

(No Model.)

2 Sheets—Sheet 1.

C. E. BUELL.
OPERATING MECHANISMS BY EXPLOSIVES.

No. 548,741.

Patented Oct. 29, 1895.

Fig. 1.

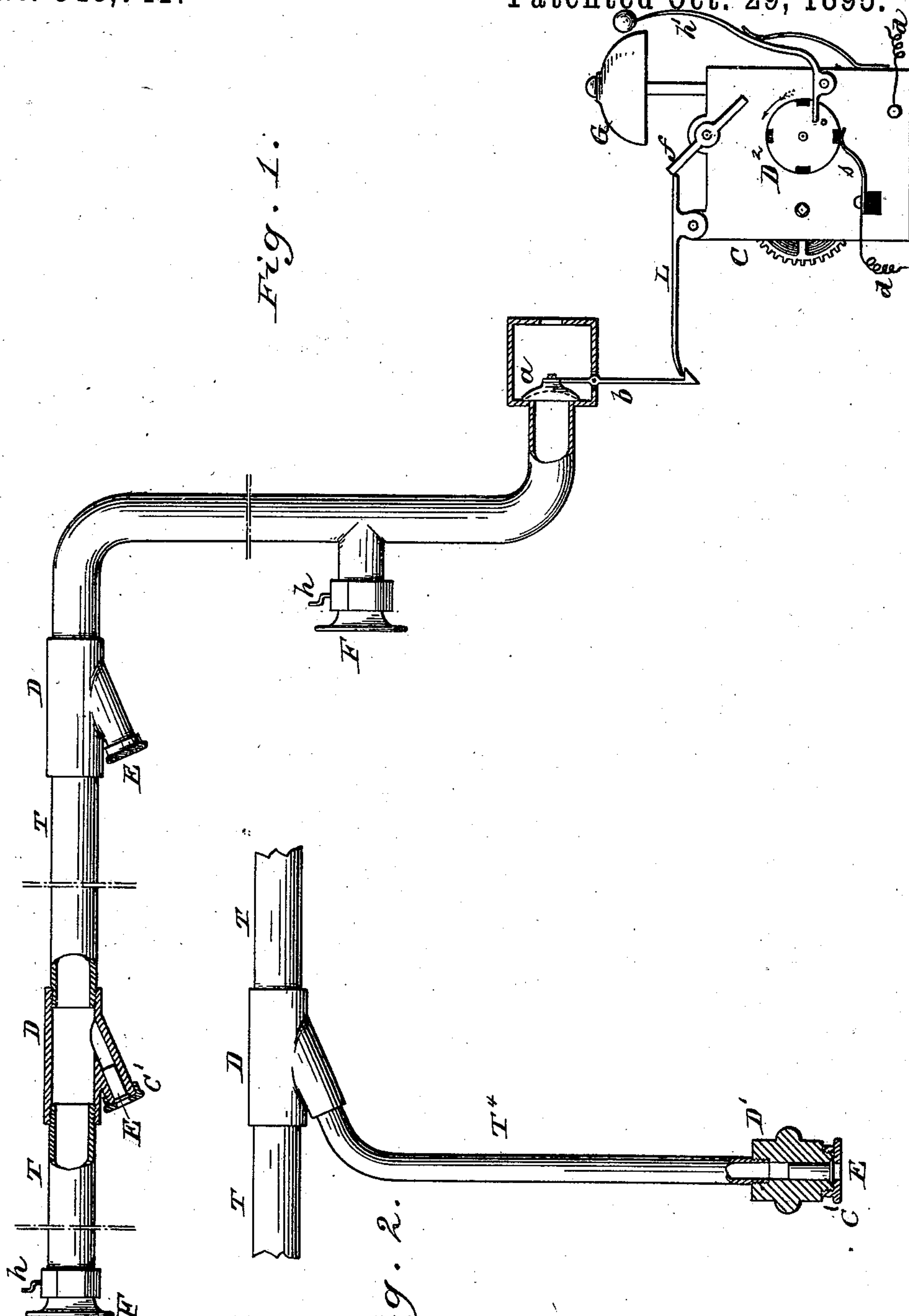
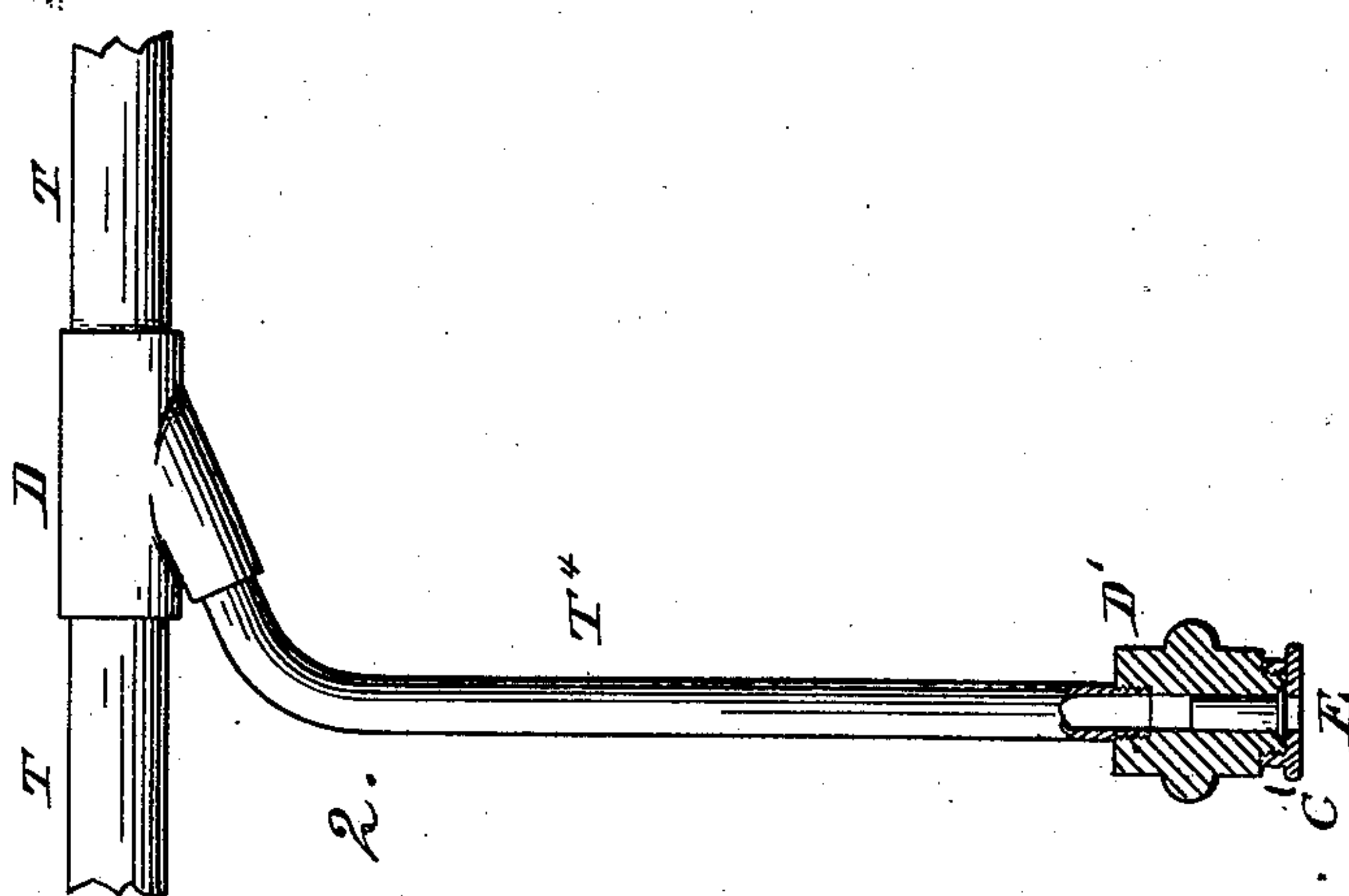


Fig. 2.



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Fig. 5.

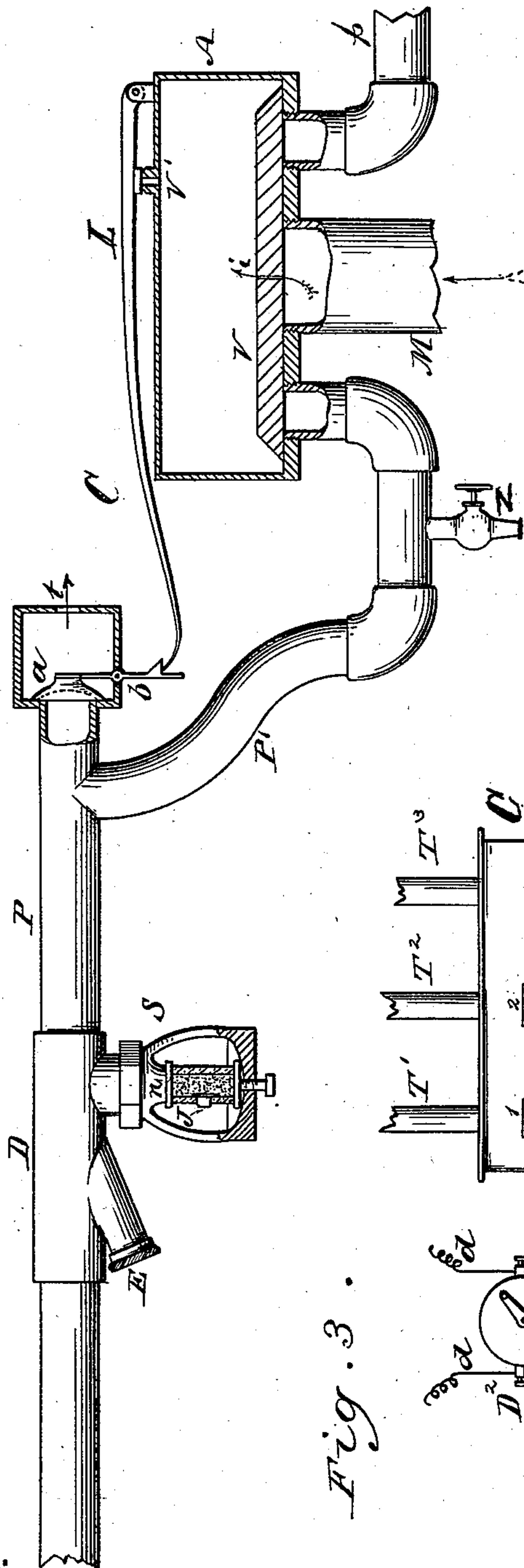


Fig. 4.

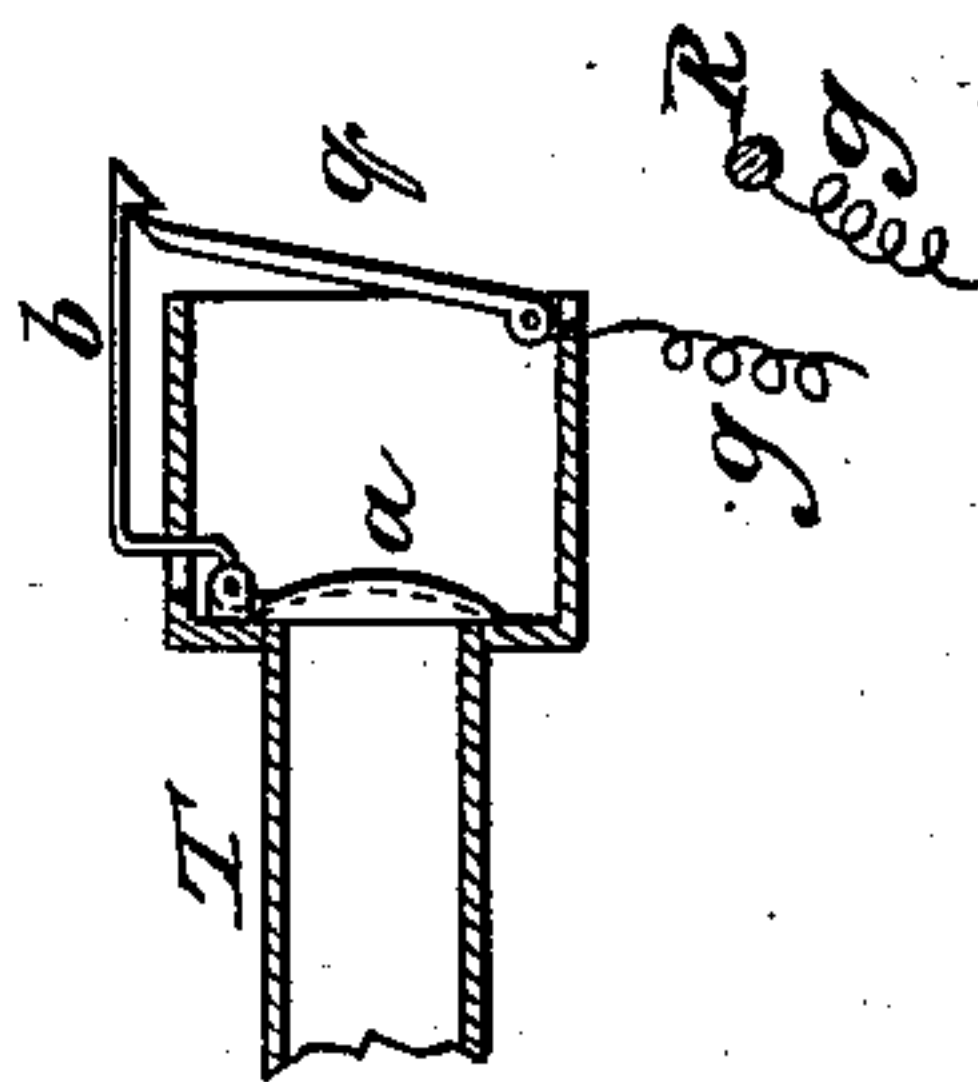
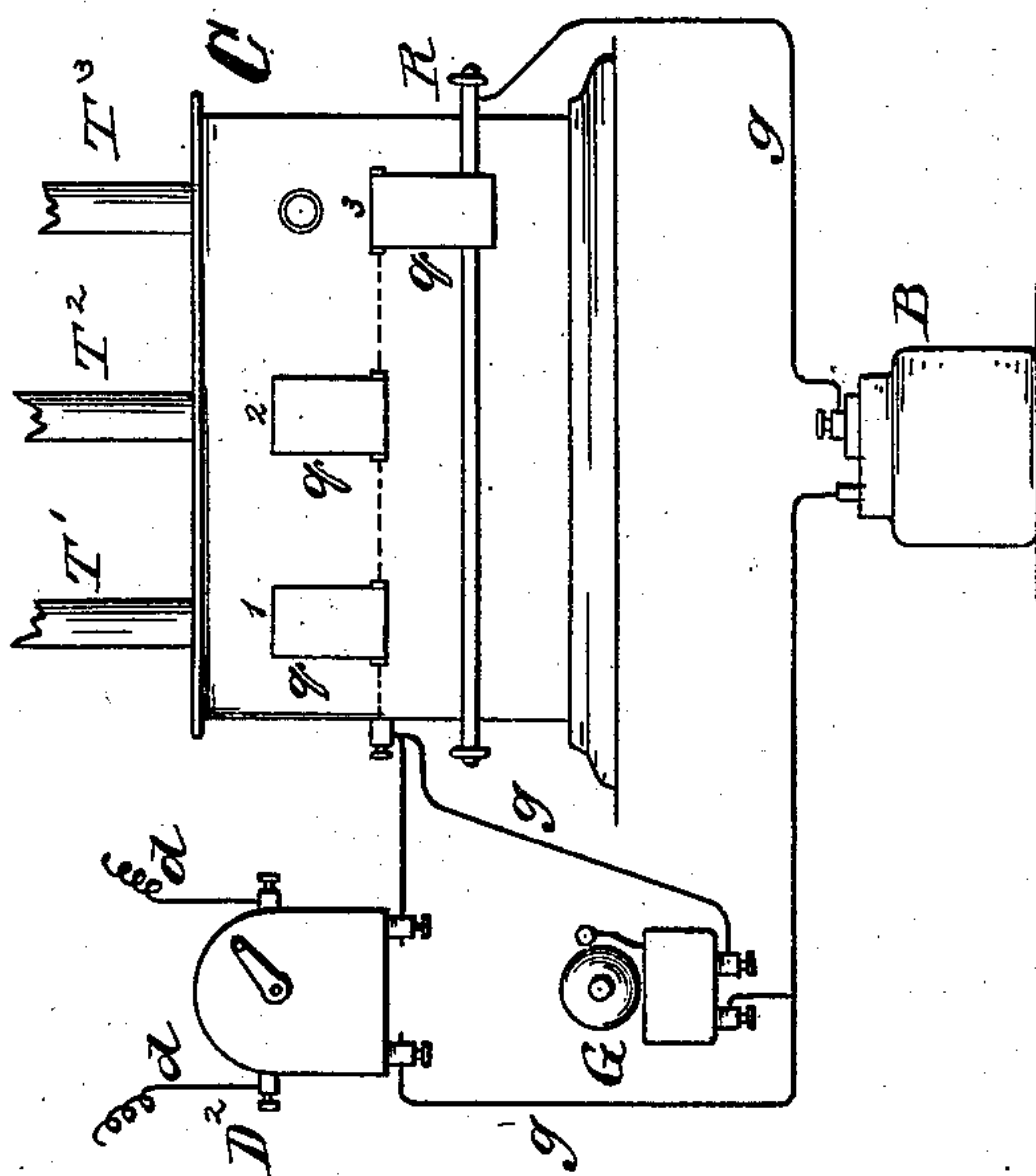


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES E. BUELL, OF NORTH PLAINFIELD, NEW JERSEY.

OPERATING MECHANISMS BY EXPLOSIVES.

SPECIFICATION forming part of Letters Patent No. 548,741, dated October 29, 1895.

Application filed May 31, 1888. Serial No. 275,576. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. BUELL, of North Plainfield, Somerset county, State of New Jersey, have invented Improvements in
5 Operating Mechanisms by Explosives, of which the following is a specification.

My invention consists, primarily, in the combination, with a pipe or pipes provided with pressure-actuated apparatus, of one or more
10 inlet-ports in said pipe that contain an explosive cartridge or cartridges that will explode by heat, whereby an abnormal increase of temperature around the said pipes will develop pressure within said pipes and operate
15 said pressure-actuated apparatus, substantially as hereinafter described.

My invention further consists in the combinations and sub-combinations to be hereinafter described.

20 By the term "cartridge" I mean a suitable quantity of a substance or material which contains within itself the elements of chemical change for liberating mechanical energy when acted upon by heat and which will remain inert until so acted upon, the said substance, material, or compound being preferably incased in a shell and comprising a primer and an explosive that is not as easily ignited as the said primer, as will be hereinafter explained.
30

Referring to the accompanying drawings, Figure 1 shows a tube and apparatus arranged for carrying out my invention. Figs. 2, 3, and 4 show details of my invention. Fig. 5
35 shows a "dry-pipe" system of automatic sprinklers that embodies my invention.

Referring to Fig. 1, there is shown a pipe or tube T T, with connection D D and speaking-tube mouthpieces F F, that are normally
40 closed by valves that can be turned out of the way by their handles h h when desired to use said tube for oral communication.

At the lower terminus of tube T T a disk or valve a covers the mouth of the tube, and to
45 this disk is attached a pivoted lever or latch b, that interlocks with lever L of a wound-up train C, the said lever or detent L being so arranged that when in the position shown it will be interposed in the way of the fly-wheel f of
50 said train, but when the latch b is removed from supporting the long arm of lever L the said lever will swing away from fan f, releasing

the train C, which in running down will sound an alarm on gong G and make operative an electric circuit d d by the circuit-controlling wheel D² and contact-spring s. 55

To make operative the valve or disk a to release the alarm mechanism C, I insert an explosive cartridge E in each of the chambers D D and secure it therein by the screw-cap c', (shown in Fig. 2,) the screw-cap being perforated to expose a portion of the cartridge to the exterior atmosphere, the chamber thus formed being an adjunct to the pipe T T. 60

A cartridge E, that will explode by the heat of an incipient fire, is placed in each of the chambers D, and when fired by the action of heat into the tube T T throws back the disk a, making operative the alarm mechanism C, as described. The cartridge E comprises a
65 primer of phosphorous compound or an easily fired fulminate or explosive and a charge of a less easily fired material, as common gunpowder. 70

The known fulminates in the form of the ordinary percussion-caps and gunpowder do not deteriorate when kept for a long time, as most of the high explosives do. 75

Percussion-caps that were put into an ordinary leather cap-pouch before the battle of Fair Oaks, Virginia, May 31, 1862, are at the present time as good as new. 80

In the "Report on Gunpowder," by the Ordnance Department, Washington, D. C., 1844, pages 9 and 275, it states that gunpowder which has been kept without special care for thirty-three years gave satisfactory results in tests made by the Government. 85

Because of the fact that properly-prepared cartridges employing a fulminate and gunpowder will not deteriorate, I prefer to make use of such; but I may use any of the explosive compounds that will, under the action of the heat of a small fire, develop mechanical energy to perform the work required. 90 95

Referring to Fig. 2, there is shown the branch pipe T⁴, joined to pipe T T at D, the branch pipe T⁴ being provided with an exploding-chamber D', having a cap c', through which is a hole to admit of the heat reaching the cartridge E, placed therein. By employing a main tube T T, with branch tubes of less diameter, economy will be reached in apartments with a large area of ceiling. 100

These tubes or pipes are preferably secured upon the ceilings of apartments and provided with exploding-cartridges at intervals of ten feet and the lines of pipe placed at like intervals.

Fig. 3 shows a series of pipes $T^1 T^2 T^3$ entering an annunciator, which comprises the drops $q^1 q^2 q^3$, as in the well-known form of annunciators used with speaking-tubes. A rod of metal R is placed so that when a drop falls it will rest on said rod, and a battery B is connected to the rod R and drops $q^1 q^2 q^3$ by wires $g g g$. In the circuit thus formed are included a gong G and signal-transmitting box D^2 , that is provided with connections to an outside circuit $d d$.

The battery B, gong G, and box D^2 are well-known devices.

The mode of operating the drops $q^1 q^2 q^3$ is shown in Fig. 4 in cross-section view, in which T represents a tube having a disk a covering its outlet. Movable with the disk a is a latch b , which normally holds a drop q in the position shown. When the disk a is forced back by pressure in the pipe T, the latch b is lifted and the drop q falls against the rod R, displaying a number or word to designate a locality, and by its contact with the rod R, the drop being of metal or faced with metal, connects the wires $g g$, said wires being electrically connected to said drop and said rod, and by connecting said circuit-wires the gong G and box D are operated to give the desired alarm.

In Fig. 5 there is shown the automatic sprinkler-pipe P, with connections D, comprising an exploding-chamber, into which the cartridge E is inserted and fits tightly to prevent water-pressure in the pipe P from causing a drip. A sprinkler S is shown connected therewith. Said sprinkler S consists of the nozzle n , closed by a valve-plate that is held to its seat by a cartridge that will be shattered and dislodged by the explosion of its contents, which is preferably a charge of gunpowder with a sensitive primer J, that will ignite at a lower temperature than gunpowder, as previously explained.

When the cartridge is removed by the action of heat, the sprinkler is opened.

From the pipe P a branch pipe extends to a valve A, into which the main M and pipes P' and p enter. The main M is a water-supply pipe. The openings of these several pipes are normally closed by the metal-plate valve V, which is held tightly over the several pipes by water-pressure upon its upper surface, the water entering through the orifice i and the top of the plate V being of larger area than the surface exposed to the pressure from the main M, the vent v' being normally closed by the plate on the lever L. When an explo-

sion occurs in the pipe P, the lever L is unlatched, opening the vent v' , the pressure in the case A lowers, the plate v is lifted, and water enters the sprinkler-pipe. When the water is admitted to the pipe P, it also enters the pipe p . A drip-pipe Z is provided for emptying the pipe P when desired. When water has entered the pipe P, it chills the unexploded cartridges that may be in the pipe or its branches and prevents them from exploding unless the heat increases considerably.

The cartridge E for operating the water-supply valve can be made to explode at a slightly-lower temperature than the cap J of the sprinkler S with advantages in the operating of the valve mechanism. As the cap J is not chilled by the water in the pipe P, the sprinkler S will open after the water has entered the pipe P.

Intermural conduits or other inclosures may be employed to guide and confine the explosions instead of the pipe or tube described.

I do claim herein the cartridge shown and described, and which is an essential element in the carrying out of the invention, as the same has been claimed in my subsequent application, Serial No. 359,698, filed July 23, 1890.

I claim—

1. The combination with a pipe, or pipes, and an apparatus operated by pressures caused by explosions in said pipe, of one or more cartridges connected to said pipe to explode therein, substantially as described.

2. The combination with a pipe or pipes, and an apparatus operated by explosions therein, of one or more thermally exploded cartridges in said pipe, substantially as described.

3. The combination with a pipe, or pipes, and an apparatus operated by explosions in said pipe, of one or more thermally exploded cartridges connected to said pipe to explode therein each of which cartridges comprises a primer that is easily ignited, and a charge that is less easily ignited, substantially as described.

4. The combination with a pipe and apparatus operated by pressures caused by explosions in said pipe, of a thermally exploded cartridge connected to said pipe to explode therein, and an automatic sprinkler connected to said pipe that is held closed by a cartridge that explodes at a higher temperature than the first named cartridge, substantially as described.

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Witnesses:

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