

No. 828,091.

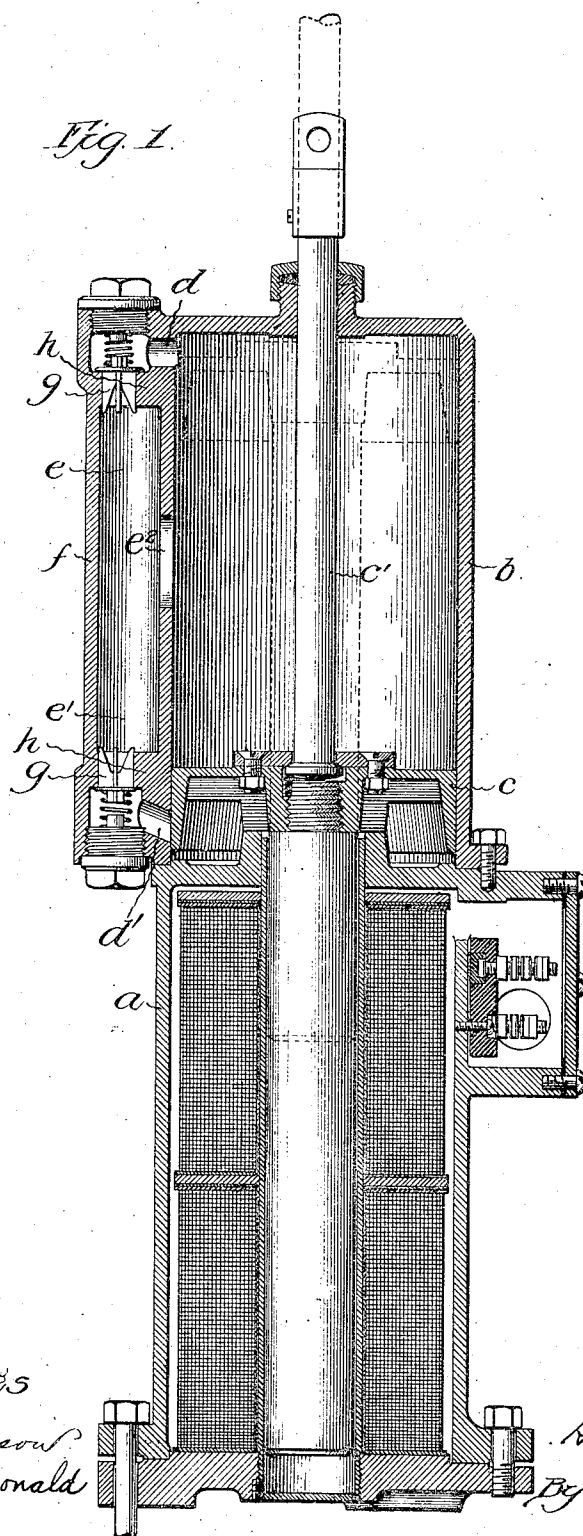
PATENTED AUG. 7, 1906.

H. M. CRANE.

DASH POT.

APPLIOATION FILED JUNE 5, 1905. RENEWED FEB. 13, 1906.

2 SHEETS—SHEET 1.



Witnesses
Geo. Garwood
Irving MacDonald

Inventor
Henry M. Crane
By Barton Tomner
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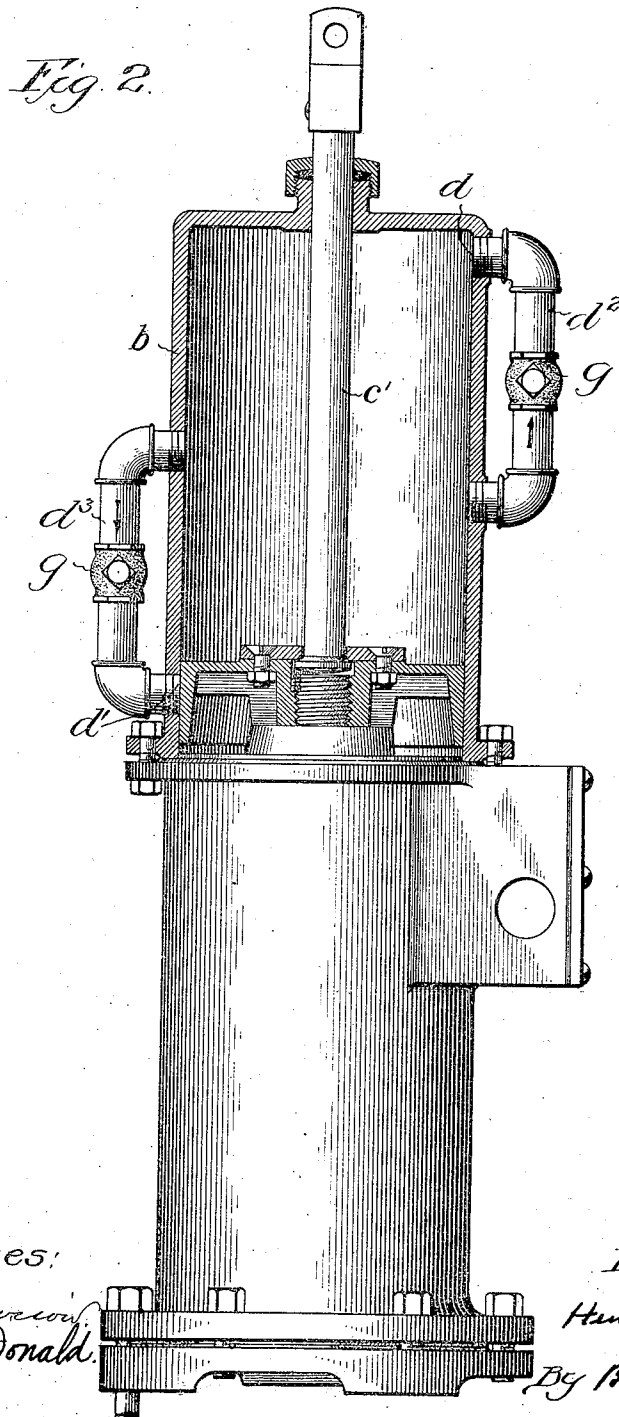
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2 SHEETS—SHEET 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY M. CRANE, OF NEW YORK, N. Y., ASSIGNOR TO WESTERN
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OF ILLINOIS.

DASH-POT.

No. 828,091.

Specification of Letters Patent.

Patented Aug. 7, 1906.

Application filed June 5, 1905. Renewed February 13, 1906. Serial No. 300,915.

To all whom it may concern:

Be it known that I, HENRY M. CRANE, a citizen of the United States, residing at New York, in the county of New York and State
5 of New York, have invented a certain new and useful Improvement in Dash-Pots, of which the following is a full, clear, concise, and exact description.

My invention relates to a dash-pot, and
10 has for its object to provide an improved brake or dash-pot which will be especially adapted for use in connection with solenoids employed to control the movements of semaphore-vanes.

15 My object has been to construct a dash-pot which will be absolutely self-contained and waterproof, so that it may be mounted in the most exposed positions. It has also been my aim to avoid suction between the
20 piston of the dash-pot and the ends of the cylinder in order that the acceleration of the piston upon starting may be as rapid as possible and to provide an air-cushion at each end of its stroke to regulate said piston, and
25 thereby prevent its being brought violently against the end of the cylinder.

In the dash-pot of my invention I provide a closed cylinder within which a piston is adapted to reciprocate, the piston-rod passing
30 through the cylinder to the exterior thereof. Covered passages are provided in association with the cylinder having openings at their ends communicating with the cylinder, said passages opening into the cylinder intermediate said end holes. The air is thus
35 allowed to flow through the passages and end holes, respectively, into the cylinder at the rear of the piston when moving in either direction, so as to prevent suction of the piston
40 and allow the same to accelerate rapidly at the beginning of its stroke. I also provide check-valves within said passages, which are adapted to prevent air from passing from the cylinder through the end holes into the pas-
45 sages connected therewith. Thus when the piston passes the central opening, moving in either direction, it prevents the flow of air into the portion or end of the cylinder immediately before it, and as the check-valve associated
50 with the hole in that end of the cylinder is closed an air-cushion is furnished for the piston during the remainder of its travel in such direction.

I will describe my invention more par-

ticularly by reference to the accompanying
55 drawings, which illustrate the preferred embodiment thereof, reserving for the appended claims a statement of the parts, improvements, or combinations which I consider novel
60 with me.

Figure 1 is a vertical sectional view of the dash-pot embodying my invention applied to a solenoid, and Fig. 2 is a sectional view of another form of my invention.

The same letters of reference designate the
65 same parts throughout both figures of the drawings.

The drawings illustrate the application of my invention to a solenoid controlling a
semaphore-vane such as is employed in sig-
70 naling systems of ships. The frame *a* of the solenoid would in practice be secured to the mast of a vessel and carry at its upper end the dash-pot, which would act as a brake for the moving solenoid-core, and the semaphore-
75 arm operated thereby.

Referring first to Fig. 1, the cylinder *b* of the dash-pot is preferably secured to the frame of the solenoid at the upper end there-
80 of, a piston *c* being provided within the cylinder adapted to move with the core of the solenoid, being preferably attached to the end thereof. The piston-rod *c'* extends through the cylinder to the exterior thereof and may be connected with a semaphore-vane, the up-
85 per end wall of the cylinder forming a bearing for the piston-rod. The semaphore-vane would thus be caused to partake of the movement of the solenoid-core.

The side wall of the cylinder is provided
90 with holes *d d'* at opposite ends thereof, and covered air-passages *e e'*, external to the cylinder and having openings communicating with the holes *d d'*, lead from said holes and
95 open into the cylinder near the middle of the side wall thereof, said passages preferably communicating with a hole *e²* near the middle of the side wall. A cover *f* is secured to the outer surface of the cylinder over the
100 holes referred to, the wall and cover forming the air-passages referred to. Thus when the piston begins its movement in either direction and until it passes the central opening *e²* in the wall of the cylinder air will be permitted to flow through the opening *e²* into one of the
105 passages *e e'* through the end opening in the cylinder communicating with said passage to the rear of the moving piston, preventing

suction of the piston and allowing the same to start quickly with rapid acceleration.

In each passage e e' I provide a check-valve g near the end opening in the cylinder connected with such passage. Adjacent to each end hole is provided a partition h , extending between the cover f and the side wall of the cylinder and having an opening therein in which the check-valve associated with such end hole may be mounted. Each check-valve is adapted to permit air to flow through the central opening e^2 into the passage in which it is secured and through the end opening connected with such passage into the cylinder, but to prevent air from flowing in the opposite direction from the cylinder through the end opening with which it is associated and into the passage connected with such opening. Thus when the piston traveling in either direction passes the central opening e^2 the supply of air to the portion of the cylinder immediately before the piston is cut off and an air-cushion provided for the piston during the balance of its movement in such direction.

The operation of the dash-pot may be briefly described as follows: In the drawings the core of the solenoid is shown attracted and within the helix of the solenoid with the piston at the lower end of the cylinder. In this position of the parts the semaphore-vane would be in a signaling position. When the solenoid becomes deenergized, the core is released, and the weight of the semaphore-arm would withdraw the core from the helix and move the piston to the upper end of the cylinder, as indicated in dotted lines in Fig. 1. As the piston begins its upward movement and until it passes the central opening e^2 in the wall of the cylinder the air is caused to flow from the cylinder through the opening e^2 in the wall thereof, through the passage e' and end opening d' into the cylinder at the rear of the piston, thus preventing any suction which would retard the movement of the piston at the beginning of its stroke. After the piston travels beyond the opening e^2 it is cushioned for the balance of its stroke, since the check-valve in the passage e' prevents the escape of the air from the portion of the cylinder immediately before the piston by way of the end hole d' .

In the modified form of my invention shown in Fig. 2 I provide covered passages in the form of pipes d^2 d^3 external to the cylinder and leading from the end holes d d' , respectively, in the cylinder, said pipes opening into the cylinder near the middle of the wall thereof, each pipe being provided with a check-valve g . The operation of the dash-pot as thus modified would be substantially the same as described with respect to Fig. 1.

I claim—

1. In a dash-pot, the combination with a cylinder, of a piston within the cylinder, a

piston-rod passing through the cylinder, the cylinder having holes therein at its opposite ends, covered passages external to the cylinder leading from said holes and opening into the cylinder, and check-valves adapted to prevent air from entering said passages through said end holes, but to permit air to flow in the opposite direction through the passages and end holes into the cylinder; whereby the piston is cushioned at both ends of its stroke.

2. In a dash-pot, the combination with a cylinder, of a piston within the cylinder, a piston-rod passing through said cylinder, the wall of the cylinder having a hole therein at each end and near the middle thereof, covered passages external to the cylinder leading from said end holes to the central hole, the air flowing through said central hole and passages into the cylinder to prevent suction of the piston, and check-valves adapted to prevent the entry of air to the passages through said end holes; whereby the piston after it passes said central opening is provided with an air-cushion.

3. In a dash-pot, the combination with a cylinder, of a piston within the cylinder, a piston-rod passing through the cylinder, the wall of the cylinder having holes at opposite ends and an opening near the middle thereof, an inclosing cover secured to the outer surface of the cylinder over said openings to form an air-chamber, the air flowing through said central opening and passages into the chamber to prevent suction of the piston, the piston after passing said central opening preventing the flow of air into the end of the cylinder immediately before it, and check-valves for said end openings adapted to prevent the passage of air from the cylinder to said chamber through said end openings; whereby an air-cushion is provided for the piston at each end of its stroke.

4. In a dash-pot, the combination with a cylinder, of a piston within the cylinder, a piston-rod passing through the cylinder, the side wall of the cylinder having openings therein at each end and near the middle thereof, a cover secured to the outer surface of said cylinder over said openings to form an air-chamber, partitions at opposite ends of said chamber near the end openings extending between the cylinder-wall and the cover, said partitions having openings therein, and check-valves within said openings adapted to prevent air from entering the chamber through said end openings but to permit air to flow through said central opening into said chamber and through the end openings into the cylinder; whereby an air-cushion is provided for the piston at each end of its stroke.

5. In a dash-pot, the combination with a cylinder, of a piston therein, a piston-rod passing through the cylinder, the cylinder

having holes therein at its opposite ends, covered passages leading from said holes and opening into the cylinder, the piston in either stroke after passing the point where
5 said passages open into the cylinder preventing the flow of air into the portion of the cylinder in front thereof, and check-valves adapted to prevent the entry of air to said passages through said end holes; whereby
o the piston is cushioned at both ends of its stroke.

6. In a dash-pot, the combination with a cylinder, of a piston within the cylinder, a piston-rod connected with said piston, covered passages having openings at their ends
5 communicating with said cylinder, said passages opening into the cylinder intermediate said end openings, and check-valves adapted

to prevent air from entering said passages through said end openings, but to permit air
20 to flow in the opposite direction through said passages into the cylinder; whereby the piston is cushioned at both ends of its stroke.

7. In a dash-pot, the combination with a cylinder, of a piston within the cylinder, covered passages communicating with the cylinder
25 at the end thereof, said passages opening into the cylinder intermediate the ends thereof, and check-valves associated with said passages.

In witness whereof I hereunto subscribe
my name this 18th day of April, A. D. 1905.
HENRY M. CRANE. 30

Witnesses:

GEORGE A. HAMILTON
ALBERT M. BULLARD.