XXIV. *Account of a Machine for raiſing Water, executed at* Oulton, *in* Cheſhire, *in* 1772. *In a Letter from Mr.* John Whitehurſt *to Dr.* Franklin.

DEAR SIR,

Redde, Mar. 16, 1775. PRESUMING the mode of raiſing water by its *momentum* may be new and uſeful to many individuals, induces me to ſend you the incloſed plan and deſcription of a work, executed in the year 1772, at Oulton, in Cheſhire, the ſeat of PHILIP EGERTON, Eſq. for the ſervice of a brewhouſe and other offices, and is found to anſwer effectually. I am, SIR,

Your moſt obedient ſervant,

JOHN WHITEHURST.

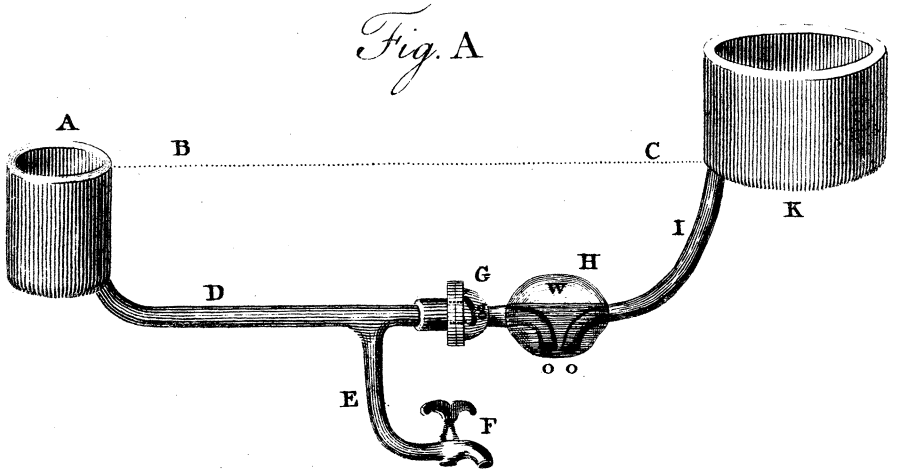
Pleaſe to obſerve, that the circumſtances attending this water-work, require a particular attention, and are as follows (ſee TAB. VII. fig. A.): (A) repreſents the ſpring or original reſervoir, whoſe upper ſurface coincides with the horizontal line BC, and the bottom of the reſervoir K. D the main pipe, $1\frac{1}{2}$ inch diameter, and nearly two hundred yards in length. E a branch pipe, of the former di-

menſions, for the ſervice of the kitchen offices. Now it is to be obſerved, that the kitchen offices are ſituated at leaſt eighteen or twenty feet below the ſurface of the reſervoir A, and that the cock F is about ſixteen feet below it. G repreſents a valve-box, *g* the valve, H an air-veſſel, *oo* the ends of the main-pipe inſerted into H, and bending downwards, to prevent the air from being driven out when the water is forced into it, w the ſurface of the water. Now it is well known, that water diſcharged from an aperture, under a preſſure of ſixteen feet perpendicular height, moves at the rate of thirty-two feet in a ſecond of time; therefore ſuch will be the velocity of the water from the cock F. And although the aperture of the cock F is not equal to the diameter of the pipe D, yet the velocity of the water contained in it will be very conſiderable: conſequently, when a column of water, two hundred yards in length, is thus put into motion, and ſuddenly ſtopped by the cock F, its momentous force will open the valve *g*, and condenſe the air in H, as often as water is drawn from F. In what degree the air is thus condenſed, is needleſs to ſay in the inſtance before us; therefore I ſhall only obſerve, that it was ſufficiently condenſed to force out the water into the reſervoir K, and even to burſt the veſſel H, in a few months after it was firſt conſtructed, though apparently very firm, being made of ſheet lead, about nine or ten pounds weight to a ſquare foot. From whence it ſeems reaſonable to infer, that the momentous force is much

ſuperior

ſuperior to the ſimple preſſure of the column IK; and therefore equal to a greater reſiſtance (if required) than a preſſure of four or five feet, perpendicular height. It ſeems neceſſary further to obſerve, that the conſumption of water in the kitchen offices is very conſiderable; that is, that water is frequently drawing from morning till night all the days of the year.

Fig. A



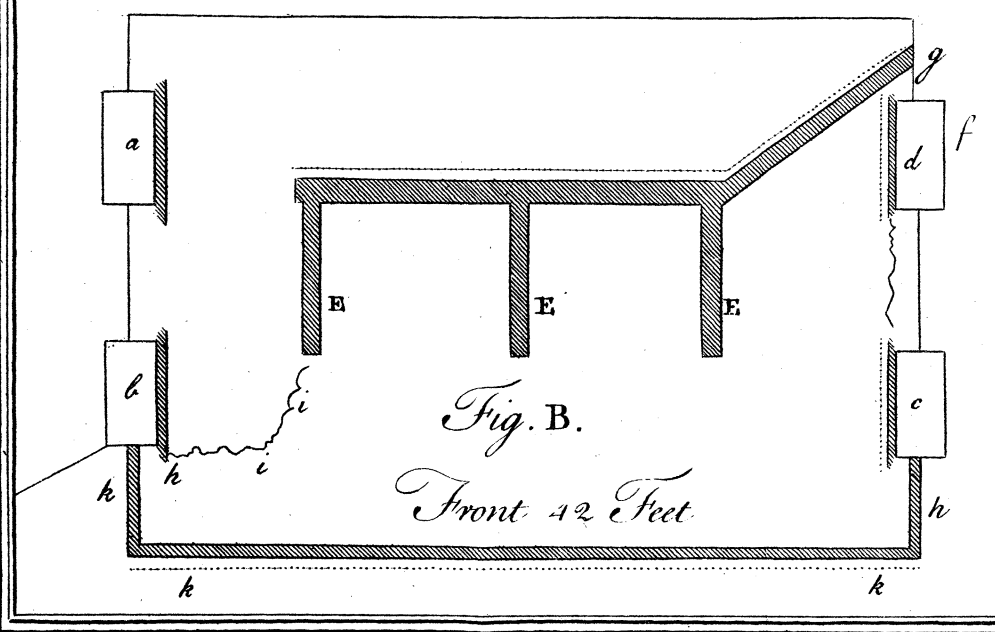
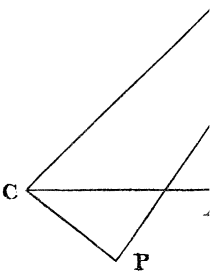


Fig. B.

Front 42 Feet

Fig. 1.



1.

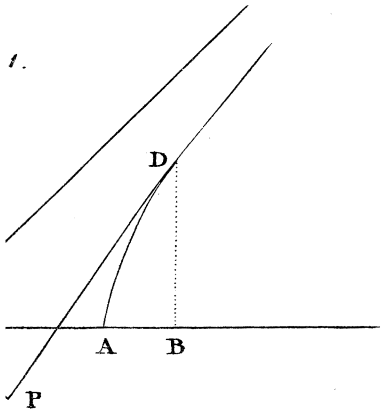
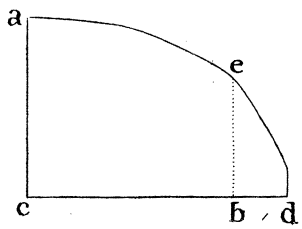


Fig. 2.



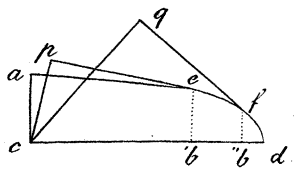


Fig. 3.

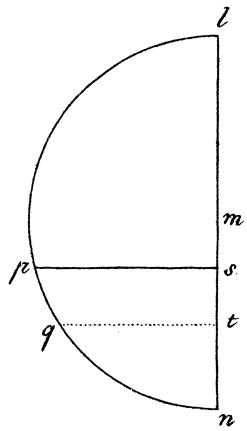
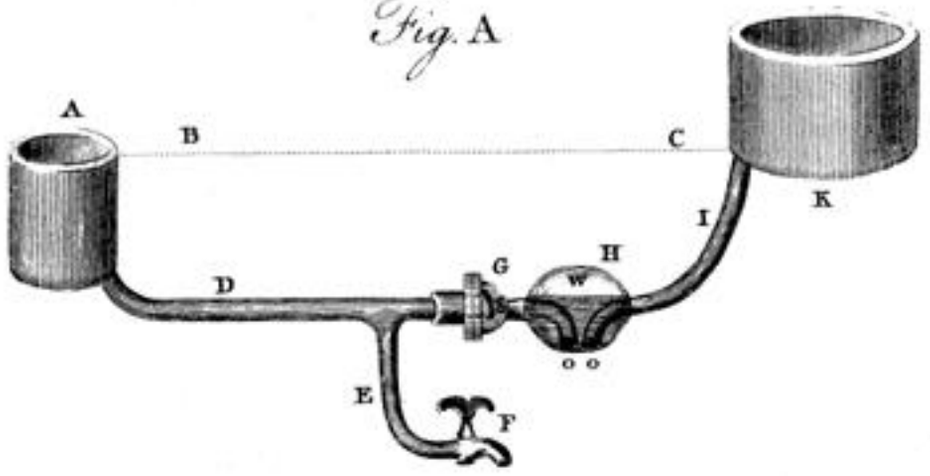


Fig. 4.

Fig. A



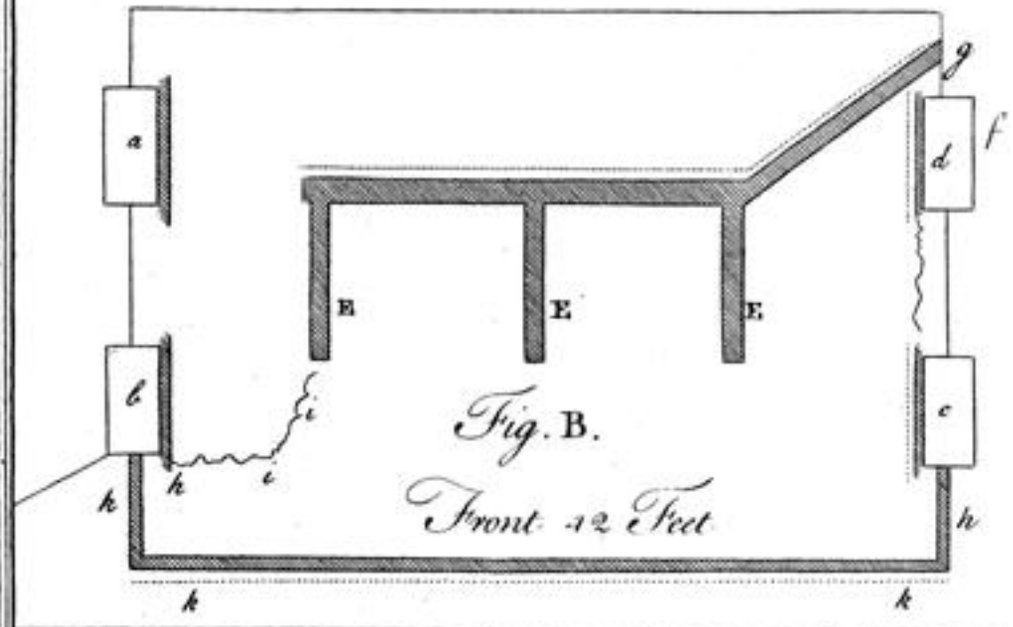


Fig. B.

Fig. 1.

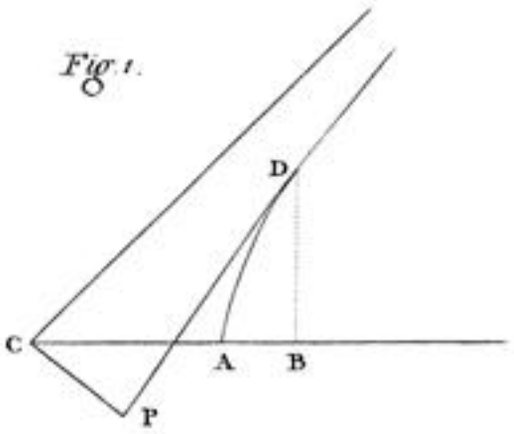
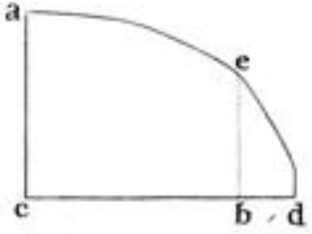


Fig. 2.



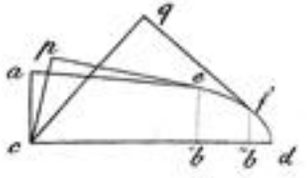


Fig. 3.

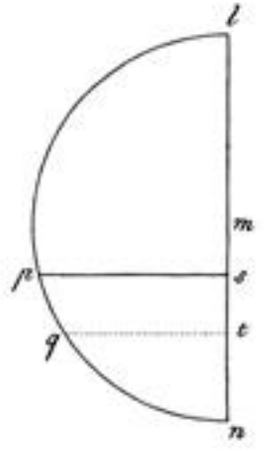


Fig. 4.