

*C. W. Grannis,
Fire Engine.*

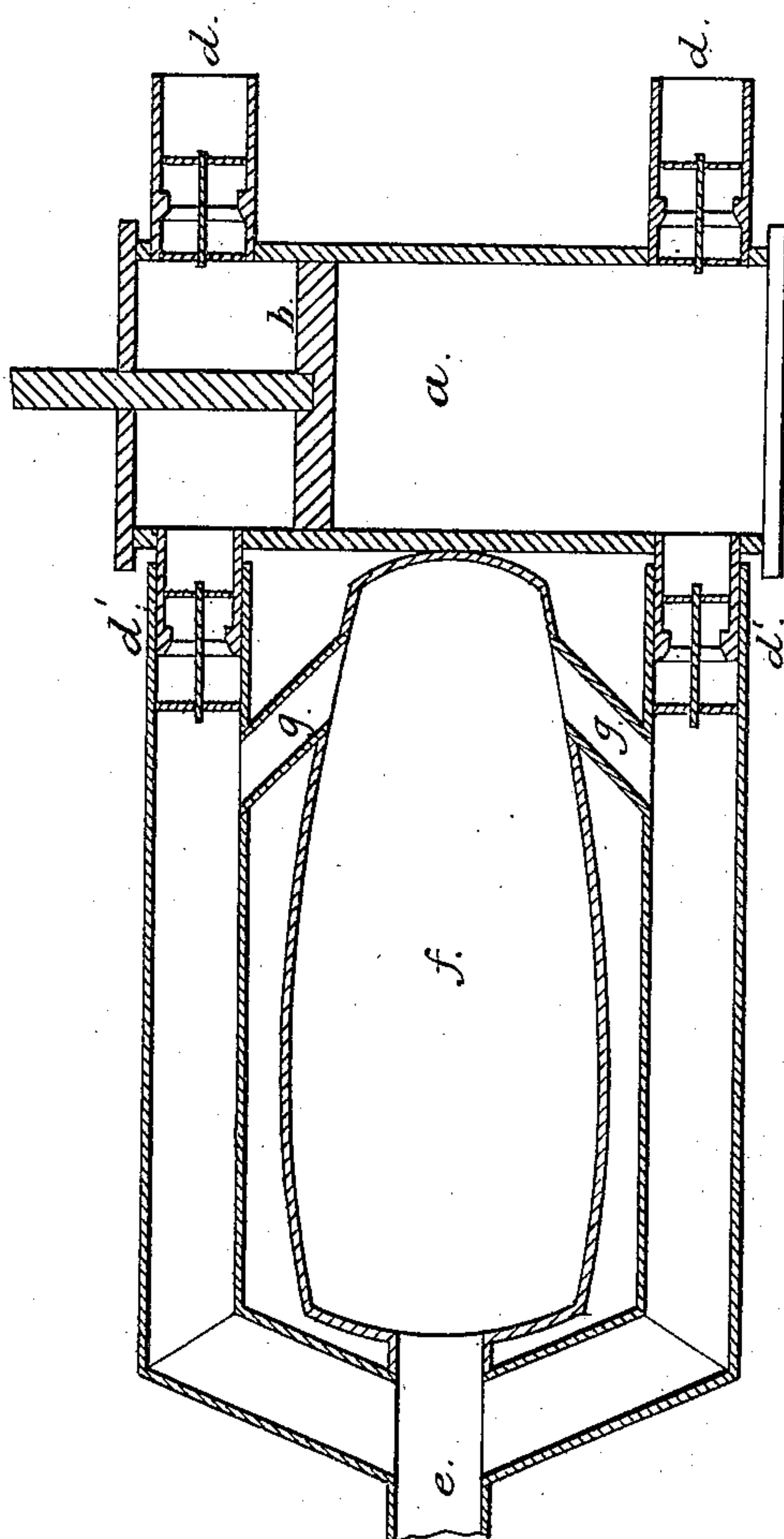
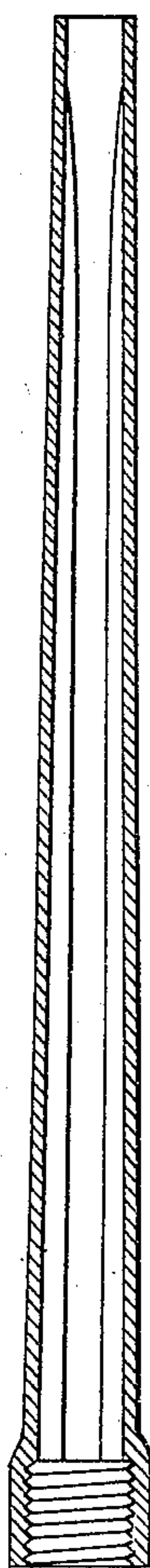
No. 4,796.

Patented Oct. 7, 1846.

Fig. 2.



Fig. 1.



UNITED STATES PATENT OFFICE.

CHARLES W. GRANNIS, OF PERSIA, NEW YORK.

FIRE-ENGINE.

Specification of Letters Patent No. 4,796, dated October 7, 1846.

To all whom it may concern:

Be it known that I, CHARLES W. GRANNIS, of Persia, in the county of Cattaraugus and State of New York, have invented new and
5 useful Improvements in Fire and other Engines for Throwing Water, and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things be-
10 fore known and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical section of the cylinder, piston, pipes and air vessels and Fig.
15 2 a cross section of the discharge pipe.

The same letters indicate like parts in all the figures.

It is well known that in fire and other en-
20 gines for throwing water the air vessel into which the water is forced on its way to the discharge pipe for the purpose of equalizing the discharge by the elasticity of the air contained is liable to a serious objection,
25 viz: that of mixing the air with the water which causes the column of water to break into spray on leaving the discharge pipe, and that if the engine be kept at work for any considerable length of time all the air
30 is discharged from the vessel. This defect arises from the imperfect manner in which the air vessel is connected with the cylinder and the discharge pipe in such manner that all the water has to be forced through the
35 air vessel.

The nature of my invention, devised for obviating this difficulty consists in placing the air vessel of a double acting engine between the two branch pipes which form the
40 connection between the two ends of the cylinder and the discharge pipe, and connecting the air vessel with them by means of pipes inclining upward from the air vessel to the branch pipe, or rather inclining
45 in the direction of the discharging current by means of which that violent agitation which takes place within the air vessel on the usual plan is entirely avoided, the outward current being without the vessel while
50 the body of air within the vessel is pressed on either side by the pressure of the water. This constitutes the first part of my invention.

It is a well known physical law that all

fluids in issuing from a vessel through an
55 aperture take a rotary motion, and hence the difficulty of throwing a solid unbroken column of water—a result admitted to be very important. This whirling motion of the
60 water is necessarily due to the force applied and by that much reduces the distance to which the column would otherwise be thrown. The object of my second improvement is to avoid this whirling motion and
65 at the same time save the power thus consumed, and consist in providing the bore of the discharge nozzle or pipe with wings parallel with and converging to the axis of
70 the bore, whereby the column is divided into as many parts as there are wings, and the rotation of the water prevented.

In the accompanying drawings (a) represents the cylinder of the engine, and (b) the solid piston. The cylinder is provided with an induction pipe (d) and an eduction
75 pipe (d') at each end with valves in the usual manner of double acting force pumps. The eduction or branch pipes (d', d') run up for a short distance parallel to each other and are then curved and united into one
80 discharge pipe (e). Between these two branch pipes is placed the air vessel (f) the lower end of which communicates on each side with one of the branch pipes (d') by means of an inclined tube (g) the con-
85 nection of these with the air vessel being lowest or nearest the cylinder, so that the tendency of the current of water independent of the pressure would be to exhaust the air vessel instead of forcing the water into
90 it, and therefore the water will only compress the air within the vessel by virtue of the force, thus avoiding all tendency to commingle with the air and carry it out of
95 the vessel. The bore of the nozzle or discharge pipe is slightly conical, as usual, and provided with one, two or more wings parallel with its longitudinal axis and converging toward the center. These wings are
100 in width at the inner end of the nozzle about half the diameter of the bore, and are in a curved line gradually diminished toward the discharge end so as to permit the divided column gradually to reunite at or near the
105 discharge. This device I have found in practice effectually to avoid the whirling motion referred to, and to throw a more solid column of water to a greater distance

than can be affected with the same force by the nozzle made in the usual manner.

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

- 5 1. Arranging the air vessel of double acting force pumps between the two eduction or branch pipes when the connection is formed by means of two pipes inclining from the air vessel to the branch pipes in
10 the direction of the issuing columns, as described, whereby the discharge of air from the vessel is effectually prevented, and the elastic force of the air exerts a more direct force on the column of water at the end of

the stroke of the piston, than by any known 15 arrangement.

2. And I also claim the employment of a wing or wings within the bore of the nozzle or discharge pipe of fire and other engines, for throwing water, as herein described, by 20 means of which the whirling motion of the stream is prevented and a more solid column obtained than by any other known method.

CHARLES W. GRANNIS.

Witnesses:

A. V. BROWNE,
S. W. SELBY.