(No Model.)

H. W. METZING.

PNEUMATIC ENGINE.

No. 441,103. Patented Nov. 18, 1890.

Fig. 1.

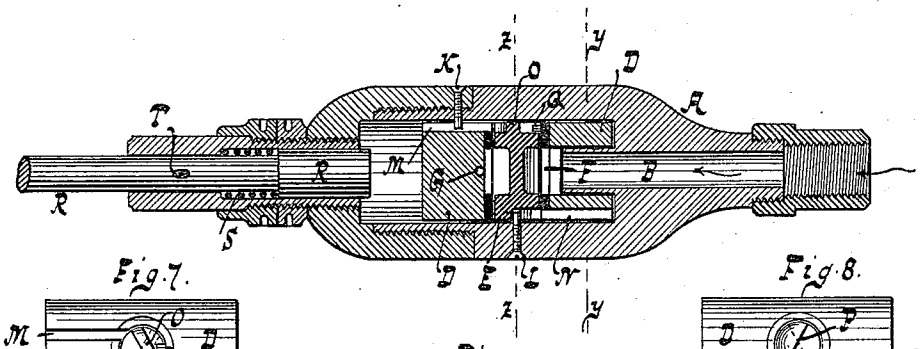


Fig. 7.



Fig. 8.

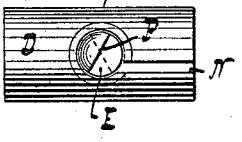


Fig. 2.

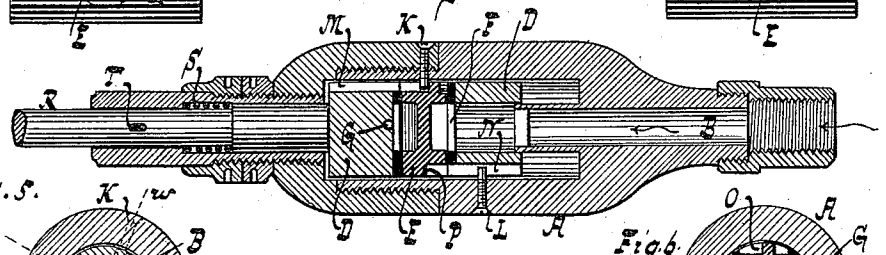


Fig. 5.

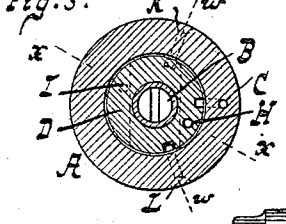


Fig. 6.

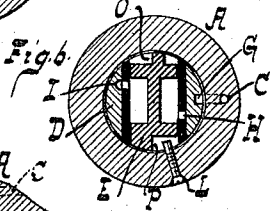


Fig. 3.

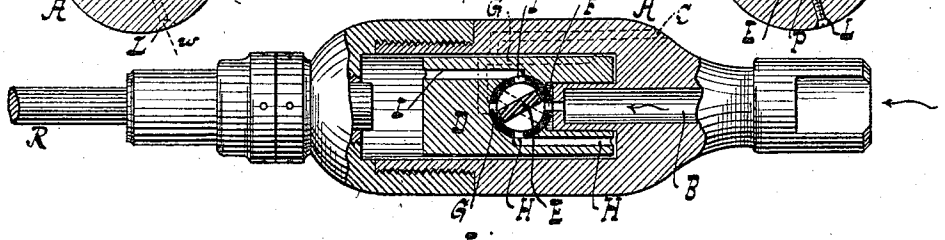
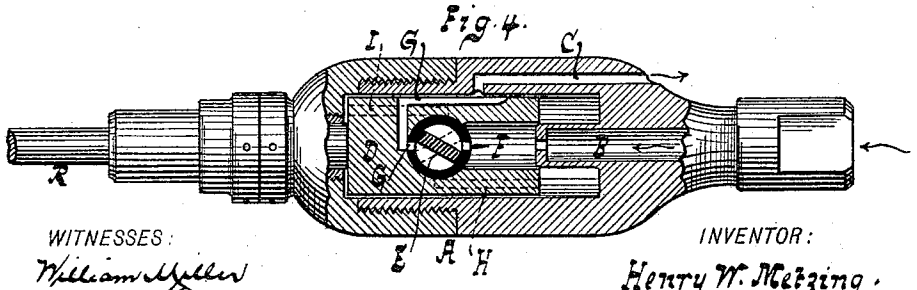


Fig. 4.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HENRY W. METZING, OF NEW YORK, N. Y., ASSIGNOR TO THE NATIONAL PNEUMATIC TOOL COMPANY, OF SAME PLACE.

PNEUMATIC ENGINE.

SPECIFICATION forming part of Letters Patent No. 441,103, dated November 18, 1890.

Application filed June 20, 1890. Serial No. 356,044. (No model.)

To all whom it may concern

Be it known that I, HENRY W. METZING, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Pneumatic Engines, of which the following is a specification.

This invention relates to an improvement in pneumatic engines; and the invention consists in the details of construction set forth in the following specification and claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section along *w w*, Fig. 5, of a pneumatic engine containing my invention. Fig. 2 is a section similar to Fig. 1 with parts in a different position than in Fig. 1. Fig. 3 is a section along *x x*, Fig. 5. Fig. 4 is a view similar to Fig. 3 with parts in a different position than in Fig. 3. Fig. 5 is a section along *y y*, Fig. 1. Fig. 6 is a section along *z z*, Fig. 1. Fig. 7 is a detail view of one side of the cylinder. Fig. 8 is a detail view of the other side of the cylinder.

In the drawings, the letter A indicates a casing having a supply-channel B and an exhaust-channel C. The supply-channel is shown located at the center or along the median line of the casing and the exhaust-channel at one side of the casing. Within the casing is located a cylinder D, having a valve-chamber which is provided with a valve E. The cylinder is provided with ports leading from the valve-chamber.

The port F communicates with the supply-channel B, Fig. 3, the port G, Fig. 4, with the exhaust C, the port H, Fig. 3, with the rear end of the cylinder, and the port I with the front end of the cylinder. That end of the cylinder lying toward the supply-channel B is herein considered the rear end of the cylinder.

When the parts are in the position shown in Fig. 3 in full lines, the cylinder is in its extreme rear position. Air, gas, or steam injected through the supply-channel B then passes into the valve-chamber through port F and out through port H, so as to press against the rear of the cylinder and drive the cylinder forward. The air, gas, or steam in front of the cylinder enters the valve-chamber through port I and passes out through port G to the exhaust C. When the cylinder has reached the end of its forward stroke, the valve is shifted to the position shown in Fig. 3 in dotted lines and in Fig. 4 in full lines. Air or steam from the supply B then passes through port F into valve-chamber and out through port I, so as to press against the forward end of the cylinder and drive the cylinder backward and to the position shown in Fig. 3. The air or steam in the rear of the piston entering through port H into the valve-chamber can pass through port G to the exhaust C. The cylinder is thus moved back and forth. The oscillations of the valve are caused by suitable studs K L projecting from the casing A. The stud K extends into the depression or groove M in the side of the cylinder, and the stud L projects into a similar groove N. These studs and grooves prevent turning of the cylinder, while leaving the cylinder free to oscillate back and forth. As the cylinder approaches the end of its forward stroke, the shoulder O on the valve E is brought into contact with stud K, extending into groove M. This contact shifts the valve from the position shown in full lines in Figs. 3 and 7 to the position there shown in broken lines, said latter position being shown in Figs. 4 and 8 in full lines. As the cylinder approaches the end of its return or rear stroke, the shoulder P on valve E is brought into contact with stud L, extending into groove N. This contact shifts the valve from the position shown in full lines in Figs 4 and 8 back to the position shown in broken lines in said Figs. 4 and 8 and in full lines in Figs. 3 and 7. The cylinder has a stop Q, located at the rear of the shoulder O, Fig. 7, so as to prevent excessive shifting of the valve E.

The studs K L are readily formed by screws inserted a suitable distance into holes tapped into the casing. The casing is shown as composed of two parts or sections screwed together, and the stud K, by being passed through both sections, will form a lock for preventing said sections from unscrewing or separating from one another.

The forward stroke of the cylinder can be

imparted to a reciprocating rod R, and when the cylinder moves back a spring S moves the rod R back into position to be actuated by the next forward stroke of the piston. A stop or stud T, extending into a slot in the rod R, prevents excessive movement of the rod.

The valve-chamber, as seen in the drawings, extends transversely through the cylinder.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a casing A, having a supply-channel and an exhaust-channel, and a cylinder D, located within the casing and having a valve-chamber extending through said cylinder, said valve-chamber being provided with a rocking or oscillating valve and being made to communicate with ports communicating, respectively, with the ends of the cylinder, the supply-channel, and the exhaust, substantially as described.

2. The combination of a casing A, having a supply-channel located at the center of the casing and an exhaust-channel located at one side of said casing, and a cylinder D, located within the casing and having a valve-chamber, said valve-chamber being provided with a rocking or oscillating valve and being made to communicate with ports communicating, respectively, with the ends of the cylinder, the supply-channel, and the exhaust, substantially as described.

3. The combination of a casing A, having a supply-channel and an exhaust-channel, a cylinder D, located within the casing and having a valve-chamber, a valve located in said valve-chamber, a stop Q on the cylinder for limiting the motion of the valve, and actuating-studs K L on the casing for actuating the valve, said valve-chamber being made to communicate with ports communicating, respectively, with the ends of the cylinder, the supply-channel, and the exhaust, substantially as described.

4. The combination of a casing A, having a supply-channel and an exhaust-channel, a cylinder D, located within the casing and having a valve-chamber, a valve located in said valve-chamber, a stop Q on the cylinder for limiting the motion of the valve, and actuating-studs K L on the casing for actuating the valve, said studs being made to enter suitable grooves M N on the cylinder, and said valve-chamber being made to communicate with ports communicating, respectively, with the ends of the cylinder, the supply-channel, and the exhaust, substantially as described.

5. The combination of a casing provided with a cylinder, a valve-chamber extending through said cylinder, and a rocking or oscillating valve located in said chamber, the cylinder, the casing, and the valve-chamber having suitable ports for supply and exhaust, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HENRY W. METZING.

Witnesses:
W. C. HAUFF,
E. F. KASTENHUBER.