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Frederic Graff Jr. Scrapbook, 1854-1857**

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pipe in the usual manner.

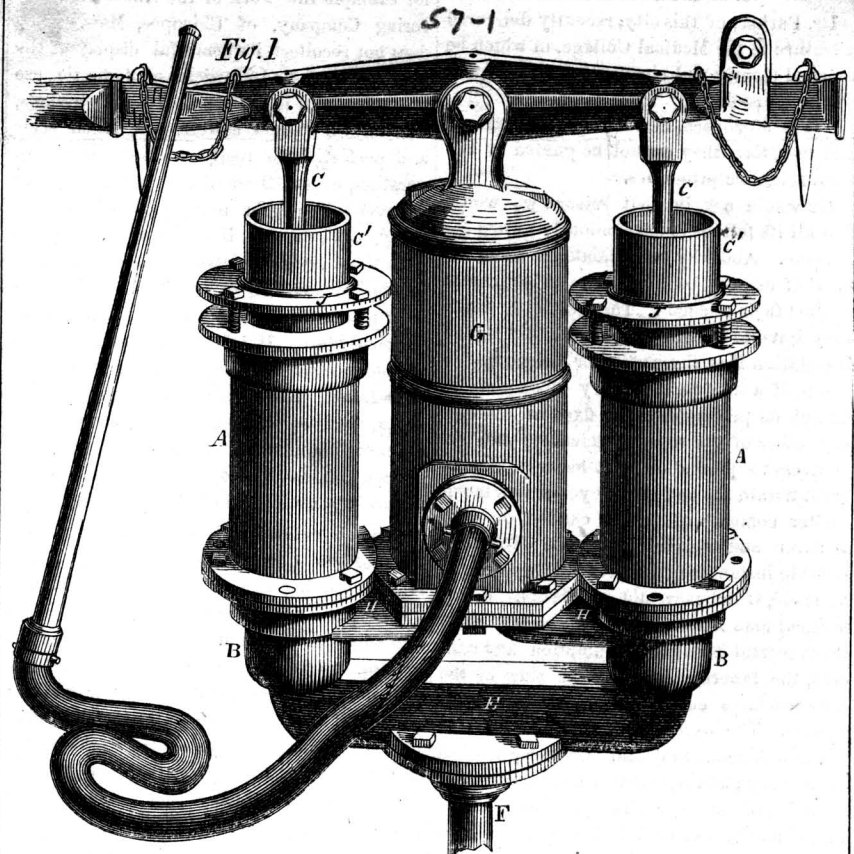
As a ship's bilge pump this improvement is of great utility, since grain and other articles may be carried in bulk without any danger of choking the valves; the same pump is also available in case of fire. There is another novelty connected with this pump, when used on ship board, that deserves mention. By applying a whistle, which Mr. Tower's furnishes, to the escape aperture of the air chamber, an alarm, equal to the steam whistle, is produced. In foggy weather this contrivance will be found very serviceable, as the inventor states that the alarm can be heard for a very long distance.

Placed upon a small platform with wheels, the pump is adapted as a fire engine for steamboats, villages, &c., the cost being very small when compared with ordinary engines.

The ends of the brake bar, L, are furnished with cavities into which the brake levers are introduced. The power of the pump may at any time be increased by lengthening the levers.

Further information may be had on application to the inventor, No. 93 Cedar st., New York.

IMPROVED FIRE ENGINE PUMP.



The annexed engravings illustrate a very excellent improvement in pumps, by Mr. Ambrose Tower, of this city, who has made application for a patent.

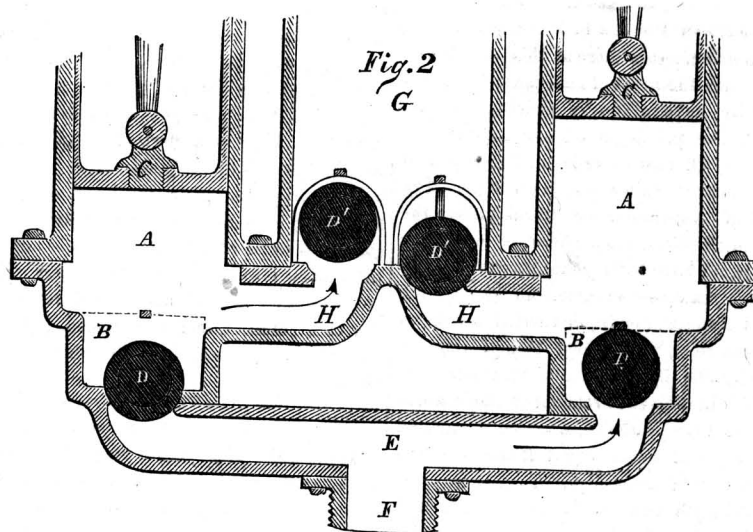
Figure 1 is a side elevation, and fig. 2 is a side sectional elevation. Similar letters of reference indicate the same parts.

The great object of the inventor in this improvement has been to construct a pump, which, while it serves all the purposes of the ordinary lift and force pump, may also be used at any moment as an effective fire engine; as such it requires to be substantially made, and to be free from liability to disorder, whether by choking or the wearing of the parts.

This pump is furnished with ball valves, D D'—double ball valves would be a more

suitable term, for each valve is composed of two spheres, viz.: a central metallic sphere covered with india rubber, or other suitable elastic substance. In consequence of this elastic covering the balls always fit their seats closely, while the rush of the water causes the valves partially to revolve at every stroke, so that the surface contact of the valves, with their seats, is continually changing. Hence the wear of the valves is even, and very slight.

The spherical form and elasticity of the valves are safeguards against the choking of the pump. The valves being free from hinges and other appurtenances, it is plain that foreign substances can find no lodgment, even if they did it would matter little, since the valves are self adjusting, and their elasticity



would permit their accommodation to the seats and to any foreign matter that happened to be left upon them.

The plungers, C, are hollow, the connecting rods, C', being attached at the bottom thereof, as shown. Instead of packing the piston head in the common manner, the vacuum is produced by causing the plungers—which are almost of the same size as the pump barrels—to pass through stuffing boxes, J. If from long use, or unusual pressure, (as in

the case of fire) the packing in the stuffing boxes becomes loose, it is quickly tightened, without removing the plungers, by turning the stuffing box screws. The inventor regards this as a very desirable advantage over ordinary pumps.

In the operation of this invention the water enters the supply pipe, F, chamber, E, and passes through valve boxes, B, and air chamber pipes, H, alternately, into the air chamber, G, whence it is discharged by hose