W. Loughridge,

Fire Engine,

No. 12,686. Patented Apr. 10, 1855.

Fig. 1.

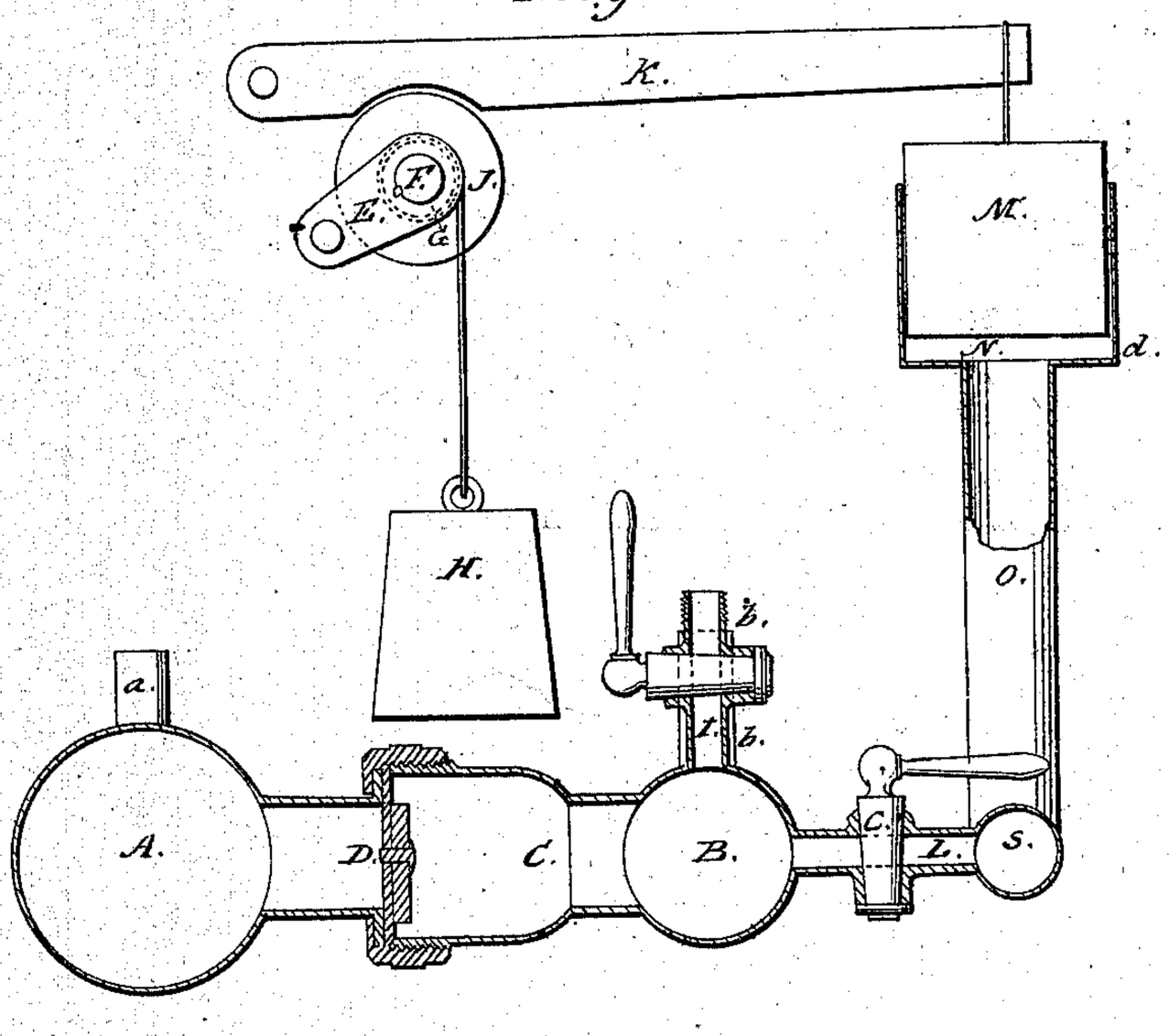
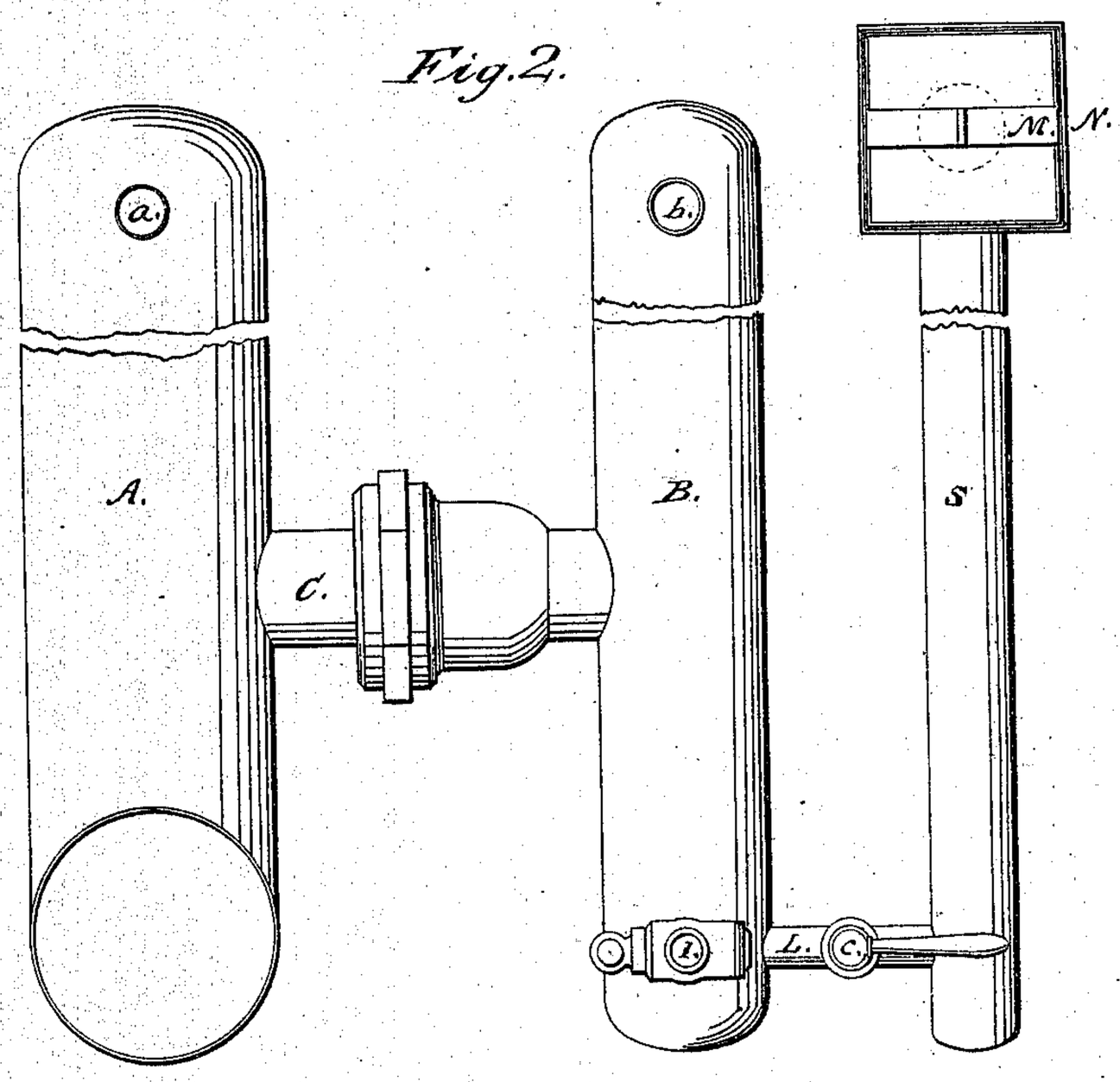


Fig. 2.



UNITED STATES PATENT OFFICE.

WILLIAM LOUGHRIDGE, OF WEVERTON, MARYLAND.

STATIONARY HYDRO-PNEUMATIC ENGINE FOR EXTINGUISHING FIRE.

Specification forming part of Letters Patent No. **12,686,** dated April 10, 1855.

To all whom it may concern:

Be it known that I, WILLIAM LOUGHRIDGE, of Weverton, in the county of Washington yland, have invented a new and useful apparatus for forcing and throwing water to extinguish fires in any part of a city or district by a stationary engine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional elevation of the apparatus, and Fig. 2 is a plan of the principal portion of the same.

Similar letters of reference indicate corresponding parts in both the figures.

This invention consists in a certain arrangement of pipes and certain other apparatus by which water may be forced or thrown at a moment's notice from a reservoir or fountain to any part of a city, town, or district, to extinguish fire by means of a stationary steam or other engine. The same arrangement admits of the necessary supply of water for domestic, manufacturing, and other purposes without interruption during the time it is being used for fire.

To enable those skilled in the art to construct and use my invention, I will proceed to describe its construction and operation.

A and B are two pipes, which may be termed, respectively, the "supply-pipe" and the "force-pipe," which are laid side by side or near each other all over the city, town, or district, in the same manner as the main or street pipes now used. The supply-pipe A is the largest and receives the water from the reservoir or fountain, and the force-pipe B receives it from the supply-pipe through connecting pipes C at proper intervals apart to allow a free circulation between the two. Each connecting pipe is fitted with a valve D, which opens by the pressure of the head in the pipe A, but which would be closed, as represented in Fig. 1, by a greater pressure in the force-pipe. A light spring may be applied to the valve to keep it open until the pressure on the force-pipe is considerably greater than on the supply-pipe.

The supply and force pipes are to be connected at any part of their length by a force-pump which is to be driven by the stationary engine, the suction being attached to the supply and the discharge to the force pipe for the purpose of forcing water from the supply into the force pipe and creating a great pressure within the force-pipe. This pump may be of well-known construction, and as its representation would not in any way facilitate the description of the invention, I have not shown it, but have only shown portions of the suction-pipe *a* and discharge-pipe *b*. The force-pipe is furnished with fire-plugs I at convenient distances—say one hundred or two hundred feet apart—each of which may have one or more nozzles to attach one or more hose to throw the water on the fire at such point or points as may be desired.

E is a crank for working the force-pump. The shaft F of this crank may be the engine-shaft, or may be geared with the engine-shaft; but in either case the engine should be disconnected from the shaft F until a fire takes place. The shaft carries, in addition to the crank or some equivalent device for working the pump, a pulley G, from which is suspended a weight H, sufficient to work the pump after the breaking out of a fire until steam can be raised to drive the pump by the engine. It also carries a brake-wheel J, which is held by a powerful weighted brake-lever K, to restrain the action of the weight until an alarm of fire is given.

S is what I term a "signal-pipe," which serves to give an almost instantaneous alarm of fire to the person in charge of the stationary engine, and at the same time serves to convey water to act upon a float M attached to the brake-lever, and raise the said lever almost instantaneously to set free the pump-shaft F, to allow the weight H to act upon it and set the pump in operation. The signal-pipe is much smaller than the supply or force pipes. It is arranged side by side with or near those pipes and may be connected with either of them at convenient intervals by short connecting-pipes L, each furnished with a cock *c* or cut-off. It is desirable to have one of these connecting-pipes near every fire-plug. The float M is contained within a tank N, with which the signal-pipe communicates by an upright pipe O. This tank must be below the head of the reservoir or fountain in order that the float may

be raised by the column of water in the pipe O in the attempt to arrive at a state of equilibrium with the reservoir or head which the said column will make when there is free communication through one or more of the connecting-pipes L. A small escape-opening *d* is provided near the bottom of the tank.

I will now describe the management and operation of the apparatus. In order to have it in readiness, the weight H must be wound up by some suitable means. The cocks *c* in the connecting-pipes L are kept closed, and the level of the water in the tank will not be above the escape-orifice *d*, which will allow the lever K to bear with its full force upon the brake-wheel J to restrain the action of the weight. When a fire takes place, the first thing to be done is to open the nearest cock *c*, and then the water, being allowed free ingress to the signal-pipe S, rises in the pipe O and tank N and raises the float until it lifts the lever free of the brake-wheel and allows the weight to descend and drive the pump. This gives notice to the person in charge of the stationary engine to get steam up. As soon as the cock *c* has been opened hose are attached to the contiguous fire plug or plugs and the plugs opened. The pressure given by the pump to the water in the force-pipe will close the valves D, and the water will be driven through the hose with a force due to the power applied, in addition to the force due to the head of the reservoir or fountain. It will be seen that water may be brought to play upon a fire in much less time than it could in most cases, if not in any case, from a fire-engine which requires to be run to a fire, as all is in readiness by the time the hose is connected. It will be understood that the pump may be set in motion by a person at any distance from it, all that is necessary to effect this being the opening of one of the cocks *c*. As soon as the steam is up and the engine in readiness it should be connected or thrown into gear with the pump-shaft F. When the fire is extinct or no more water is required, the closing of the cock or cocks *c* will stop the supply of water to the signal-pipe and the level in the tank N will fall to the escape-orifice *d* and allow the brake to come into operation, giving notice to the engineer that the engine is no longer required. Before dispensing with the engine it may be employed to raise the weight H to be in readiness for the next fire, after which it may be disconnected. An engine employed for some manufacturing or other purpose might be employed for this purpose, or a part of the power of some such engine. Then no time would be lost in getting up steam, as it would only be necessary to throw the pump in gear.

Instead of employing a steam or other engine at one point, stationary engines worked by brakes like common fire-engines may be placed at such parts of the city, town, or district as may be thought desirable.

The force-pipe B should be provided with an air chamber or chambers, or with safety-valves, to prevent it being burst by the force of the water being thrown too suddenly upon it. Air-chambers may also be applied to the fire-plugs, with steam-whistles, to be blown by the air compressed into the said chambers by the force of the water. For fire purposes alone the force-pipe B only is necessary, and the supply-pipe A need not be used, as the suction-pipe of the pump might take water directly from the reservoir or fountain; but if a single pipe were used both as a fire-pipe and for the ordinary supply of water, the street-hydrants and other pipes supplying water for domestic or other ordinary purposes would require to have valves which would close like D as soon as extra pressure comes on the force-pipe. This, however, would cause a temporary stoppage of water for other purposes during the continuance of the fire. By using the two pipes and taking the supply for ordinary purposes from the supply-pipe A, the supply of water for those purposes is not interfered with during the continuance of a fire. In the latter case the force-pipe may have hydrants which may be used for ordinary purposes when the pump is not in operation.

Instead of the weight H, a strong spring or combination of springs may be employed to start the pump and work it till the engine can be got ready and connected.

The principal advantages of this invention are: First, it constitutes a perfect apparatus for extinguishing fire, which is applicable immediately wherever wanted; second, the necessity of keeping an engine for the purpose of driving the pump, with steam always up, is obviated, and, third, it allows the whole or part of the power of an engine which is at other times used for other purposes to be used to drive the pump in case of fire, and notifies the person in charge when to connect the pump.

Having thus fully described my invention, I will proceed to state what I claim and desire to secure by Letters Patent—

1. The employment, for the purpose of supplying water for fires and ordinary uses at the same time, of the supply and force pipes A B, connected by connecting-pipes C, fitted with valves D, said supply-pipe being connected with the suction *a*, and said force-pipe with the discharge *b* of a force-pump, and the whole operating substantially as set forth.

2. Though I do not claim the employment of a weight as a motor irrespective of its particular use in this apparatus, I claim the application of the weight H, or its equivalent, to the driving-shaft F of the pump, in connection with a brake K, as described, for the purpose of setting the said shaft in motion by the mere act of liberating it from the restraint of the brake and thereby calling the attention of the engineer, and continuing to drive it until the engineer can get the engine ready and connect it, thereby obviating the neces-

sity of having the engine always connected and in readiness, substantially as herein set forth.

3. The combination of the signal-pipe S, the tank N, and float M, the signal-pipe being connected either with the supply or force pipe and the float with the brake-lever, substantially as set forth, for the purpose of enabling a person at any distance from the forcing pump to set free the brake and start the pump instantaneously, and to give notice to the engineer when to connect the engine or get in readiness.

WM. LOUGHRIDGE.

Witnesses:
WM. E. DOYLE,
DAVID M. DETRICH.