(No Model.) 4 Sheets—Sheet 1.

J. BIRKETT & W. McELROY.

SYSTEM OF AND APPARATUS FOR EXTINGUISHING FIRES.

No. 540,226. Patented June 4, 1895.

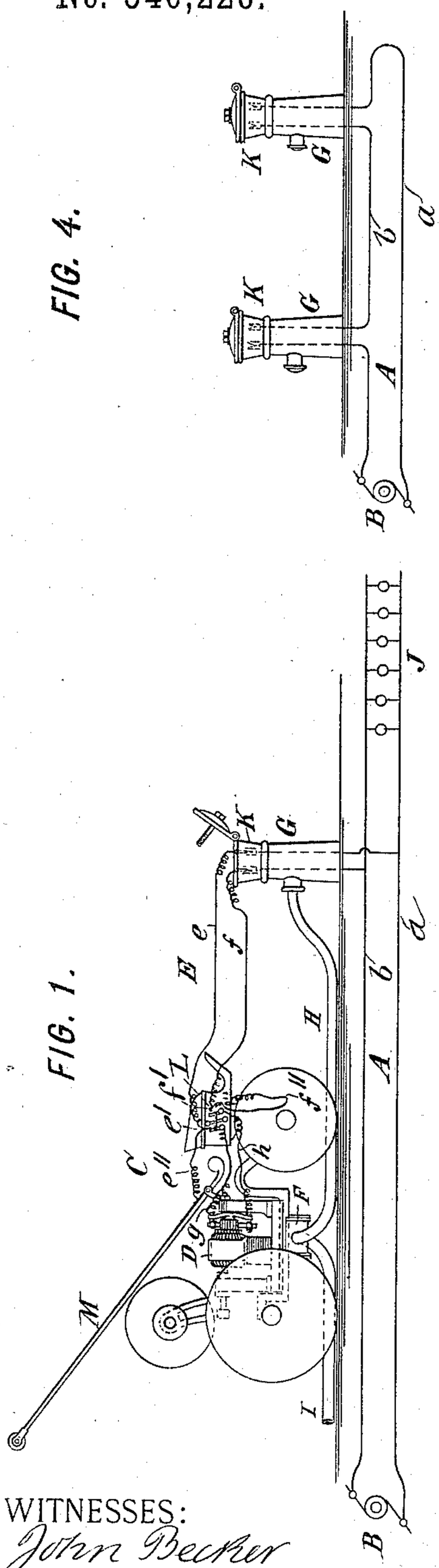


FIG. 1.

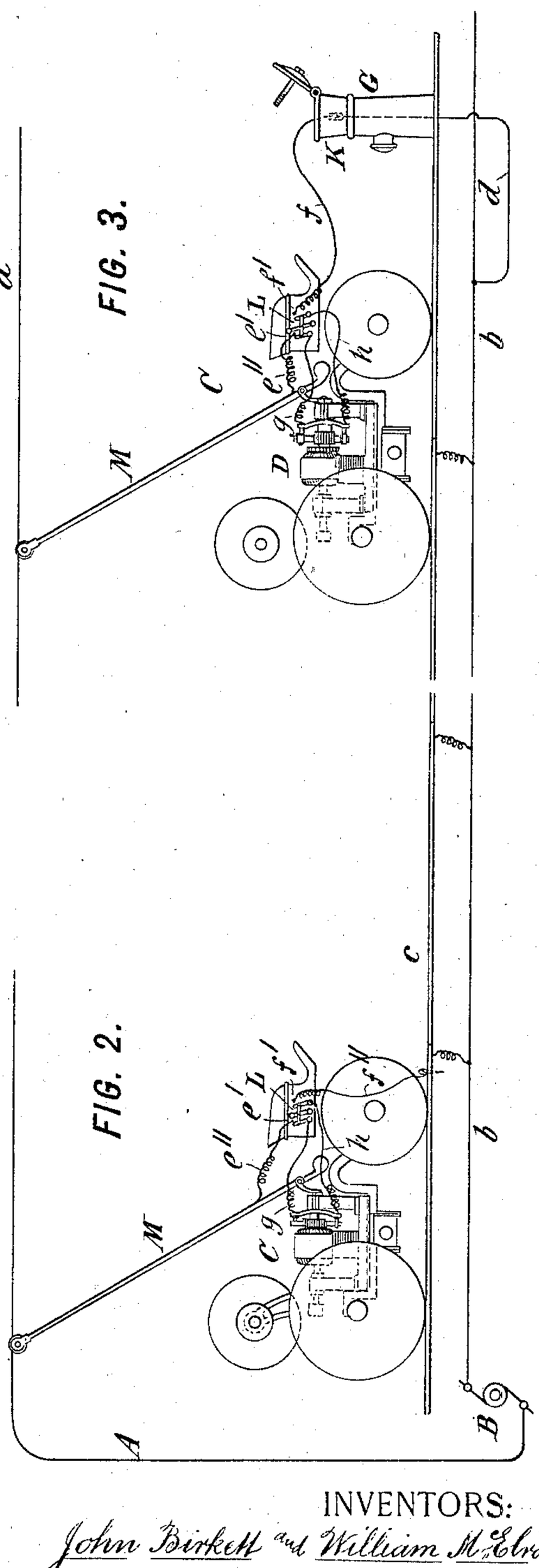


FIG. 3.

FIG. 2.

WITNESSES:
John Becker
Fred White

INVENTORS:
John Birkett and William McElroy,
By their Attorneys,
Arthur G. Fraser & Co.

(No Model.) 4 Sheets—Sheet 2.

J. BIRKETT & W. McELROY.

SYSTEM OF AND APPARATUS FOR EXTINGUISHING FIRES.

No. 540,226. Patented June 4, 1895.

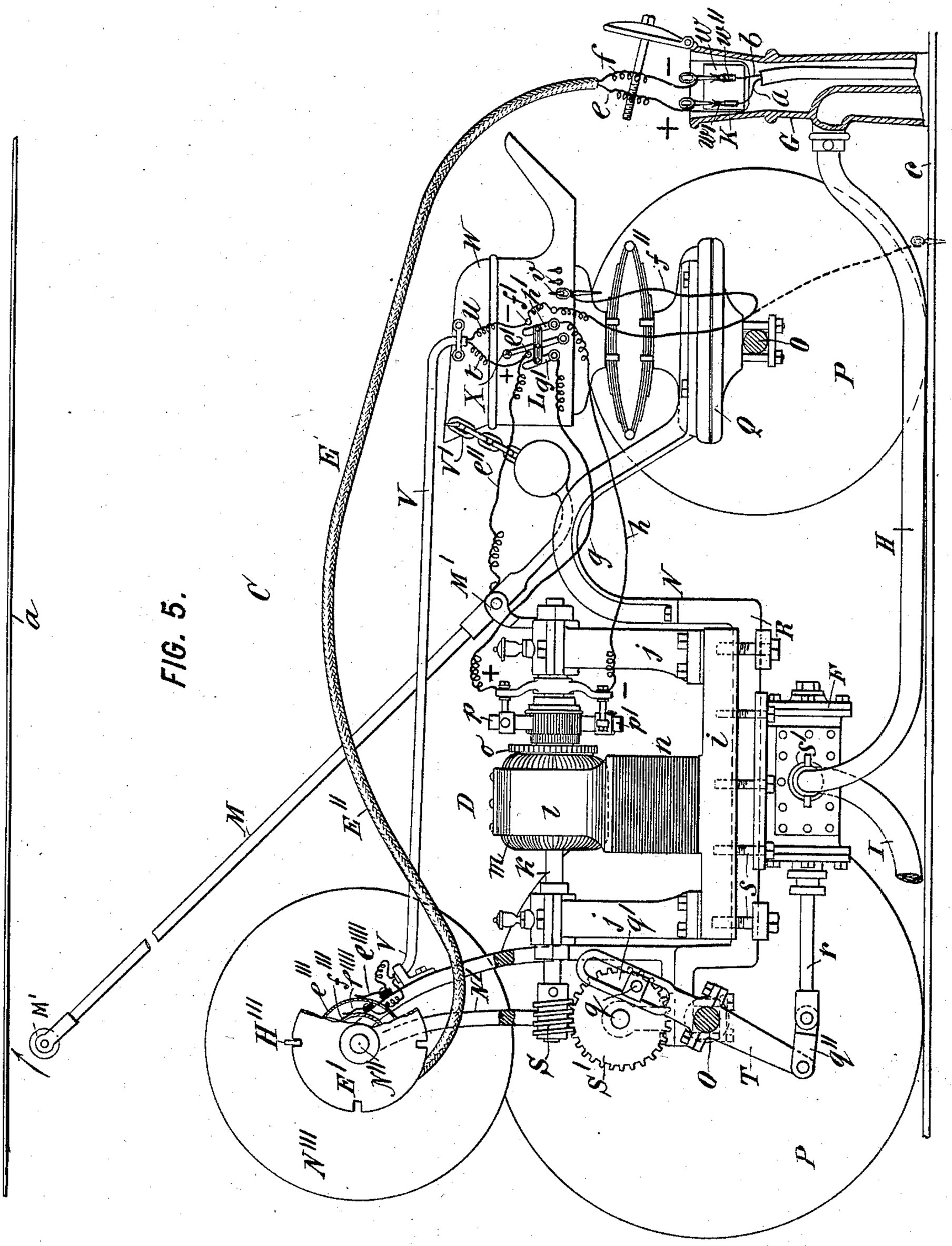


FIG. 5.

WITNESSES:

Fred White

L. K. Fraser.

INVENTORS:

John Birkett and William McElroy,

By their Attorneys,

Arthur G. Fraser & Co.

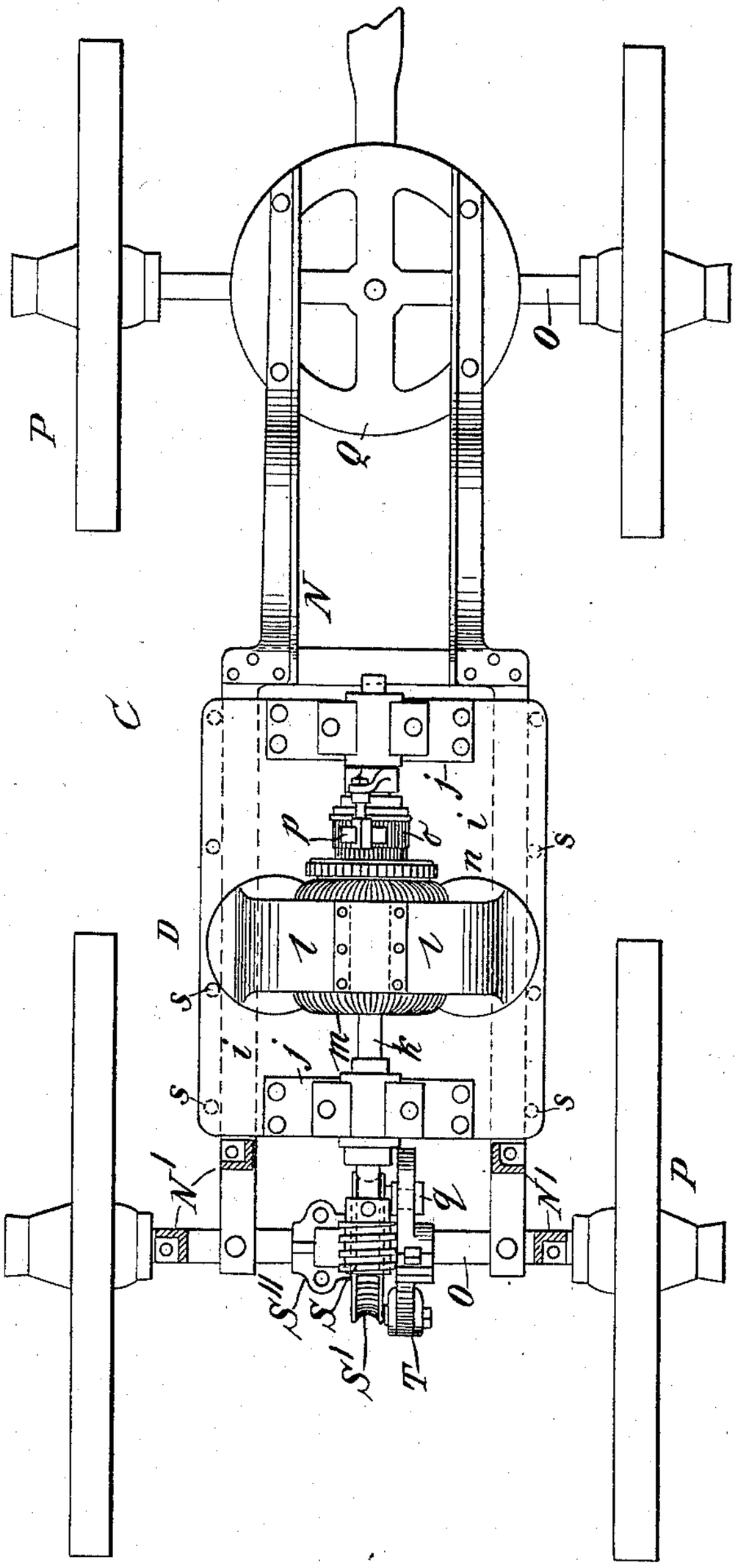
(No Model.) 4 Sheets—Sheet 3.

J. BIRKETT & W. McELROY.

SYSTEM OF AND APPARATUS FOR EXTINGUISHING FIRES.

No. 540,226. Patented June 4, 1895.

FIG. 6.



WITNESSES:
John Becher
Fred White

INVENTORS:
John Birkett and William McElroy,
By their Attorneys,
Arthur G. Fraser & Co.

(No Model.) 4 Sheets—Sheet 4.

J. BIRKETT & W. McELROY.

SYSTEM OF AND APPARATUS FOR EXTINGUISHING FIRES.

No. 540,226. Patented June 4, 1895.

FIG. 9.

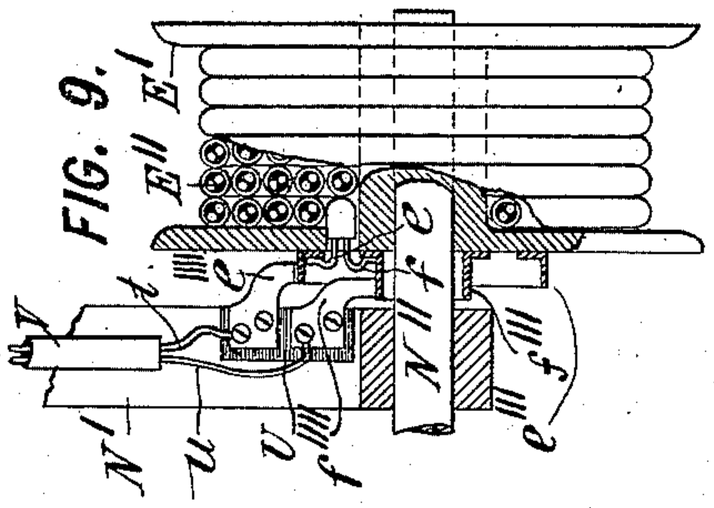


FIG. 11.

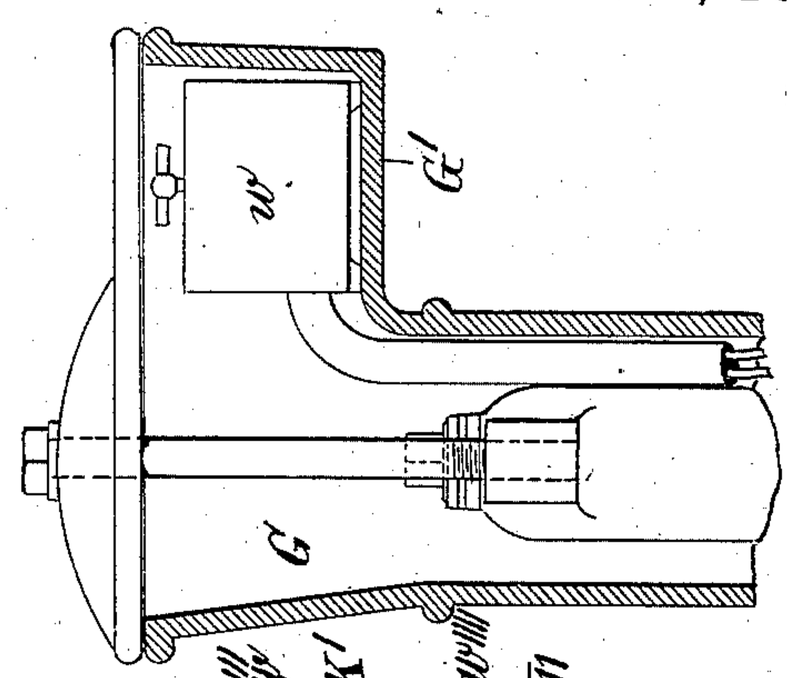


FIG. 8.

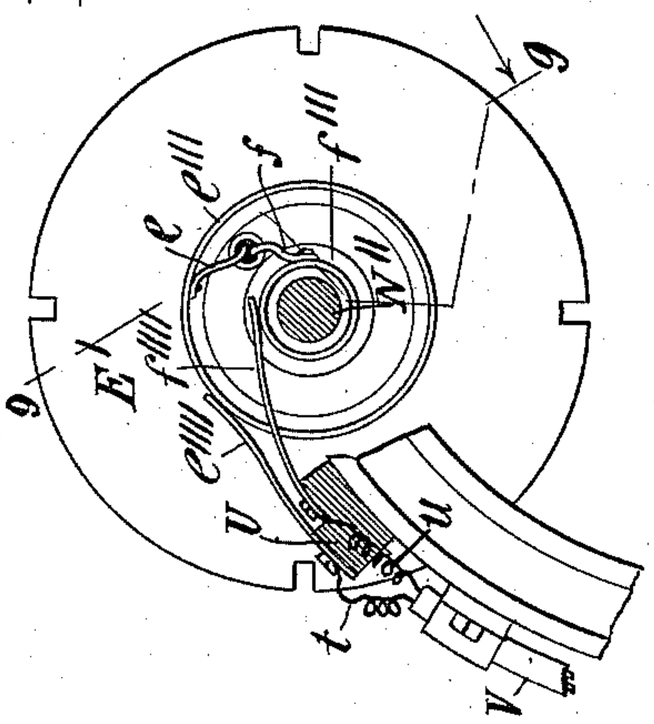


FIG. 10.

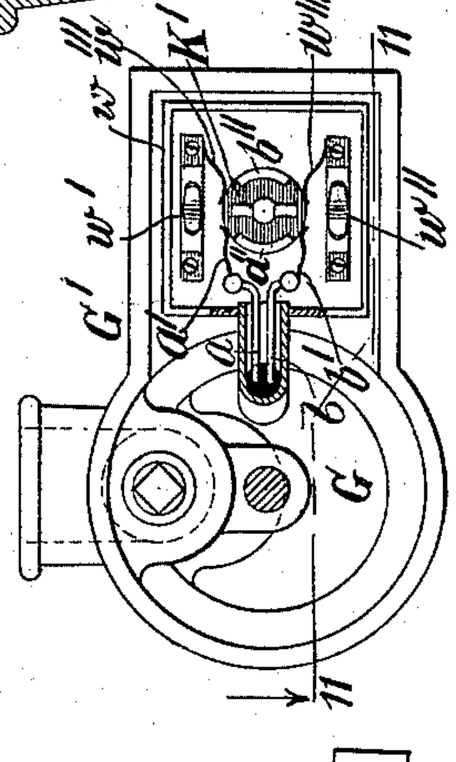
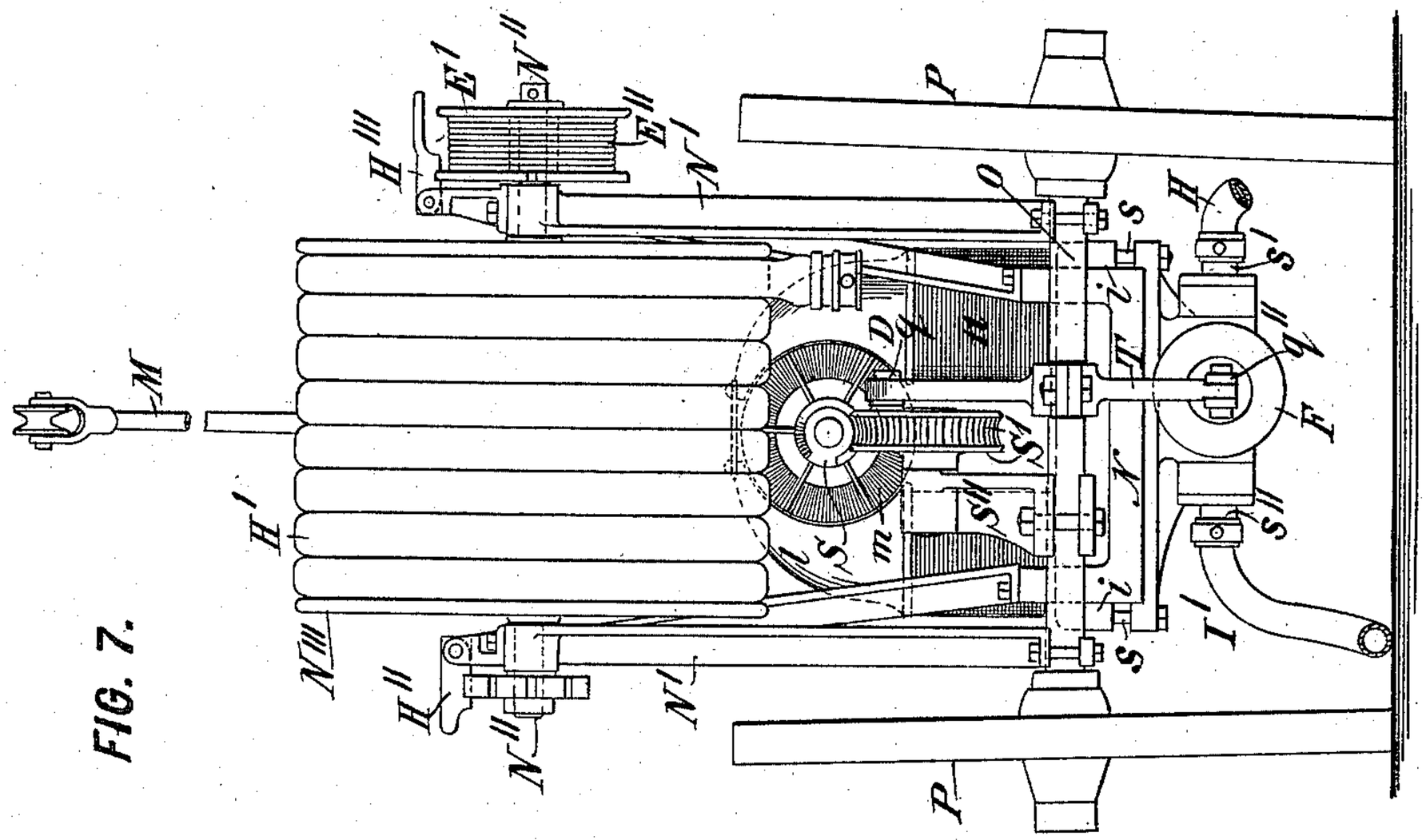


FIG. 7.



WITNESSES:

John Becker

Fred White

INVENTORS:

John Birkett and William McElroy,

By their Attorneys,

Arthur G. Fraser & Co.

UNITED STATES PATENT OFFICE.

JOHN BIRKETT AND WILLIAM McELROY, OF BROOKLYN, NEW YORK.

SYSTEM OF AND APPARATUS FOR EXTINGUISHING FIRES.

SPECIFICATION forming part of Letters Patent No. 540,226, dated June 4, 1895.

Application filed February 6, 1893. Serial No. 461,276. (No model.)

To all whom it may concern:

Be it known that we, JOHN BIRKETT and WILLIAM MCELROY, citizens of the United States, residing in Brooklyn, in the county of Kings and State of New York, have jointly invented certain new and useful Improvements in Systems of and Apparatus for Extinguishing Fires, of which the following is a specification.

This invention relates to systems and apparatus for extinguishing fires, wherein electric energy is utilized for operating the fire extinguishing apparatus.

Our invention aims to provide an improved electric fire engine which can be utilized in connection with any suitable system for electric distribution, of which many are now in use in large cities, among which may be mentioned the trolley systems for tramway use, and the incandescent and arc lighting systems which traverse many city streets in the form of either overhead or underground conductors, or both.

In carrying out the preferred form of our invention we provide certain features of improvement which will be hereinafter fully set forth.

In the accompanying drawings, which illustrate certain adaptations of our invention, Figure 1 is a diagrammatic view showing our improved engine when used in connection with an incandescent lighting-circuit. Fig. 2 is a similar view showing the use in connection with a trolley system for electrical distribution. Fig. 3 is a similar view showing the use in connection with a trolley system one conductor of which is connected to the hydrant. Fig. 4 is a similar view of a fire-extinguishing system in which the system for distribution of electric energy is provided solely for fire-extinguishing purposes. Fig. 5 is a side elevation of a fire-extinguishing apparatus constructed according to the preferred form of our invention, the apparatus being partly in section to show its construction more clearly. Fig. 6 is a plan view of the apparatus shown in Fig. 5, partly broken away in horizontal section. Fig. 7 is a rear elevation of this apparatus. Fig. 8 is an enlarged fragmentary view showing the inner face of the conductor-drum. Fig. 9 is a plan view of the latter, partly in section on the line 9 9 in Fig. 8. Fig. 10 is a plan, and Fig. 11 a fragmentary section on a larger scale, of the hydrant.

Referring to the drawings, let A indicate a system for distribution of electric energy; B, the electric generator pertaining thereto; C, the fire extinguishing apparatus as a whole; D, an electric motor thereon; E, the electric conductors communicating between the system A and the motor D; F, a pump on the apparatus operated by the motor D; G, a fire hydrant for supplying the apparatus with water; H, a hose between the hydrant and apparatus, and I a discharge hose for the latter.

The system A may be any known or suitable system for the distribution of electric energy. That shown in Fig. 1 is intended to represent an incandescent electric lighting system in which the lamps, shown diagrammatically at J, are arranged in multiple arc, the system being normally used to feed these lamps.

The system shown in Fig. 2 is a trolley system for tramway roads, the one conductor lettered *a* being an overhead wire, and the other conductor lettered *b* being the usual ground wire which is connected to the rails lettered *c*, the normal work of the system being the propulsion of tramway cars.

The system shown in Fig. 3 is likewise the usual trolley system having the usual overhead wire *a*, and a special connection *d* extending from the usual ground wire to an adjacent hydrant.

The system shown in Fig. 4 is a special system provided exclusively for use in a fire extinguishing system, and consists of two ordinary conductors, all the hydrants of the system being connected in the line in series.

The apparatus C may be any suitable fire extinguishing apparatus which can be operated by electric energy. It is shown as a portable apparatus comprising an electric motor for operating the usual pump, and electric conductors E for making connection between this motor and the system A. These conductors E may be of any suitable or known construction depending upon the character of electric system with which the apparatus is to be used. According to one feature of our invention, the conductors E are of improved construction and are preferably constructed for use either to make connection where special connecting points (as shown in

Fig. 1) are provided on the system A, or where the trolley system as shown in Fig. 2 is to be utilized. Where special points of connection are provided, as shown in Figs. 1 and 4, these contact points, lettered K in the drawings, constitute any suitable or known means for establishing electric connection between the electric system A and the motor D of the apparatus C.

In the construction shown in Fig. 1, conductors lead from the line of the system to the contact points K, and these conductors, E, consist of any suitable electric conductors *e* and *f* making connection with those from the line at the contact points K, and leading from there to the apparatus C, and terminating respectively in contact posts *e' f'* on the apparatus, connected by the arms of a switch L with conductors *g* and *h* leading to the motor D. In the construction shown, auxiliary conductors *e''* and *f''* are shown, the former consisting of a trolley pole M, and affording electric communication through the trolley pole to the contact post *e'*, and the latter consisting of any suitable electric wire having a contact pin and connected at its one end to the contact post *f'*, and constructed to afford electrical communication between this post and the track of a trolley road. In Fig. 1, only the conductors *e* and *f* are shown as in use, the conductors *e''* and *f''* not being required when the special contact points K are provided. With this construction the apparatus C can be used in connection with a trolley, as shown in Fig. 2, where such connection is available, and at other points with the special contact points K. In the former case the electric communication will be through the overhead wire *a*, and trolley pole M and wire *e''* to the binding post *e'*, thence through the switch L and wire *g* to the motor, and from the latter through the wire *h* to the other post *f'*, and thence through the wire *f''* to the track *c*, and back through the other conductor *b* of the system.

When the trolley system is utilized in the manner shown in Fig. 3, a special wire *d* from the return wire *b* of the system running to a contact point K in or near the hydrant G, the conductors E will consist of the trolley pole M and its wire *e''*, the switch L and the wires leading from and to the latter from the motor D, and the single wire *f* from the switch to the contact point K. In this arrangement the electric current will pass from the overhead wire through the apparatus to the branch wire *d*, and from the latter to the return wire *b*.

In using the special circuit shown in Fig. 4, the contact-points K will be arranged in or near each hydrant, and the apparatus will be connected to them in the same manner as shown in Fig. 1. The motor D may be any suitable construction of electric motor capable of mechanical connection with the pump of the apparatus for operating such pump. The hydrants G may be the ordinary fire hydrants now in use, or any suitable source of supply for supplying water or other fire extinguishing matter to the apparatus. In installing our improvements, convenient provision is made for making the electric connection between the apparatus C and the distributing system A at each hydrant, after which in operating with this system, the apparatus is drawn to the point where required for use, the electrical connection is completed, and the connection is made between the pump and hydrant, whereupon the fire engine may be operated as required.

Having thus described the general features of our improved system and apparatus, we will now describe in detail the preferred form of our improved fire engine, referring particularly to Figs. 5 to 9 inclusive. In these figures the apparatus C is shown as constructed with a framework N supported at front and rear on axles O carried by wheels P as usual. Preferably the forward portion of the framework is bowed upwardly to permit free turning of the front wheels on the fifth wheel Q of the vehicle. Preferably the frame N has depending portion R at rear, on which is mounted the motor D. The latter is constructed in the form here shown of a base-plate *i* bolted to the frame N, and carrying at its upper side the bearing brackets *j j* for the armature shaft *k* of the motor, and intermediate of these brackets the field magnets *l*, the pole pieces of which embrace the armature *m* at top, while on their lower portions are wound the field coils *n*.

o indicates the commutator, and *p p* the brushes.

In the construction shown a worm S is carried on the outer end of the armature shaft *k* of the motor, and gears with a worm-gear S' rotatively mounted on the stud of a bracket S'', which gear carries an outwardly projecting crank-pin *q* on its side engaging a slot *q'* in the upper end of a lever T fulcrumed on the rear axle O of the apparatus, and connected at its other end by a link *q''* with the piston rod *r* of the pump F. By this construction the operation of the motor will be communicated through the worm-gear S' and its pin *q* to oscillate the lever T, and through the latter reciprocate the piston rod of the pump to operate the latter.

The pump F may be of any suitable construction and location. Preferably it is bolted against the under side of the frame N beneath the motor D, the two being held in position on the frame by bolts *s* serving to clamp them against the top and bottom sides of the frame. Preferably the inlet of the pump is at one side, and constructed with a coupling neck *s'*, and the outlet is at the opposite side of the pump and constructed with a coupling neck *s''*. Communication can be afforded between the inlet side of the pump and the hydrant or other source of supply by any suitable length of hose, as H, and a like hose, as I, can be coupled to the discharge neck *s''* for delivering the discharge from the pump to the point

of use. Preferably the frame is constructed with upwardly extending arms N′ at rear, which arms carry in bearings at their upper ends a shaft N″, on which is fixed a hose-drum N‴ disposed between the arms N′. On this drum N‴ is wound a length of hose H′ which can be used to afford communication between the hydrant G and the pump of the engine, where it is desired that the latter shall be at some distance from the hydrant. The usual ratchet and pawl H″ is provided for locking the drum against rotation.

According to our invention we also provide a conductor- or cable-drum E′, preferably mounted freely on the outer end of the shaft N″, upon which a length of cable E″ can be wound for use when it is desired to afford communication between the contact points K and the engine, when the latter is at some distance from these points. A ratchet and pawl H‴ is provided for locking the drum E′ against rotation.

The apparatus is shown as constructed with the electric conductors E described with reference to Fig. 1. In the particular construction shown, these conductors consist of the positive wire *e* and the negative wire *f*, each terminating in a contact plug or handle at one end, and united into the cable E″, extending to and wound upon the drum E′, and fixed at its other end to said drum as shown in Fig. 9. At its drum end the wires *e* and *f* leave the cable and pass through the side of the drum, the wire *e* being electrically connected to an insulated metallic contact ring *e‴*, and the wire *f* being connected to a similar but smaller metallic contact ring *f‴* arranged within the other ring and both concentric with the axis of rotation of the drum and fixed on the inner side wall thereof. On the adjacent arm N′ is mounted a block U of insulating material, on which are fixed contact springs *e⁗* and *f⁗*, the former making electrical contact with the ring *e‴*, and the latter with the ring *f‴*. To these contact springs are connected respectively wires *t* and *u*, which pass through a pipe V fixed at one end of the arm N′, and at its other end to the seat W at the other end of the apparatus, and emerge at the other end of the pipe and make electrical contact respectively with the contact posts *e′* and *f′*, whereby complete electrical communication exists between the contact plugs at the ends of the wires *e f*, and the contact posts *e′ f′*. The auxiliary conductors for use with the trolley in this instance consist of the trolley-pole M, which is pivoted on a bracket M′, and weighted at its lower end, with which the wire *e″* makes electrical connection at one end, while its other end makes electrical connection with the positive contact post *e′*. The other member of the auxiliary conductor consists of the wire *f″*, which makes electrical connection with the negative contact post *f′* at one end and carries at its other end a contact plug constructed to be driven in beside the rail of a tramway track, as indicated in dotted lines in Fig. 5, when used as one of the conductors E, and to be hung on one of the hooks *v* at the side of the seat W when not used. The auxiliary conductor will afford when in use electrical connection between the overhead trolley wire *a* at top and the positive contact post *e′*, and from the negative contact post *f′* through the wire *f″* to the rail *c* through which the current would be in connection with the return wire of a trolley system. Preferably a lock V′ is provided consisting of a chain engaging a hook for securing the trolley pole when in the inactive position.

The switch L may be of any suitable construction. It is shown as consisting of two switch-arms *g′* and *h′* connected to, insulated from, and operated by, a hand-lever X, all being preferably placed on the side of the seat W. The conductor *g* leads from the switch-arm *g′* through the positive brush *p* of the motor, and the conductor *h* leads from the negative brush *p′* of the motor to the switch-arm *h′*. Thus when the switch L is thrown on, there will be complete electrical communication between the motor and the conductors E.

The contact points K are preferably disposed within the hydrant G in such manner that they will be inaccessible to other than persons authorized to open the hydrants, whereby danger of accident is avoided. Preferably they consist of a box *w* having positive contact springs *w′* and negative contact springs *w″*, adapted respectively to receive the plugs of the wires *e* and *f*, and in electrical communication with the respective conductors of a system for distribution of electric energy.

We prefer to construct the hydrant G as shown in Figs. 10 and 11, where it has the usual water conduit and valve rod therefor, and locking bolt for preserving its cover in the closed position when out of use, and in addition, according to our invention, is constructed with a lateral pocket G′ at top, closed by a corresponding projection on the hydrant cover, which pocket contains the contact points and switch for making connection between the system for electric distribution and the fire engine. Preferably a box *w*, of insulating material and having an open top is fitted into this pocket G′, and the conductors *a b* of the system A rise through a tube in the hydrant and enter this box, terminating in contact springs *a′ b′* therein, which springs bear against a disk switch K′ in the box. This switch has conducting pieces *a″ b″*, on its periphery, and is constructed intermediately of these pieces with an insulating material, and has a projecting handle by which it is shifted from one position to the other. The springs *w′ w″* are each mounted in this box *w* and have contact springs *w‴ w⁗* respectively which bear against said switch K′ and are disposed in relation to the conducting parts *a″ b″* and the contact springs *a′ b′* in such manner that when the switch is turned to the one position electri-

cal communication will exist between the conductors *a b* and the springs *w' w''*, and when it is turned to the other position such communication will be interrupted. This is a safe and convenient arrangement of the contact points K, whereby access to them can only be had by those able to open the hydrant G, and the plug pins of the conductors E can be adjusted in the contact springs *w' w''* conveniently and without danger before the switch K' is turned on, whereby the flow of current can be controlled at the hydrant.

In operating our invention when the apparatus used is that shown in Figs. 5 to 9 inclusive, the engine will be drawn to the hydrant or other source of water supply nearest to the point of use, and if the trolley system is the source from which the electric current is taken, the trolley pole will be thrown in contact with the wire *a* overhead, and the conductor *f''* will be put in contact with the rail *c* of the track beneath by driving its contact plug alongside the latter. The connection between the hydrant G and pump F will be made by the hose H, whereupon the pump can be driven to throw a stream of water by closing the circuit with the switch L. To stop the motor the switch need only be shifted to the other position. If the contact points K are utilized instead of a trolley system, when the apparatus arrives at the hydrant the latter will be opened and the contact plugs of the wires *e* and *f* will be inserted in their respective contact springs on the box *w*, whereupon the apparatus can be operated as before. If, however, it is desired to remove the engine to some distance from the hydrant or from the contact points, then the hose H' on the drum H'' will be connected to the hydrant G after the electrical connection has been made just as described, the pawls for locking the drums N''' and E' will be freed, whereupon the engine can be drawn to the point desired, the hose H' and cable E'' being unreeled as the engine progresses, after which the other end of the hose H' may be connected to the inlet neck *s'* of the pump, whereupon the apparatus can be operated as before, drawing water through the hose H' and discharging it through the hose I, and receiving its electrical energy through the conductors within the cable E''.

What we claim is, in systems and apparatus for extinguishing fires, the following-defined novel features and combinations, substantially as hereinbefore set forth, namely:

1. In an electric fire engine, the pump F, the motor D for driving the latter, a frame N carrying said parts, a seat W carried by said frame, the switch L on said seat, conductors *g* and *h* between said switch and motor, conductors *t* and *u* leading from said switch, tube V connected to said seat at one end inclosing said conductors *t* and *u*, and extending backwardly and connected to said frame at rear, shaft N'' carried by said frame, drum E' rotatively mounted on said shaft, rings *e''' f'''* fixed on the inner side of and rotating with said drum, contact pieces *e'''' f''''* connected respectively to said wires *t* and *u* and bearing respectively on said rings, cable E wound on said drum, and conductors *e* and *f* traversing said cable and connected respectively at one end to said rings, and having at their other end contact pins for making electrical connection with the terminals of an electric circuit, all combined and arranged substantially as and for the purpose set forth.

2. In an electric fire engine, the pump F, the motor D for driving the latter, a frame N carrying said parts, a seat W carried by said frame, the switch L on said seat, conductors *g* and *h* between said switch and motor, conductors *t* and *u* leading from said switch, tube V connected to said seat at one end inclosing said conductors *t* and *u*, and extending backwardly and connected to said frame at rear, shaft N'' carried by said frame, drum E' rotatively mounted on said shaft, rings *e''' f'''* fixed on the inner side of and rotating with said drum, contact pieces *e'''' f''''* connected respectively to said wires *t* and *u* and bearing respectively on said rings, cable E wound on said drum, and conductors *e* and *f* traversing said cable and connected respectively at one end to said rings, and having at their other end contact pins for making electrical connection with the terminals of an electric circuit, a trolley pole M carried by said drum, conductor *e''* between said pole and switch, and wire *f''* connected with said switch and carrying a contact pin for making electrical connection with the ground conductor of a trolley system, said contact pins constructed with perforated heads and said seat W carrying hooks *v* for supporting said pins.

3. In an electric fire engine comprising a pump, a motor for driving the latter and conductors for making connections for a system of electric distribution, the hose drum N''', the frame N' and the shaft N'' mounted in said frame and carrying said drum, in combination with the cable drum E' mounted on said shaft exteriorly of said frame, and rotative independently of said hose drum, substantially as and for the purpose set forth.

4. The combination with a fire hydrant, of electric conductors rising therethrough, a tube therein and closing said conductors, a box W connected to said tube, a switch K' in said box, and contact springs *w' w''* in said box constituting respectively terminals of said conductors when said switch is in one position, and cut out therefrom when said switch is in the other position, substantially as and for the purpose set forth.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

JOHN BIRKETT.
WILLIAM McELROY.

Witnesses:
GEORGE H. FRASER,
CHARLES K. FRASER.