E. R. & H. S. Cole.

Fire Engine.

No. 79,730. Patented Jul. 7, 1868.

Fig: 1.

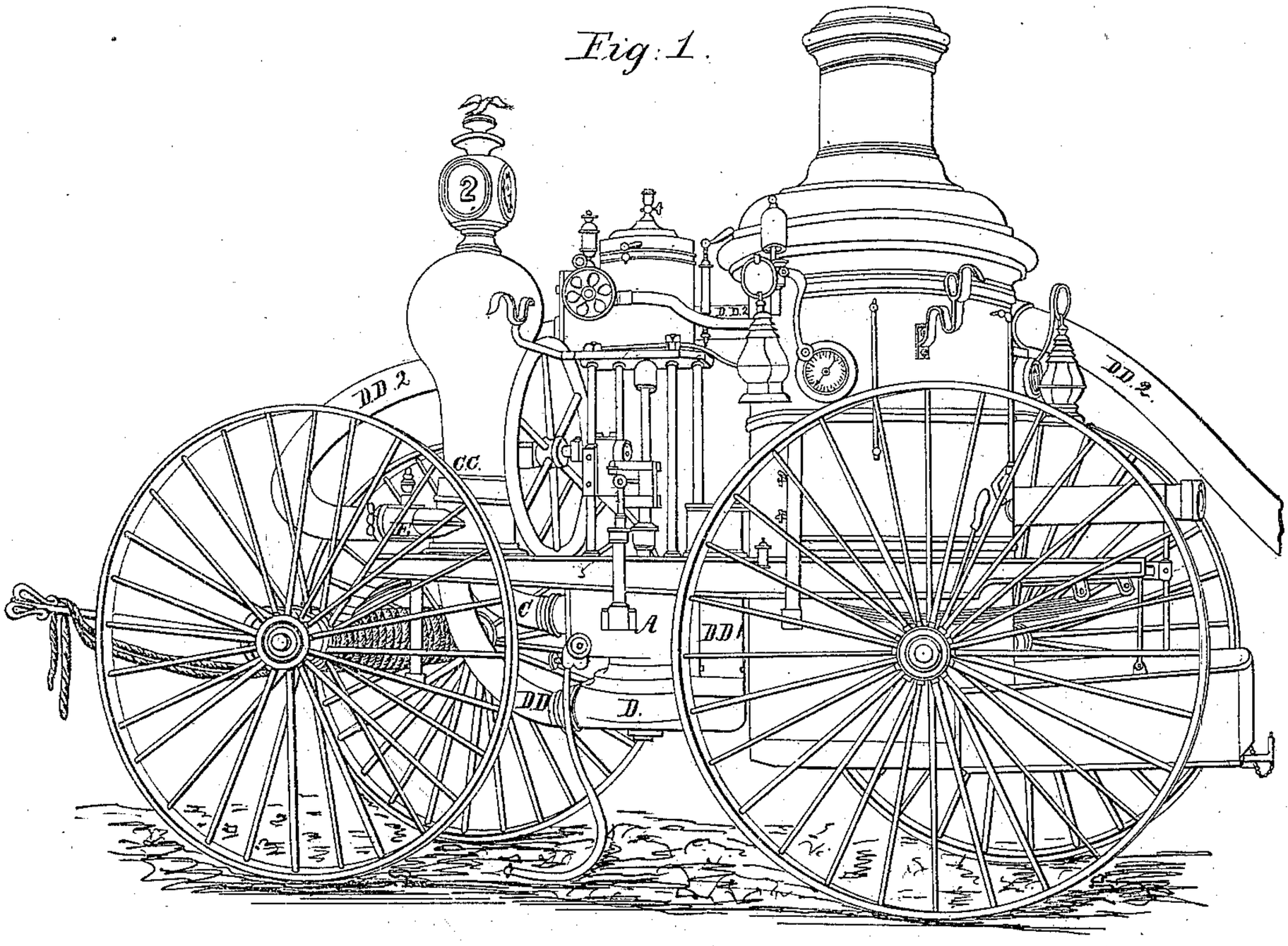


Fig: 2.

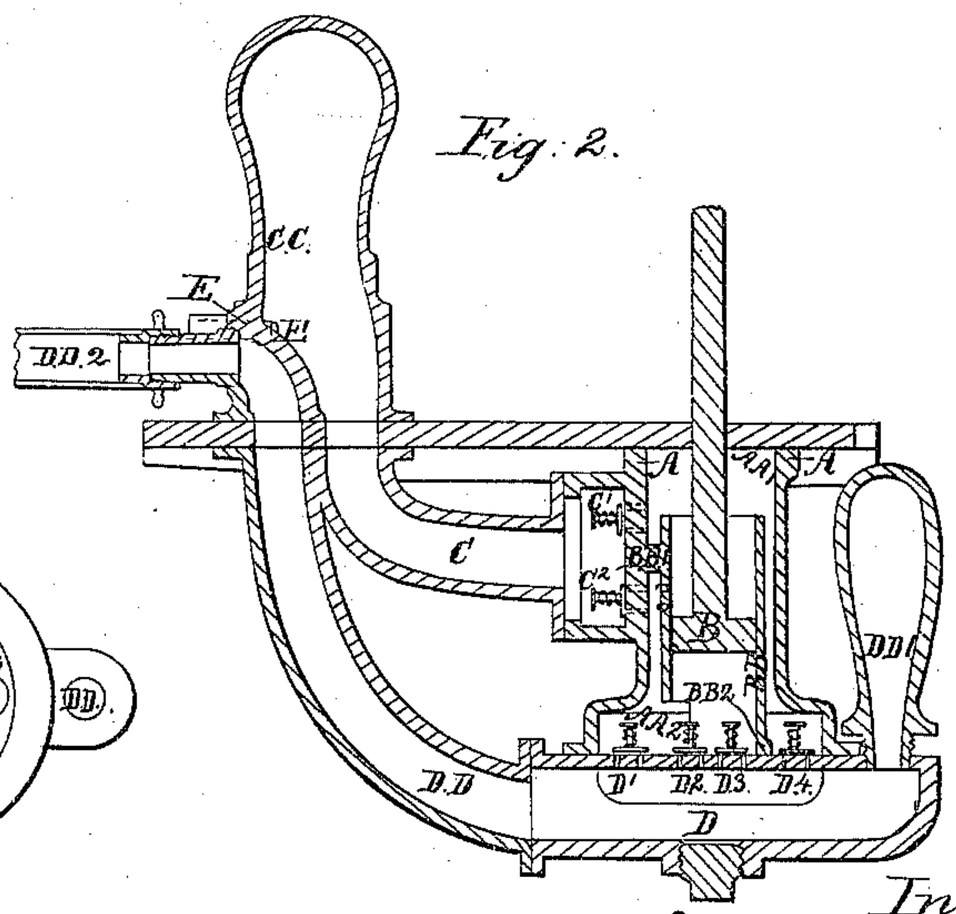
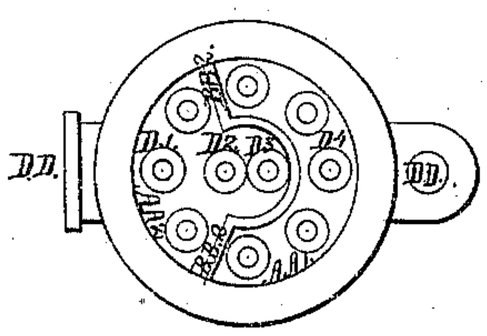


Fig: 3.



Witnesses;

Edmund Masson

R. L. Ross Jr.

Inventors;

Edward R. Cole -

Henry S. Cole -

Per Wm. C. Wood Atty

United States Patent Office.

EDWARD R. COLE AND HENRY S. COLE, OF PAWTUCKET, RHODE ISLAND.

Letters Patent No. 79,730, *dated July* 7, 1868.

IMPROVEMENT IN STEAM FIRE-ENGINE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, EDWARD R. COLE and HENRY S. COLE, of Pawtucket, county of Providence, and State of Rhode Island, have invented certain new and valuable Improvements in Steam Fire-Engines.

Said improvements consist in the construction and arrangement of a force-pump peculiarly adapted for steam fire-engines.

We assert that the perpendicularly-acting pump is the most desirable one for such purposes, and cite, as the chief reason therefor, the fact that, while in action, there is less motion to the engine than is the case with engines using other forms of pump.

The advantages in overcoming useless motion in such an apparatus are obvious. The chafing wear of hose and suction is avoided, the rack and strain upon wheels, axles, springs, and other auxiliary parts, are greatly lessened, and consequently the engine is susceptible of longer service without replacement or repairs. To this may be added the advantage of maintaining within the cylinder an equal and easily-compensated wear by friction upon the piston or plunger and rod.

To more properly and perfectly overcome useless motion in the apparatus; to avoid complication; to lessen expense of manufacture; to strengthen parts by new combination; to assist the working of the engine by natural principles; and to overcome the fault in steam fire-engines, known as "pounding," our invention is intended, and, in practical effect, accomplishes.

To enable others skilled in the art to make and use our invention, we will proceed to give, with the assistance of the drawings, a full, clear, and true description thereof.

Figure 1 represents a steam fire-engine complete, containing our improvements, marked with distinctive letters corresponding with fig. 2.

Figure 2 represents a section of our pump, showing wherein our improvement and invention rest.

A represents a cylinder, the interior of which is at once a suction and a compressing-chamber.

B represents the piston and rod.

B B represents a cylinder within the cylinder A, in which the piston B moves up and down. It will be seen, at points marked B B^1 and B B^2, that there are solid connections between cylinder B B and inner walls of cylinder A. The piston B, in fact, forms a movable partition between the top, bottom, and one side of the interior of cylinder A and the bottom and opposite side of the same. The upper portion of the interior is marked A A^1; the lower, A A^2. Without the presence of the plunger or piston B, these chambers would be in one.

D D represents the suction or supply-pipe, and is, with the pipe C, constructed in one piece. This pipe leads from the base of the air-chamber, a point considerably above the whole pump, and terminates at the supply-chamber D.

C represents the eduction-pipe to air-chamber C C, into which forced water passes from either part of the pump A A^1 or A A^2 through the spring-valves, shown near the partition B B^1, and marked C^1 and C^2.

D represents the supply-chamber, from which water is drawn to supply either chamber above through spring-valves D^1, D^2, D^3, &c.

D D^1 represents a vacuum-chamber, for maintaining, in a measure, a uniform suction at change of stroke.

E represents the point at which forced water is delivered to the hose.

Figure 3 represents the bottom of the pump, and shows the spring-valves and dividing-partition B B^2.

The operation of the pump is as follows:

The piston being raised, water is thereby drawn from the supply-chamber D into the inner and lower chamber A A^2, through the spring-valves D^1, D^2, D^3, &c. The piston being depressed, the water then in chamber A A^2 is forced through spring-valve C^2 into eduction-pipe C, air-chamber C C, thence to hose. The upper chamber, A A^1, is filled by the downward suction of piston B by water through valves D^1, &c., and, by the succeeding upward movement, the water so drawn is forced through spring-valve C^1, and so on.

Referring to our previous enumeration of advantages gained by us through our improvement, we will now consider each in turn.

We more perfectly overcome useless motion by the arch and weight of the suction-pipe D D^2, and the column of water within. This is utilized by our peculiar arrangement, and is shown in fig. 1.

We avoid complication, and thereby lessen expense of manufacturing, by the obviously simple arrangement of parts, and by the casting in one piece of the cylinder A and the interior cylinder B B, and also by casting in one piece the pipes C and D D, as shown in figs. 1 and 2, between the air-chamber C C and the pump.

We strengthen the pump and auxiliary parts by the unity of pipes C and D D, as by their form and position they are, in effect, a perfect truss and brace, greatly adding to the solidity and firmness of the pump.

We assist the pump by natural forces, by elevating our suction-pipe above the pump, and continued, as shown in fig. 1, thus forming a siphon, in effect, to no inconsiderable extent, which tends to lessen the draughting labor of the pump.

We obviate practically the fault of "pounding," by the elevation of the suction-pipe above the pump, by which means, the pump, after being started, is constantly or continually charged, and the power applied is exhausted by direct action upon the water instead of upon a vacuum, as in the case of a "pounding" pump.

Having thus described our invention, we claim, and desire to secure by Letters Patent—

1. The pump-cylinder A, constructed substantially as described, forming the chambers A A^1 and A A^2 by the interposition of plunger B.

2. The elevated induction-pipe D D and eduction-pipe C, connected substantially as described, for the purposes specified.

3. The arrangement of the siphon-formed induction-pipe D D^2 in relation to the air-chamber C C, waterway D D, and operative parts A B and A A^2 and B B, all substantially as shown and described.

EDWARD R. COLE,
HENRY S. COLE.

Witnesses:
ROYAL LEE,
GEO. A. CARPENTER.