No. 796,899. PATENTED AUG. 8, 1905.

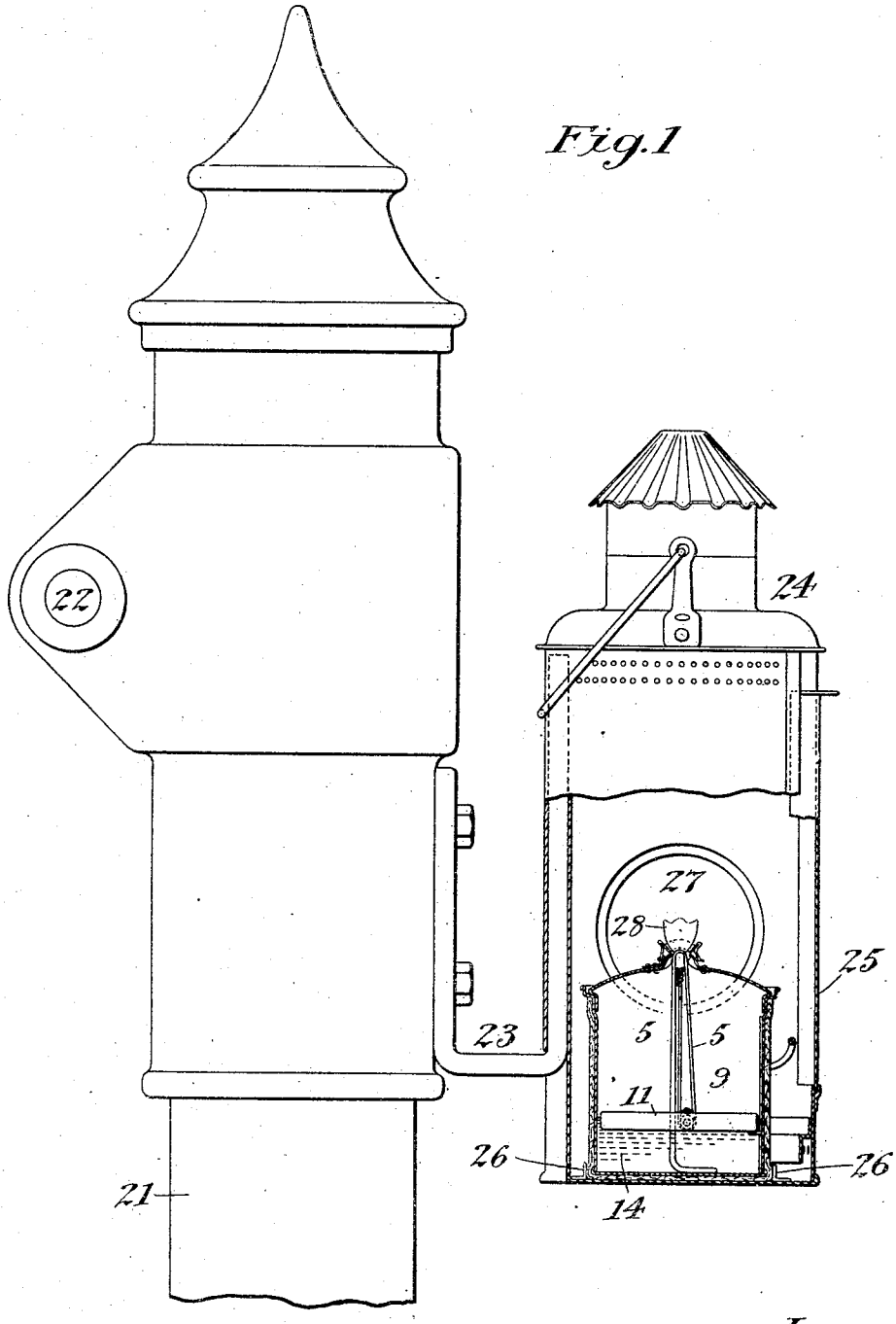
C. J. COLEMAN.

FUEL BURNING APPARATUS.

APPLICATION FILED JULY 20, 1904.

4 SHEETS—SHEET 1.

Fig. 1



Witnesses:
Albert V. S. Day
Henry Babnes

Inventor.
Clyde J. Coleman
by Henry D. Williams
Atty.

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS. WASHINGTON, D. C.

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4 SHEETS—SHEET 2.

Fig. 4

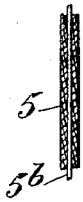


Fig. 2

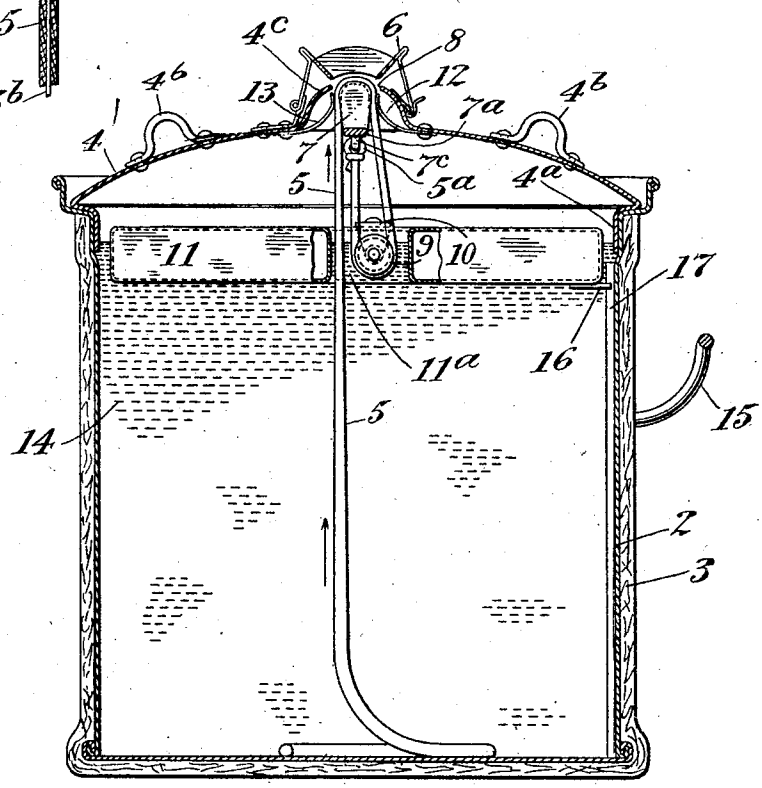
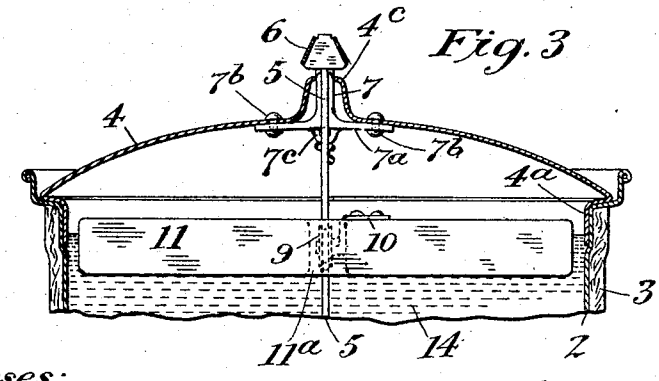


Fig. 3



Witnesses:
Albert V. T. Day
Henry Barnes

Inventor:
Clyde J. Coleman
by Henry D. Williams
Atty

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

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4 SHEETS—SHEET 3.

Fig. 5

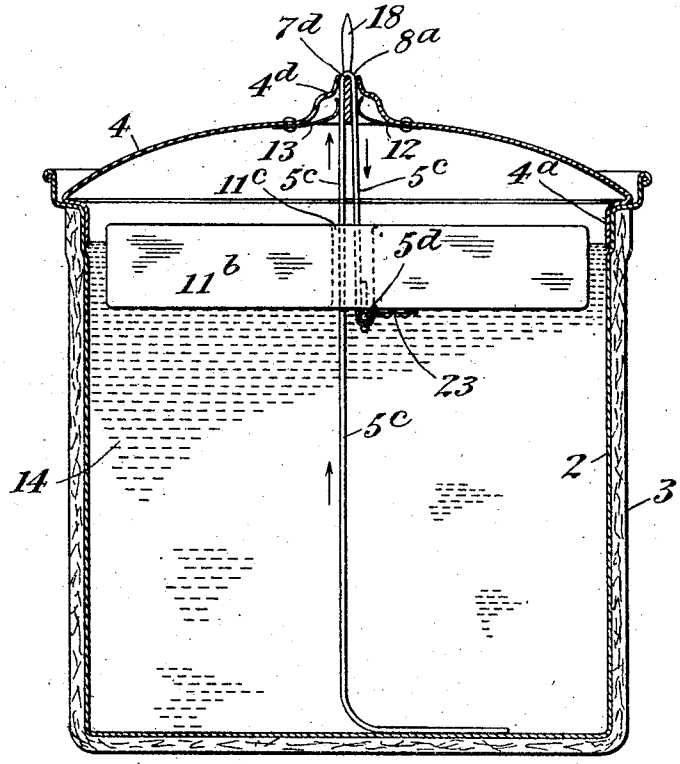
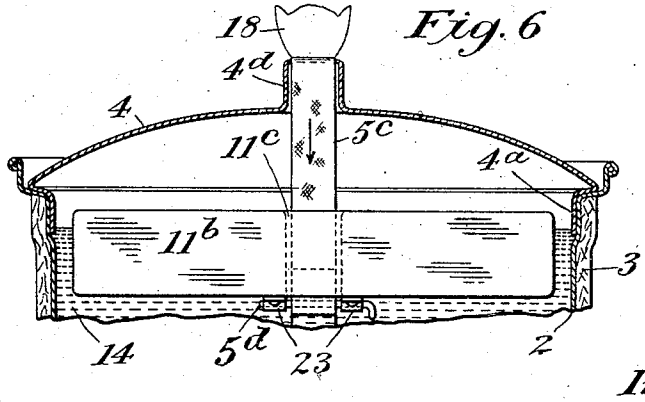


Fig. 6



Witnesses:
Albert V. S. Day
Henry B. Barnes

Inventor:
Clyde J. Coleman
by Henry D. Williams
Atty.

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

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4 SHEETS—SHEET 4.

Fig. 7

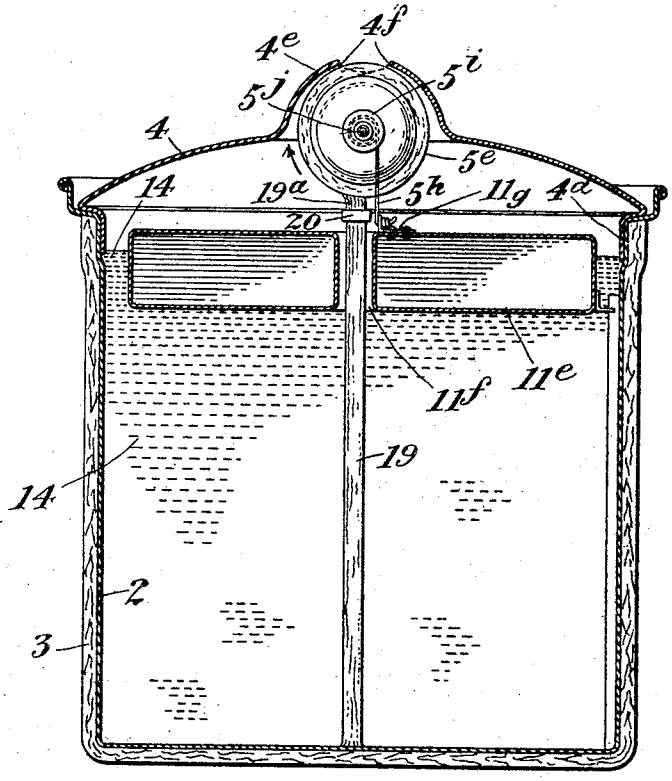


Fig. 8

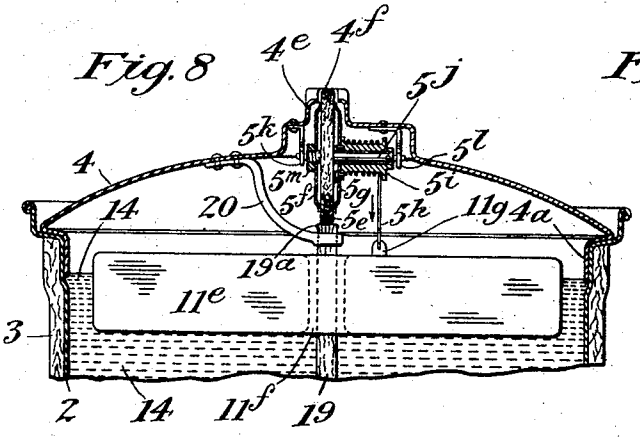
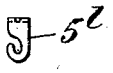


Fig. 9



Witnesses:
Albert W. Day
Henry Barnes

Inventor:
Clyde J. Coleman
by Henry D. Williams
Atty.

ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CLYDE J. COLEMAN, OF ROCKAWAY, NEW JERSEY, ASSIGNOR TO CLARENCE W. COLEMAN, OF WESTFIELD, NEW JERSEY.

FUEL-BURNING APPARATUS.

No. 796,899. Specification of Letters Patent. Patented Aug. 8, 1905.

Application filed July 20, 1904. Serial No. 217,414.

To all whom it may concern:

Be it known that I, CLYDE J. COLEMAN, a citizen of the United States, residing at Rockaway, in the county of Morris and State of New Jersey, have invented certain new and useful Improvements in Fuel-Burning Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings, forming a part thereof.

My invention relates to wick-lamps for converting the energy of fuel into available light, heat, or other form of energy, and has for its object to control the flame.

My invention comprises a fuel-wick communicating with the source of fluid fuel and exposed to the base of the flame or seat of combustion at an interterminal or non-terminal point of ignition, and an automatic wick-feeding apparatus coöperative with the wick to move, feed, or draw the wick through the seat of combustion, such automatic wick-feeding apparatus being actuated commensurately to the consumption of the fuel.

My invention also includes a controlling-float buoyed on the fluid fuel and feeding the wick responsively to variations in the fluid-fuel level.

My invention also includes a tapering wick or wick of graduated or varying cross-sectional area and a means for feeding the tapering wick to the flame, so as to increase the mean cross-sectional area of that portion of the wick which leads to the flame from the source of fluid fuel. Such an increase in the mean cross-sectional area of that portion of the fuel-wick which is available to convey fluid fuel from the source to the flame increases the capillary conductance or conveying capability of the fuel-wick, so as to compensate or partially compensate for the increase in distance of capillary convection due to consumption of the fluid fuel and consequent lowering of its level. This feature of my invention may be advantageously embodied in a wick having an interterminal or non-terminal point of ignition, such as already described, and may be very advantageously embodied in combination with automatic wick-feeding means, in which embodiment the variation of mean cross-sectional area of the fluid-conveying section of the wick will automatically compensate or counteract the variation in distance of capillary convection.

Pursuant to the broad purpose already mentioned, my invention comprehends, broadly, the combination of a fuel-wick, a float buoyed on the fluid fuel, which feeds the wick, and motion-multiplying means arranged to transmit wick-feeding motion from the float to the wick and to multiply or increase the wick-feeding motion thus transmitted. This feature of my invention can be very advantageously embodied with the wick having a non-terminal ignition-point, and such is the embodiment illustrated in the accompanying drawings.

My invention also broadly comprehends, in combination with the wick having a non-terminal point of ignition and means for drawing and guiding the wick through the seat of combustion, a yielding tension device coöperative with the fuel-wick and maintaining a proper tension thereon by pulling back against the force which feeds the wick, and thereby restraining a too free movement of the wick.

My invention has one very important application in its adaptation to railway signal-lights, such as switch-lights and block-signal lights. Generally such railway signal-lights are distantly isolated from any common center of maintenance, being sometimes located, for instance, at various successive and distant points along a railway-line, and heretofore much difficulty, expense, and uncertainty has been involved in the maintenance of such lamps which by the essential nature of their functions are required to burn brightly and steadily for long intervals of time. The signal-lights such as have been heretofore generally used have been liable to dimming or extinguishment by incrustation of char upon the lamp-wicks and by various other causes when left to burn for a long time without personal attendance, and this situation has given rise not only to considerable hazard in the possibility of signal-light failure, but also to much trouble and expense in personal attendance upon the lamps.

In its application to railway signaling purposes it is the object of my invention to provide a railway signal-light which will steadfastly burn for a long period of time and without personal attendance and which will thus add greatly to the safety and economy of the signal-light regime of railroads generally.

To these ends my invention comprises vari-

ous forms of the automatic lamp and automatic flame-controlling or flame-regulating apparatus which have already been generally pointed out.

My invention comprehends also various other features which appear in the following particular description so clearly that they need not be enumerated at this point.

The accompanying drawings illustrate various particular embodiments of my broad invention which have been especially designed for railway signaling purposes, although it will of course be apparent that they are available for diverse uses.

I will now specifically describe those exemplifications of my broad invention which are illustrated in the accompanying drawings and will thereafter point out the novel features of my invention in a series of claims.

In the accompanying drawings, Figure 1 is an elevational assembly of a railway signal-post and one form of my automatic railway signal-lamp mounted thereon, the lamp being shown partially in middle section and the view being taken from a point in rear of the signal-post. As shown in this figure, the fuel-oil of the lamp is partially consumed. Fig. 2 is a vertical transverse central sectional elevation of the lamp proper comprised in the apparatus shown in Fig. 1, the view-point in Fig. 2 being the same as that of Fig. 1, but Fig. 2 showing the condition of the apparatus before any considerable portion of the fuel-oil therein has been consumed. Fig. 3 is a central sectional elevation of the upper portion of the lamp proper shown in Fig. 2, but taken from a view-point to the right of Fig. 2. Fig. 4 is a longitudinal central sectional view of a portion of the lamp-wick employed in the apparatus shown in Figs. 1, 2, and 3. Fig. 5 is a central sectional elevation of another form of lamp proper in which my invention may be embodied. Fig. 6 is a central sectional elevation of the upper portion of the lamp proper shown in Fig. 5, but taken from a view-point to the right of Fig. 5. Fig. 7 is a central sectional elevation of still another construction of automatic lamp in which my invention may be embodied. Fig. 8 is a central sectional elevation of the upper portion of the automatic lamp shown in Fig. 7, but taken from a view-point to the left of Fig. 7. Fig. 9 is a detail elevation of one of the depending bearings for the shaft of the wick-wheel of the lamp shown in Figs. 7 and 8, and this detail view is taken from a view-point to the right of Fig. 8.

Each of the lamps illustrated in the drawings comprises a sheet-metal oil-can or oil-tank 2, which may be of cylindrical form and which is inclosed within a suitable casing 3 of sufficient mechanical rigidity to protect the sheet-metal can from being dented or bent in the operations of handling, refilling, &c. This casing 3 is preferably made of heat-insulating material for the purpose which has already been mentioned. In each construction illustrated in the drawings the oil-can 2 is provided at its upper end with a removable cover 4, convex on its upper side and provided with a cylindrical flange 4^a, which is inserted with a tight spring fit into the upper end of the oil-can. In the construction illustrated in Figs. 1 to 4, inclusive, the tank-cover 4 is provided with suitable handles, such as 4^b. This construction employs a lamp-wick 5, of circular cross-section and of gradually-tapering diameter and having a central core 5^b of relatively small diameter and of strong non-combustible material, such as a metallic wire. This lamp-wick passes over a concave guiding-groove in the edge of the rounded upper end of a flat vertical wick-guide 7, which projects upwardly through a slot 8 in the upper end of a burner-dome 4^c, integrally formed upon the center of the tank-cover 4. The lower end of the flat vertical wick-guide 7 is formed integrally with a horizontal guide-supporting bridge 7^a, which spans the bottom of the burner-dome and is riveted at either end to the under side of the tank-cover by rivets 7^b. The flat wick-guide 7 projects upwardly from the center of this guide-supporting bridge and passes through the slot in the burner-dome with a sufficient clearance around the grooved edge of the wick-guide to permit free passage of the lamp-wick 5 over the top thereof. The smaller end 5^a of the lamp-wick or the end of lesser diameter is detachably secured to an anchor-eye 7^c, integrally formed upon and depending from the center of the wick-guide bridge 7^a. From its anchorage in the eye 7^c the wick passes vertically downward and under a float-pulley 9, rotatively mounted in an opening 11^a in the wick-feeding float 11 and upon a suitable bearing-bracket 10, secured to the float. The wick-feeding float is preferably made in an outline corresponding substantially to the plan outline of the lamp-tank, but of sufficiently smaller dimensions to afford ample clearance between the edges of the float and the inner sides of the tank. For instance, when the tank is cylindrical in form the wick-feeding float will preferably be disk-shaped and of a diameter somewhat less than the inner diameter of the tank. Passing under the float-pulley 9 the lamp-wick is immersed in the oil 14, contained in the lamp-tank, and thence extends upward and passes between one upright edge of the flat wick-guide 7 and a tension-spring 12, one end of which is riveted to the under side of the tank-cover 4 and the other end of which projects upward into the burner-dome and presses lightly upon the side of the lamp-wick. Thence the lamp-wick passes over the edge of the upper or rounded end of the wick-guide 7, being guided and

held in position by the concave groove in such edge, and thence passes downward between the opposite upright edge of the wick-guide and another tension-spring 13, mounted similarly to the tension-spring 12, but upon the opposite side of the wick-guide and pressing lightly upon the lamp-wick at a point opposite the point of engagement of the tension-spring 12. Thence the lamp-wick hangs downward through the opening 11^a in the wick-feeding float 11 and is immersed in the fuel-oil 14, contained within the lamp-tank. The burner-dome is surmounted by a burner-flue 6 of ordinary design. The wick-feeding float 11 is adapted to float upon the surface of the fuel-oil and falls as the level of the fuel-oil is lowered by consumption. The float may be restrained from torsional or angular displacement by means of a slotted guide-finger 16, the slot of which straddles a vertical guide-bar 17, secured to the inner side of the lamp-tank 2. The lamp-tank is provided with a suitable handle, such as 15. When it is desired to refill the lamp-tank with oil or to replace the lamp-wick, the tank-cover 4 may be removed by means of its handles 4^b so as to give free access to the tank and its float, wick, and accessory parts contained therein. Figs. 2 and 3 show the elevation of the oil 14 and of the wick-feeding float 11 just after the lamp-tank has been refilled. After refilling the tank the wick is ignited at the point where it passes over the upper edge of the flat wick-guide 7. The heat of combustion continuously volatilizes the fuel-oil in the wick at or near the point of ignition, and the volatilized fuel continuously passes off into and feeds the flame, while the wick, by capillary attraction, continuously draws oil from the tank to replace the volatilized fuel as rapidly as it is consumed. Since the float-pulley 9 and that portion of the lamp-wick which passes under it are immersed in the oil, the flame will be fed by convection of oil through that section of the wick extending from the pulley to one side of the wick-guide and one side of the flame as well as through that section of the wick extending from the other side of the wick-guide and flame downward through the opening 11^a of the float and into the oil-tank. Thus fuel-oil will be fed to the flame by capillary action of the wick through two distinct and separate paths approaching the flame from opposite sides thereof. As the fuel is consumed its level gradually falls, so that the float is gradually lowered and the downward pull of the float-pulley working in the depending loop of the lamp-wick draws that portion of the wick extending from the pulley over the wick-guide and thence down into the oil-tank, over the guiding edge of the guide-wick and at a linear rate double the linear rate at which the float falls. The slight retarding tendency of the tension-springs 12 and 13 bearing upon the sides of the lamp-wick prevents the lamp-wick from running too freely and prevents the accumulation of undesirable slack therein. As the oil-level falls and the wick is drawn over the guiding edge of the wick-guide, the charred or partially burned portion of the lamp-wick which has passed through or underneath the flame or the base thereof is removed from the base of the flame or seat of combustion, together with all the char and other impediment to combustion which may have collected thereon, and fresh wick-surface is continuously drawn into the base of the flame or seat of combustion, as that portion of the lamp-wick depending from the wick-guide through the float and into the oil-tank is drawn over the wick-guide. Also as the float and its float-pulley fall and draw the free end or larger end of the taper wick over the guiding edge of the wick-guide the feeding-sections of the lamp-wick or those sections extending from opposing sides of the wick-guide downward into the fuel-oil are continuously replaced by feeding-sections of greater cross-sectional area, so as to continuously increase the cross-sectional feeding capacity of the lamp-wick as the lowering of the oil-level increases the length of such feeding-sections or the distance through which they are required to conduct the oil to the flame. The feeding action of the float upon the lamp-wick is aptly illustrated in Fig. 1, which shows the condition of the apparatus after the oil-level has fallen nearly to the bottom of the oil-tank. This figure shows the lamp-flame 28 projecting upward from the ignited portion of the lamp-wick and also shows the organization of the automatic lamp proper with a railway signal-post 21, upon which may be mounted suitable railway signal-indicating means, such as a signal-semaphore. Such a semaphore, however, is not shown in this figure. It may be pivotally mounted upon a suitable semaphore-bearing, such as 22, and it will be provided with colored signal-light spectacles coöperating with the signal-lamp in a well-known manner. The lamp proper is secured and located by retaining-clips, such as 26, within a suitable outer box or casing, such as 24. This casing is provided with a suitable reflector, such as 27, and with a lens (not shown in the drawings) and has a door, such as 25, giving access to the interior of the casing for removal and adjustment of the lamp proper and for similar purposes. The casing is provided with a vertical pocket open at its lower end and adapted to receive the outer and upwardly-projecting leg of a U-shaped bracket 23, the inner leg of which is suitably secured to the signal-post 21. The continuous presentation of fresh wick-surface to the flame as the oil is consumed enables the lamp to burn a much greater quantity of oil and for a much longer period of

time than would otherwise be possible without personal attendance. When the oil in the lamp-tank has been consumed and when the attendant refills the lamp-tank, the lamp-wick may be cleaned by hand and reused several times until it is too much burned for further use, or a new lamp-wick may be substituted by the attendant each time the oil-tank is refilled. In the event of the former practice the non-combustible wick-core 5^b insures linear intactness of the wick, so as to effectually prevent breakage thereof, due to excessive burning, and such non-combustible wick-core likewise insures intactness of the wick when the wick is used but one time, although in the latter case the chance or possibility of breaking the wick is at the most very remote. It will be noted that the tension-spring or retarding-spring 12, which maintains a proper tension of the automatically-fed wick, may be so adjusted in its pressure upon the side of the wick that as the wick leaves the seat of combustion or burner proper and rubs against the spring 12 the wick-char will be scraped from the wick by its rubbing action against the spring, which will thereby automatically scrape or clean the wick as it is fed or carried downward toward the wick-feeding float. This wick-scraping action in this particular instance is not a burner-clearing action, since the wick and its char are already removed from the seat of combustion when the char is scraped from the wick; but the scraping operation serves to automatically clean the wick and prepare it for reuse after refilling the oil-tank, as mentioned in the foregoing paragraph, thus obviating or reducing the expenditure of time and labor in cleaning the wick by hand. It will be noted that the feeding movement of the lamp-wick depends directly upon the feeding movement of the wick-feeding float, which in turn depends directly upon the rate of fuel consumption, so that the feeding movement of the wick is always directly proportionate to and must always vary with the rate of fuel consumption. Should the rate of fuel consumption be varied by varying temperature or atmospheric conditions or by variations in the quality or grade of oil with which the lamp-tank is filled, the rate of feeding the wick would vary consequently and proportionately. For instance, should the oil burn more rapidly the wick would be more rapidly fed to the flame and should the oil burn less rapidly the wick would be less rapidly fed to the flame.

That embodiment of my invention illustrated in Figs. 5 and 6 is similar to the embodiment shown in Figs. 2, 3, and 4, excepting in the particulars which will now be pointed out with respect to the construction of Figs. 5 and 6. This construction employs a flat lamp-wick, such as 5^c, passing over the top of a vertical flat wick-guide 7^d, located within and extending transversely and horizontally across the burner-dome 4^d and secured at its opposing ends to the inner sides of such burner-dome. The upper horizontal edge of the wick-guide 7^d is located in and parallel with a wick-slot 8^a in the top of the burner-dome. Clearance between the upper edge of the wick-guide and the opposing sides of the wick-slot in the burner-dome is sufficient to afford free passage of the lamp-wick. The portion of the lamp-wick depending from one side of the wick-guide 7^d passes through the opening 11^c in the wick-feeding float 11^b and at its lower end is anchored to such wick-feeding float by means of an anchor-pin 5^d, which is inserted through an eye formed in the wick end and passes across the lower end of the opening 11^c in the float and through the eyes of suitable supporting-brackets, such as 23, riveted to the bottom of the float and supporting opposite ends of the anchor-pin. This arrangement enables the float to pull down on that section of the wick to which the anchor-pin is fastened. This anchored end of the lamp-wick is immersed in the oil, and from its anchor-pin the wick extends upward and passes between one side of the wick-guide 7^d and a tension-spring 12, riveted at one end to the under side of the tank-cover adjacent to the burner-dome and extending up into the burner-dome and pressing lightly against the flat side of the lamp-wick. Thence the lamp-wick extends upward and through the wick-slot 8^a in the burner-dome and over the horizontal upper edge of the wick-guide, and thence downward through the wick-slot and between the opposite side of the wick-guide and an opposite tension-spring 13, mounted similarly to the tension-spring 12 and similarly pressing lightly upon the lamp-wick at the opposite side of the wick-guide. From such opposite side of the wick-guide the lamp-wick hangs downward, passing through the opening 11^c in the wick-feeding float 11^b and into the oil 14, contained in the oil-tank 2. The wick is ignited at the point where it passes through the wick-slot in the burner-dome and over the upper horizontal edge of the wick-guide 7^d, and the base of the flame 18 or the seat of combustion is disposed in a line of ignition which lies transverse to the length of the lamp-wick rather than longitudinally with the lamp-wick, as in the case of the construction illustrated in Figs. 1 to 4, inclusive.

In the construction illustrated in Figs. 5 and 6 the flat lamp-wick 5^c also feeds the flame from both ends of the lamp-wick, and as the oil 14 is consumed by combustion the wick-feeding float 11^b is lowered by the fall of the oil-level and gradually but continuously draws the lamp-wick over its wick-guide and through the seat of combustion or underneath the base of the flame 18; but in this instance, since there is no device for multiplying the move-

ment of the lamp-wick relative to the movement of its wick-feeding float, the lamp-wick is drawn over its wick-guide and through the flame at a rate of linear movement which is the same as the rate at which the float is lowered.

It will be noted that either in that form of my invention illustrated in Figs. 2 and 3 or in that form shown in Figs. 5 and 6 the available fuel capacity of the apparatus, and consequently the time during which the lamp will burn without attendance, is limited by the permissible depth of the oil-tank and by its permissible lateral area or capacity. The depth of the oil-tank is in turn limited by the practicable distance or elevation through which the fuel can be effectually conveyed by the wick to the flame when the fuel-level reaches its lowest point, and the lateral area or capacity of the tank is limited by the requirement that the consumption of a unit quantity of fuel must effect a certain lowering of the fuel-level and wick-feeding float in order to feed the wick a certain linear amount necessary to remove the wick-char produced by the burning of the said unit quantity of fuel. As a comparison between the structure of Figs. 2 and 3 and the structure of Figs. 5 and 6 it may be said that when a relatively small fuel and time capacity is desired the structure of Figs. 5 and 6 may be employed, and the lateral area or capacity of the fuel-tank may be so limited that the consumption of a unit or given quantity of fuel will lower the fuel-level and wick-feeding float sufficiently to effect the required linear feed of the fuel-wick and without a motion-multiplying device, such as that of Figs. 2 and 3; but if a comparatively large and long fuel capacity and time capacity are desired the construction of Figs. 2 and 3 may be employed, and the lateral area or capacity of the fuel-tank may be increased or doubled, so as to reduce or halve the amount of drop in the fuel-level and float per unit of fuel consumption, in which case the motion-multiplying device will double the linear feeding movement of the wick relative to the rate at which the float falls, so as to compensate for the aforementioned reduction in ratio of float fall to fuel consumption.

That embodiment of my invention shown in Figs. 7 to 9, inclusive, is in the matter of construction a considerable departure from the embodiments illustrated in the preceding figures. This construction employs a circular wick 5^e, removably clamped between wick-clamping plates 5^f and 5^g, and thus mounted upon a rotatable wick-spindle 5^j, which is in turn rotatably and removably mounted in the depending hook-shaped ends of the spindle-brackets 5^k and 5^l, riveted at their upper ends to the inside of the burner-dome 4^e. A small wick-actuating drum 5^i is secured to the wick-spindle. The inner end of this drum abuts against the inner face of the inner wick-clamping plate 5^g, while the outer face of the outer wick-clamping plate 5^f is engaged by a clamping-nut 5^m, screwed upon one end of the wick-spindle and serving to press the clamping-plate 5^f firmly against its adjacent side of the circular wick 5^e, and thus bind the circular wick firmly in place between its two clamping-plates. A wick-actuating string or wire 5^h is secured at one end to the inner end of the wick-actuating drum 5^i and is wound upon such wick-actuating drum and has its free end depending therefrom and secured at its lower extremity to an anchor-lug 11^g, riveted to the top of the wick-feeding float 11^e. The circular wick 5^e is fed by a vertical stationary feed-wick 19 of comparatively large cross-sectional area. The upper end 19^a of the feed-wick 19 bears and rubs upon the periphery of the circular wick 5^e at the under side of the circular wick and is secured in a supporting-bracket 20, riveted to the inside of the tank-cover 4. The feed-wick 19 conveys oil to the under side of the circular lamp-wick 5^e, and the oil is thence conveyed by capillary action to the upper side of the circular lamp-wick, which rotates in a wick-slot 4^f in the upper side of the burner-dome 4^e. The circular lamp-wick is ignited at the point where it is exposed in the wick-slot of the burner-dome. The oil is then consumed by combustion and its level lowered, thus gradually but continuously lowering the float, which continuously pulls down upon the wick-actuating string 5^h, so as to continuously rotate the wick-actuating drum 5^i and the circular wick. As the circular wick is rotated that portion of its periphery which has passed through or underneath the base of the flame is gradually but continuously removed from the seat of combustion and fresh wick-surface is gradually but continuously moved into the seat of combustion to take its place. The peripheral portion of the circular wick which has passed through the flame is rotated down through the space within the burner-dome and the tank-cover until it wipes over the top of the feed-wick 19. The rubbing action between the circular wick and the feed-wick removes the char and other impediment to combustion from the periphery of the circular wick. Each time the lamp-tank is refilled a new wick may be put into place, if desired. To remove the burned lamp-wick, the wick-spindle 5^j is removed from its hook-shaped supporting-brackets 5^k and 5^l. The wick-clamping nut 5^m is then removed from the end of the wick-spindle, whereupon the wick-clamping plate 5^f and the circular wick may be withdrawn therefrom and a new circular wick substituted and readily clamped in place by means of the clamping-plate and clamping-nut. The wick-spindle may then be readily reinserted in its hook-shaped bearing-brackets.

It will be apparent that my invention may be embodied in diversely-modified forms and arrangements of construction and may be applied to diverse and numerous uses without, however, in any wise exceeding or departing from its present scope, spirit, and intent.

What I now claim as my invention, and desire to secure by United States Letters Patent, is—

1. A wick-lamp comprising a wick exposed to the seat of combustion at a non-terminal point of ignition, and automatic means actuated commensurately to fuel consumption, for shifting the wick relative to the seat of combustion to vary the non-terminal point of ignition.

2. Fuel-burning apparatus comprising a source of fluid fuel, a wick having a non-terminal point of ignition, and automatic wick-feeding apparatus coöperative with the wick to shift it with respect to the point of ignition and including a controlling-float buoyed by the fluid fuel in the source.

3. Fuel-burning apparatus comprising a source of fluid fuel, a fuel-wick communicating with the source of fluid fuel and exposed to the base of the flame at a non-terminal point of ignition, and a wick-feeding float buoyed upon the fluid fuel in the fluid-fuel source and cooperative with the fuel-wick to draw it with a continuous and unremitting movement through the base of the flame.

4. Fuel-burning apparatus comprising a source of fluid fuel, a fuel-wick communicating therewith at two points on the wick and exposed to the seat of combustion at a point between such two points of fluid-fuel communication, and a wick-feeding apparatus cooperative with the fuel-wick to draw it through the seat of combustion and comprising a controlling-float buoyed by the fluid fuel in the fluid-fuel source.

5. A wick-lamp comprising a source of fluid fuel, wick-feeding means, and a tapering wick communicating with the source of fluid fuel and feedable by the wick-feeding means to the flame so as to increase the mean cross-sectional area of that portion of the tapering wick leading to the flame from the source of fluid fuel.

6. Fuel-burning apparatus comprising a source of fluid fuel, a burner proper, a wick of variable cross-sectional area having a fuel-feeding section extending from the source of fluid fuel to the burner proper and adapted to feed fuel to the burner by capillary attraction, and automatic wick-feeding apparatus coöperative with the wick to feed the same to the burner and by such feeding movement increase the mean cross-sectional area of the fuel-feeding section of the wick.

7. Fuel-burning apparatus comprising a source of fluid fuel, automatic wick-feeding mechanism including a controlling-float buoyed by the fluid fuel in the source, and a tapering wick communicating with the source of fluid fuel and feedable by the automatic wick-feeding mechanism to the flame so as to increase the mean cross-sectional area of that portion of the tapering wick leading to the flame from the source of fluid fuel.

8. Fuel-burning apparatus comprising a source of fluid fuel, a fuel-wick communicating therewith, and a wick-feeding float buoyed upon the fluid fuel in the source and movable by variation in the fluid-fuel level and cooperative with the wick to feed it to the flame, and a motion-multiplying device for multiplying the motion transmitted from the float to the wick.

9. Fuel-burning apparatus comprising a source of fluid fuel, a burner proper, a fuel-wick communicating with the source of fluid fuel and leading through the burner proper and anchored at one point, a wick-feeding float buoyed upon the fluid fuel in the fluid-fuel source and carrying a wick-feeding pulley engaging the fuel-wick between its anchorage and the burner and coöperative with the fuel-wick to draw it through the burner as the float falls with the level of fluid fuel.

10. Fuel-burning apparatus comprising a source of fluid fuel, a wick-feeding float buoyed by the fluid fuel in the source and movable by variation in the fluid-fuel level and carrying a wick-feeding pulley, a fuel-wick communicating with the source of fluid fuel and from one point of immersion in the fluid fuel extending through the seat of combustion and thence around the wick-feeding pulley and again into the fluid fuel and to a fixed anchorage-point and such fuel-wick being adapted to convey fluid fuel by capillary action from both its aforesaid points of immersion to the seat of combustion and being movable through the seat of combustion by falling movement of the wick-feeding float.

11. Fuel-burning apparatus comprising a fluid-receptacle, a wick-feeding float buoyed on the fluid in such receptacle, and a fuel-wick extending from the wick to the seat of combustion and thence to a point of connection with the wick-feeding float, whereby the movement of the float feeds the wick.

12. Fuel-burning apparatus comprising a source of fluid fuel, a fuel-wick communicating therewith at one point of immersion, a wick-guide located in proximity to the seat of combustion, means for drawing the fuel-wick over the wick-guide and through the seat of combustion, and a yielding tension device cooperative with the fuel-wick.

13. Fuel-burning apparatus comprising a fuel-wick, a wick-guide located in proximity to the seat of combustion, means for drawing the fuel-wick over the wick-guide and through the seat of combustion, and springs bearing upon the fuel-wick at either side of its area of ignition exposed to the seat of combustion.

14. Fuel-burning apparatus comprising a fluid-fuel tank, a removable cover therefor, a burner proper secured to the cover, a wick-feeding float buoyed upon the fluid fuel in the fluid-fuel tank, and a fuel-wick communicating at one point of immersion with the fluid fuel in the fluid-fuel tank and thence extending through the burner proper and thence to a point of connection with the wick-feeding float.

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

CLYDE J. COLEMAN.

Witnesses:
HENRY D. WILLIAMS,
HENRY BARNES.