No. 880,780. PATENTED MAR. 3, 1908.

G. A. DRAKE.

MEANS FOR ELECTRICALLY OPERATING FIRE ENGINES.

APPLICATION FILED JUNE 17, 1907.

4 SHEETS—SHEET 1.

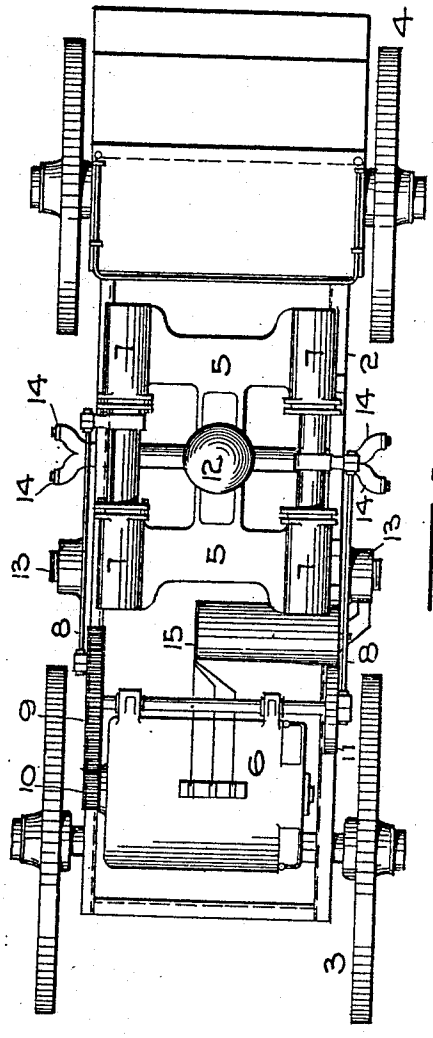

FIG. 1

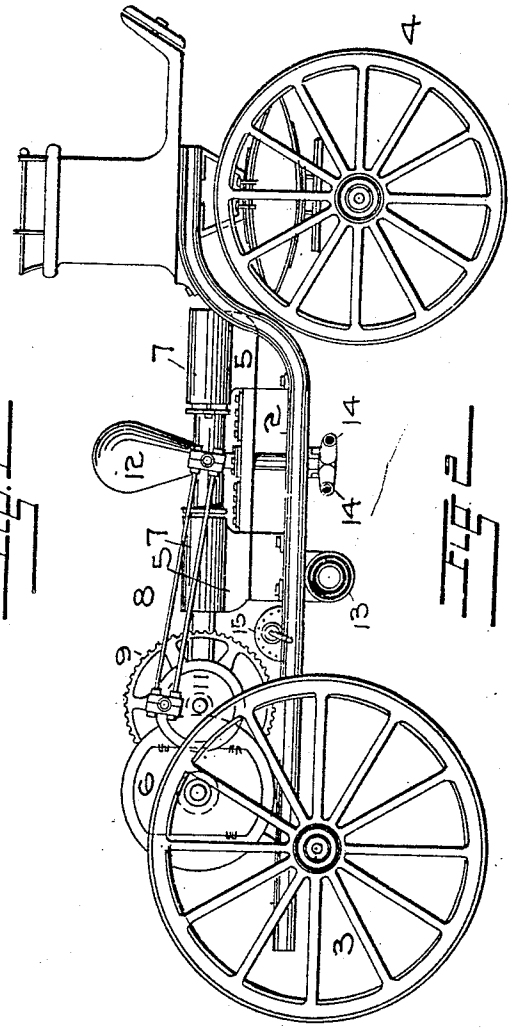

FIG. 2

WITNESSES:
K. M. Stumpf
E. K. Burrows.

INVENTOR.
G. A. Drake
BY
ATTORNEY.

No. 880,780. PATENTED MAR. 3, 1908.

G. A. DRAKE.

MEANS FOR ELECTRICALLY OPERATING FIRE ENGINES.

APPLICATION FILED JUNE 17, 1907.

4 SHEETS—SHEET 2.

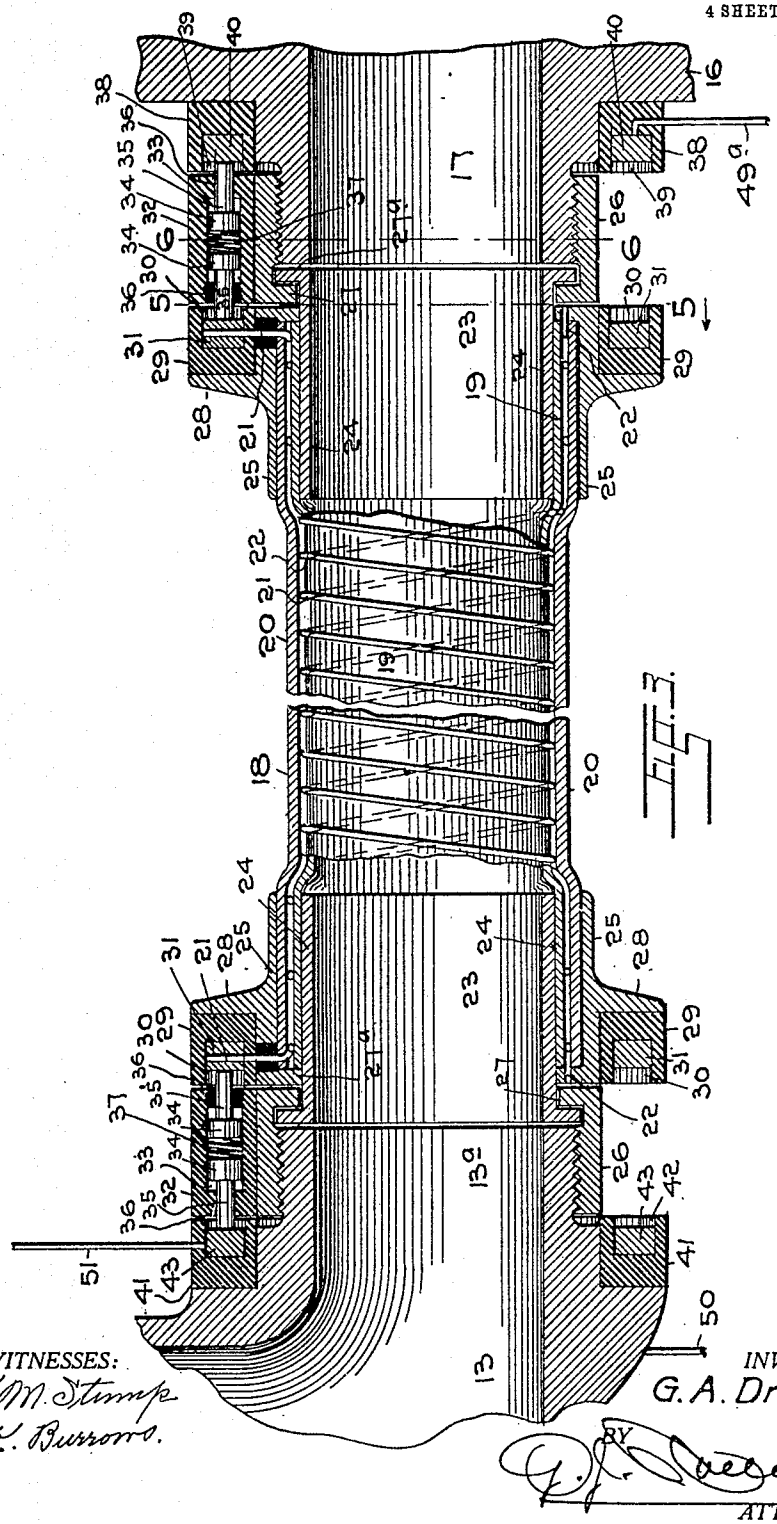

FIG. 7.

WITNESSES:
T. M. Stump
E. K. Burrows.

INVENTOR.
G. A. Drake
BY
ATTORNEY.

CLASS 169-FIRE EXTINGUISHERS,

24

DRAFTSMAN,

No. 880,780. PATENTED MAR. 3, 1908.

G. A. DRAKE.

MEANS FOR ELECTRICALLY OPERATING FIRE ENGINES.

APPLICATION FILED JUNE 17, 1907.

4 SHEETS—SHEET 3.

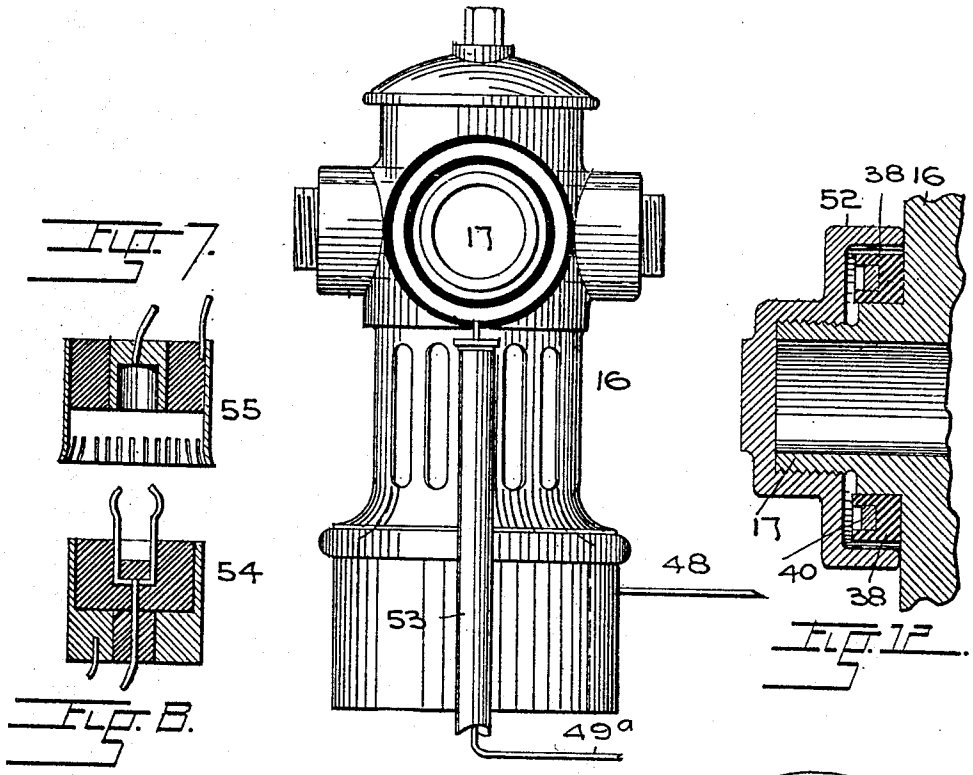

FIG. 7.

FIG. 8.

FIG. 4.

FIG. 12.

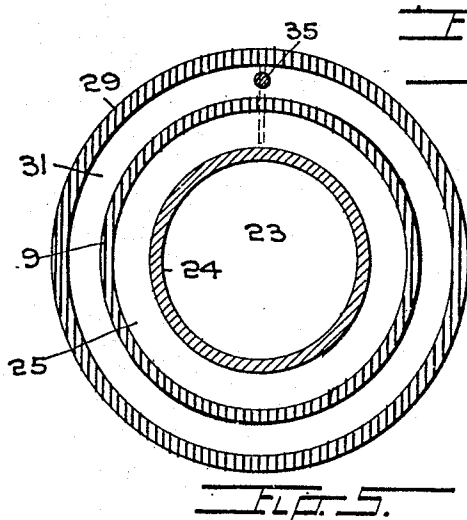

FIG. 5.

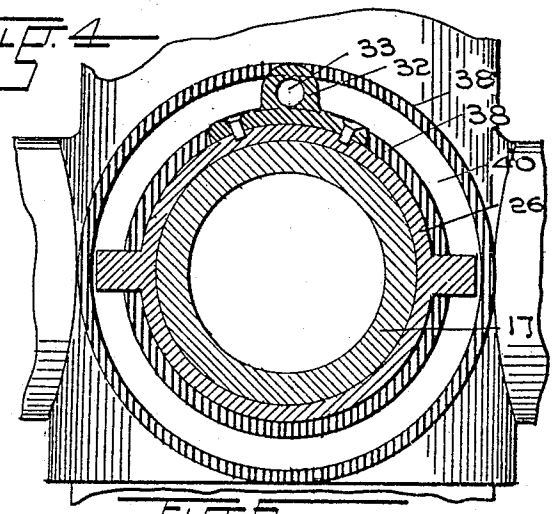

FIG. 6.

WITNESSES:

S. M. Stumpf

E. K. Burrows.

INVENTOR.

G. A. Drake

BY

ATTORNEY.

No. 880,780. PATENTED MAR. 3, 1908.

G. A. DRAKE.

MEANS FOR ELECTRICALLY OPERATING FIRE ENGINES.

APPLICATION FILED JUNE 17, 1907.

4 SHEETS—SHEET 4.

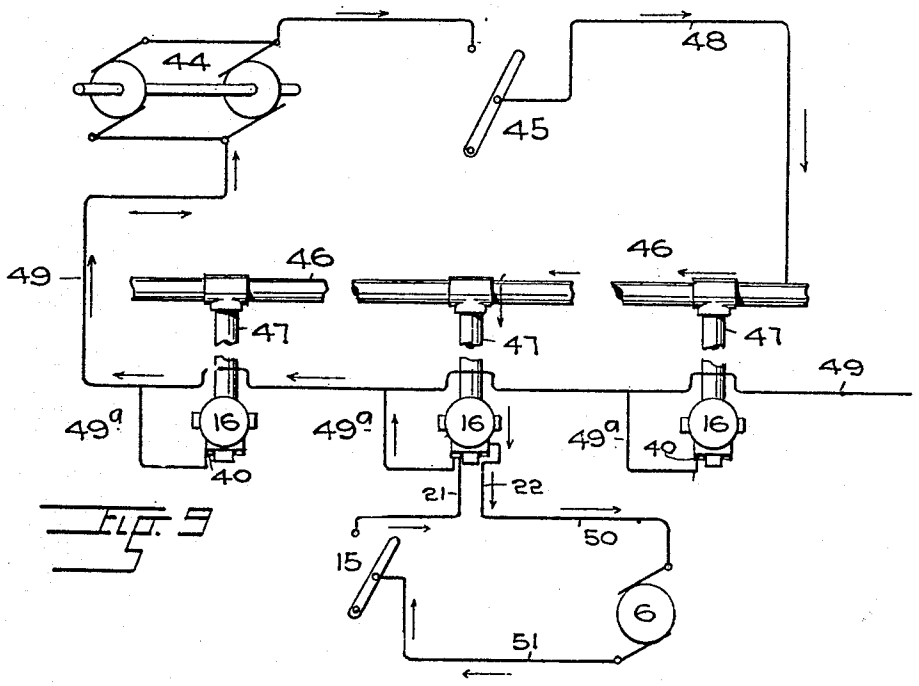

Fig. 9

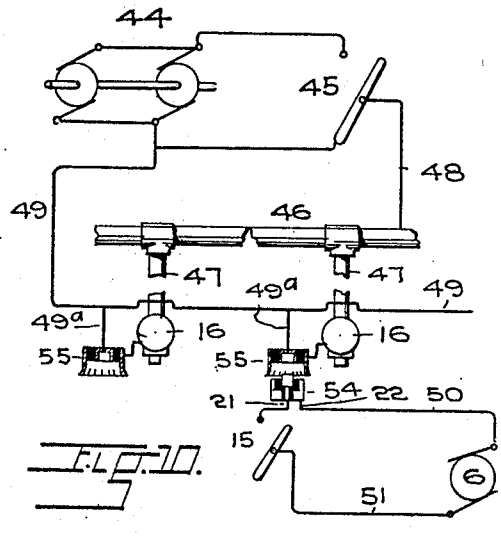

Fig. 10.

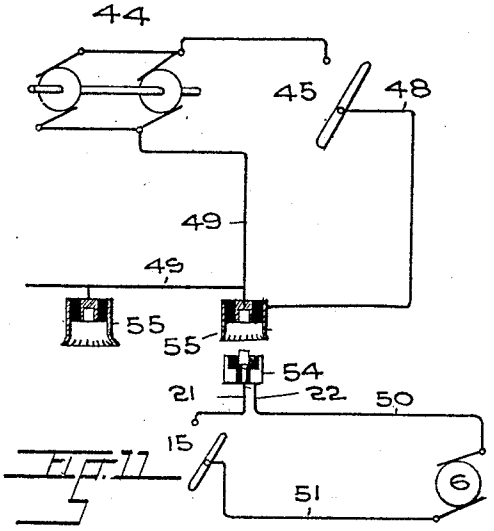

Fig. 11

WITNESSES:
F. M. Stumpf
E. K. Burrows.

INVENTOR.
G. A. Drake
BY
G. P. Adams
ATTORNEY.

UNITED STATES PATENT OFFICE.

GUSTAVE A. DRAKE, OF DENVER, COLORADO.

MEANS FOR ELECTRICALLY OPERATING FIRE-ENGINES.

No. 880,780. Specification of Letters Patent. Patented March 3, 1908.

Application filed June 17, 1907. Serial No. 379,515.

To all whom it may concern:

Be it known that I, GUSTAVE A. DRAKE, a citizen of the United States of America, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Means for Electrically Operating Fire-Engines, of which the following is a specification.

My invention relates to a system of and means for operating by electric power, engines designed to throw a continuous stream of water upon a conflagration.

Although my invention is especially adapted for the operating of the movable pumping contrivances, commonly known as fire engines, it may be employed with equal results to actuate stationary force and suction pumps in public buildings from any one of a plurality of preëstablished points and its objects are to provide means whereby the original cost of fire engines as well as the labor, time and expense involved in maintaining them in readiness for action, may be materially lessened, by which a force and suction pump may speedily be actuated by electric connection made at any one of a number of pre-determined points, and whereby the amount of time required to actuate the pump and make the necessary connections prior to delivering a stream of water, may be reduced to a minimum. I attain these objects by the means illustrated in the accompanying drawings in the various views of which like parts are similarly designated and in which

Figure 1 represents a plan view of a fire engine constructed in accordance with my improved method of operation, Fig. 2 a side elevation thereof, Fig. 3 a sectional, fragmentary view of the nozzle of a hydrant or fire plug, the extremity of the induction pipe of a suction and force pump and the interposed suction hose equipped at its extremities with the required couplings, Fig. 4 an elevation of a hydrant or fire plug, Fig. 5 a cross section taken along a line 5—5, Fig. 3, Fig. 6 a transverse section taken along a line 6—6, Fig. 3, Figs. 7 and 8 respectively a socket and plug employed to electrically connect the engine with a source of electric power, Fig. 9 a diagrammatical representation of the electric circuit through which the current circulates between the fire engine, hydrants and the stationary source of electricity, Fig. 10 a diagrammatical view of a circuit similar to that represented in the preceding figure, the sockets and plugs shown in Figs. 7 and 8 being included therein, Fig. 11 a diagrammatical view of the electric circuit between the fire engines and the generating station with means independent of the hydrants to establish the connection between them, and Fig. 12 a sectional view of a hydrant nozzle provided with a protecting cap.

The fire engine illustrated in Figs. 1 and 2 comprises a frame 2 supported upon the trucks 3 and 4 and adapted to be propelled in the usual manner either by draft animals or by electrical or mechanical means. Mounted upon the frame 2 is a force and suction pump 5, preferably of the double action type, and an electric motor 6 by means of which the electric power derived from an independent source, may be transformed into the mechanical power required to operate the pump. The last named contrivance includes the pump cylinders 7, the plungers in which are connected with the movable parts of the motor by means of pitmen 8, a gear 9, a co-operative pinion 10 and a crank wheel 11, the air chamber 12, the induction or suction pipes 13 and the eduction or discharge nozzles 14. A controller 15, placed upon the frame intermediate the motor and the pump, is adapted to change the system of connections with the generator.

The reference character 16 designates a hydrant or fire plug such as commonly used in municipalities, as agents for connecting the pumps of fire engines with the underground main leading from the water supply and which is provided with a screw nozzle 17 by means of which the connection with the suction hose 18 is established.

The hose 18 is composed of internal and external tubes 19 and 20 in between which are wound the insulated wires 21 and 22 through which the electric current passes between the generator and the motor and which may take the place of the metallic reënforcements commonly employed in the manufacture of the flexible tubing designed for the conveyance of water to and from fire engines. The hose 18 is provided at its extremities with identical couplings 23 by means of which it may be connected with the induction pipe 13 of the engine and the nozzle 17 of the fire plug 16, and which consists of

the internal and external circular bands 24 and 25 in between which the end of the flexible tubing 18 is clamped, and the swivel collar 26 which is rotatably held upon the outwardly extending portion of the band 24 through instrumentality of flanges 27 and 27ª.

The collars 26 are provided with an internal screw thread adapted to engage the coöperatively, externally threaded extremities of the nozzles 17 and 13ª respectively on the hydrant 16 and the induction pipe 13 of the pump. The external part 25 of the couplings 23 is provided with a surrounding flange 28 in engagement with which is secured an annulus 29 made of fiber or other suitable insulating material and having an annular recess 30 cut into its outer face, in which a metallic ring 31 is embedded. The rings 31 of the couplings at both ends of the hose 18 are connected by means of one of the before named wires (21) while the terminals of the other wire 22 connect with any convenient portion of the internal members 19 of the couplings.

Secured upon the circumferential surface of the swivel collar 26 is a block 32 made of fiber or other insulating material and having a bore 33 into which are fitted the heads 34 of two reversedly arranged plungers 35 the opposite extremities of which protrude through correspondingly formed openings 36 in the opposite sides of the block. A coiled spring 37 placed between the opposite surfaces of the heads 34, is designed to resiliently maintain the two plungers in contact with parts engaged by their opposite outer extremities. The nozzles 17 and 13ª of the hydrant 16 and the suction pipe 13 are surrounded at a point beyond their threaded extremities, with insulating rings 38 and 41 identical to those secured upon the bands 24 of the couplings 22 and in whose respective annular recesses 39 and 42 are embedded the metallic rings 40 and 43.

The distance from the center of the couplings 22 to the center of the axially alined plungers 35 in the blocks 32, being equal to the mean radii of the embedded rings 31, 40 and 43 in the identical insulating collars 29, 38 and 41 upon the members 25 of the couplings and the nozzles 17 and 13ª of the fire plug and the intake 13, the extremities of the innermost plungers will, through instrumentality of the springs 37, be in constant contact with the opposed rings 31 of the couplings while the oppositely projecting plungers will engage the respective rings 40 and 43 when the couplings are screwed home upon the threaded extremities of the two nozzles. The result is that when by means of the flexible conduit 18, the pump of the fire engine is connected with the water supply an electrical connection is simultaneously established between the metallic rings 43 and 40 respectively secured upon and insulated from the nozzles 13ª and 17 of the induction pipe 13 and the hydrant 16.

Referring to the diagrammatical representation in Fig. 9 of the drawings, the reference character 44 designates the dynamo electric machine or generator designed to generate the electricity required for operating the pumps, and 45 the switch, rheostat or circuit breaker located in proximity to the dynamo and by which the circuit may be closed or broken.

The reference numeral 46 indicates the underground water main with which the hydrants 16 are connected by means of branch pipes 47; 6 the afore mentioned motor of the fire engine and 15 the controller or rheostat connected therewith.

One of the poles of the generator 44 is connected by means of a conductor 48 which passes through the switch 45, with the metallic water main 46 while its opposite pole connects by means of a wire 49 and branch wires 49ª with the metallic rings 40 which as hereinbefore described, are mounted upon and insulated from the hydrants 16.

The station at which the generator 44 is located is preferably connected with the alarm system commonly employed in cities to signal the occurrence of a fire, to the various fire stations, for the purpose of obviating the necessity of constant electrification of the wires and parts employed to convey the electric fluid from the generator. When a conflagration occurs and the alarm is sounded at the generating station, the engineer closes the switch 45 and thereby causes the electricity generated by the dynamo 44 to flow through the wire 48 and the pipes 46 and 47 to the various hydrants and through the wires 49 and 49ª to the therefrom insulated rings 40. The fire engine having stopped in proximity to the hydrant, nearest to the fire, its pump is connected therewith by means of the suction hose 18, the connection being accomplished by screwing the couplings 23 upon the respective nozzles of the suction pipe 13 and the fire plug 16. As the wires 50 and 51 which lead from the motor 6, through the controller 15, terminate respectively in the nozzle 13ª or therewith electrically connected parts and in the therefrom insulated ring 43 an electrical connection will be established by means of the wires 21 and 22 with the coupling 23 at the opposite or hydrant end of the hose and the therewith associated insulated ring 31. As soon as the outer plunger 35 upon the coupler at the engine end of the hose has come in contact with the ring 43 on the nozzle 13ª and inasmuch as the hydrant and its nozzle and the insulated ring 40 constitute the terminals of the conductors leading from the generator, the latter will be electrically connected with the motor when the coupling 22 is screwed upon

the nozzle and the outer plunger 35 has come in contact with the ring 40. The motor thus being energized imparts its motive force to the pump by the means hereinbefore described, which occurring simultaneously with the making of the water connection, assures the delivery of the stream of water upon the conflagration in the minimum of time.

To prevent accidents liable to occur by simultaneous contact with the hydrant and the ring 40 which before the above described connection is made, constitute the terminals of the electric circuit, the nozzle when not in use is provided with a screw cap 52 which surrounds the insulating collar 38 as shown in Fig. 12. The rings 31, 40 and 43 within the recesses of the respective collars 29, 38 and 41 are embedded below the outer face of the said rings so that when the couplings are screwed upon the nozzles the spanner, wrench or other tool employed to couple the parts, cannot establish a connection between the said rings by contact therewith.

The branch wires 49ª leading from the generator-conductor 49 to the rings 40 have been shown in Fig. 4, to be incased in tubes 53 composed of porcelain or other insulating material. For the sake of clearer illustration this tube has been shown to be disposed outside the hydrant but it will be understood that it may be located within the plug or that the wire may be connected with the terminal ring and insulated from the hydrant in any suitable manner. It should also be understood that instead of employing the watermains and the therewith connected branch pipes and hydrants, to conduct the electric fluid from the generator to the motor, a separate wire may be used for this purpose and that both this wire and the wire 49 may be placed underground or led overhead along poles or other suitable supports.

Instead of establishing the electrical connection between the motor 6 and the generator through instrumentality of the couplings, the wires 21 and 22 may terminate in a plug 54, adapted to be inserted in a correspondingly formed socket 55, which is electrically connected with the hydrant. (See Figs. 7, 8 and 10.) A similar contrivance may be employed to connect the wires 21 and 22 at the engine and the said wires instead of being wound in between the internal and external portions of the hose, may be separate therefrom or incased in a separate tubing.

In the circuit illustrated in Fig. 11, the hydrants are left out of the circuit, and the sockets 55 brought directly in electrical connection with the wire 49. This method is especially adapted for use in buildings where the generator and pump may be established in the engine room and the sockets at each floor or in each room, or it may be employed by securing the sockets either upon the hydrants or upon other convenient supports at various points of the thoroughfares of a city or town.

Although the method of arranging the pump and motor of the fire engine as illustrated in Figs. 1 and 2 of the drawings as well as the manner of making the electrical connection by means of the couplings, are preferable on account of their simplicity, I wish it understood that modifications in the arrangement and the construction of the various parts comprised in my invention may be availed of within its principle. It should furthermore be observed that instead of providing a separate generator to produce the electric fluid required to energize the motor which operates the pump, use may be made of a source of electricity previously established for other purposes such as providing a municipality with electricity for lighting or power or for operating electrically driven conveyances.

Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is:

1. The means for operating fire engines comprising a pump including discharge and suction nozzles, an electric motor operatively associated therewith and means adapted to simultaneously connect the motor with the terminals of the conductors in a broken electric circuit and the said suction nozzle with a water conduit.

2. The means to operate fire engines comprising a pump including discharge and suction nozzles, an electric motor operatively connected therewith, and a flexible conduit adapted to connect the suction nozzle with a water supply and to simultaneously connect the motor with the terminals of the conductors in a broken electric circuit.

3. The means for operating fire engines including a water supply conduit, a discharge nozzle communicating therewith a broken electric circuit terminating on the said nozzle at two insulated points, an electrically driven pump, a flexible conduit connected with its suction opening and having at its free end means adapted to operatively connect with the said nozzle and provided with insulated contacts electrically connected with the motor employed to drive the pump, and arranged to engage the insulated points on the nozzle, when the said connection between the latter and the conduit is being made.

4. The means for operating fire engines including a water supply conduit, a discharge nozzle associated therewith, a broken electric circuit terminating in the said nozzle and in a contact insulated therefrom, an electrically driven pump, a flexible conduit connected with its suction opening and having at its free end means adapted to operatively connect with the said nozzle and having an insulated contact arranged to engage the contact

on the nozzle when the connection with the flexible conduit is being made, the said means of connection and its insulated contact being electrically connected with the motor employed to drive the pump.

5. The means for operating fire engines including a water supply conduit, a discharge nozzle connected therewith, a broken electric circuit terminating on the said nozzle at two insulated points, an electrically driven pump including a suction nozzle having two insulated contacts electrically connected with the motor employed to drive the pump, and a detachable conduit adapted to connect the said nozzles and to electrically connect the insulated contacts on the one with the insulated points on the other.

6. The means for operating fire engines including a water supply conduit, a discharge nozzle associated therewith, a broken electric circuit terminating in the said conduit and in a contact insulated from its nozzle, an electrically driven pump, a flexible conduit connected with its suction opening and having at its free end means adapted to operatively connect with the said nozzle and having an insulated contact arranged to engage the contact on the nozzle when the connection with the flexible conduit is being made, the said means of connection and its insulated contact being electrically connected with the motor employed to drive the pump.

7. The means for operating fire engines including a water supply conduit, a discharge nozzle communicating therewith, a broken electric circuit terminating in the said nozzle and in a contact insulated therefrom, a pump including discharge and suction nozzles, a motor arranged to drive the said pump and electrically connected with the said suction nozzle and with a contact insulated therefrom and a flexible conduit adapted to connect the said nozzles mechanically and electrically and to electrically connect their respective insulated contacts.

8. Means to operate fire engines comprising a water supply conduit, a screw nozzle connected therewith, a broken electric circuit connected with the nozzle at two insulated points, an electrically driven pump, and a flexible conduit communicating with its suction opening and having at its free end a coupling including a swivel collar connected at two insulated parts with the motor employed to drive the pump, the said parts being arranged to engage the insulated points on the nozzle while the said collar is screwed thereupon.

9. Means to operate fire engines comprising a water supply conduit, a screw nozzle connected therewith, a broken electric circuit connected with the nozzle at two insulated points, an electrically driven pump including discharge and suction nozzles the latter being connected with the motor employed to drive the pump at two insulated points, and a flexible connection having at its opposite ends identical couplings including screw collars electrically connected at two insulated parts, the said parts being arranged to engage the insulated points on the respective nozzles while the said collars are being screwed thereon.

In testimony whereof I have affixed my signature in presence of two witnesses.

GUSTAVE A. DRAKE.

Witnesses:
G. J. ROLLANDET,
K. M. STUMP.