G. Barton, Jr.

Fire Engine.

No. 3,707. Patented Aug. 16, 1844.

Fig. 1.

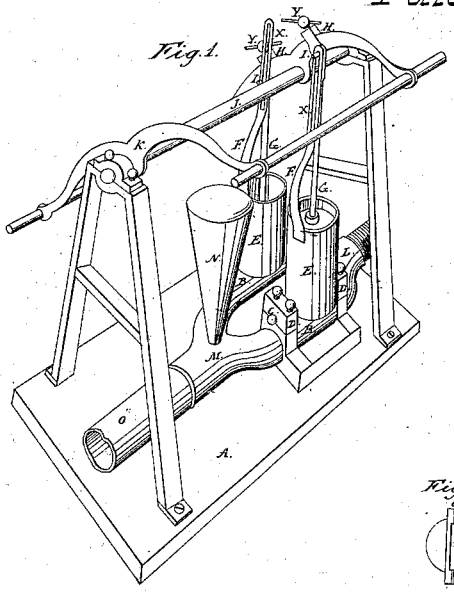


Fig. 4.

Fig. 2.

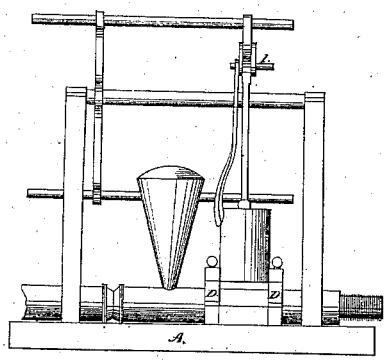


Fig. 3.

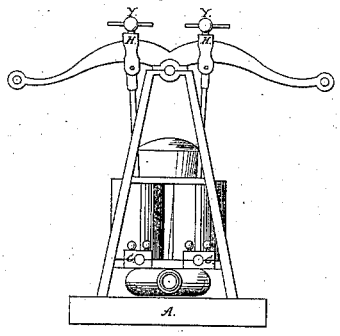


Fig. 5.

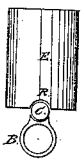
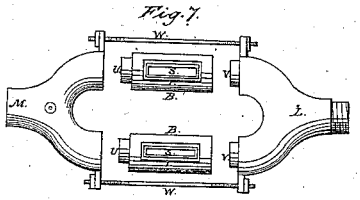


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

GARDNER BARTON, JR., OF WATERFORD, NEW YORK.

FIRE-ENGINE.

Specification of Letters Patent No. 3,707, dated August 16, 1844.

To all whom it may concern:

Be it known that I, GARDNER BARTON, JR., of Waterford, in the county of Saratoga and State of New York, have invented a new and useful Improvement in the Construction of Fire-Engines and their Appendages; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a perspective view. Fig. 2 is a longitudinal elevation. Fig. 3 is a transverse section. Fig. 4 is a view of the lower end of the cylinder and arbor. Fig. 5 is a view of a cylinder and tube B endwise. Fig. 6 is a valve. Fig. 7 is a top or upper side view of the tubes B B and the branched conductor L and M.

Figs. 1, 2, 3, A is the base of the reservoir or tub.

B B are hollow tubes. C C are the arbors secured to the lower ends of the cylinders. D D D D are the caps over the ends of the arbors C, C. E E are the cylinders. F F are the guides on the cylinders. G G are the piston rods. H H are the slides on the lever or balance beam. I I are the connecting pins. J is the balance arbor. K is the lever or balance beam. L is the receiving pipe with branches. M is the discharging pipe with branches. N is the air barrel. O is the discharging hose. X X are openings in the guides F F. Y Y are the binding screws.

Fig. 4, C is the arbor on the bottom of the cylinder. P is the opening for a water passage through the arbor C. Q is the bottom of the cylinder.

Fig. 5, E is the cylinder. R is the scallop in the under side of the cylinder head. C is the end of the arbor soldered to the cylinder head. B is the end of the tube B over which the cylinder E is placed.

Fig. 6 is a valve.

Fig. 7, B B are the hollow tubes under the cylinders. S S are the openings for water passages. T T are the grooves to be filled with packing around the openings S S. U U are the openings through the tubes B B over which valves shown by Fig. 6 are to be placed. V V are the openings in the ends of the branches of the receiving pipe L. L is the receiving pipe with branches. M is the discharging pipe with branches. W W are the bolts to secure the pipes L and M to the tubes B B.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

I construct the carriage and water reservoir in any of the known or convenient forms and in the reservoir or tub I place a pump constructed as follows: For an engine designed to be used by thirty-six men (and such a one I intend here to describe) I make of brass or other strong metal two tubes B B about seventeen inches long, the diameters of the hollows or openings through them should be four inches on the upper side and near each of the ends are projections on which the caps D D D D are fitted and secured by screws these serve to hold the arbors C C in their places I make holes two and one half inches in diameter one semicircle of which is in the undersides of the caps and the other part is partly in the projections before named on the upper sides of the tubes B B and in the upper sides of the tubes extending longitudinally on the tubes in the segment of a circle in such a manner that they form bearings for the arbors C C to rest upon openings S S Fig. 7 about nine inches long and one inch wide should be made through the upper sides of the tubes B B and directly under the openings in the arbors C C these openings are designed for water passages a groove about one fourth of an inch wide and one eighth of an inch deep should be made on each side of the openings and transversely near the ends for the purpose of receiving a leather or other packing these grooves may be seen at T T Fig. 7.

At the discharging ends of the tubes N N Fig. 7 valves should be placed to prevent the return of the water into the cylinders these valves should be made of brass or other metal in the form shown in Fig. 6 the other ends of the tubes B B will receive the branched ends of the receiving pipe L which is in like manner supplied with valves placed over the openings Y. Y. to prevent the water from returning into the tub or suction hose. The branching pipe L Fig. 7 should be made of brass or some strong metal and the hollow inside for the water courses should be about four inches in diameter and the ends of the branches must be made to enter into the ends of the tubes B B up to their

shoulders or up to the packing which is placed between the shoulders and the ends of the tubes B B the branching pipe M should be made of brass copper or other metal and the hollow or water course through it should be about four inches in diameter the branched end will be placed over the ends of the tubes B B and up to the packing which rests against shoulders formed on the tubes B B and thus inclosing the valves placed over the openings U U Fig. 7 the branching pipes L and M are secured firmly in their places by the bolts W W passing through ears formed on the ends of the branches of the pipes. The arbors C C on the lower ends of the cylinders should be made of brass or other strong metal about thirteen inches long and two and one half inches in diameter.

The cylinders E E should be made of brass bronze or some strong metal about thirteen inches high and nine inches in diameter on the insides the lower ends should be closed with heads of metal. I make scallops on the under sides of the heads in such a manner that the upper sides of the arbors C C will be received and fitted on about one third of their circumference an end view of one of these scallops may be seen at R Fig. 5 beneath which at C is an end view of one of the arbors resting above the tube B.

The arbors C C may be secured to the heads of the cylinders by soldering. I make openings in the arbors C C about nine inches long and one inch wide corresponding with and over the openings S S in the tubes B B through which the water passes into and out of the cylinders an opening through the arbor C may be seen at P in Fig. 4.

The guides F F I make of wrought iron or some strong metal extending from the bottom of the cylinders upward about thirty inches or above the connecting pins I I these guides should be about one half inch thick and about three inches wide. At the upper ends I make openings extending downward about thirteen inches long and one and one fourth inches wide these openings serve to receive the ends of the connecting pins I I which should be supplied with friction rollers nearly to fit into the openings before named in the guides F F these openings are shown in Fig. 1 at X X these guides should be secured to the cylinders E E on the outsides in such way that the openings X X will be on a line parallel with the insides of the cylinders. The guides F F before described when acted upon by the pins I I which are attached to the balance beam K by the slides H H will give a vibrating motion to the cylinders E E in such manner that the pistons and piston rods will always be in direct lines parallel with the insides of the cylinders.

These guides F F before described are different from those heretofore used on vibrating steam engines in this they are acted upon by the connecting pins I I instead of being acted upon by the piston rods which causes a pressure upon the pistons in a sideway direction producing friction on the inside of the cylinders which friction the guides F F does not produce; the piston rods G G I make of iron with collars near the lower ends to bear on the piston heads and secured firmly by screws beneath the upper ends should be boxed or capped.

H H are slides made in any convenient form and fitted to the lever or balance beam K. I would advise that these slides H H be made of iron in the form of a flat band open on the lower side with ears descending below the underside of the lever or balance beam K. Pins may be inserted through the ears beneath the balance beam and secured by riveting a hole about one inch in diameter should be made through the ears between the pins before named and below the balance beam in which to place the connecting pins I I.

On the top side above the balance beam a set screw may be inserted which will serve to fasten the slide to the balance beam in every required place. Small indentures may be made in the upper side of the balance beam K to receive the end of the set or binding screws Y Y, before named. See Y, Y, Figs. 1 and 2. These slides support the connecting pins I I and by means of securing them by the binding screws Y Y in different places on the balance beam longer or shorter motions of the pistons will be produced.

K is a lever or balance beam made of iron of any convenient length the thickness and width such that the lever will possess sufficient strength and it should be secured firmly to the arbor J.

J is a balance arbor about two and one half inches in diameter and of any desired length supported by bearings above the reservoir or tub.

I would here observe that variation if desired may be made in the arbors C C in such a manner that the water will be received into the cylinders through openings in the ends of the arbors C C and discharged through the same or through openings in the opposite ends and receiving and discharging valves applied in any convenient manner in such case the diameters of the arbors C C must be enlarged to admit of sufficient openings for water passages. And I would further observe that when the water is introduced into and out of the cylinders through the opening P Fig. 4 the arbor C may be small in diameter and the cylinders will vibrate with small friction.

The breaks or hand poles on which the men operate should be made always to move upward and downward through the same

length of space. Springs or cushions placed on the reservoir or tub will serve to determine the length of this motion.

It will be perceived that the construction of the engine is such that the engineer or other person operating it can easily enlarge or diminish the length of the motion of the pistons in the cylinders and adjust it as circumstances may require. This is performed by placing the slides H H nearer to or farther from the arbor J. When the slides H H are placed near to the arbor J and secured in their places by the binding screws Y Y the motions of the pistons will be short. For illustration I will suppose a case where it is desired to carry a large quantity of water from some fountain through a long hose in to the reservoir of a second engine stationed near the fire, then the engineer of the first engine stationed at the fountain will move the slides H H outward from the arbor J and secure them by the binding screws Y Y to the balance beam K in such manner that the pistons will move nearly or quite the entire length of the cylinders when the balance beam K is made to operate with its full extent of motion. Now this extent of motion before named is far too great to be used by the engine stationed near the fire. The second engine or that which throws the water on to the fire will have the slides H H set nearer to the arbor J and the motion of the pistons diminished for the purpose of producing a stronger pressure which will be necessary for the purpose of throwing the water to a sufficient elevation. The engine being thus adjusted it will be perceived that if both are operated with the same number of motions there must be a surplusage or redundancy of water carried from the engine at the fountain to the engine stationed at the fire, which surplus may be used by a third engine or with buckets or if a supply of water for one engine only is required then the first engine at the fountain may be operated with a slower motion which will be less fatiguing to the men.

I will now suppose a case where it is desired to throw a large quantity of water on to a fire at no great elevation. Set the slides H H on the lever K outward from the arbor J so as to produce large motion on the pistons and use a large discharge pipe. And in a case where it is desirable to throw a smaller quantity of water to a large elevation or on to the top of some high edifice then a smaller discharge pipe should be used and the slides H H should be set nearer to the arbor J and the object desired will be easily effected and by such means when a fire originates in the roof of a high building a few persons without waiting for the arrival of more force will be able to throw a small stream on to it which is sometimes an object of much importance.

The advantages obtained by using vibrating cylinders instead of those which are stationary may be thus considered first by their use an engine can be easily constructed of a variable capacity. Second the action of the piston is always in a direct line parallel with the insides of the cylinders there being no lateral or sideways pressure of the pistons on the inside of the cylinders which can not be avoided on stationary cylinders operated or by a lever or break beam. Third the piston can be taken out and repacked more readily as there are no guides or parts over it to be removed.

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

1. The combination and arrangement of the cylinders E E with the guides F F attached and their agreement with the slides H H by means of which the capacity of the engine may be enlarged or diminished at pleasure.

2. I do not claim the invention of vibrating cylinders but I do claim the invention of the application of the vibrating cylinders E E to the purposes of pumps for fire engines operating in the manner hereinbefore described.

3. I also claim the opening X X in the upper ends of the guide F F on which the connecting pins I I act.

4. And I claim the opening P through the arbor C Fig. 4 and the corresponding openings S, S, Fig. 7 serving for water passages.

GARDNER BARTON, Jun.

In presence of—
Archibald Bull,
John Price.