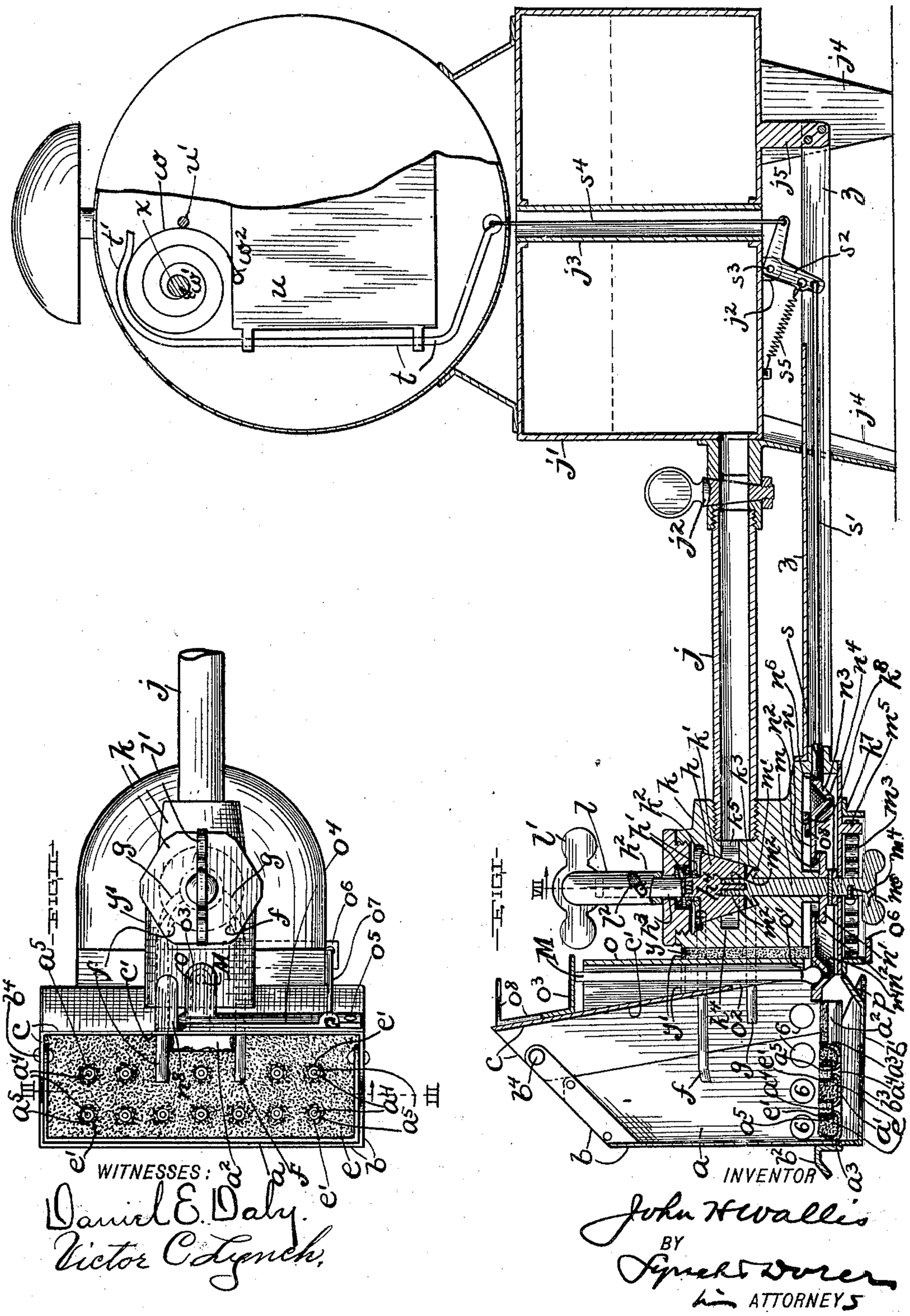
No. 688,906. Patented Dec. 17, 1901.

J. H. WALLIS.

FIRE KINDLER.

(Application filed Feb. 14, 1901.)

(No Model.) 2 Sheets—Sheet 1.



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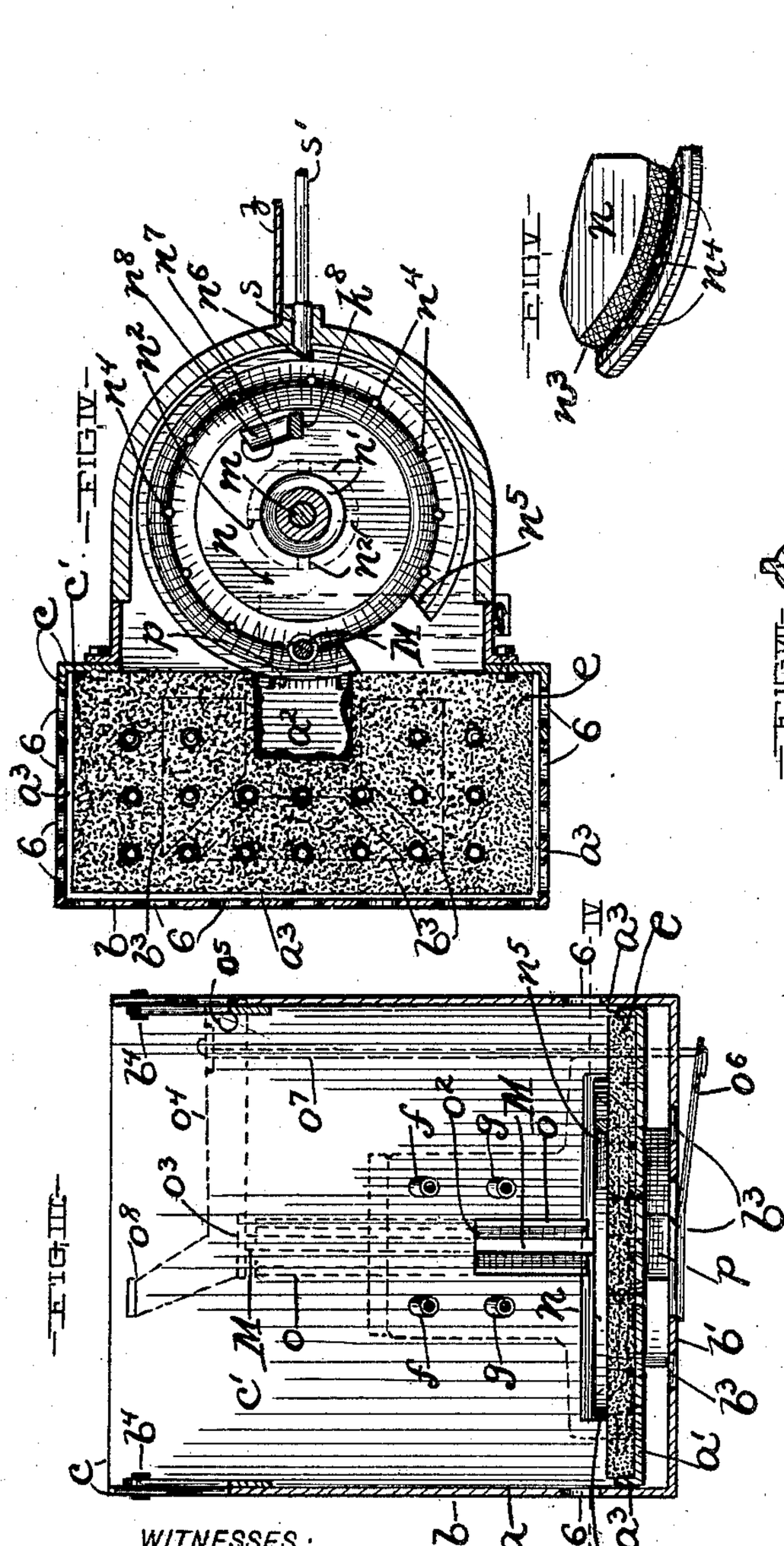

UNITED STATES PATENT OFFICE.

JOHN H. WALLIS, OF CLEVELAND, OHIO.

FIRE-KINDLER.

SPECIFICATION forming part of Letters Patent No. 688,906, dated December 17, 1901.

Application filed February 14, 1901. Serial No. 47,293. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. WALLIS, a resident of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Fire-Kindlers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as wlil enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in fire-kindlers.

The primary object of this invention is to provide a device of the character indicated that comprises an oil-reservoir having an outlet, a combustion-chamber arranged a suitable distance from the outlet of the oil-reservoir and having a flame-outlet, a valve-casing arranged between the combustion-chamber and the said reservoir, a passage-way for conducting oil from the oil-reservoir to the chamber of the valve-casing, pipes or passage-ways for conducting oil from the valve-casing chamber to the combustion-chamber, a valve within the chamber of the valve-casing normally interrupting communication between the inlet and the outlet or outlets of the valve-casing, mechanism for operating the aforesaid valve, so as to permit oil to flow from the chamber of the valve-casing to the outlet or outlets of the said casing, and means whereby a match is ignited and caused to ignite oil which has been conducted to the aforesaid combustion-chamber.

With this object in view and to the end of realizing other advantages hereinafter appearing the invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure I is a side elevation, largely in central longitudinal section, of a fire-kindling apparatus embodying my invention. Fig. II is a top plan of a portion of the apparatus. Fig. III is a vertical section on line III III, Fig. II, looking inwardly. Fig. IV is a top plan in section on line IV IV, Fig. III. Fig. V is a view in perspective of a portion of the match-igniting disk or device. Fig. VI is a top plan in section of the match-igniting device, but shows the said device in position after the completion of its operation of igniting the head of the match. Fig. VII is a vertical section on line VII VII, Fig. I, looking in the direction indicated by the arrow.

Referring to the drawings, *a* designates the combustion-chamber, into which the oil that is to be ignited within the lower portion of the said chamber is fed, as will hereinafter appear. The bottom of the chamber *a* comprises a horizontally-arranged metal plate *a'*, which is provided at the rear portion of the chamber and centrally between the side walls of the chamber with a slot or opening a^2 for receiving the ignited match, which, as will hereinafter appear, causes the ignition of the oil upon or over the bottom *a'*. The slot or opening a^2 accommodates the dropping of the ignited match through the said bottom onto a metal shelf *b'*, which is arranged horizontally a short distance below the bottom *a'* and is formed upon a metallic section *b*, that composes the forward wall and the forward portions of the side walls of the chamber *a*. A metallic section *c* composes the rear wall and the rear portion of the side walls of the chamber *a*. The rear wall *c'* of the chamber *a* slopes forwardly toward its upper end and extends a suitable distance above the upper end of the forward wall of the said chamber and is consequently instrumental in guiding any flame produced within the lower portion of the said chamber forwardly over the upper end of the forward wall of the chamber. The side walls of the chamber *a*, formed by the sections *b* and *c*, have their upper ends cut, so that their upper edges extend diagonally from the upper extremity of the rear wall *c'* downwardly and forwardly toward the forward wall of the said chamber *a*, and this construction, it will be observed, accommodates the placing of the combustion-chamber formed by the sections *a'*, *b*, and *c* against a grate that is low.

By the construction hereinbefore described it will be observed that the combustion-chamber *a* of my improved fire-kindler is formed in the main by three metallic sections, the bottom-forming section *a'* and the front and rear sections *b* and *c*. The bottom-forming section *a'* is rigidly secured in any approved manner to the rear section *c*. The front section *b* is provided with a handle b^2. A layer

e of asbestos or other material which is fireproof and capable of absorbing oil is placed upon the bottom *a'*. The bottom *a'* is flanged upwardly at its edges, as at a^3, all around the bottom, so as to prevent an overflow of oil from the said bottom. The bottom *a'* at each side of its slot or opening a^2 and forward of the said opening is provided with annularly upwardly flanged air-inlets a^4, and the flanges a^5, surrounding the said air-inlets, prevent any oil which may be upon the bottom *a'* from flowing into and through the said inlets. The fireproof and oil-absorbing layer *e* is provided with perforations *e'*, extending vertically therethrough and registering with the different air-inlets a^4 of the bottom *a'*, respectively, and consequently the air-inlets a^4 and the perforations *e'* of the layer *e* form air-supply passage-ways leading to the combustion-chamber *a* from below. The side-wall-forming portions of the sections *b* and *c* and the front of the section *b* are provided next above the layer *e* with lateral air-inlets 6 for supplying air to the combustion-chamber from the sides of the said chamber. Obviously the air introduced by means of the perforations a^4, *e'*, and 6 will adequately support any combustion of oil within the chamber *a*.

I would here remark that the fireproof and oil-absorbing layer *e* entirely covers the upper surface of the bottom *a'* between the upwardly-flanged edges of the said bottom and that the flanges a^3 of the bottom also perform the function of preventing displacement of the said layer *e* upon the bottom.

As already indicated, the forward chamber-forming section *b* extends past the edges of and below the bottom *a'* and a short distance below the said bottom is provided with the shelf *b'*, upon which lodges the burning match instrumental in igniting the oil absorbed by the layer *e* or accumulated upon the bottom *a'*. In fact, the burning match lodges upon the shelf *b'* below the slot or opening a^2 of the bottom *a'*, and the shelf *b'* is provided in close proximity to the match-receiving portion thereof with any suitable number of air-supply holes or inlets b^3, so that air can enter the space between the shelf *b'* and the bottom *a'* not only below the rear portion of the chamber *a* at the rear end of the shelf *b'*, but from below and adjacent to the match-receiving portion of the said shelf.

The shelf-forming section *b'* of the casing of the chamber *a* is hinged or pivoted horizontally at its upper end, as at b^4, to the section *c* to render the said section *b'* capable of being swung forwardly and upwardly and afford access to the chamber *a* from the forward side of the said chamber.

Two pairs of pipes *f* and *g* conduct or feed oil to the chamber *a* at different elevations, respectively. The two lower pipes *g* and *g* extend through the rear wall *c'* of the chamber *a* at opposite sides, respectively, of the slot or opening a^2 in the bottom *a'* of the said chamber and are arranged to discharge, preferably, at the sides of the said slot or opening onto the layer *e* of fireproof and oil-absorbing material. The two upper pipes *f* and *f* extend through the rear wall *c'* of the chamber *a* at opposite sides, respectively, of the slot or opening a^2 and are arranged to discharge onto the layer *e* forwardly of the pipes *g* and *g* and forwardly of the slot or opening a^2.

A vertically-arranged plug-valve *h* is located a short distance rearwardly of the combustion-chamber *a*. The valve *h* is a tapering or conical plug arranged with its diametrically smaller end facing downwardly and engages a correspondingly-shaped upwardly-flaring chamber *k'*, formed within the valve-casing *k*. The chamber *k'* extends a suitable distance above the plug *h*, as at k^2, to accommodate the elevation of the said plug within the valve-casing. The chamber *k'* extends below the plug *h*, as at k^3, to form a small oil-receiving space at the lower end of the plug. The pipes *f* and *f* have their receiving ends connected with the upwardly-enlarged portion k^2 of the chamber *k'* of the valve-casing, as shown in dotted lines, Figs. I and II. The pipes *g* and *g* have their receiving ends connected with the oil-space forming downward enlargement k^3 of the valve-casing's chamber, as shown in dotted lines, Figs. I and II. The surrounding wall of the plug-engaging portion of the chamber of the valve-casing is provided centrally between the upper and lower ends of the plug *h* with an annular recess k^4, which at one side of the plug communicates with the oil-inlet forming port k^5 of the valve-casing, and the port k^5 has its receiving end in open relation with the discharging end of the oil-supply pipe *j*, which leads from the oil-reservoir *j'* and is provided at or near the reservoir *j'* with a valve j^2 for regulating or interrupting the supply of oil from the reservoir. The pipes *f* and *g*, as already indicated, are arranged to conduct oil to the chamber *a* from the upper end and lower end, respectively, of the chamber of the valve-casing. In the normal position of parts the plug *h* is in its lower position and in this position snugly engages the seat-forming plug-surrounding wall of the valve-casing and interrupts communication between the oil-inlet k^5 of the valve-casing and the pipes *f* and *g*, and a suitably-applied spring *h'*, confined within the valve-casing at and in engagement with the upper end of the plug, acts to retain the plug in its normal and closed position. Upon elevating the plug, however, a space is formed between the plug and plug-surrounding wall of the valve-casing, so as to establish open relation between the oil-inlet k^5 of the valve-casing and the pipes *f* and *g*.

The means for actuating the plug *h* into its elevated or open position (see Figs. I and VII) comprises, preferably, a sleeve *l*, which is turnably mounted outside of the valve-casing upon the upper end of the upwardly-extending stem h^3, with which the upper end of

the plug h is provided. The sleeve l is provided at its upper or outer end with a handle l' for turning the same. The plug-stem h^3 is provided within the sleeve l with a laterally-projecting pin h^2, which normally engages the lower end of an inclined slot l^2, formed in the sleeve l. Obviously the turning of the sleeve l by hand in the required direction will cause the lower wall of the said incline to elevate the pin h^2, and consequently the plug h, against the action of the spring h', and thereby permit the flow of oil to the pipes f and g.

The plug h is operatively connected at its lower end with a vertically-arranged shaft m, that extends downwardly through the bottom of the valve-casing k and a suitable distance below the said casing. The shaft m next to the bottom of the oil-receiving space k^3 of the chamber of the valve-casing is provided with an external annular downwardly-flaring shoulder or collar m', and the bottom of the chamber of the valve-casing is correspondingly shaped and engaged by and affords bearing to the said collar or shoulder. By this construction the shaft m is adequately supported, and leakage of oil from the valve-casing's chamber to and between the opposing surfaces of the shaft m and the valve-casing is reduced to a minimum. The operative connection between the shaft m and the plug h is such that the said plug and the said shaft will turn together, and the plug is shiftable vertically or endwise independently of the shaft without interrupting the said operative connection. A suitable operative connection between the shaft m and the plug h is formed by two vertically-arranged parallel lugs m^2 and m^2, engaging correspondingly-arranged recesses h^4, formed in the plug. A coil-spring and preferably an ordinary clock-spring m^3 is mounted upon the lower end of the shaft m and contained within a stationary case k^7, which is attached to the valve-casing in any approved manner. The spring m^3 is attached at one end to the shaft, as at m^4, and has its opposite end attached, as at m^5, to the case k^7. The shaft m is provided below the case k^7 with a handle m^6 for turning the shaft.

A disk n is pinned or otherwise operatively mounted upon the shaft m between the spring m^3 and the valve-casing. The disk n has a centrally-depressed portion n', extending around the shaft m, and the said depressed portion is provided with lateral perforations n^2, and by this construction any oil leaking downwardly between the shaft m and the valve-casing to the disk n is received by the said depressed portion n' of the disk and can escape at the perforations n^2 or evaporate by the circulation of air over the said disk through the said perforations. An annular trough n^3, which is arranged concentrically of the shaft m and which is V-shaped in cross-section, is formed upon and next to or in close proximity to the peripheral edge of the disk n. The trough n^3 extends in under the match-receiving case o, which is arranged uprightly and formed in any approved manner between the rear wall c' of the combustion-chamber a and the valve-casing k. The case o is open at its lower end, as at o'. The match M, that is to be employed in igniting the oil supplied to the chamber a, is introduced into the case o at the upper end of the said case, with its head down. The match placed in the case o has its upper end borne downwardly upon, so as to cause the head of the match to frictionally engage the downwardly-converging side walls of the trough n^3, and the said walls are knurled, serrated, or roughened in any approved manner, as shown in Fig. V, to form a suitable abrading-surface capable of igniting the match-head during the rotation of the disk n by the shaft m. The trough n^3 constitutes, therefore, an annular match-head abrader capable of igniting the match-head during the operation upon the said head by the abrader. The match M within the case o extends through the rear wall c' of the chamber a, and the said case has its lower portion in open relation at its forward side, as at o^2, with the aforesaid chamber a. The trough-shaped match-abrader n^3 is provided with a series of orifices n^4, arranged at suitable intervals circumferentially of the trough and formed in the bottom and centrally widthwise of the trough. The perforations n^4 accommodate the escape from the trough of any oil that may be accidentally spattered or otherwise introduced into the said trough and accommodate also the circulation of air through the trough to facilitate the evaporation of any oil lodging upon the trough and affording also an air-supply for participating in the support of the combustion for the burning of the match upon the ignition of the head of the match during the operation of the abrader. I would here remark that less than a whole rotation of the abrader is sufficient to effect an ignition of the match. The abrader-forming trough has its outer side wall cut away at one point, as at n^5, (see Fig. IV,) to accommodate the passage of the match from within the match-case o through the slot n^5 during the rotation of the abrader or match-igniting device. The abrader is rotated during its match-igniting operation in the direction indicated by the arrow placed thereon in Fig. IV. In the normal position of the parts the abrader has its said slot n^5 such a distance from the match-case o that the part of a rotation of the abrader required to bring the said slot into registry with the lower and open end of the match-case o shall be sufficient to effect the ignition of the match. In the wound-up position of the spring m^3 the connected abrader is in position with its match-discharging opening n^5 at the right-hand side of the match M, as shown in Fig. IV, and the abrader and the connected parts are locked in the said position by a horizontally-arranged

bolt s, which has bearing in a downward enlargement of the valve-casing k and in its operative position (shown in Figs. I and IV) engages a notch or recess n^6, formed in the peripheral edge of the abrader diametrically opposite the lower end of the match-case o. When the bolt s is rendered inoperative by withdrawing it from the engaging notch or recess n^6 of the abrader, the spring m^3 is rendered free to unwind, and the unwinding of the said spring rotates the abrader in the direction indicated by the arrow in Fig. IV—viz., to the left—causing the abrader to operate upon and ignite the match-head and thereupon to bring its match-outlet n^5 into registry, as shown in Fig. VI, with the match (then burning) and permit the match to pass into the guide-forming incline p below.

A stop for limiting the rotation of the match-abrader in the direction required to bring the slot n^5 into registry with the match-case o is provided and consists, preferably, of a lug k^8, (see Figs. I, IV, and VI,) formed upon and depending from the valve-casing k and arranged to be engaged, when the slot n^5 is in registry with the match-case o, by that face n^7 of a stop-forming lug n^8 which faces in the same direction, which lug n^8 is formed upon the upper side of the match-abrader. The lug k^8 obviously also limits the extent that the spring m^3 can be wound up.

The incline p extends from and underneath and near the abrader below the match-case o downwardly and forwardly and is formed, preferably, by an upturned portion of the shelf b', so that a burning match dropping upon the said incline is guided thereby forwardly onto the said shelf b', where the flame rising from the match can set fire to the oil absorbed by or adhering to the asbestos or oil-absorbing material overhanging the walls of the opening a^2, and I would here remark that in order to assure the ignition of the oil upon the bottom of the combustion-chamber or held by the fireproof and absorbent layer upon the said bottom a portion of the said layer is preferably caused to somewhat overhang the said opening and be within immediate reach of the flame rising from the burning match.

As already indicated, means for exerting a pressure downwardly upon the upper end of the match introduced within the match-case o is provided and (see Figs. I and III) comprises, preferably, a lid or cover o^3, normally resting upon and closing the upper end of the case. The cover o^3 is formed upon the free end of an approximately vertically tiltable bar o^4, which is pivoted at its opposite end, as at o^5, to any stationary member—such, for instance, as the upper end of the section c. A flat spring o^6, arranged below and suitably supported from the valve-casing, is operatively connected, by means of a rod or link o^7, with the bar o^4 at any suitable point between the axis and the cover-forming end of the said bar. The lid or cover o^3 is provided with a handle o^8 for convenience in elevating the said cover against the action of the spring o^7 as required to accommodate the introduction of a match into the case o.

As already indicated, the spring m^3 is wound up or placed under tension by rotating the connected shaft m in the required direction—viz., to the right. The shaft m extends downwardly through and below the case k^7 and is provided below the said case with the hand-wheel or crank m^6 for turning the shaft. By the construction hereinbefore described it is obvious that the turning of the sleeve l, as already indicated, will result in simultaneously turning and lifting the plug h and result, furthermore, in the turning of the shaft m and in the winding up of the connected spring m^3. It will be observed also that the extension of the shaft m downwardly below the spring-containing case and the provision upon the lower end of the shaft for turning it enable the winding up of the spring without incurring any endwise shifting of the plug h.

The bolt s is preferably formed upon one end of a bar s', which is arranged below and longitudinally of the pipe j and extends to and below the reservoir j', where it is operatively connected with one arm of a bell-crank lever s^2, which is fulcrumed horizontally, as at s^3, to a lug or bracket j^2, depending from the said reservoir, and has its other arm operatively connected with an upright rod s^4, that extends upwardly through a tube j^3, arranged vertically and centrally of and extending through the reservoir. A suitably-applied spiral spring s^5, which in the apparatus illustrated is attached at one end to the depending arm of the bell-crank lever s^2 and has its other end attached to the oil-reservoir, acts to retain the locking-bar s' in its operative position. The rod s^4 has its upper end operatively connected with the lower end of an upright vertically-shiftable bar t, which has lateral bearing in the framework u of a clock in any approved manner and terminates at its upper end in a laterally-projecting arm t', which overhangs and partially surrounds the clock-spring w, coiled around the shaft or spindle x of the clock mechanism and normally wound up or placed under tension and adapted to be rendered free to wind at a predetermined time by any approved and well-known mechanism capable at the time desired of suddenly releasing the spring w and permitting the said spring w to unwind. The clock-spring w is attached at one end, as at w', to the shaft or spindle x and has its other end attached to the framework of the clock, as at w^2. By the construction hereinbefore described it is obvious that the unwinding of the spring w, resulting in distention of the said spring, will cause the said spring to engage the under side and thereupon elevate the arm t' of the bar t, and thereby render the locking-bar s' inoperative, so as to release the match-abrader, and consequently the spring m^3, and render the last-mentioned

spring free to run down, and thereby operate the match-abrader and result in the ignition of the match-head pressed against the said abrader. The spring *w* is preferably confined between the bar *t* and a bar *w'* of the stationary framework *u* of the clock—that is, the bar *w'* and that portion of the bar *t* next below the arm *t'* are arranged at opposite sides, respectively, of the spring *w* and limit the distention of the spring laterally between the said bars, so that the spring during its operation spreads mainly in a vertical direction and against the under or spring-opposing side of the arm *t'*. I would remark also that the rear wall of the combustion-chamber *a* is covered, preferably, with a layer (not shown) of asbestos or other suitable fireproof material and that a layer or suitable thickness of asbestos or fireproof material *y* covers the forward side of the valve-casing and forms a partition between the said casing and the match-case *o* and prevents overheating of the valve-casing. A plate *y'* extends over the partition *y* and is soldered or otherwise secured to the valve-casing and to the rear section *c* of the casing of the combustion-chamber and connects the said casings together.

The reservoir *j'* has legs j^4, (see Fig. I,) which elevate the reservoir, and consequently the apparatus connected with the reservoir, a suitable distance, and the valve-casing in addition to its support from the reservoir by means of the pipe *j* is preferably rigidly secured to a bar *z*, which extends from and is rigidly secured to an arm or bracket j^5, depending from and rigid with the reservoir.

What I claim is—

1. A fire-kindler comprising a combustion-chamber, means for conducting oil to the said chamber, and means for igniting the oil received by the said chamber, and the said combustion-chamber having the following: a horizontally-arranged bottom, a shelf *b'* arranged horizontally a short distance below the said bottom, a rear section *c*, a forward section *b* carrying the aforesaid shelf and hinged or pivoted, at its upper end, to the rear section, and air-inlets for supplying air to the lower portion of the combustion-chamber.

2. A fire-kindler comprising a combustion-chamber, means for conducting oil to the said chamber, and means for igniting the oil received by the said chamber, and the said combustion-chamber having the following: a horizontally-arranged bottom, a shelf *b'* arranged horizontally a short distance below the said bottom, a rear section *c* forming the rear wall and the rear portions of the side walls of the said chamber with the said rear wall sloping forwardly toward its upper end and extending a suitable distance above the forward wall of the chamber, a front section *b* carrying the aforesaid shelf and forming the forward wall and forward portions of the side walls of the chamber, and the side walls of the chamber having their upper ends cut so that their upper edges extend diagonally from the upper extremity of the rear wall downwardly and forwardly toward the forward wall, and means for supplying air to the lower portion of the chamber.

3. A fire-kindler comprising a combustion-chamber, means for conducting oil to the combustion-chamber, and means for igniting the oil received by the said chamber, and the said combustion-chamber having the following: a horizontally-arranged bottom *a'* flanged upwardly at its edges, as at a^3, and being provided with upwardly-flanged air-inlets a^4, a fireproof and oil-absorbing layer *e* arranged upon the bottom and having perforations *e'* extending vertically therethrough and registering with the different aforesaid air-inlets a^4, respectively.

4. A fire-kindler comprising a combustion-chamber having its bottom formed by a horizontally-arranged metal plate *a'* which is provided, at the rear portion of the chamber and centrally between the side walls of the chamber, with a slot or opening a^2 for receiving the ignited match, a movable metal shelf *b'* arranged horizontally a short distance below the bottom *a'* and extending in under the aforesaid slot or opening a^2, the fireproof and oil-absorbing layer *e* upon the bottom *a'*, and means for supplying air to the combustion-chamber from below, substantially as and for the purpose set forth.

5. A fire-kindler comprising a combustion-chamber having its bottom formed by a horizontally-arranged metal plate *a'* which is provided, at the rear portion of the chamber and centrally between the side walls of the chamber, with a slot or opening a^2 for receiving the ignited match, a metal section *c* forming the rear wall and the rear portions of the side walls of the chamber *a*, a metal section *b* composing the forward wall and forward portions of the side walls of the chamber and having its upper end hinged or pivoted to the rear section *c*, a metal shelf *b'* arranged horizontally a short distance below the bottom *a'* and rigid with the said section *b* and extending in under the aforesaid slot or opening a^2 and having air-holes b^3, a fireproof and oil-absorbing layer *e* upon the bottom *a'*, and air passage-ways extending through the said bottom and fireproof layer, substantially as and for the purpose set forth.

6. A fire-kindler comprising a combustion-chamber having a flame-outlet, an oil-reservoir arranged a suitable distance from the combustion-chamber and having an oil-outlet, a valve-casing arranged between the reservoir and the combustion-chamber, a passage-way extending into the combustion-chamber from and connected with the chamber of the valve-casing, a passage-way connected with the chamber of the valve-casing and extending from and connected with the oil-outlet of the reservoir, a valve normally interrupting or closing communication between the discharging end of the last-mentioned passage-way and the receiving end of

the first-mentioned passage-way, means for operating the valve, and means for igniting the oil received within the combustion-chamber.

7. A fire-kindler comprising a combustion-chamber having a flame-outlet, an oil-reservoir arranged a suitable distance from the combustion-chamber and having an oil-outlet, a valve-casing arranged between the reservoir and the combustion-chamber, a passage-way extending into the combustion-chamber from and connected with the chamber of the valve-casing, a valved passage-way connected with the chamber of the valve-casing and extending from and connected with the oil-outlet of the reservoir, a valve normally interrupting or closing communication between the discharging end of the last-mentioned passage-way and the receiving end of the first-mentioned passage-way, a suitably-applied spring acting to retain the valve in its closing or interrupting position, means for actuating the valve into its open or non-obstructing position, and means for igniting the oil received by the combustion-chamber.

8. A fire-kindler comprising a combustion-chamber having a flame-outlet, an oil-reservoir arranged a suitable distance from the combustion-chamber and having an oil-outlet, a valve-casing arranged between the reservoir and the combustion-chamber, a passage-way extending into the combustion-chamber from and connected with the chamber of the valve-casing, a passage-way connected with the chamber of the valve-casing and extending from and connected with the oil-outlet of the reservoir, an externally-tapering plug-valve normally interrupting or closing communication between the discharging end of the last-mentioned passage-way and the receiving end of the first-mentioned passage-way and shiftable endwise to render it capable of being actuated into its open or non-obstructing position, means acting to retain the plug in its closing position, means for shifting the plug endwise, and means for igniting the oil received within the combustion-chamber.

9. A fire-kindler comprising a combustion-chamber having a flame-outlet, an oil-reservoir arranged a suitable distance from the said chamber and having an oil-outlet, a valve-casing arranged between the reservoir and the combustion-chamber, a passage-way connecting the chamber of the valve-casing with the combustion-chamber, a passage-way connecting the chamber of the valve-casing with the oil-outlet of the reservoir, and an externally-tapering endwise-shiftable plug normally seated within the valve-casing and interrupting communication between the inlet and outlet of the said casing, and having a stem provided with a laterally-projecting pin or member h^2, a sleeve mounted upon the stem and having the inclined slot l^2 engaged by the aforesaid member h^2, and means acting to retain the said valve in its seated and normal position, substantially as and for the purpose set forth.

10. A fire-kindler comprising a combustion-chamber having a flame-outlet, means for supplying oil to the said chamber, a shelf below the combustion-chamber for receiving the ignited match, means for holding the match before ignition adjacent to the combustion-chamber with the match-head down and above the aforesaid shelf, means for abrading and thereby igniting the said head, and means whereby is effected the passage of the match, after its ignition, onto the aforesaid shelf, substantially as and for the purpose set forth.

11. In a fire-kindler, the combination, with a suitably-operated match-head abrader having an upwardly-facing abrading-surface, of a vertically-tiltable bar o^4 arranged a suitable distance above the abrading device and having a member o^3 arranged to engage and bear down upon the upper end of a match placed with its head down upon the aforesaid abrading-surface, and a suitably-applied spring acting to cause the said member o^3 to bear down upon the match, substantially as and for the purpose set forth.

12. A fire-kindler comprising a combustion-chamber having a flame-outlet, an oil-reservoir arranged a suitable distance from the combustion-chamber and having an oil-outlet, a valve-casing arranged between the reservoir and the combustion-chamber, a passage-way connecting the chamber of the valve-casing with the combustion-chamber, a passage-way connecting the valve-casing chamber with the oil-outlet of the reservoir, a valve within the valve-casing normally interrupting communication between the inlet and the outlet of the said casing, a shaft, such an operative connection between the valve and the shaft as will render the valve capable of being actuated to establish communication between the aforesaid inlet and outlet of the valve-casing without interrupting operative connection between the valve and the shaft, and means for actuating the valve in the direction required to establish communication between the inlet and the outlet of the valve-casing.

13. A fire-kindler comprising a combustion-chamber having a flame-outlet, an oil-reservoir arranged a suitable distance from the combustion-chamber and having an oil-outlet, a valve-casing arranged between the reservoir and the combustion-chamber, a passage-way connecting the chamber of the valve-casing with the combustion-chamber, a passage-way connecting the valve-casing chamber with the oil-outlet of the reservoir, an externally-tapering plug normally seated within the valve-casing and interrupting communication between the inlet and the outlet of the said casing and arranged with its smaller end down, means acting to retain the plug in its obstructing or closing position, an upright shaft arranged below the plug, such an oper-

ative connection between the plug and the shaft as will enable the plug to be elevated without interrupting operative connection between the shaft and the plug, means for lifting the plug, a match-igniter arranged to operate during the rotation of the shaft, means for rotating the shaft, and means whereby a match ignited by the match-igniter is conducted into such position relative to the combustion-chamber that the flame of the burning match shall ignite the oil in the said chamber.

14. A fire-kindler comprising a combustion-chamber having a flame-outlet, an oil-reservoir arranged a suitable distance from the combustion-chamber and having an oil-outlet, a valve-casing arranged between the resorvoir and the said chamber, a passage-way connecting the chamber of the valve-casing with the combustion-chamber, a passage-way connecting the valve-casing chamber with the oil-outlet of the reservoir, a valve normally seated within the valve-casing and interrupting or closing communication between the inlet and the outlet of the said casing, means for actuating the valve into its open or non-obstructing position, an upright shaft having lateral bearing in the valve-casing below the aforesaid valve, a match-igniting disk operatively mounted upon the shaft and having an upwardly-facing abrading-surface, means for holding the match with its head in contact with the said abrading-surface, means for rotating the shaft, and means whereby the match ignited by the abrading-surface is conducted into such position relative to the combustion-chamber that the flame of the burning match shall result in an ignition of oil in the said chamber.

15. In a fire-kindler, the combination with a combustion-chamber provided with a flame-outlet and having its bottom provided with an opening a^2, means for supplying air to the combustion-chamber, a shelf b' extending in under the said opening, and means for supplying inflammable fluid to the said chamber, of a match-case o arranged at the rear of the combustion-chamber and open at its lower end, a suitably-operated abrading device having an upwardly-facing abrading-surface extending in under the match-case o and arranged to be engaged by the head of a match placed head down in the aforesaid case, means for pressing the match downwardly against the abrading-surface, and means whereby the match, after its ignition by the abrading-surface, is conducted onto the aforesaid shelf through the aforesaid opening in the bottom.

16. In a fire-kindler, the combination, with a combustion-chamber provided with a flame-outlet, means for supplying air to the combustion-chamber, and means for supplying inflammable fluid to the said chamber, of a match-igniting disk at the rear of the lower portion of the combustion-chamber and having an upwardly-facing abrading-surface arranged concentrically of the axis of the disk, a suitably-applied spring normally wound up and acting to rotate the aforesaid disk in one direction, a stop for limiting the rotation of the disk in the opposite direction, means for locking the disk in the wound-up condition of the spring, means for rendering the locking means inoperative, means for holding the match with its head down upon the abrading-surface of the disk, and the disk having a match-discharge opening n^5 arranged to communicate with the combustion-chamber upon the operation of the aforesaid spring, all relatively arranged and operating substantially as shown, for the purpose set forth.

17. In a fire-kindler, the combination, with a match-igniter, means acting to operate the match-igniter and means acting to hold the match-igniter inoperative, of mechanism for rendering the last-mentioned means inoperative and comprising a suitably-operated clock-spring w, a shiftable bar t having one end thereof extending partially around the said spring and arranged to be shifted in one direction during the operation of the said spring, and means acting to shift the said bar in the opposite direction, and the arrangement of parts being such that the match-igniter is locked or rendered free to operate according as the aforesaid bar is shifted in the one or the other direction.

18. A fire-kindler having a combustion-chamber, a reservoir for supplying the inflammable fluid, a valve-casing arranged between the reservoir and the combustion-chamber and having an inlet and an outlet, a passage-way between the outlet of the valve-casing and the combustion-chamber, a passage-way between the valve-casing inlet and the reservoir, a valve within the valve-casing for controlling the feed of inflammable fluid to the combustion-chamber, means for igniting the inflammable fluid received by the combustion-chamber, and a partition between the combustion-chamber and the valve-casing and composed of material which is a good non-conductor of heat, substantially as and for the purpose set forth.

Signed by me at Cleveland, Ohio, this 22d day of December, 1900.

JOHN H. WALLIS.

Witnesses:
C. H. DORER,
A. H. PARRATT.