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AUTOMATIC ELECTRIC IGNITER FOR ORCHARD HEATERS.

APPLICATION FILED JAN. 13, 1909.

983,979.

Patented Feb. 14, 1911.

3 SHEETS—SHEET 1.

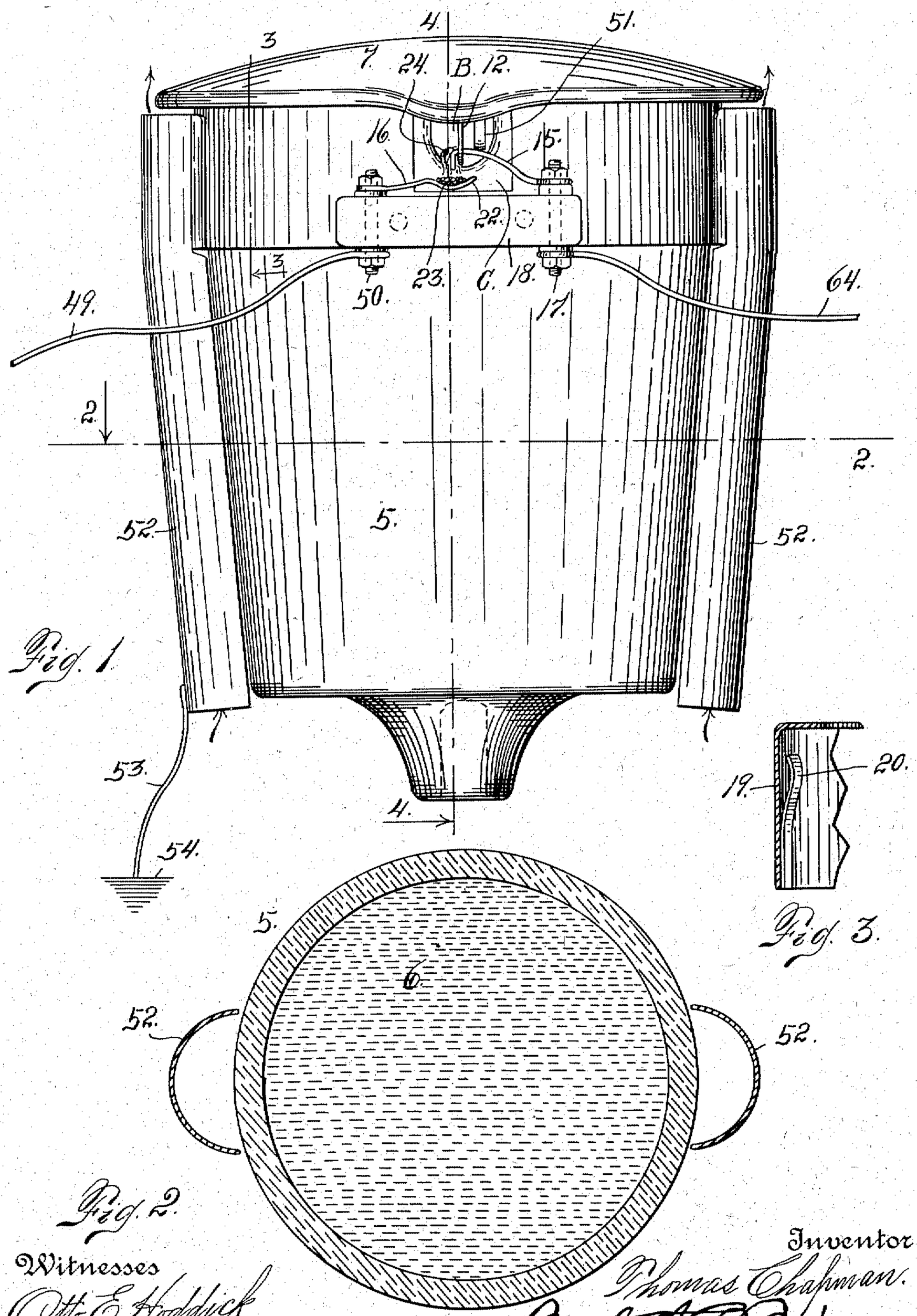

Fig. 1.

Fig. 3.

Fig. 2.

Witnesses

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3 SHEETS—SHEET 2.

Fig. 5.

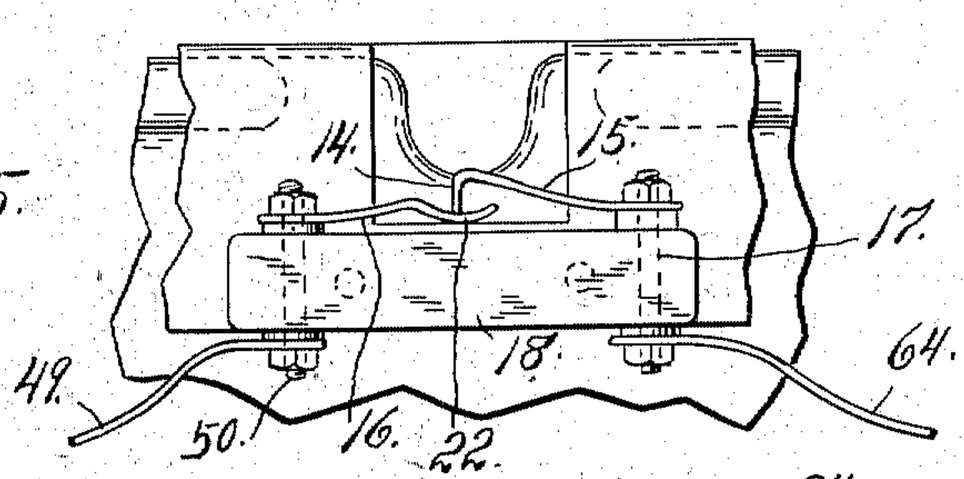

Fig. 7.

Fig. 4.

Fig. 6.

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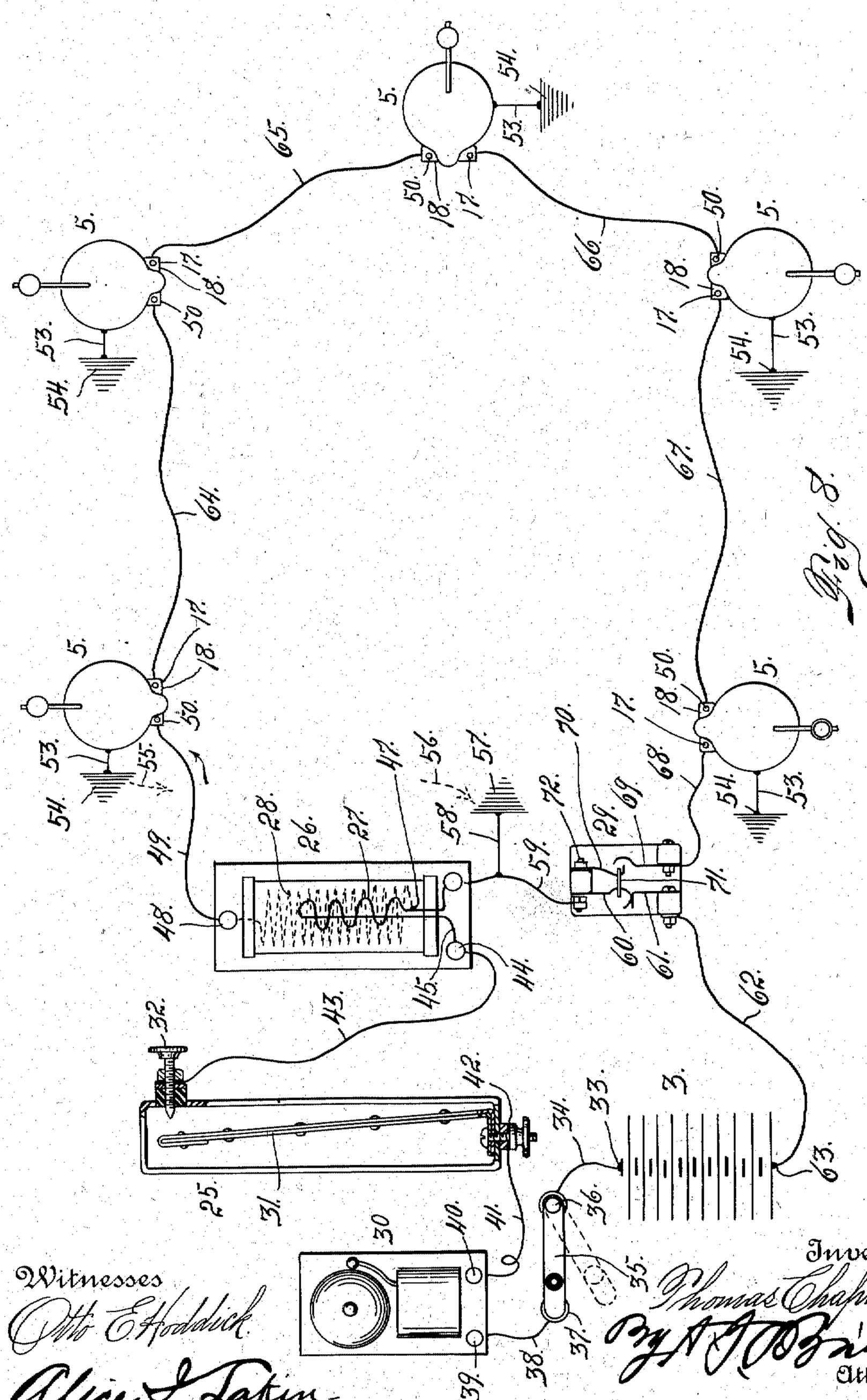

Witnesses

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UNITED STATES PATENT OFFICE.

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AUTOMATIC ELECTRIC IGNITER FOR ORCHARD-HEATERS.

983,979. Specification of Letters Patent. **Patented Feb. 14, 1911.**

Application filed January 13, 1909. Serial No. 472,142.

To all whom it may concern:

Be it known that I, THOMAS CHAPMAN, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Automatic Electric Igniters for Orchard-Heaters; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in electrical apparatus for automatically igniting orchard heaters or other similar devices.

In many sections of the country it has become necessary to employ heaters in certain localities in order to protect orchards, fruit-bearing shrubbery generally and other vegetation from the destructive effects of frosts in the early fall and late spring. It is customary to distribute comparatively small heating devices at suitable intervals in the localities to be thus protected. It is important that these heating devices should be normally charged with fuel, and also properly protected by closures to prevent the entrance of moisture due to storms, and also dust and other foreign particles of matter when the devices are not in use.

The object of my improvement is to provide means whereby each heating device of a series of these devices has its cover normally held in the closed position by a fusible device located in an electrical circuit which is automatically closed through the instrumentality of a thermostat, when the temperature of the locality to be protected becomes sufficiently low to make it necessary or desirable to use the heating devices. Each cover retained in the closed position by the fusible device, as aforesaid, is provided with a weight which automatically throws it to the open position as soon as the fusible lock is destroyed. Provision is also made whereby the fuel, as oil, of each heater is automatically ignited simultaneously with the destruction of the fusible device which normally holds the cover in the closed position.

Having briefly outlined my improvement, I will proceed to describe the same in detail, reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is an elevation of a heating device equipped in accordance with my improvement. Fig. 2 is a horizontal section taken on the line 2—2, Fig. 1. Fig. 3 is a vertical section taken on the line 3—3, Fig. 1. Fig. 4 is a section of a heater also equipped in accordance with my improvement. This section is taken on the line 4—4, Fig. 1. Fig. 5 is a fragmentary detail view illustrating the circuit closing apparatus with which each heater is equipped. Fig. 6 is a detail view illustrating an automatic cut-off employed in connection with the apparatus. Fig. 7 is a detail view illustrating a fusible link or locking device shown upon a larger scale. Fig. 8 is a diagrammatic view illustrating the complete system or the operation of my improved igniter when applied to a series of heaters, as heretofore outlined.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate an orchard heater of any suitable construction. As illustrated in the drawing, this heater is provided with a quantity of fuel oil 6. It also has a cover 7 hinged at 8 and provided with an arm 9 having a weight 10 so arranged as to have a tendency to throw the cover to the open position, or that indicated by dotted lines in Fig. 4, when a fusible link 12 is destroyed. This link is connected with a hook or ring 13 with which the cover is provided at a point opposite the location of the weighted arm. The link also engages a hook 14 of a spring contact 15 which is normally held out of engagement with a contact 16. The contact 15 is connected by a suitable fastening device 17 with an insulating block 18 mounted on the heater. As shown in the drawing, this block is mounted upon a band 19 surrounding the upper extremity of the heater and normally held in place thereon by leaf springs 20 which engage a circumferential bead 21 with which the top of the heater is provided.

The contact 16 has a shallow pan 22 at its free extremity, in which is placed a small quantity of powder 23 which is ignited by the electric spark resulting from the jumping of the current between the contacts 15

and 16 when the circuit is originally closed. The burning of the powder results in igniting a wick 24, and the link 12, both of which are located in immediate proximity to the powder in the pan 22, while one extremity of the wick hangs downwardly and enters the fuel oil 6 of the heater. This wick is of such character that it will burn readily and contains sufficient combustion material to ignite the oil or other fuel within the receptacle.

My invention necessitates the employment of a thermostat 25 and an induction coil 26 comprising a primary coil 27 and a secondary coil 28, indicated by dotted lines. I also employ an automatic cut-out 29 and an electric bell 30. This bell may be located at any desired distance from the thermostat and other apparatus; as, for instance, at the home of the person having charge of the orchard. This bell is so arranged that as soon as the main circuit is closed by the movement of and bar 31 of the thermostat, whereby it is brought into contact with a screw 32, the bell will ring and notify any one in the vicinity thereof that the igniting mechanism is performing its work. The operation of the device will perhaps be best understood by referring to Fig. 8, which, as heretofore indicated, is largely diagrammatic. In this view the numeral 3 designates a suitable source of electricity. From a pole 33 of this circuit leads a wire 34 to a switch arm 35 pivoted at 36 and adapted to engage a contact 37. From the contact 37 leads a conductor 38 to a binding post 39 of the electric bell 30. From another post 40 leads a wire 41 to a binding post 42 which is attached to the thermostat bar 31. From the screw 32 leads a conductor 43 to a binding post 44 of the induction coil 26. From this binding post leads a conductor 45 which merges into the primary coil 27 of the induction 26. One extremity of the secondary coil 28 is connected with the primary coil as shown at 47, while the opposite extremity of the secondary coil leads to a binding post 48. From the binding post 48 leads a conductor 49 to a fastening device 50 mounted upon the insulating block 18 of one of a series of heaters 5. The fastening device 50 also connects the contact 16 with the said insulating block 18. The electric current forms a spark between the powder 23 in the pan 22 and the hook 14 of the spring contact 15, which is normally held out of contact by the fusible link or locking device 12. The induction current passes from the contact 15 to a spring contact 51 which engages the contact 15 when the latter is held out of engagement with the contact 16, or before the fusible device 12 is destroyed. From this contact 51, which is connected with the metal top 7 of the heater, the current passes through the metal band 19 and thence through a metal flue 52 which extends downwardly from the said band and is grounded by a conductor 53, as shown at 54. Then the circuit is completed through the ground, as indicated by the dotted arrows 55 and 56, passing through the ground 57 to a conductor 58, and thence to a conductor 59 leading to a contact 60 which engages a contact 61 from which leads a conductor 62 to the opposite pole 63 of the electric source 3. As soon as the fusible device 12 is destroyed, the contact 15 is released and springs downwardly into engagement with the pan 22 (see Fig. 5). During the sparking operation, and during the combustion of the powder 23, the fusible device 12 is melted and also the wick 24 which results in igniting the fuel 6, as heretofore explained. The engagement of the contacts 15 and 16 closes the circuit through the fastening device 17 and a conductor 64 which leads to another fastening device 50 and thence to a contact 16 of another heater 5, with the result that the powder 23 is ignited, the fusible device 12 being melted from the combustion of the powder and the wick 24 lighted, resulting in the igniting of the fuel oil. Simultaneously with this operation the spring contact 15 of what may be termed the second heater, springs into engagement with the contact 16, whereby the current is allowed to pass through a conductor 65 which leads to the contact 16 of a third heater, whence it passes by way of a conductor 66 to a fourth heater, and so on.

As shown in the drawing, a conductor 67 leads from the fourth to the fifth or last heater. From the fastening device 17 of the contact 15, a conductor 68 leads to a contact 69 which is separated from a spring contact 70 which is held out of engagement with the contact 69 by a fusible link 71. The jumping of the current will ignite the powder on contact 69 which will destroy the link 71, allowing the spring contact 70 to engage the contact 69 thus completing a circuit through these contacts to a fastening device 72. During the jumping of the current between the contacts 69 and 70, the current is grounded through conductors 59 and 58, as shown at 57. As soon as the fusible device 71 is destroyed, the contact 60 springs out of engagement with the contact 61, as indicated by dotted lines in Fig. 6, thus breaking the main circuit and cutting the entire apparatus off from the electric source, whereby the main circuit is broken. This only occurs, however, after the entire series of heaters has been ignited.

From what has been heretofore explained it will be understood that each heating device 5 of the series is equipped with a weighted arm 9 which automatically throws the cover 7 to the open position indicated

by dotted lines in Fig. 4, as soon as the fusible link 12 is destroyed, after which the current passes to the next heater, and so on throughout the entire series, the cover of each heater being automatically thrown to the open position, whereby the oil or other fuel is ignited and free to burn without interference from the cover or closure.

It will be understood that after the fuel of all the heaters of any series has been ignited, the oil will burn until the entire quantity is consumed, unless the fire is extinguished, which may be readily done if it is not necessary to burn the entire quantity of fuel. In any event, in order to re-prepare the series of heaters for automatic ignition, the covers must be closed and connected with the contact 15 by the fusible link 12, as heretofore explained, a quantity of powder being placed in the pan 22, as will be readily understood. It is evident that instead of using powder, any material or substance which shall be sufficiently inflammable for the purpose may be employed.

The fusible link 12 may be composed of any material which may be readily fused. It is believed that celluloid may be advantageously employed. This material is also of sufficient strength when hardened to hold the cover of the heater in the closed position against the action of the weighted arm 9, or its equivalent. It must be understood, however, that I am not limited to any specific material for use in this connection.

I prefer to form the fuel receptacle of pottery material, which is a good insulator and therefore is believed preferable for this purpose. The fuel receptacle is equipped at its bottom with a depending rod or pin A, whose free extremity is pointed whereby it will readily enter the earth to sufficient depth to support the receptacle in the upright position under all ordinary circumstances.

It will be understood that any desired number of heaters or fuel receptacles may be located in the same electrical circuit for the purposes of ignition.

There is a vertically disposed metal flue 52 attached to each side of the fuel receptacle. These flues are open ended. They are secured at their upper extremities to the metal band 19. When the cover is raised or in the position indicated by dotted lines in Fig. 4, the cover will have a tendency to prevent wind or drafts or air extending in a direction to strike either the front or rear surface of the cover, from interfering with the burning of the fuel within the receptacle. In other words, the raised cover serves to protect the heater from the action of the wind in a given direction. When, however, the wind blows at right angles to the aforesaid direction, or across the top of the receptacle in front of the raised cover, a certain degree of protection will be afforded by upwardly directed currents of air passing through the side flues 52. This is of considerable importance, since it is well known that a draft of air of considerable strength will materially interfere with the burning of fuel in an open receptacle; it may, of course, be of sufficient strength to extinguish the fire. The object of the flues 52 is to overcome this difficulty as far as possible.

As shown in the drawing, the upper edge of the receptacle 5 is provided with a slot or opening B, through which the wick 24 passes. The band 19 is also slotted, as shown at C, for the purpose.

Having thus described my invention, what I claim is:

1. The combination of a series of fuel receptacles, a circuit, a pan located in the circuit and mounted on each fuel receptacle and containing a quantity of inflammable material, a contact normally located in the circuit, a fusible device connected with the said contact for holding the latter out of engagement with the pan, a cover for the receptacle and having a tendency to open, the said fusible device being also connected with the cover to hold it in the closed position, means mounted on each receptacle for grounding the current during the melting of the fusible device, the said contact being arranged to engage the pan and close the main circuit when unrestrained by the fusible device, each receptacle having a wick leading to the fuel and arranged to be fired by electric ignition, substantially as described.

2. The combination with an electric circuit, a series of fuel receptacles having covers normally held in the open position, a fusible device for retaining the cover of each receptacle in the closed position, means located in the circuit for melting the fusible device, a wick leading from the means for melting the fusible device to the fuel receptacle, and means for closing the circuit whereby the fusible devices are destroyed and all the covers allowed to open simultaneously with the igniting of the fuel of the receptacle, substantially as described.

3. The combination of a series of fuel receptacles having hinged covers, means attached to each cover for opening the same when unrestrained, an electric circuit, a fusible restraining device, means located in the circuit for melting the fusible restraining device and means for automatically closing the circuit whereby all of the said fusible devices are destroyed, permitting the covers to open, substantially as described.

4. A fuel receptacle having a hinged cover weighted to cause it to open when unrestrained, a fusible restraining device, an

electric circuit, means located in the circuit for melting the fusible restraining device and means for automatically closing the said circuit, substantially as described.

5. A series of fuel receptacles having covers weighted to open when unrestrained, fusible restraining devices for the several covers, an electric circuit in which all of the said fusible devices are located, means also located in the circuit for melting the fuses, means for automatically closing said circuit, and wicks leading from the fusible devices to the fuel of the several receptacles, substantially as described.

6. A fuel receptacle, a cover, means mounted thereon for normally holding the cover in the open position, a fusible device for holding the cover in the closed position against the action of its restraining means, an electrical circuit, means located in the circuit in close proximity to the fusible device for melting the same, and means for closing said circuit whereby the fusible device is destroyed by said means and the cover allowed to open, substantially as described.

7. The combination of a fuel receptacle composed of pottery material, a metallic band surrounding the upper extremity of the receptacle, means for retaining the band thereon, a cover hinged to the band, a weight connected with the cover and normally having a tendency to throw it to the open position, a fusible link for retaining the cover in the closed position against the action of its weight, an induction circuit, means for closing said circuit, and means acted on by the closing of the circuit whereby the link is destroyed and the cover allowed to assume the open position, substantially as described.

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

THOMAS CHAPMAN.

Witnesses:
A. J. O'Brien,
A. Ebert O'Brien.