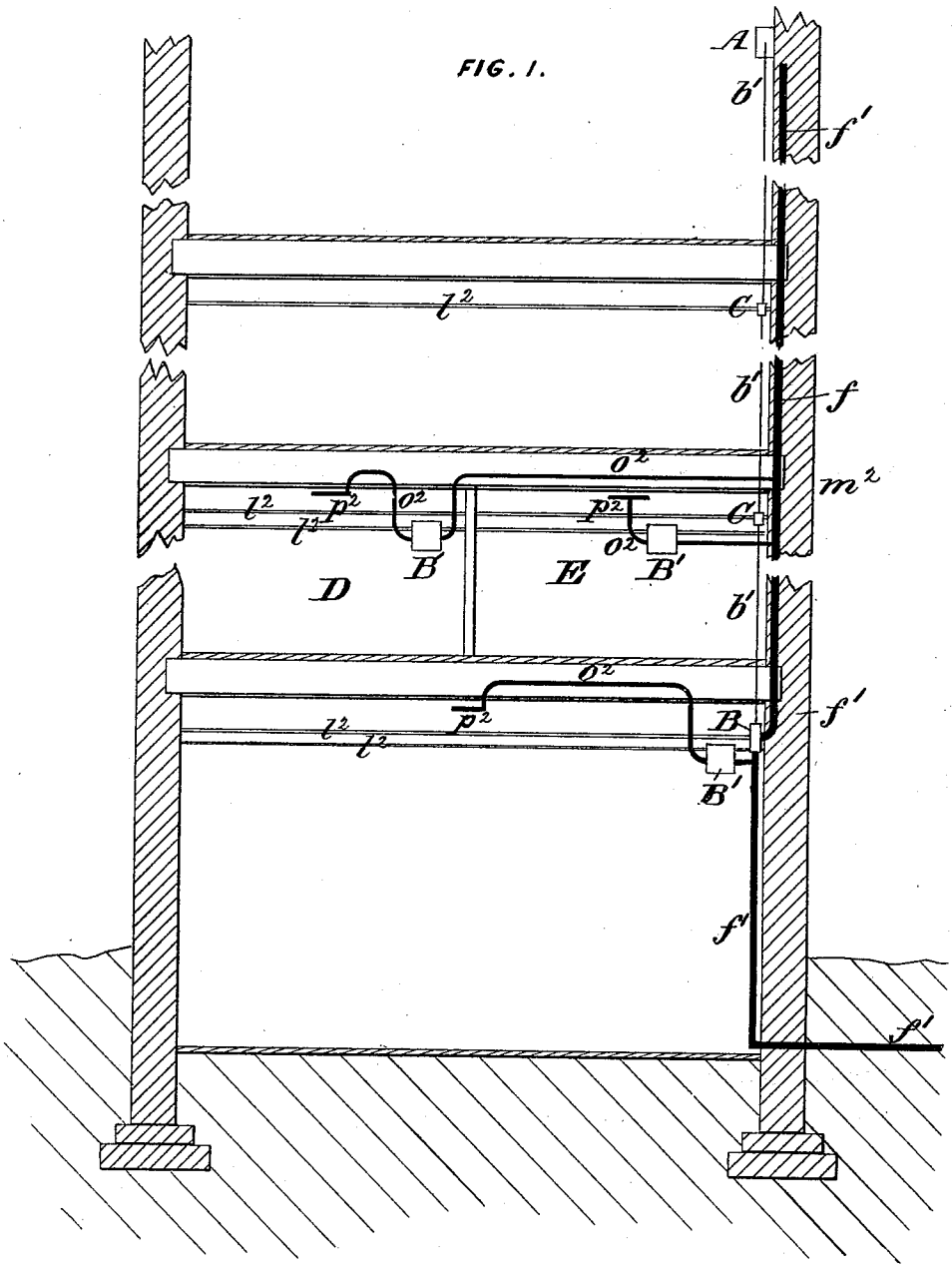
3 Sheets—Sheet 1.

D. KEARNEY.

AUTOMATIC FIRE-ALARM.

No. 171,669. Patented Jan. 4, 1876.

FIG. 1.



WITNESSES

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AUTOMATIC FIRE-ALARM.

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FIG. 2.

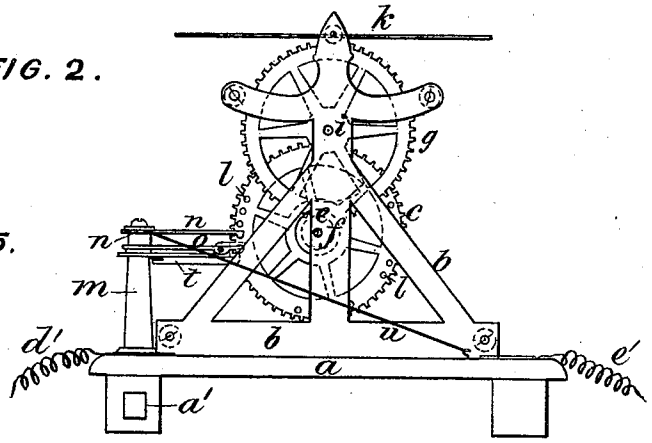


FIG. 5.

FIG. 3.

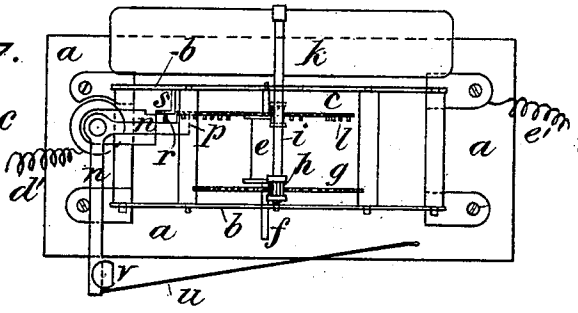


FIG. 6.

FIG. 7.

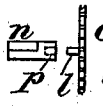


FIG. 4

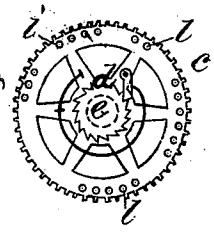
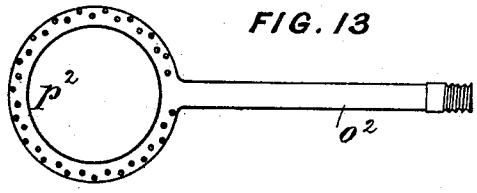


FIG. 13



WITNESSES

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FIG. 8.

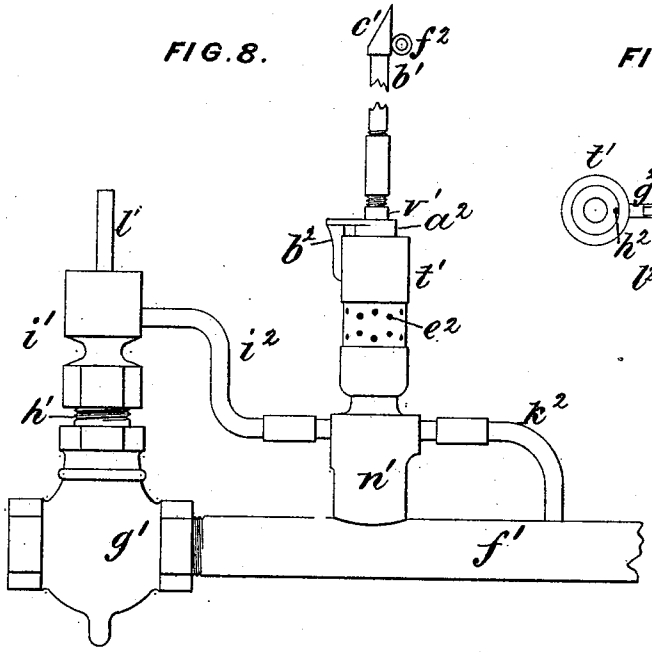


FIG. 10.

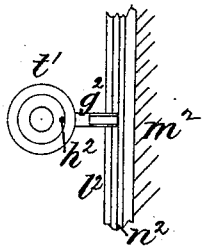


FIG. 9.

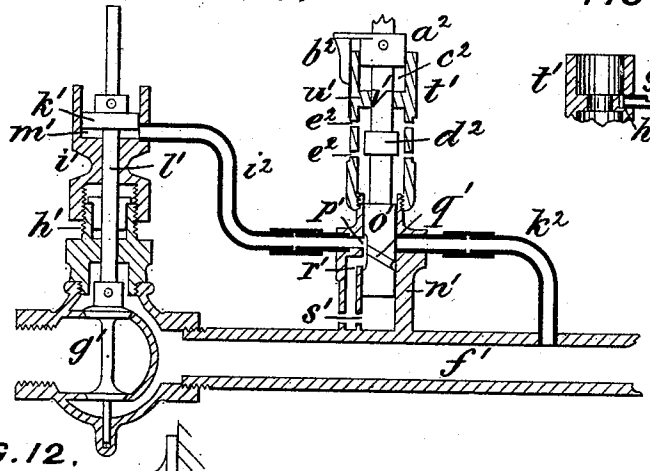


FIG. 11.

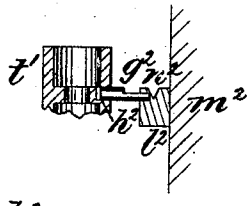
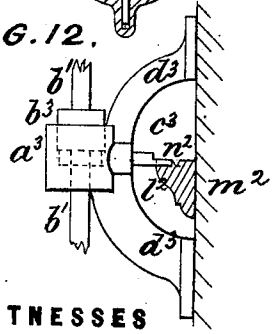


FIG. 12.



WITNESSES

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DANIEL KEARNEY, OF MONTREAL, CANADA.

IMPROVEMENT IN AUTOMATIC FIRE-ALARMS.

Specification forming part of Letters Patent No. **171,669**, dated January 4, 1876; application filed November 4, 1875.

To all whom it may concern:

Be it known that I, DANIEL KEARNEY, of the city and district of Montreal, Province of Quebec, Canada, engineer, have invented certain new and useful Improvements on Automatic Fire-Alarms and Combined Automatic Fire-Alarm and Extinguisher; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention consists, in the first place, of the construction of an electro-magnetic fire-alarm, arranged in such a manner that it will not only signify the street in which the fire occurs, but also the particular house in said street.

It is intended to use the invention only where a system of electro-telegraph wires has been arranged in connection with fire-stations or other alarms, such as church-bells, &c., or alarms local to the building or premises arranged for that purpose; otherwise such arrangements will have to be made. The only difference in this respect will be designating the locality where the fire occurs by the number, such as is used for the fire-signal box. I should prefer to designate it by arranging the street with regard to fire-alarms by numbers, and make the number of the house in the street the number of the fire-alarm signal in that street. For instance, if a fire occurred at the house number fifty-three, in the street number nine, in the fire-alarm signal my signal would first strike nine. There would then be a pause, when it would strike five, and after a shorter pause strike three. There would occur a pause of still greater length, when the signal would be repeated. But my invention is also applicable to numbers used to designate the locality, as in the fire-signal box now in use above mentioned.

In the above it has been stated that the number of the street will first be given; but it will be readily understood that should it be preferred to give first the number of the house, the same may be effected by a very slight change in the details of construction of the invention.

My invention consists, secondly, of an automatic fire-extinguisher, to be used in combination with the above, so that in the combined form, whenever a fire occurs in any room in a house or other building, my combined mechanism will turn the water onto the particular room in which the fire occurs, and sound the alarm at the same time; but for the extinguisher it is necessary to have or create a head or pressure of water in the pipe hereinafter mentioned.

In the drawing hereunto annexed similar letters of reference indicate like parts.

Figure 1 is a sectional elevation of a building, showing the general arrangement of my invention. Fig. 2 is a side elevation of my automatic fire-alarm mechanism, which will be all comprised under the letter A in this specification. Fig. 3 is a plan of Fig. 2. Figs. 4, 5, 6, 7 are details of Figs. 2 and 3. Fig. 8 is a side elevation of a portion of my automatic fire-extinguishing mechanism, which will be all comprised under the letter B in this specification. Fig. 9 is a vertical section of Fig. 8. Figs. 10, 11 are details of Figs. 8 and 9. Fig. 12 is a side elevation of a portion of the mechanism constituting the connecting-link, which operates simultaneously A and B, or A alone if B is not present, and will be comprised under the letter C in the following specification. Fig. 13 is a detail of extinguisher.

I will first describe the construction of A. Letter *a* is an entablature, upon which the parts are secured. *b* is any suitable frame for holding the moving and smaller parts in their proper relative positions. *c* is a clock gear-wheel, made with an ordinary ratchet-wheel, *d*, and has a cylinder or drum, *e*, on the axle *f*, for a cord or chain and weight to operate in the ordinary manner to revolve the same. Toward the opposite end of the axle *f* to that on which the wheel *c* is placed is secured a pinion, intermeshing with the gear-wheel *g*; this, in its turn, engages with the pinion *h* on the shaft *i*, on which is also secured the fan *k*. On the wheel *c* projections *l* are formed. These projections are in number, and spaced between them in accordance to the signal or number of strokes to be struck on a bell or other alarm instruments, as shown in Fig. 4. There are first three projections, then a space; then four projections, then a space and two projections. By this three strokes would be struck, then four, then two, which would be read three hundred and forty-two. After this a longer

space occurs, and then six projections, and then five, which would similarly represent sixty-five. The first of these may represent the street, and the latter the house, or vice versa. After the above a long space occurs, and in the revolutions of the wheel *c* the signal is repeated at each revolution. By the size of the fan *k* the wheel is regulated to revolve at any desired speed in the ordinary manner in this class of mechanism. *m* is a standard attached on *a*, and, as shown in the drawing, the bell-crank *n* and arm *o* are pivoted to it, rotating freely horizontally. On the inward end of the bell-crank *n* a socket is formed for engaging with the pins *l*. (See Fig. 7.) On the outward end of the bell-crank *n* is attached an insulated wedge, *v*. (See Fig. 5.) *u* is a spiral or other suitable spring (in this case simply represented by a single line) attached to *a* and the outer extremity of the bell-crank *n*, to cause the socket *p* to be engaged with the projection *l*, unless forcibly prevented from so doing, as will be hereinafter more particularly described. On the end of the arm *o* is attached a wedge, *q*, of proper material to form an insulator, such as glass, bone, gutta-percha, &c., and is arranged to be acted upon by the projections *l*. *r* is a small projection on the arm *o*, so that when the wedge *q* is in the position shown in Fig. 6 the projection *r* rests against the angle-plate *s*, attached to the frame *b*. *t* is any desired spring, arranged to cause the arm *o*, after it has been pushed back by the action of one of the projections *l*, to return to its proper position to engage with the next projection. a^1 is a guide for the rod b^1, (see Figs. 1 and 8,) the wedge c^1 on the top of which engages with the wedge *v*, Fig. 5. d^1 and e^1 are electric-telegraph wires, attached, one to the standard *m* and the other to the frame *b*, which is insulated, the current of electricity passing, through the standard, bell-crank, arm, and projection *r* on the arm, to the angle-plate *s*, and finally to the wire e^1, which is continued to complete the circuit. If, now, by means hereinafter described, the rod b^1 and wedge c^1 are raised, and acting on the wedge *v*, they cause the socket *p* to be drawn back from engaging with the projection *l*; the electrical current has then no other channel than to pass, by the arm *o*, projection *r*, and surface *s*, to the frame *b* and wire e^1. Now, when the projection acting on the wedge *q* forces back the arm *o*, the contact of the projection *r* with the plate *s* is removed, and the electrical current is cut off. This action will be arranged to sound any of the ordinary alarms in any of the manners at present in use, and, as the action of breaking the electrical current is effected at the passage of each of the projections *l*, acting on the wedge *q*, a corresponding number of strokes is struck upon the alarm.

The machine B is constructed as follows: To the main service water-pipe f^1 is attached a balance globe-valve, g^1, and on the projection h^1, forming the stuffing-box of the valve, is screwed a socket, i^1. The upper part is made in the form of a hollow cylinder, on which the piston k^1 (attached on the extension of the valve-spindle l^1) works. This piston is so situated that when the valves are down on their seats a space, m^1, exists between it and the bottom of the cylinder. n^1 is a cylinder, which is preferably made in one with the pipe f^1, for the sake of compactness and economy, otherwise not necessarily so. In this the piston-valve o^1 is placed, being provided with a recess, p^1, and groove *q*. The cylinder is further provided with a passage, *r'*, made in the same side as the recess p^1 in the valve is situated. A passage, *s'*, is also formed, connecting the bottom of the cylinder with outer space. To the top of the cylinder n^1 is screwed another cylinder, *t'*, divided into two parts by the diaphragm *u'*. The piston-valve o^1 is made in one with a spindle, *r'*, extending upward, as shown in Figs. 8 and 9, and on it is secured the piston a^2. This is prevented from descending lower in the cylinder than the position shown by making the cylinder a little smaller in diameter in its lower part, and thus forming a slight shoulder for it to rest upon, leaving a space, c^2, also suspending the valve and other parts in the proper position. b^2 is any suitable projection working in a groove formed on the side of the cylinder, for preventing the piston a^2 from turning in the cylinder, and thus changing the position of the rod b^1 and wedge c^1 attached to it. d^2 is a collar on the spindle *r'*, preventing the valve o^1 and piston a^2 from rising more than the proper height. Any suitable number of perforations, e^2, are made in the lower part of the cylinder *t'*. These and opening *s'* are for the purpose of allowing any water leaking past the valve o^1 to escape, and not rise above the valve and destroy the powder above, or raise a pressure on the end of the valve below and move it unduly, as will hereinafter more fully be understood. f^2 is an eye formed on the wedge c^1, by which a cord or wire is attached, and said wire is carried over a pulley situated above the wedge, and to the end of the wire is attached a weight of sufficient gravity exactly to counterbalance the rod b^1 and all the parts thereto attached. g^2 is a small tube or nipple, (which in Figs. 8 and 9 is situated immediately behind the cylinder *t'*, and therefore in them it does not appear,) communicating, by a small opening, h^2, with the space c^2. i^2 is a pipe connecting the space m^1 with the recess p^1. k^2 is a pipe connecting the pipe f^1 with the groove *q'*, when the valve o^1 is moved in the proper position for that purpose. l^2 is a small bead or molding attached on the wall m^2, preferably up high near the ceiling, and the machine B placed and securely attached in position, to bring the nipple g^2 to the position shown. In the top of the bead a small groove, n^2, is formed, in which a train of gunpowder is laid. The arrangement of the beads l^2 will be hereinafter more particularly described.

The operation of this mechanism is as follows: The space c^2 is filled with gunpowder by raising the collar d^2 to the diaphragm u', when the piston a^2 will be raised clear of the cylinder t', and give a sufficient space for introducing the powder; or this may be done by detaching the piston from the rod by removing the screw securing it, and sliding it upon the rod. The nipple g^2 and grooves n^2 will also be charged with gunpowder. When the powder in the groove n^2 is ignited the train, by the nipple g^2, connects with the powder in the recess c^2, and causes it to explode, forcibly ejecting the piston a^2 from the cylinder t'. By this means the wedge c^1 at the upper end of the rod causes the socket p to be withdrawn from the projection l, and allows the alarm to act. It also raises the piston-valve o^1, which is retained in its raised position by the cord and counter-balance, above described as attached to the eye f^2, and connects the groove q' with the pipe k^2, closing the passage r', and causing the water to flow, by the pipe i^2, into the recess m^1, where its pressure, acting on the surface of the piston k^1, causes the balance-valves below attached to open and allow the water to pass through the globe-valve g^1, and into the extension of the service-pipe attached to its other end. Thus the water is admitted into all the main service-pipes over the building.

The beads l^2 are arranged as follows: One bead is arranged completely around each flat of the building, and a second bead, l^2, is arranged completely around each room in each flat, or any particular room, as desired, should some of them be deemed safe without it. In each room that the second bead l^2 is placed a machine, B′, is attached to it as a sub to the main one in the basement. These sub-machines have the pipes o^2, bearing the same relative position with them that the extension of the main service-pipe f^1 has with the general machine. These pipes are by preference, for the sake of appearance, either laid on the walls, or in recesses made in them, and between the floors and ceilings. They are terminated in a rose head or perforated rose-ring, p^2, (shown in Fig. 13,) arranged to come about the center of the room.

Fig. 12 shows a small cylinder, a^3, and piston b^3, with nipple c^3. These are constructed and arranged exactly like those parts described t', a^2, and g^2, and connect with the beads l^2, that are laid around each flat. They are made in one, with a bracket, d^3, for securely attaching on the walls. The piston b^3 is secured on the rod b^1. This whole machine is represented by the letter C in Fig. 1.

The operation of the whole arrangement of the invention is as follows: In the building delineated in Fig. 1 we will suppose a fire to occur in the room D. The fire igniting the powder in the two beads l^2, the sub-machine B′ in that room is operated by the lower one, while the machine C in the room E is operated by the upper one. This raises the rod b^1, and operates the machines A and B, thus giving the alarm, and turning on the water simultaneously, the water being let into the main pipes only, and the pipes o^2 leading to the sub-machines B′, with the exception of that one in the room D which has been opened by the action of the sub-machine in it, and allowing the water to escape by the rose p^2.

What I claim as my invention is as follows:

1. The combination of the projections l with arm o, having projections r, acting upon surface s, and with bell-crank n, substantially as and for the purposes described.

2. The combination of the equilibrium-valves in g^1 with the piston k^1, substantially as and for the purposes described.

3. The combination of the equilibrium-valves in g^1, piston k^1, and valve o^1, substantially as and for the purposes described.

4. The combination of the valve o^1, piston a^2, space c^2, substantially as and for the purposes set forth.

5. The combination of the equilibrium-valves in g^1, piston k^1, connection i^2, valve o^1, connection k^2, piston a^2, and space c^2, substantially as and for the purposes set forth.

6. The combination of the space c^2 with nipple g^2 and grooved beads l^2, substantially as and for the purposes set forth.

7. The bead l^2, arranged completely around each room or each flat, substantially as and for the purpose herein specified.

8. The combination of a train or trains of powder, substantially as described, with either or both of the machines B and C, constructed substantially as described.

Montreal, 29th day of October, A. D. 1875.

DANIEL KEARNEY.

Witnesses:

C. G. C. SIMPSON,

M. A. NELSON.