overrunning piston
and the remaining air compressed in one cyl-
inder to form a cushion.

10 5. In a dash-pot, the combination, substan-
tially as set forth, of a cylinder having a uni-
form bore from end to end, a transverse par-
tition therein, a piston below and a piston
connected therewith above said partition, and
connected ports above and below said parti-
15 tion between the pistons.

20 6. In a dash-pot, the combination, substan-
tially as set forth, of a cylinder having two
connected ports in its wall, a pair of connected
pistons, and a separable transverse partition
fitting the bore of and secured in the cylinder
between the two ports and between the two
pistons.

25 7. In a dash-pot, the combination, substan-
tially as set forth, of a cylinder having two
connected ports in its wall, a pair of connected
pistons, a transverse partition separably dis-
posed in the cylinder between said two ports
and between said two pistons, and pins engag-

ing the cylinder-wall and partition and secur-
ing the partition in place.

30 8. In a dash-pot, the combination, substan-
tially as set forth, of an upstanding stationary
piston, a piston above the same, a piston-rod
uniting the two pistons, a closed-top cylinder
engaging the two pistons and having a motion-
35 rod, and a transverse partition in the cylin-
der between the two pistons.

9. In a dash-pot, the combination, substan-
tially as set forth, of a suction cylinder and
piston, a valve-body having a socket commu-
40 nicating with the cylinder, a socketed valve
screwed into said valve-body, a valve in said
socketed valve, a spring over said valve, and
an adjusting screw screwed into the socketed
valve over the spring.

45 10. In a dash-pot, the combination, substan-
tially as set forth, of a dash-pot cylinder and
piston, a socket for a motion-rod, a motion-
rod having a ball-segment in said socket, a
split gland in the socket over the ball-segment,
50 and a spring in the socket under the ball-seg-
ment.

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Witnesses:

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