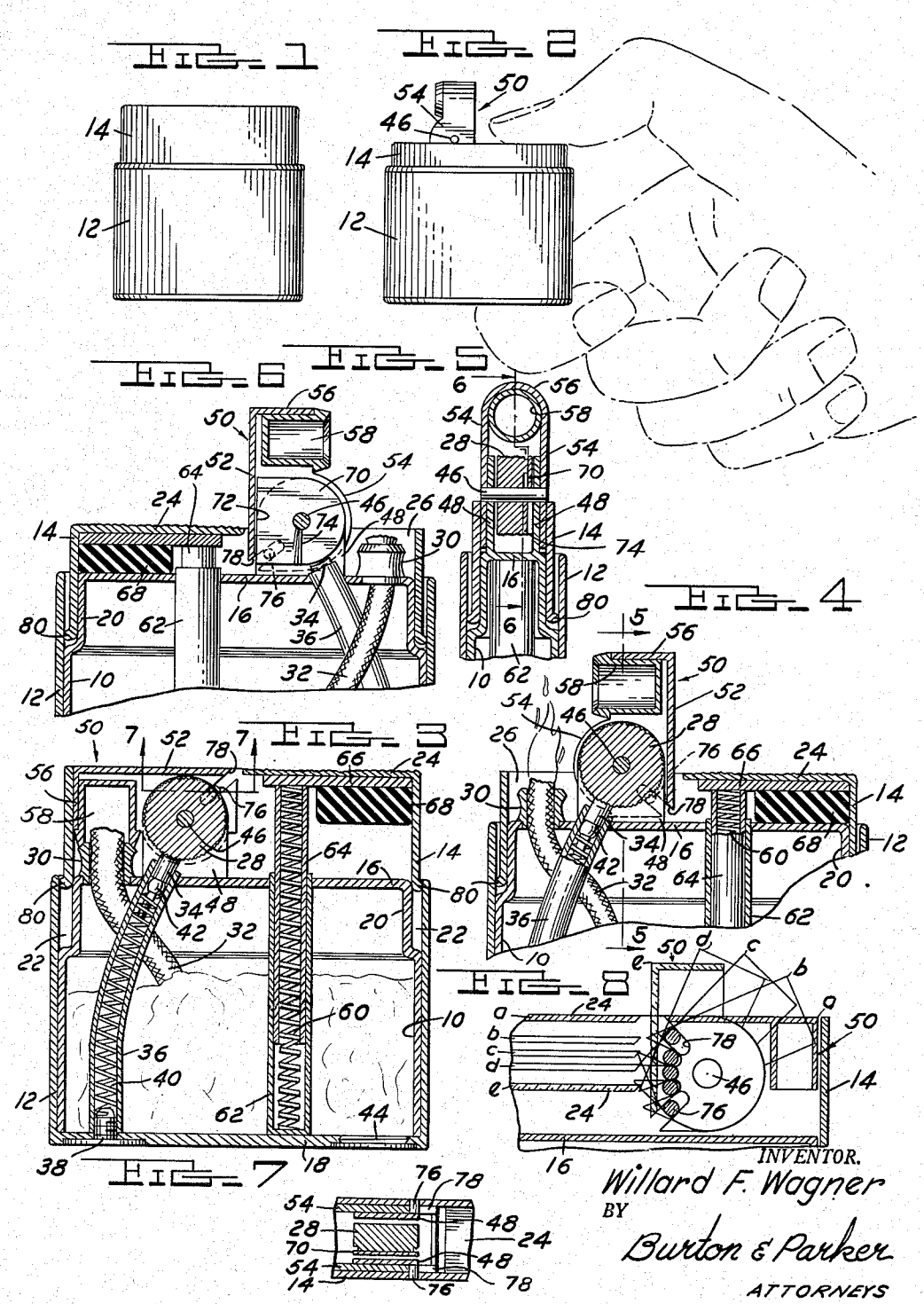
Nov. 24, 1953 W. F. WAGNER 2,660,042

LIGHTER

Filed Aug. 2, 1950 3 Sheets-Sheet 1



Nov. 24, 1953 W. F. WAGNER 2,660,042

LIGHTER

Filed Aug. 2, 1950 3 Sheets-Sheet 2

FIG. 10

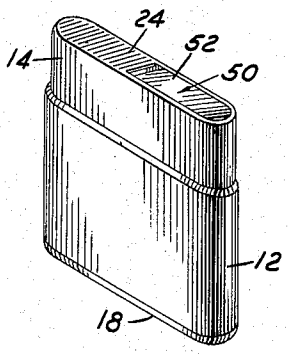


FIG. 11

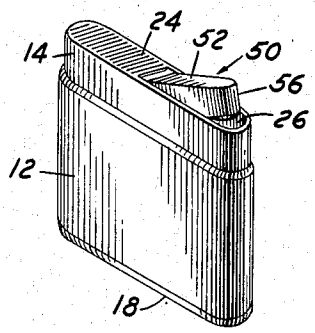


FIG. 12

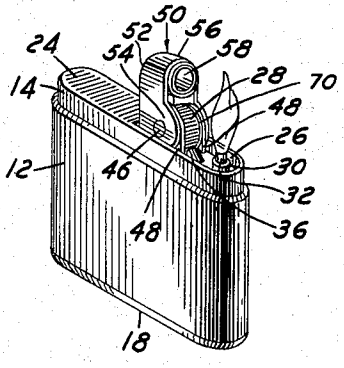
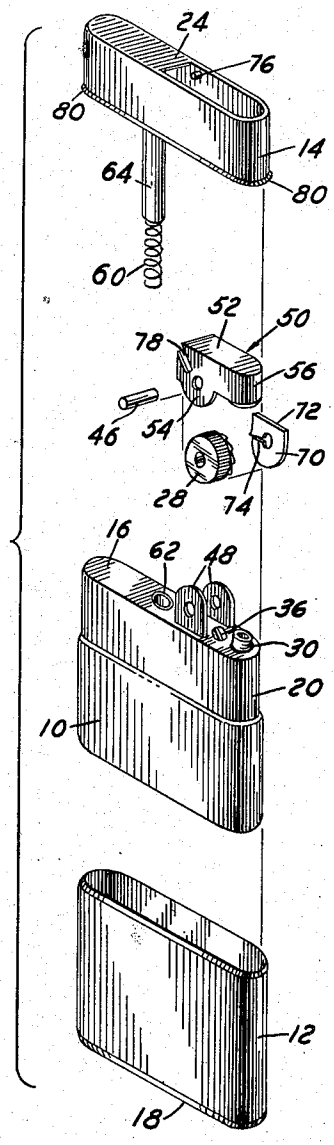


FIG. 9



INVENTOR.
Willard F. Wagner
BY
Burton & Parker
ATTORNEYS

Nov. 24, 1953 W. F. WAGNER 2,660,042

LIGHTER

Filed Aug. 2, 1950 3 Sheets-Sheet 3

FIG. 13

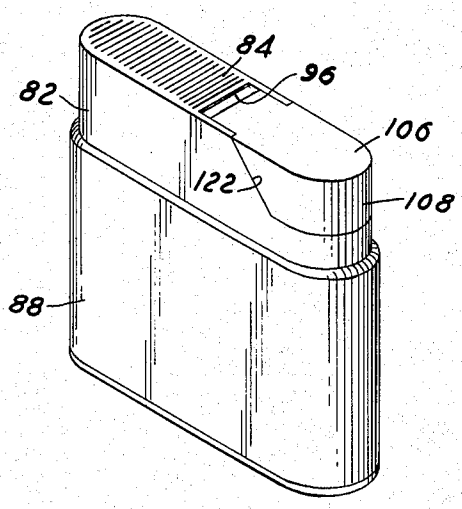


FIG. 15

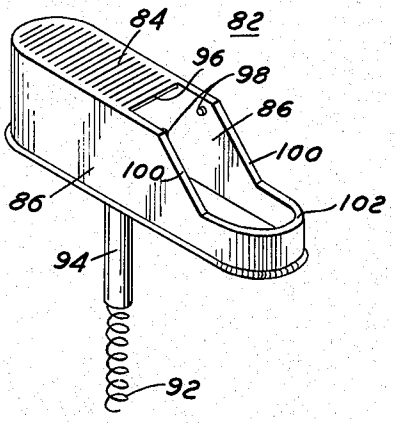


FIG. 16

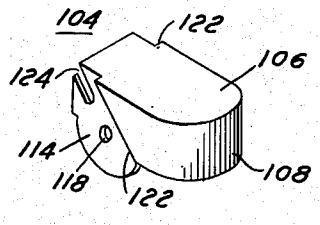


FIG. 14

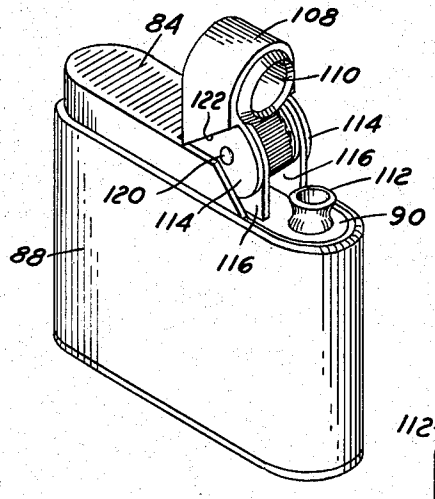
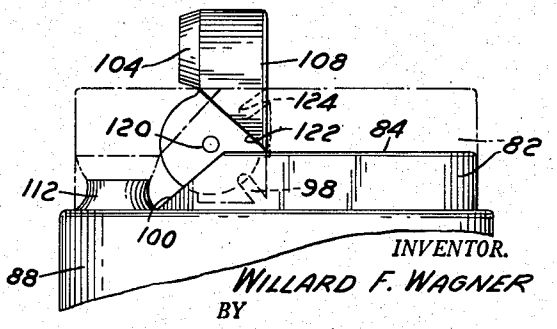


FIG. 17



INVENTOR.
WILLARD F. WAGNER
BY
Burton & Parker
ATTORNEYS

Patented Nov. 24, 1953

2,660,042

UNITED STATES PATENT OFFICE

2,660,042

LIGHTER

Willard F. Wagner, Detroit, Mich., assignor of one-half to Charles W. Glenn, Detroit, Mich.

Application August 2, 1950, Serial No. 177,293

5 Claims. (Cl. 67—7.1)

1

This invention relates to lighters and particularly to an improved lighter primarily adapted for igniting cigars and cigarettes.

The invention relates particularly to cigar and cigarette lighters of the character having a fuel receptacle and a flame producing mechanism supported on the upper end of the receptacle. Heretofore, the general practice has been to mount the parts of the flame producing mechanism in exposed condition on top of the receptacle.

An important object of the invention is to provide an improved lighter having the parts of the casing and the flame producing mechanism designed and associated together in a novel manner for economical fabrication and assembly and which in the normal position of the parts exhibits an artistic contour completely concealing the flame producing mechanism from view. Another important object of the invention is to provide a lighter of this character combining with the desirable exterior contour a highly efficient yet simple mechanical action for operating the flame producing mechanism.

An important feature of the invention is the design of the major pieces of the lighter such that they may be separately produced under deep drawing dies and in assembled position cooperate together to form enclosures for the flame producing mechanism and the combustible material. One of the exterior parts of the lighter is an inverted generally cup-shaped member constituting a hood or cover for the flame producing mechanism. This cover member is mounted for depressible telescoping movement between an interior body constituting the fuel receptacle and a surrounding exterior casing part. Another important feature of the invention is the provision of a cap member pivoted to the top of the fuel receptacle and functioning as a wick snuffer and as an intermediary driving connection between the depressible cover member and the friction wheel. The cap member is shaped to interfit within the depressed cover member and in normal position extends flush therewith. The cap member is designed with side walls which embrace the friction wheel supporting posts and extend between the same and the side walls of the depressible cover member to improve the appearance of the lighter.

Various other objects, advantages and meritorious features of the invention will become more fully apparent from the following specification, appended claims and accompanying drawings wherein:

Fig. 1 is a side elevation of an embodiment of the invention illustrating the same in the normal closed position of the parts,

2

Fig. 2 is a side elevation of the lighter of Fig. 1 showing the same in the open igniting position to which it is manipulated by the hand,

Fig. 3 is a vertical longitudinal sectional view through the lighter of Figs. 1 and 2 showing the position of the parts in the normal closed position,

Fig. 4 is a vertical sectional view through the upper portion of the lighter showing the parts in opening igniting position,

Fig. 5 is a vertical sectional view taken along line 5—5 of Fig. 4,

Fig. 6 is a vertical sectional view of the upper portion of the lighter from the side opposite to that shown in Fig. 4 and taken along line 6—6 of Fig. 5,

Fig. 7 is a fragmentary sectional view taken along line 7—7 of Fig. 3,

Fig. 8 is a diagrammatic view illustrating the variable drive connection between the finger depressible control member and the moving parts of the flame producing mechanism,

Fig. 9 is an exploded perspective view of the parts of the lighter,

Figs. 10, 11 and 12 are perspective views of the lighter in closed, partially opened, and fully opened positions respectively,

Figs. 13 and 14 are perspective views of a modification of the lighter showing the same in closed and opened positions respectively,

Fig. 15 is a perspective view of the finger depressible member of the modification,

Fig. 16 is a perspective view of the cap member of the modification, and

Fig. 17 is a side view of the top of the modified lighter showing in full and dotted lines the opened and closed positions of the cap member.

The embodiment of the invention illustrated in the drawings comprises, in general, an inner hollow body or member 10 which preferably constitutes the fuel container or receptacle, an outer casing member or shell 12 which encloses the receptacle, and a depressible cover member 14 which forms part of the casing of the lighter and in the illustrated construction telescopingly interfits between the fuel receptacle and the casing member and in normal position projects thereabove. Mounted on the upper end of the fuel receptacle 10 and normally enclosed by the cover member 12 is a flame producing mechanism. The fuel receptacle and the casing and cover members are preferably elongated in horizontal cross-section so as to form a relatively flat lighter for convenient portability and handling.

The fuel receptacle 10 is closed by an upper horizontally extending end wall 16. Although the bottom end of the fuel receptacle may be closed by an end wall integrally connected to its side walls, it is preferred for economical manufacture to omit such an end wall and leave the lower end of the receptacle open. As in conventional practice, the receptacle is filled with absorbent material such as cotton which is saturated with an inflammable liquid. To close the bottom opening of the receptacle, the outside casing member or shell 12 is provided with a lower end wall 18 which may be integrally connected to the side wall of the casing member as shown. In the assembled position of the parts shown in Fig. 3, the bottom wall 18 overlies the opened end of the receptacle completing the enclosure of the saturated absorbent material therein.

The upper end portions of the fuel receptacle 10 and the outer casing member 12 are shaped to telescopingly slidingly receive the cover member 14 therebetween. As shown in Figs. 3 to 6, this is preferably accomplished by reducing the upper end of the fuel receptacle on all sides thereof to form an inwardly spaced wall section 20 therearound which forms a clearance 22 between the receptacle and the casing shell which is approximately the thickness of the wall portion of the cover member. The cover member is designed and shaped to embrace the upper portion of the fuel receptacle and to slidingly telescopingly reciprocate in the clearance provided between the casing member and the upper part of the fuel receptacle as shown by comparison of Figs. 4, 5 and 6 with Fig. 3. The cover member 14 exhibits an inverted cup-shaped configuration the side wall portions of which are slidingly received in the clearance 22. In assembled position, the cover member forms a hood for the upper end of the lighter which in the normal inoperative position of the parts encloses the flame producing mechanism of the device. The upper end of the cover member, which would normally be considered the base of its cup formation, is partially closed by an end wall 24. In the illustrated embodiment of the invention this end wall occupies approximately one half of the cross sectional area of the upper end of the cover member, the balance being open and forming an aperture 26 for the purpose described hereinafter.

It is evident from the description of the device thus far made that the three members constituting the major pieces of the lighter, namely the receptacle 10, casing 12 and cover 14, are cup-shaped in formation. Constructed in this manner, they are able to be economically and rapidly produced under deep drawing dies.

The flame producing mechanism of the present embodiment of the invention comprises certain parts which are conventionally employed on lighters of this character but the organization and relation of these parts to one another and to the major pieces of the device and the manner of actuating the moving parts of the mechanism constitutes a distinct improvement. Supported on the upper end wall 16 of the fuel receptacle is an axially bored friction or abradant wheel 28. The wheel is mounted in line with the opening 26 of the cover member and on a transverse axis located approximately one third of the distance between the opposite narrow side walls of the cover member. Between the friction wheel and the nearest narrow side wall of the receptacle, is a wick guide 30. The wick guide is in the form of a short open-ended tube of conventional shape

supported in upright position on the end wall 16 and opening into the interior of the fuel receptacle. The upper end section of a wick 32 extends through the wick guide and projects slightly thereabove.

Yieldingly pressed against the underside of the friction wheel 28 is a pyrophoric element or flint 34. The flint is supported in a guide 36 which is in the form of an elongated tube opening out through the end wall 16 at its upper end and extending downwardly in the fuel receptacle and terminating in substantial abutment with the bottom wall 18 of the casing member. The bottom wall 18 is provided with an opening in alignment with the lower end of the tube 36 which is normally closed by a screw threaded cap 38. A coiled spring 40 is positioned in the tube 36 and extends substantially the length thereof. One end of the spring is seated on and secured to the cap 38. Carried by the opposite end of the spring is a ball shaped member 42 which abuts the inner end of the flint. Since the spring in the assembled position of the parts is under compression it yieldingly urges the flint against the abraded periphery of the wheel. The spring 40 and its associated parts are of conventional design. However, to provide a balanced symmetry to the lighter the flint tube 36 is curved outwardly from the wheel to bring the lower flint admitting end of the tube closely adjacent to one of the ends of the bottom wall 18 of the fuel receptacle. The opposite end of the bottom wall 18 is provided with an opening through which inflammable liquid is introduced into the receptacle. This opening is closed by a removable screw threaded cap 44 similar in exterior appearance to the cap 38. As in conventional lighter designs, the two caps 38 and 44 may be provided with transversely extending key slots for receiving the edge of a coin or the like for loosening and tightening the caps.

The friction wheel 28 is supported and journaled for rotation above the upper end of the fuel receptacle by means of a transversely extending shaft 46. The opposite ends of the shaft are supported by a pair of similarly shaped flat supporting posts or ears 48—48 which are fixed to the upper end wall 16 of the fuel receptacle and project thereabove in spaced parallel relation to one another as best shown in Figs. 5, 7 and 9 and along the opposite sides of the wheel. Each ear 48 is provided with a circular hole therethrough which aligns with the hole in the other ear and through which the adjacent end of the shaft 46 is received. The shaft is slidingly fitted in the holes of the ears and the axial bore of the wheel 28 and as will be explained more fully hereinafter is capable of being slidably shifted axially for removal and replacement in order to detach the wheel and its associated parts and assemble the same on the lighter. The two ears 48—48 are disposed in planes spaced slightly inwardly from the opposite side walls of the receptacle as shown in Figs. 5, 7 and 9 for the purpose described hereinafter. Preferably the upper ends of the ears are rounded on a radius of curvature corresponding to the radius of the wheel in order to extend flush with the upper peripheral portion of the wheel as shown in Figs. 5 and 12.

As previously described the cover member 14 has its upper end closed by a wall 24, the balance of the upper end being opened and forming the aperture 26. Forming a subsidiary cover for the opening 36 and serving as a flame or wick snuffer is a cap 50. In general, the cap is like conven-

tional wick snuffers in that it is constructed with a flat plate-like top wall 52, opposed parallel side walls 54—54 and a rounded front end wall 56 which merges with the side walls. However, the cap 50 is designed and supported in an improved manner to fit the aperture 26 of the cover member and in the closed position of the lighter to have its top wall extended flush with the end wall 24 of the cover member and its side and end walls received within the cover member in juxtaposed relation to the side wall portions of the latter as shown in Figs. 3, 5, 11 and 12. In the closed position of the cap, the top wall thereof occupies substantially the entire area of the opening 26 and cooperates with the end wall 24 of the cover to form a flat surface on the top of the lighter.

Carried on the underside of the cap 50 at its forward end is an inverted snuffer cup 58 which in the closed position of the lighter is arranged to enclose the projecting end of the wick 32 and rest on the upper end of the wick guide 30 as shown in Fig. 3. The side wall of the snuffer cup is cylindrical and is snugly fitted in and secured to the side and end walls of the cap as in conventional practice.

The cap 50 is mounted for movement from a normal horizontally extending closed position to an upright open position. For this purpose, the cap is preferably rockingly supported on the same axis upon which the friction wheel is rotated. For this purpose, the rear portions of the two side walls 54—54 of the cup are provided with aligned circular holes of a size to slidingly receive the shaft 46. To provide sufficient wall material around all rear portions of the sides of the shaft, the side walls 54—54 may be extended downwardly relative to the top wall 52 and rounded on a radius of curvature having the axis of the shaft as the center. The depending rear portions of the side walls 54—54 overlie the outer surfaces of the two ears 48—48 and extend into the clearance between the same and the side wall portions of the cover member 14 as shown in Figs. 5 and 7. The shaft receiving holes in the side walls 54—54 are so located with respect to the top plate 52 of the cap that in the closed position of the cap the top plate extends horizontally and flush with the end wall 24 of the cover member. In the open position of the cap, its top plate 52 extends vertically and perpendicular to the end wall 24 of the cover member.

The cover member 14 is mounted as previously described for telescoping movement relative to the fuel receptacle 10 and the surrounding shell or casing 12. It is collapsible downwardly toward these members and retractible upwardly away therefrom. The cover member is urged to its upper normal position by spring means which may take the form shown of a coiled spring 60 extending the vertical length of the lighter. The spring 60 is housed in two telescoping sleeves 62 and 64, the former being secured in depending relation to the upper wall 16 of the fuel receptacle and the latter being secured to the underside of the end wall 24 of the cover member. The sleeve 62 is closed at its lower end to form a seat for the coiled spring. The upper end wall 24 of the cover member may be reinforced by a plate 66 and if such is provided it may be interposed between the end wall and the upper end of the sleeve 64. In such a mounting the upper end of the coiled spring seats on the plate 66 and since in the assembled position of the parts the spring is under compression it exerts a continuous force tending to raise the cover member to its normal projected position shown in Figs. 1 and 3.

The end wall 24 of the cover member serves as a finger engaging surface for depressing the cover member. To improve the frictional engagement of the finger with the cover member and to quickly indicate how the device should be held, the upper surface of the end wall 24 may be provided with crossing serrations as best shown in Figs. 9 to 12. The lighter may be held in the hand in any convenient way and operated by exerting finger pressure to depress the cover member. One method of holding and operating the device is shown in Fig. 2. The top and bottom portions of the device on the serrated side of the cover member are grasped between the thumb and either the forefinger or the next finger of the hand. Upon squeezing the two fingers together, the cover member is depressed. To eliminate a metallic click when the cover member is depressed and to absorb the shock of its contact with the receptacle, there is provided a block 68 of resilient material carried on the underside of the plate 66. The block 68 is of a size to abut the top wall 16 of the receptacle just before the side walls of the cover member strike the shoulder at the bottom of the clearance 22.

Since the friction wheel 28 and its supporting posts or ears 48—48 are located on the aperture side of the cover member they will upon relative depressible movement of the cover member project upwardly through the aperture 26 as shown by a comparison of Figs. 3 and 4. The reciprocating movement of the cover member and the wheel mounting are so designed that in the fully depressed position of the cover member the ends of the shaft 46 are exposed to view as shown in Fig. 12. In this position a small pointed tool may be used to forcibly slide the shaft out of the wheel and the supporting ears and permit separation of the shaft carried parts from the lighter. Contrariwise, the full depression of the cover member is utilized to assemble the shaft and the parts carried thereby on the lighter. In any other position except the fully depressed position of the cover member, the side walls of the cover member overlap upon the ends of the shaft and hold the same against axial shiftable movement. In the fully depressed position of the cover member the shaft will not normally shift in its mounting for the reason that the pressure of the spring urged flint 34 will force the wheel against one side of the shaft and in turn press the shaft against one side of its bearing mounting in the ears 48—48. This will frictionally hold the shaft in position until the side walls of the cover member return to shaft overlapping position.

The depressible movement of the cover member is employed to swing the cap 50 to open position and at the same time rotate the friction wheel 28 against the flint 34. A one-way drive connection is provided between the cap and the friction causing the wheel to rotate during the opening movements of the cap but remaining stationary during the return or closing movement of the cap. The friction wheel is provided on one side thereof with ratchet teeth in accordance with conventional lighter practice. Interposed between the ratchet side of the wheel and the adjacent supporting ear 48 is a thin relatively flat plate or washer 70. The plate is provided with a hole through which the shaft 46 extends and further provided with a straight edge 72 which abuts the underside of the cap top wall 52 as shown in

Fig. 6. In this manner the plate will partake of the same movement as the cap. The washer or plate 70 is slit on a line 74 extending radially of the shaft's axis and one edge formed by the slit is inturned toward the wheel to form a pawl for engaging the ratchet teeth of the wheel. The pawl is so related to the turning movement of the cap that it will engage one of the ratchet teeth on the upward opening movement of the cap and cause the wheel to rotate in the same direction therewith and on the downward closing movement it will skip past the teeth. It is understood that movement of the abrasive periphery of the wheel over the flint will produce sparks for igniting the projecting end of the wick 32.

The cap 50 is driven from the cover member through a self-variable leverage connection which causes the cap and the wheel to move at a rate differing from that of the cover member. The drive from the cover member to the cap is in the form of a pin and slot connection. As shown in Fig. 7, two short aligned pins 76—76 are mounted in the opposite side walls of the cover member. Each pin projects inwardly from the side wall in which it is mounted and enters a slot 78 formed in the adjacent side wall 54 of the cap. Since each side wall 54 of the cap and the companion side wall of the cover member have contiguous surfaces, the length of each pin 76 need not be any longer than the combined thickness of these walls. The axis of the two pins 76—76 is disposed in offset parallel relation to the shaft 46 and in the closed position of the lighter is located near to the top wall 52 of the cap and inwardly and above the shaft as shown in Fig. 3.

The slots 78—78 in the side walls 54—54 of the cap member extend in the same plane and open out through the rear edges of the walls in order to admit the pins 76—76 at the time of assembly and to provide disconnection therefrom when the cap is removed from the device. In so far as the driving relation between the cover member 14 and the cap is concerned the slots may be closed at both ends. The two slots preferably extend on a plane substantially intersecting the axis of the shaft and at an upwardly and inwardly directed angle in the closed position of the parts as shown in Fig. 3. Since the cover member telescopes in a vertical straight-line movement the pins 76—76 likewise travel in a vertical path as shown by the various positions of one of the pins in Fig. 8. As the pins move in their path of travel, the distance separating the axis of the pins from the axis of the shaft varies. This causes the pins to shift along the slots either toward one end or the other end thereof depending on the position of the cap in its swinging movement and its direction of travel. This causes a variable leverage action on the cap and the friction wheel.

Fig. 8 schematically illustrates the drive relation between the depressible cover member and the cap 50. The pins 76—76 travel in a vertical path, the plane of which in the illustrated embodiment of the invention intersects a chord line of the friction wheel 28. One of the pin and slot connections is shown in Fig. 8. In the closed position of the parts, the pin is in the uppermost position and the thumb engaging end wall 24 and the top wall 52 of the cap extend in the same plane at the positions marked "*a*" for each element. Upon depression of the cover member to position "*b*" the cap swings upwardly to its position "*b*," the pin in the meantime moving in the slot toward the shaft 46 and progressively reducing its leverage action on the cap. When the cover member is depressed downwardly from position "*b*" to "*d*" it moves a comparatively short distance while the cap swings through a comparatively large arc from its position "*b*" to "*d*." In the final depressing movement of the cover member from position "*d*" to "*e*" the pin travels outwardly in the slot, increasing its leverage action on the cap and causing it to swing to its vertical open position "*e*." It is evident that if the cover member is depressed by the thumb at a constant rate it will in its early movement act with greater leverage on the cap and cause the cap to swing at a relatively slower rate. This is desirable in order to start the movement of the parts from a stationary condition. As the cover member is further depressed at this constant rate it decreases its leverage action on the cap but on the other hand the cap swings at a greater rate. In the final downward movements of the cover member the leverage action on the cap increases but the speed with which it moves the cap to fully opened position decreases. Since the friction wheel is coupled to the cap during the depressible movement of the cover member, it partakes of the same movement as the cap, rotating at an increasing rate during the first half of the depressible movement of the cover and thereafter at a decreasing rate. Such a drive connection improves the "feel" of the lighter and enables the user to operate the lighter smoothly and with a minimum amount of pressure.

When the cover member is released for upward movement by the spring, the pins 76—76 travel upwardly and acting through slots cause the cap 50 and snuffer cup 58 to swing downwardly to closed horizontal position. In addition to serving as the drive connection between the cover member and the cap, the pin and slot connection also assist in limiting the height to which the cover member may be raised by the spring. The abutment of the snuffer cup with the wick guide 30 stops further closing movement of the cap. This discontinues further swinging movement of the slots 78—78 beyond the position shown in Fig. 3 and since the pins are restricted to a vertical path of travel their upward movement will stop at the time the cap comes to rest. The pins being fixed to the cover member will hold the latter from any further upward movement beyond the level of the top wall 52 of the cap.

The depressible cover member forms a part of the casing of the lighter and in its raised position a large area of its side walls are exposed to view. To prevent marring or scratching of the exterior side wall surfaces of the cover member as it reciprocates in the clearance 22 between the receptacle 10 and casing shell 12, the lower edge of the cover member is turned slightly outwardly to form a projecting bulge or ridge 80. The ridge slidingly bears on the inside surface of the shell 12 preventing direct metal-to-metal contact between the balance of the cover member and the shell. For purpose of clarity, the width of the clearance 22 and the ridge 80 is shown in slightly exaggerated condition.

Figs. 13 to 17 inclusive illustrate a modification wherein the cover member 14 and the cap 50 of the previously described embodiment of the invention are shaped differently to provide a greater clearance around the wick and to change the outside appearance of the lighter. The remaining parts of the lighter may be constructed in the manner previously described.

In the modification, a cover member corresponding in function to the cover 14 of the earlier

form of the invention is indicated at 82. In general, the cover 82 exhibits an inverted cup-shaped formation including an upper end wall 84 and depending side walls 86—86 of similar formation. The cover member is elongated in horizontal cross section and the opposite ends of the side walls 86—86 are rounded or curved inwardly and integrally merged with one another to form opposed narrow side walls at opposite ends of the member. As in the previously described embodiment of the invention, the lower portion of the cover 82 is telescopingly slidably fitted between the outer casing shell or sleeve 88 and the fuel receptacle, the top wall of which is shown at 90 in Fig. 14. The upper end wall 84 of the cover serves as the thumb engaging portion of the device for telescopingly depressing the cover from its normal raised position shown in Fig. 13 to the fully depressed position shown in Fig. 14. The downward movement of the cover is yieldingly resisted by a return spring 92 similar to spring 60, the upper end section of which is housed in a tube 94 fixed to the underside of the end wall 84.

As in the previously described embodiment of the invention, the thumb engaging end wall 84 extends only part of the long dimension of the cover member, leaving an opening for the flame and the upper portion of the friction wheel. The inner terminating edge of the end wall is indicated at 96. Projecting inwardly from each side wall 86 of the cover is a pin 98 corresponding in function to the cap operating pins 76 of the previously described embodiment of the invention. Slightly beyond the pins 98, each side wall 86 is provided with a similar downwardly sloping edge 100 which as best shown in Fig. 15 terminates short of the bottom edge of the cover. From the lower terminus of each slanting edge 100, the side walls form a horizontal edge 102 which follows the curve of the rounded narrow side wall.

In the normal position of the parts the opening in the upper end of the cover member 82 is closed by a cap 104 shown in Fig. 16 and generally like the previously described cap 50. The cap includes a flat plate-like top wall 106 and a depending wall 108 which rounds the front end of the cap and extends along each side of the cap in parallel spaced apart relationship. Fixed in the rounded end of the cap is a snuffer cup 110 which is similar to cup 58 and functions to enclose the wick projecting out of the wick guide 112. Recessed inwardly from the side extensions of the cap wall 108 are side wall portions 114—114 similar in formation to one another and arranged in opposed parallel relation. These side wall portions are spaced apart sufficiently to straddle the friction wheel supporting ears 116—116 on the top of the fuel receptacle and extend between each of the ears and the adjacent side wall 86 of the depressible cover member as is evident in Fig. 14. The ears 116—116 are spaced inwardly from the opposite longitudinal edges of the top wall 90 of the fuel receptacle in the manner previously described to provide the clearances for the wall portions 114—114. Each side wall portion 114 is provided with a substantially centered hole 118 which aligns with the hole in the opposite wall portion for the purpose of receiving the ends of the friction wheel supporting shaft 120.

The recessed character of each wall portion 114 to the side wall 108 of the cap provides a shoulder 122 which is clearly evident in Fig. 16. The two shoulders 122—122 are similarly inclined to the plane of the top wall 106 of the cap and are so formed that in the closed position of the cap they substantially abut the slanting edges 100—100 of the depressible cover member as shown in Fig. 13. The stepped or shouldered formation of the side of the cap may be accomplished as shown in Fig. 14 by making the wall portion 108 of a greater thickness than the wall portions 114—114. However, these wall portions may be formed from metal stock of the same thickness and jogged to form the slanting shoulders 122—122. The cap is so dimensionally proportioned with respect to the cover member 82 that in its closed position the slanting shoulders 122—122 and the bottom edge of the wall portion 108 substantially abut the slanting edges 100—100 and the horizontal edge 102 of the cover member. In this position the top wall 106 of the cap extends flush with the thumb engaging wall 84 of the depressible cover element.

As in the previously described embodiment of the invention the cap 104 is moved to opened position exposing the wick when the cover member is depressed. This is accomplished in a manner similar to that previously described by providing the cap with slanting slots 124—124 into which the pins 98 of the cover extend. These slots are located in the recessed side wall portions 114—114 of the cap and open out through the corners formed by these portions with the inner end of the top wall 106 of the cap. The action of the pins in the slots is similar to that previously described in connection with Fig. 8.

Also, as in the earlier form of the invention hereinabove described, the friction wheel shaft 120 is only exposed for removal and attachment when the cover member is substantially fully depressed. As shown in Fig. 14 and in the full line position of the parts in Fig. 17, the top wall 84 of the cover member in its fully depressed position extends on a level below the shaft 120. The slanting edges 100—100 of the cover member function to expose the ends of the shaft as the cover member reaches the lowest level of its depressible movement. In all other positions of the cover member, the side walls 86—86 overlie the ends of the shaft and serve as retaining means therefor holding the same from any axial displacement.

What I claim is:

1. A lighter comprising, in combination, a fuel receptacle elongated in horizontal cross-section, a fuel guide and a pyrophoric element guide arranged to open out through the top of the receptacle adjacent to one narrow side thereof, a pair of flat post-like elements projecting upwardly from the top of the receptacle in parallel spaced apart relation to one another, an endwise removable pin bridging the space between the posts and extending through the posts and beyond the outer faces thereof, a friction wheel rotatably journaled on the bridging portion of the pin between the elements, a depressible cover of inverted cup-shaped formation and elongated in horizontal cross-section, said cover member slidingly telescoping the upper end of the receptacle and movable from a raised position wherein it forms a hood enclosing the wheel to a depressed position below said pin wherein the pin may be endwise removed from the friction wheel, the end wall of the cover member being provided with an aperture for that part of its extent overlying the wheel

and being of a size to permit the wheel to project therethrough when the cover member is depressed, spring means carried by the receptacle and projecting thereabove to yieldingly oppose the depressible movement of the cover member, a cap member having depending wall portions arranged to straddle said pair of wheel mounting elements and being pivotally connected to the projecting extremities of said pin to provide swingable movement of the cap member from a closed substantially horizontal position to an open upright position, said cap member in closed position occupying the area of said aperture and extending flush with the end wall of the cover member, a flame snuffer carried on the underside of the cap member, a one-way driving connection between the cap member and the wheel and operable to rotate the wheel when the cap member is swung to open position, and a driving connection between the cover member and the cap member and operable in response to the depression of the cover member to cause the cap member to swing to open position.

2. In a lighter, a hollow body having two relatively flat oppositely disposed side walls, a pair of flat-sided posts secured to and rising upwardly from the upper end wall of the body in opposed parallel spaced apart relation to one another, said posts being displaced inwardly from and extending parallel to said side walls of the body and each provided with an aperture aligning with the other, an endwise removable pin bridging the space between the posts and extending through the apertures thereof and having its extremities projecting therebeyond, but not past the planes of said side walls of the body, a friction wheel journaled on said pin between the posts, a depressible cover member of inverted cup-shaped formation having its side walls slidingly telescopingly embracing the upper portion of the body and being movable from a raised position where it forms a hood enclosing the posts and the friction wheel to a depressed position below the level of said wheel journaling pin, the upper transverse wall of the cover member which constitutes the base of its cup-shaped formation having an opening for that part of its extent overlying the wheel and the posts and being of a size to admit the same when the cover member is depressed, a cap member for closing the opening of the cover member, said cap member having a pair of opposed depending side wall portions straddling said posts and interposed between the same and the side walls of the cover member, said depending side walls of the cap member being pivotally mounted upon the projecting extremities of the wheel journaling pin, the side walls of the cover member normally overlying the extremities of the wheel journaling pin but when fully depressed exposing the extremities of the wheel journaling pin for endwise removal and assembly.

3. A lighter comprising, in combination, a fuel receptacle having a fuel outlet and a pyrophoric material guide opening out through the upper end thereof, an abradant wheel, a rotatable mounting for the wheel supported on a pair of post-like elements arranged in opposed parallel spaced apart relation, said elements being fixed to the upper end of the receptacle in upwardly projecting relation thereto and displaced inwardly from and extending parallel to two opposite side walls of the receptacle, a depressible cover member of inverted cup-shaped formation having a flat end wall portion overlying the upper end of the receptacle and depending side wall portions slidingly telescoping the sides of the receptacle, said cover member forming a hood over the top of the receptacle and completely enclosing the parts thereon except for the provision of an opening in the end wall portion thereof over the wheel and the fuel outlet, a cap member for said opening having a flat end wall portion normally extending flush with the end wall portion of the cover member and further having depending parallel side wall portions disposed between the side wall portions of the cover member and said wheel mounting elements, means pivoting the side wall portions of the cap member on the post-like elements for swinging movement about the axis of rotation of the wheel from its flush closed position to a substantially vertical open position, a driving connection between said cap member and the wheel and operable to rotate the wheel when the member is swung to its open position, and a driving connection between the cover member and the cap member and operable to swing the latter to open position when the cover member is depressed.

4. In a lighter, a fuel receptacle having a pair of opposed substantially parallel side walls and a flat top wall, a fuel emission port and a pyrophoric element emission port both opening out through the top wall of the receptacle, a pair of similar flat-sided elements fixed to the top wall of the receptacle and projecting upwardly therefrom in substantially parallel opposed relation to one another and in planes spaced inwardly of the planes of said side walls of the receptacle, a pivot shaft bridging the space between said elements and having its end sections extending through the elements and projecting therebeyond but short of the planes of said side walls, a friction wheel mounted on the bridging portion of the shaft and rotatable about the axis thereof, a cover member of inverted cup-shaped formation slidingly telescoping the upper end of the receptacle and being reciprocably telescopingly movable from a raised position where it forms a hood for the friction wheel and said ports to a depressed position below the level of the upper part of the wheel, the upper transverse wall of the cover member which constitutes the base of its cup-shaped formation having an opening overlying the friction wheel and being of a size to permit the wheel to project therethrough when the cover member is depressed, a snuffer cap member so dimensionally proportioned as to substantially fully occupy said opening of the cover member and extend flush with the upper transverse wall thereof in one position of its movement and at the same time close the fuel emission port, said cap member having oppositely disposed depending substantially parallel side walls extending between said elements and the adjacent side wall portions of the cover member and being mounted on said projecting ends of the pivot shaft for swinging movement about the axis thereof, and an operative connection between said cover member and said cap member and operable in response to the depressive movement of the former to swing the latter to a substantially upright open position, and an operative connection between the cap member and the wheel and operable to drive the wheel when the cap member is swung to open position.

5. A lighter comprising, in combination, a fuel receptacle having a fuel outlet and a pyrophoric

material guide opening out through the upper end thereof, an abradant wheel, a rotatable mounting for the wheel supported on a pair of post-like elements fixed to the upper end of the receptacle and projecting upwardly thereabove in spaced apart parallel relation, said elements being displaced inwardly from and extending parallel to two opposite side walls of the receptacle, a depressible cover member of inverted cup-shaped formation having a flat end wall above the upper end of the receptacle and depending side wall portions slidingly telescoping the sides of the receptacle, said cover member forming a hood over the upper end of the receptacle and completely enclosing the parts thereon except for the provision of an opening in the end wall thereof over the wheel and the fuel outlet, a cap member for said opening having a flat end wall portion normally extending flush with the end wall portion of the cover member to close the opening and further having depending parallel side wall portions straddling the post-like elements and disposed between the same and the side wall portions of the cover member, means pivoting the depending side wall portions of the cap member on the post-like elements for swinging movement about the axis of rotation of the

wheel from its flush closed position to a substantially vertical open position, a driving connection between the cap member and the wheel and operable to rotate the wheel when the cap member is swung to open position, and one or more transversely extending pins carried by the cover member and engaging the cap member to provide a driving connection between the cover member and the cap member for swinging the latter to open position when the cover member is depressed.

WILLARD F. WAGNER.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,026,571	Dubinski	May 14, 1912
2,449,314	Nissen	Sept. 14, 1948
2,523,511	Martindell	Sept. 26, 1950
2,532,650	Tigges	Dec. 5, 1950

FOREIGN PATENTS

Number	Country	Date
221,577	Germany	May 3, 1910
685,360	France	Mar. 31, 1930