3 Sheets—Sheet 1

L. G. WOOLLEY.

Electro-Magnetic Fire-Engine and Alarm.

No. 207,377. Patented Aug. 27, 1878.

Fig. 1.

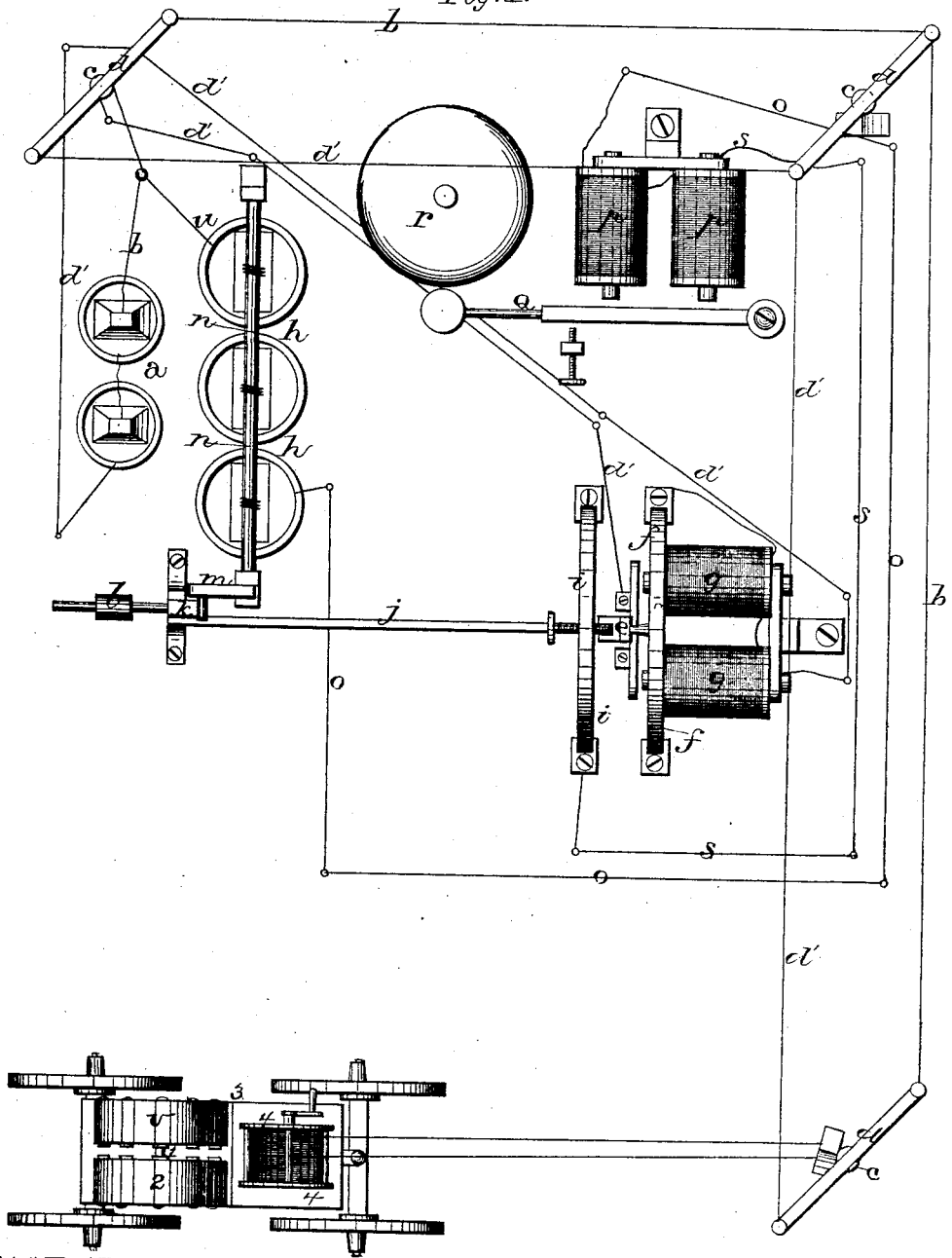

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Fig. 2.

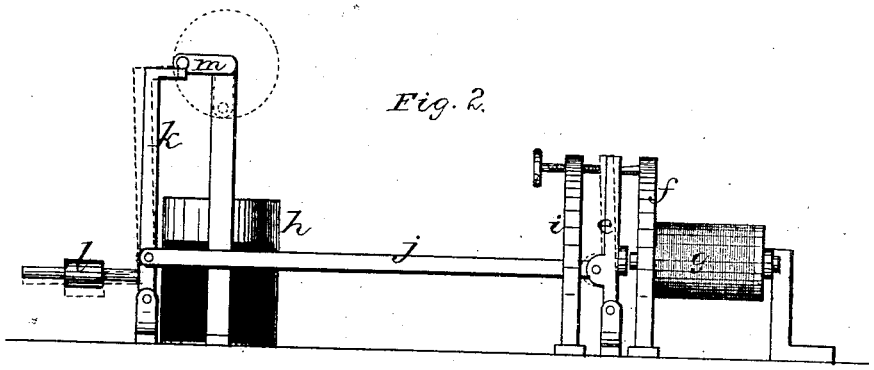
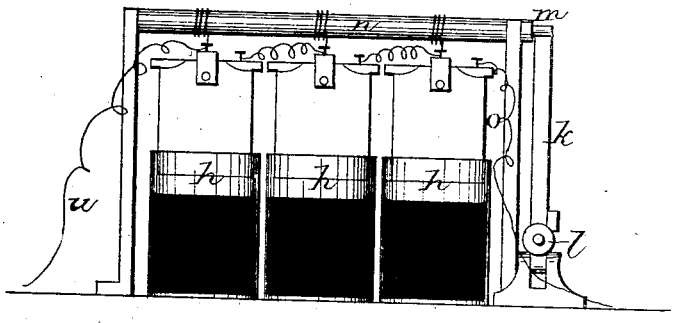


Fig. 3.



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3 Sheets—Sheet 3.

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Fig. 4.

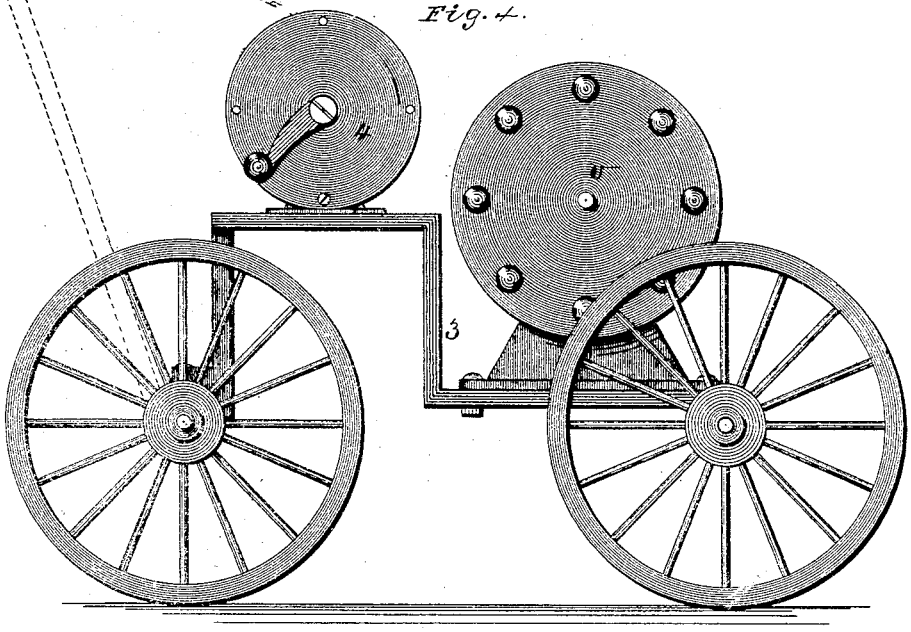
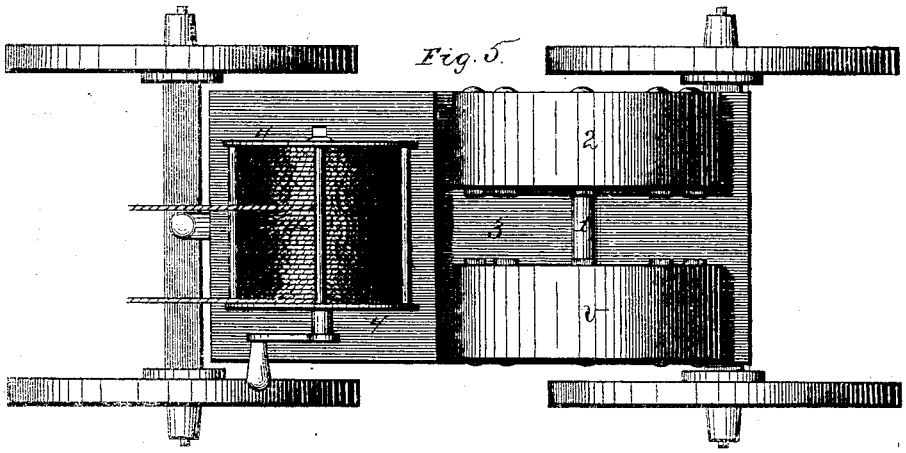


Fig. 5.



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UNITED STATES PATENT OFFICE.

LEONIDAS G. WOOLLEY, OF MENDON, MICHIGAN.

IMPROVEMENT IN ELECTRO-MAGNETIC FIRE ENGINE AND ALARM.

Specification forming part of Letters Patent No. **207,377**, dated August 27, 1878; application filed December 17, 1877.

To all whom it may concern:

Be it known that I, LEONIDAS G. WOOLLEY, of Mendon, in the county of St. Joseph and State of Michigan, have invented certain new and useful Improvements in Combined Electro-Magnetic Fire Engine and Alarm; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in combined electro-magnetic fire-engine and alarm; and it consists in operating a rotary or other force-pump by an electro-magnetic engine at any distance from the battery.

It also consists in the use of a large and a small battery, the latter remaining in constant use until an alarm of fire is turned in, when it is at once shut out and the large one turned on, so as to sound the alarm and generate the power that is to drive the engine.

It further consists in the arrangement and combination of parts whereby the small battery is shut out and the zinc and carbon plates are lowered into the cups of the large battery, as will be more fully described hereinafter.

It still further consists in having two wires running from both batteries all over the city or town, and connected with fire-alarm boxes, which boxes serve to turn in the alarm and attach the engine to, for the purpose of putting it in operation.

My system is more especially intended for villages and towns; but is equally well adapted for use in large cities and private residences.

Figure 1 is a plan view of my invention, showing the engine ready for use a long distance from the battery. Fig. 2 is a side elevation of the current-changer for bringing the large battery into action and shutting out the small one. Fig. 3 is a side elevation of the windlass and supporting-post. Figs. 4 and 5 are views of the fire-engine alone.

a represents a small gravity or other suitable battery, consisting of two or more cups, as occasion may require. Where the village or private residence is comparatively small but one or two cups will answer; but where the circuit is long the number of cups will be increased in proportion to the power required. A gravity-battery is to be preferred for this circuit, as it is kept closed all the time except when the large battery is in operation.

The wire *b* extends from one of the poles of this battery out of the engine-house, in which it is placed, to the nearest pole *c*, upon which the wires are supported, and which poles will be placed throughout the town or city in the same manner as telegraph-poles. Each one of these poles will be provided with cross-arms *d*, provided with suitable insulators, and every post, at any distance from the engine-house, will be provided with a fire-alarm box of any suitable construction. Each one of the wires upon the pole will pass down into and through the box in the usual manner, and thence around over the other poles until the wire returns to the engine-house from whence it started, after making a complete circuit over the town or city.

It will be found preferable to use a return-wire on account of being able to use a weak battery, *a;* but, should it be so preferred, but a single wire will be used, and the earth will be used for the return-current, the same as in the construction of the common telegraph; but in this case a more powerful battery, *a*, would have to be employed.

The return-wire *d'*, after arriving at the engine-house, has its other end connected to the armature *e*. The current of electricity passes through this armature into the conductor *f*, and from thence into the magnet *g*, and from thence back around to the opposite pole of the battery *a*, from which it started. This completes the circuit formed by the small battery, and is in constant operation day and night, so that any one can go to any of the fire-alarm boxes and instantly turn in an alarm of fire. The moment the alarm is turned in the circuit of the battery *a* is instantly broken, and this battery is at once cut out and ceases to operate. This small battery *a* is cut out and ceases to operate, as it would only offer a resistance to the main battery *h*, instead of giving the main battery power. The fluid in the small battery, not being as good a conductor as the fluid contained in the large battery, would only produce a resistance if left in the main circuit, and cause the small battery to be uselessly

consumed. As soon as the current is broken the small battery is cut out, and the magnets *g* cease to attract the armature *e*, when this armature is immediately drawn backward so as to strike against the second conductor, *i*, which is placed just opposite to the conductor *f*. Fastened to this armature *e* is a suitable connecting rod, wire, or other suitable device, *j*, which has its other end connected to the pivoted supporting-post *k*. Projecting outward from this pivoted post *k* is an arm, upon which is placed a sliding weight, *l*, which weight serves to draw the supporting-post backward, and with the post the armature *e*, as soon as the magnet *g* ceases to attract the armature to it. By means of this sliding weight *l*, or any other suitable equivalent device, the armature *e* is drawn against the conductor *i*, and the post is moved backward sufficiently far to allow the cranked arm *m* of the windlass *n* to drop downward. To this windlass *n* are attached, by means of cords or chains, the zinc and carbon plates of the large battery *h*. As soon as this windlass is left free to revolve by the backward movement of the post the zinc and carbon plates at once descend into their respective cups.

This large battery may consist of twenty, thirty, forty, or any desired number of cups; or it may be formed in sections, so that one section after the other will be brought into action, according to the power that is required. For instance, if an alarm is turned in, but a single section of the battery may be automatically brought in action, which will be amply sufficient to operate a single engine; but should a general alarm be turned in, the additional sections of the battery will be brought in operation.

As soon as the large battery *h* is brought into operation the current of electricity passes from one pole of the battery through the wire *o* to the magnet *p*, which instantly attracts to it, with all the force of the large battery, the hammer Q, and thus causes it to strike against the gong *r*. As soon as the current ceases this hammer falls backward away from the gong, and can be made to strike again and again, according to the number turned in by the box.

As the power of the first section of the battery will be about five or six horse power, it will be readily seen that each stroke of the gong will be heard a long distance.

One of the great advantages of my invention consists in the use of this alarm, by means of which the location of the fire is instantly made known to the whole city or town.

Where the fire is a long distance from the engine-house, and would have time to get under such headway as to be beyond all control if a person had to go for the engine, it is only necessary to turn in the alarm, and the engine will at once be brought where the fire is, and that before the fire has time to make much progress.

Leading from the magnet *p* is the return-wire *s*, which has its end connected to the conductor *i*. From this conductor the current passes through the armature *e*, through the wire *d'*, to the post *c*, and out through the circuit. The opposite pole of the large battery is connected by means of the wire *u* with the wire *b*.

The large battery *h* being now in action and the small one *a* entirely cut out, the full power of the electricity passes through the wires over the city or town to any desired distance. As soon as an alarm is struck the engine is at once started for the fire, and after reaching its locality is taken to the nearest pole *c*, and its two wires are connected with the two poles in the alarm-box.

The fire-engine will consist of an electro-magnetic engine, *v*, of any desired form, shape, or construction that may be preferred, the shaft 1 of which passes directly into and operates a rotary force-pump, 2, placed just opposite it on the truck or carriage 3. Instead of the rotary pump, as here shown, any other form of pump desired may be used. The truck upon which the engine is placed may be constructed as here shown, or may have but two wheels, or may be made in any other manner that may be preferred, as this forms no especial part of my invention.

For the sake of being able to get the engine as near the fire as possible, a reel, 4, is provided, upon which two separate and distinct conducting-cords are wound, one of which connects at one end to a positive pole on the engine *v*, and the other connects with the negative pole. The two opposite ends of these cords are fastened to the negative and positive poles of the fire-alarm box.

Should no fire-alarm box be used, any suitable binding-post may be attached to the post to answer the same purpose; or, if preferred, where a fire-alarm box is used, the binding-post may be placed outside of the box.

As these cords will be of considerable length, the engine may be moved a long distance from the pole *c*, and thus be brought into any desired degree of proximity to the fire. Should more than one engine be brought into action, the current will be passed through the first engine into the second one, and so on to any desired number of engines that may be needed. Where the conducting-cords will have to cross a street, the tongue of the truck or engine will be made slightly longer than is usual, and this tongue will be elevated, as shown in dotted lines, so as to raise the wires above the ground sufficiently high to be out of the way of horses or vehicles passing along.

My combined electro-magnetic engine and fire-alarm is especially adapted for use in villages, towns, and private residences, as the pump and engine together will weigh but two or three hundred pounds, and hence can be drawn to any desired part of the city or town by one or two men. There being no parts to get out of order and nothing to be superintended, no engineer is required to run or operate the engine while in use. It is always

ready at a moment's notice, and, the engine and pump being so light, it can be taken into places where the ordinary steam-engine or hand-engine could not be drawn. As there is no necessity for any men to work upon the engine, as is the case with the usual village fire-engine, the efforts of the men can be directed toward removing furniture and other articles to places of safety. By thus placing an electro-magnetic engine and a rotary pump side by side, there are but two points of friction in both engine and pump, the construction of the engine is simplified very much, and there is no danger of it getting out of repair while in action. By the use of electricity in operating the fire-engine, it will be readily seen that the first great cost of a steamer or hand-engine is entirely avoided; that the engine has but to be taken to the place of the fire and the large battery put in action, when the pump will operate of itself without any further supervision whatever. The engine as above constructed contains no water nor steam pipes and no valves, and requires no regulating or adjusting while in action. The solid elements of my main battery are separated from the fluids, except when required for action, and hence there is no waste or consumption of material except when the engine is in operation. By means of the small battery *a* alone the whole system is kept constantly ready for use, so that it may be automatically called into action at any minute.

Although but a single plan of bringing the large battery into action is here shown and described, any other manner or way of bringing the fluids, and zinc and carbon plates instantly and automatically together may be employed, and will answer equally as well.

Instead of using the small battery to keep up a constant closed circuit, as above described, the magnets and armature may be suitably arranged and an open circuit used. The only use of this small battery is to operate the mechanism through which the large battery is brought into action.

Having thus described my invention, I claim—

1. The combination of an electro-magnetic engine, suitable conducting-wires connecting it with the source of power, a small battery for keeping up a closed circuit, and a large battery for generating power, the large battery being brought into action only after the small one has been cut out, substantially as described.

2. The combination of a small battery for bringing the large battery into action and a large battery, which is brought into action only before an alarm of fire has been sounded and after the small battery has been cut out, substantially as described.

3. The combination of a small battery for bringing the large battery into action, a large battery that is brought into action before an alarm is sounded, and an electro-magnetic alarm, substantially as set forth.

4. The combination of a small battery for keeping up a closed circuit, a large battery for generating power to operate the engine, and a mechanism for bringing the large battery into action when an alarm is turned in, substantially as specified.

5. The combination of a small battery for keeping up a closed circuit, a large battery for generating power, a wire or wires for transmitting the power, alarm boxes, and an engine, whereby the engine can be worked at a distance from the battery, substantially as set forth.

6. The combination of a large battery, a small battery, a windlass for keeping the plates out of the cups, and an automatically-operating mechanism for lowering the plates into the cups, substantially as shown.

7. The combination of the small battery, conducting-wires, armature, weighted supporting-post, and the windlass for keeping the plates out of the cups until an alarm is turned in, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 17th day of December, 1877.

LEONIDAS G. WOOLLEY.

Witnesses:
WILL. H. KERN,
J. WM. GARNER.