Nov. 28, 1939. J. F. AYOTTE ET AL 2,181,447

LOCK SWITCH FOR FLASHLIGHTS

Filed Feb. 24, 1939 4 Sheets-Sheet 1

Fig. 1.

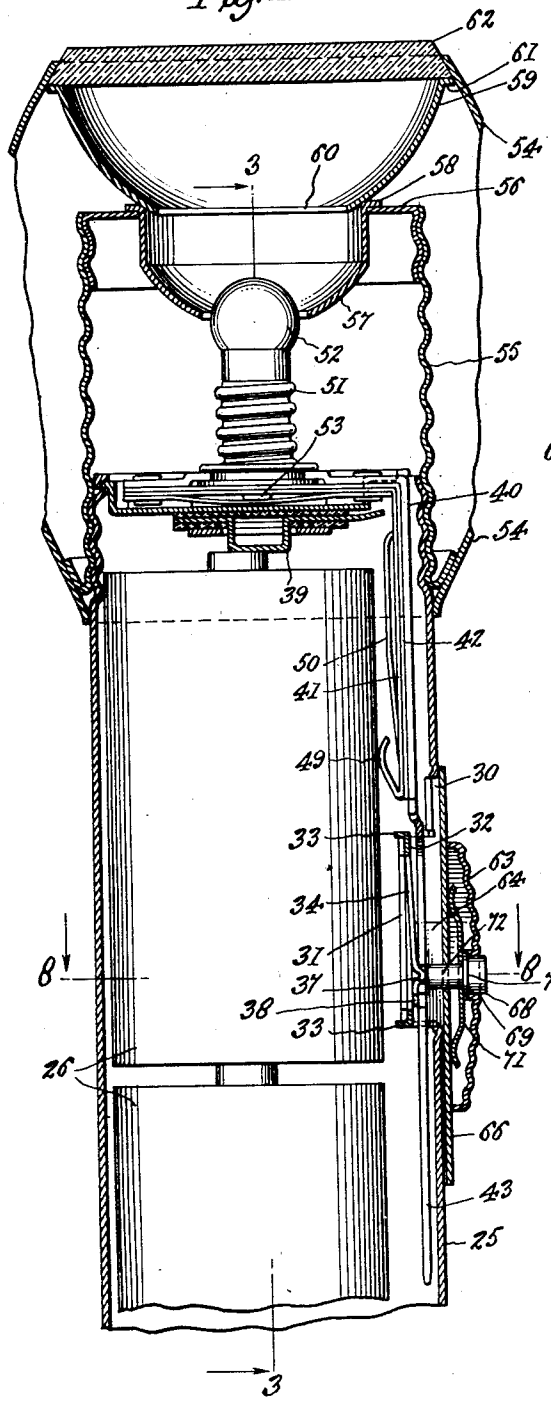
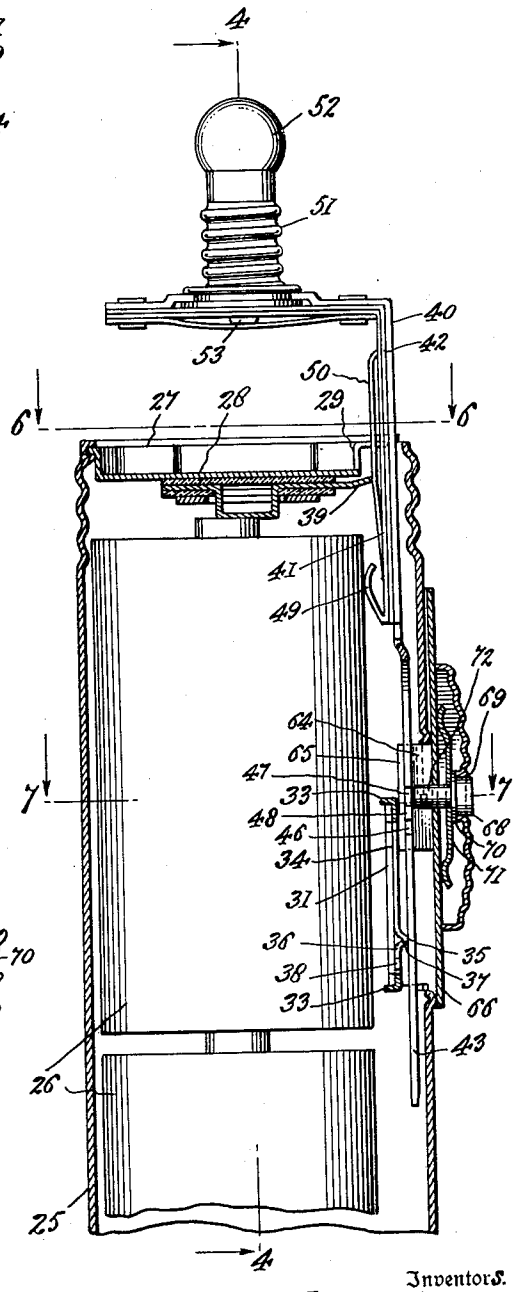


Fig. 2.



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Filed Feb. 24, 1939 4 Sheets-Sheet 2

Fig. 3.

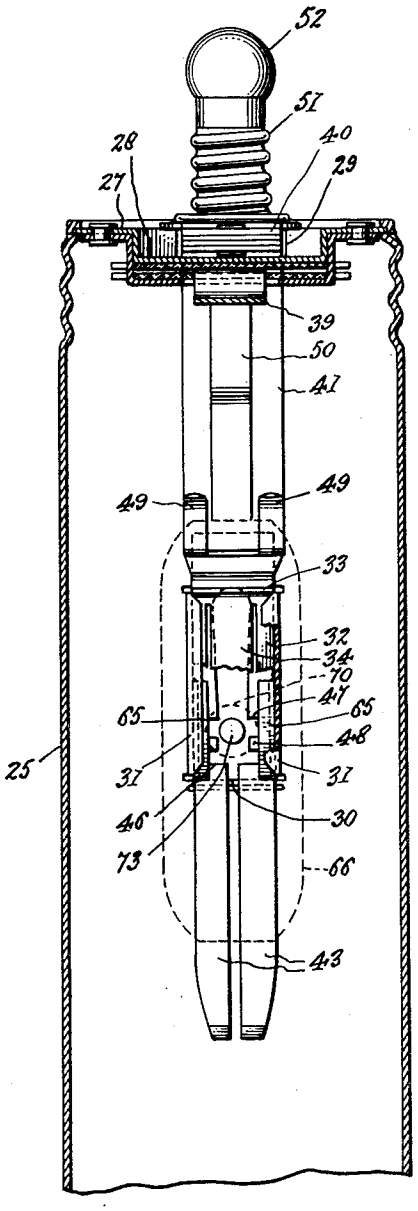
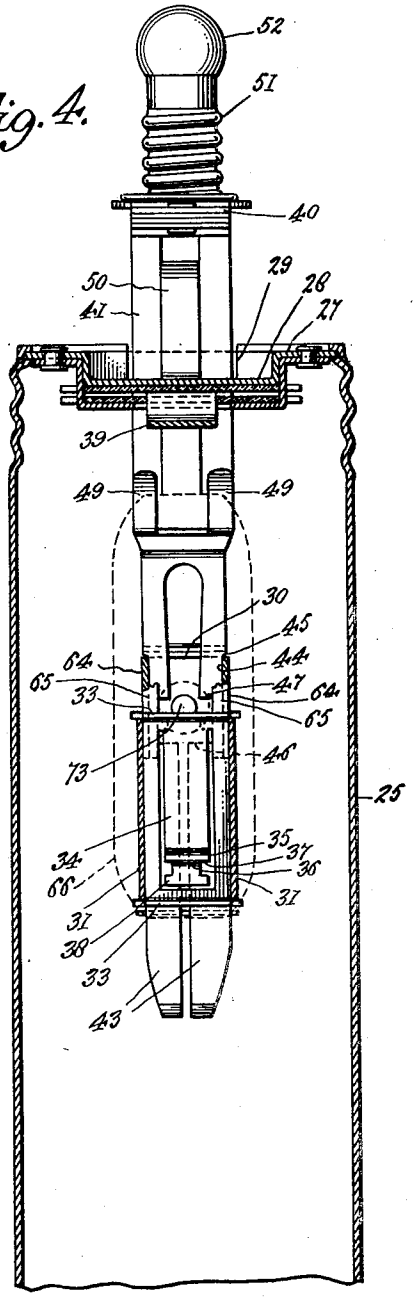


Fig. 4.



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Filed Feb. 24, 1939 4 Sheets-Sheet 3

Fig. 5.

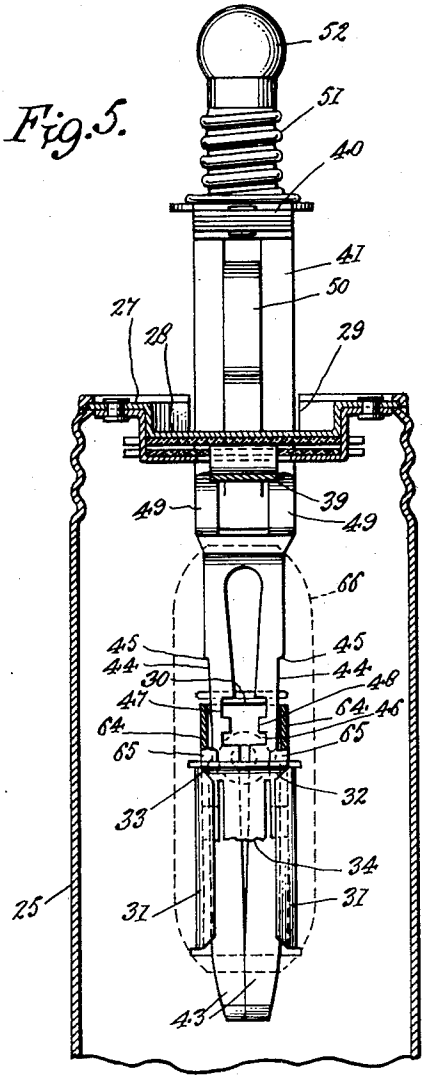


Fig. 6.

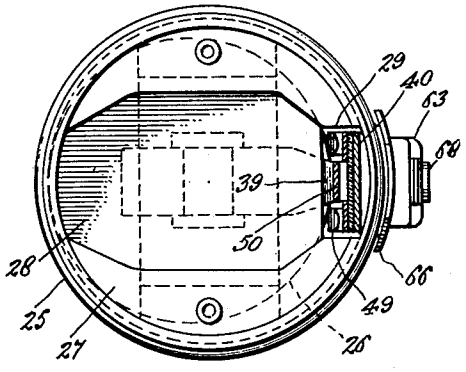


Fig. 7.

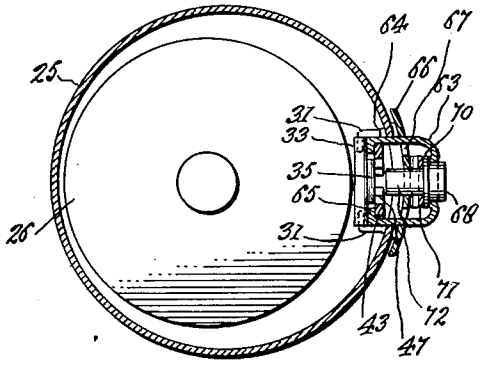


Fig. 8.

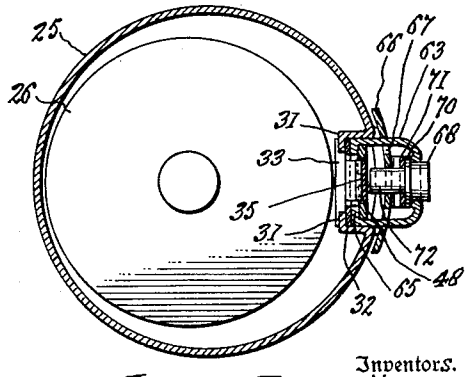
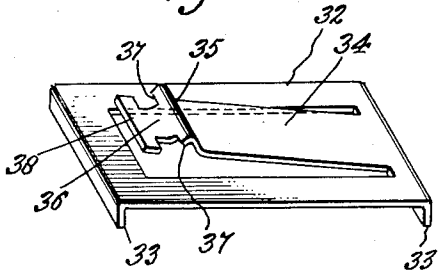


Fig. 9.



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Nov. 28, 1939. J. F. AYOTTE ET AL 2,181,447

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Filed Feb. 24, 1939 4 Sheets-Sheet 4

Fig. 10.

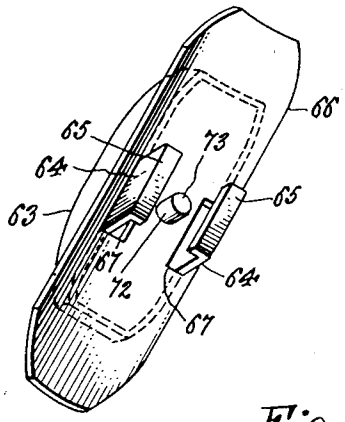


Fig. 11.

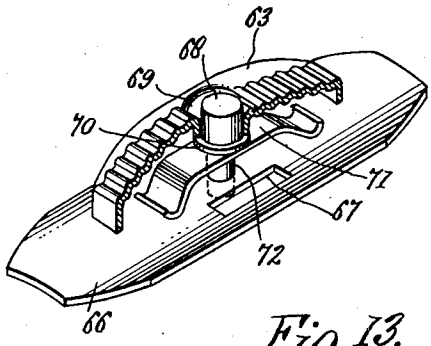


Fig. 12.

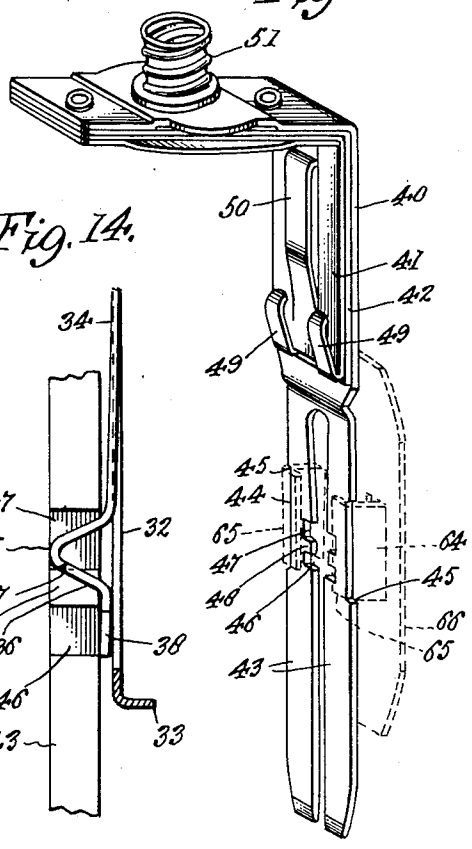


Fig. 13.

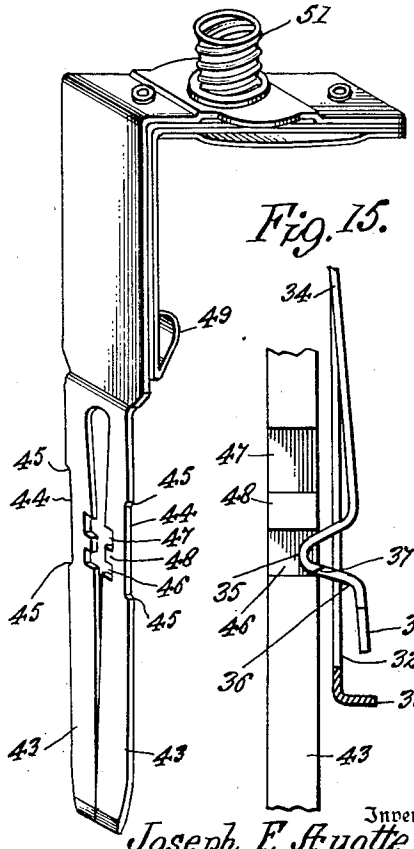


Fig. 14.

Fig. 15.

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2,181,447

UNITED STATES PATENT OFFICE

2,181,447

LOCK SWITCH FOR FLASHLIGHTS

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Application February 24, 1939, Serial No. 258,332

6 Claims. (Cl. 240—10.66)

The present invention relates to flashlights, particularly of the one hand focusing type, and embodies certain improvements in the flashlights disclosed in the patents granted July 19, 1938 to A. J. Scholtes No. 2,124,153 and granted July 26, 1938 to E. H. Tompkins and I. T. Holihan No. 2,125,038.

An object of this invention is to provide a locking device for the switch of these prior patented structures without losing any of the novel features thereof and without such changes in structure as would prohibit the manufacture and use of this invention in combination therewith.

Another object of the invention is to provide certain novel detail improvements in the parts of the prior patented structures, above referred to, which admit of a novel relationship between the parts and the locking device to admit the holding of the flashlight in one hand and, by movement of the thumb of the same hand, releasing the switch, closing the lamp circuit, and moving the lamp into its various focal positions. This object also embodies a structure which admits of the quick and easy release and removal of the combined lamp carrier and circuit forming slide, and all of the thumb and locking and releasing parts which are normally interlocked, without the use of any tools; merely by manipulation of the parts when adjusted into a predetermined position.

Another feature of this invention is to provide a locking device which is operable only when the switch slide is in "off" position so that to operate the flashlight one must first release the switch. Thereafter, however, the various focal positions of the flashlight may be determined by frictional stops and the locking device is held from operation during these latter adjustments so that the user does not have to release the locking device once the switch is released.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views;

Figure 1 is a fragmentary sectional view taken longitudinally through a flashlight, centrally of the switch thereof, showing an embodiment of the present invention and with the switch locked in "off" position.

Figure 2 is a like view but with the combined switch and lamp slide released and in its outermost focusing position.

Figure 3 is a longitudinal section taken on the line 3—3 of Figure 1 at right angles thereto and partly broken away, showing the switch releasing button and the parts in locked position.

Figure 4 is a similar view taken on the line 4—4 of Figure 2 with the parts in their outermost focusing position.

Figure 5 is a fragmentary section similar to Figure 4, but showing the combined switch and lamp slide in partly withdrawn position.

Figure 6 is a transverse section taken through the flashlight on the line 6—6 of Figure 2.

Figure 7 is a like view taken on the line 7—7 of Figure 2.

Figure 8 is a transverse section taken on the line 8—8 of Figure 1 through the locked switch.

Figure 9 is a detail perspective view of the combined latch and lock plate detachably carried in the side of the casing.

Figure 10 is a detail perspective view of the inner side of the exterior thumb piece with its slide plate and other parts assembled together.

Figure 11 is a similar view of the outer side thereof, partly in section to show the lock releasing button.

Figure 12 is a detail perspective view of the inner side of the combined switch and lamp slide, the dotted lines showing the relation of the thumb piece yieldably connected thereto.

Figure 13 is a like view showing the reverse or outer side of the slide.

Figure 14 is a fragmentary enlarged sectional view of the shank of the lamp and switch slide with the combined latch and lock plate, the parts being in locked position with the switch in "off" position, and

Figure 15 is a like view, but with the switch slide in its first forward position and with the latch and locking plate yieldably holding the parts therein.

For the purposes of illustration the improvements of this invention are shown as applied, generally, to the structure of flashlight disclosed in the above referred to Tompkins and Holihan Patent No. 2,125,038.

Referring now to the drawings, 25 designates a flashlight casing shown as of tubular construction adapted to contain a number of dry cells or batteries 26 to supply current for the flashlight. An end wall 27 closes the outer end of the casing and has a transverse depression 28 extending across the central portion of the wall and terminating at one end in a slot 29 opening against one side of the casing. The casing also has, in said wall and in line with the slot 29, a

longitudinally extending opening 30 having ledges 31 offset inwardly from the opposite lateral marginal edges of the opening.

Supported on the ledges 31 opposite the opening 30 is a combined latch and locking plate 32, shown in detail in Figure 9. This plate 32 embodies one of the novel features of this invention. The opposite longitudinal edges of the plate 32 seat against the ledges 31 and the plate is held against longitudinal movement in the casing 25 by opposite end flanges 33 which extend over the opposite ends of the ledges 31, the latter being proportioned in length to fit snugly between the flanges 33. Stamped from the central portion of the plate 32 is a spring tongue 34 which is connected to the upper portion of the plate and springs at its lower end outwardly of the casing toward the opening 30. Near its free end, the spring tongue 34 has a transverse rib 35 crimped outwardly and having inclined opposite sides providing cam faces. Beyond the rib 35, the tongue 34 is recessed in its opposite sides and the recesses extend into the adjacent side of the rib 35 to provide a central shank 36 with locking shoulders 37 at opposite sides thereof and near the crown of the rib. The extremity of the tongue 34 has a T head 38 disposed substantially in the plane of the tongue 34.

The casing end wall 27 carries at its inner side an insulated battery contact 39 looped inwardly at the central portion of the wall to engage the terminal of the adjacent battery 26 and having its free end projecting toward the side of the casing 25 in line with the slot 29 of the end wall.

Mounted for longitudinal sliding movement in the side of the casing 25 is a combined lamp and switch slide, shown in detail in Figures 12 and 13. This slide has an outer metal strip 40, an inner metal strip 41 and an interposed insulating strip 42. These strips are superposed and are bent at right angles near one end, the upper end as shown, and the angle portion is adapted to register with the depression 28 in the casing end wall 27 when the slide is in place. The lower end of the slide has the outer strip 40 longer than the inner strip 41 to provide a shank, and the latter is slotted lengthwise from its end to provide a pair of spaced apart spring arms 43. Intermediate the length of the shank, the spring arms 43 have in their outer edges shallow depressions 44 with slight shoulders 45 at opposite ends which may be beveled or otherwise constructed to offer frictional resistance only and to compress the spring arms 43 toward one another when the shank is forced longitudinally from between an interengaged part of the flashlight structure as later will be described.

In the inner edges of the arms 43, in the zone of the depression 44, are pairs of opposed recesses providing transverse slots 46 and 47 with intermediate short projections 48 which are of less depth than that of the lower edges of the lower slot 46. The slots 46 and 47 are of sufficient length to receive therein the rib 35 of the spring tongue 34, as shown in Figures 14 and 15, and the space between the ends of the projections 48 is of sufficient size to admit the central shank 36 of the tongue to pass between the projections, Figure 14, so that the rib 35 may enter the slot 47 and engage the shoulders 37 of the rib against the edges of the projections 48 and lock the lamp and switch slide in "off" position. The lower edges of the slot 46 as shown in Figure 15 overlap the shank 36 when the rib 35 projects into the slot 46 and hold the shoulders 37 from locking engagement with the lower edges of the slot 46 so that a friction stop is provided between the lamp and switch slide and the stationary tongue plate 32.

The combined lamp and switch slide has its inner metal strip 41 terminating above the spring arms 43 and provided with upturned spring fingers 49 adapted to bear against the side of the adjacent battery 26 to hold the latter tightly within the casing 25. The inner strip 41 is also provided with a long spring contact 50 which is struck inwardly from the strip and extends upwardly thereof for a considerable distance and terminates at its upper end in spaced relation to the angle portion of the slide so that, as shown in Figure 1, when the slide is fully retracted the contact 50 will be spaced inwardly of the battery contact 39 and the circuit of the flashlight will be open. The angle portion of the slide is provided on its outer side with a lamp socket 51 which is in electrical connection with the outer strip 40 of the slide and which is adapted to receive a flashlight lamp or bulb 52. The central contact 53 of the lamp is adapted to project inwardly through the socket 50 and engage the angle portion of the inner metallic strip 41. The outer strip 40 is in electrical contact with the casing 25 so that the circuit through the lamp is completed when the slide is advanced forwardly a distance sufficient to engage the spring contact 50 with the battery contact 39, and the length of the spring contact 50, as shown in Figure 2, maintains the circuit closed during the various adjustments of the slide after it has been advanced from the inner or "off" position.

The flashlight may be provided with any suitable head structure, and as shown in the present instance is provided with a head shell 54 having an internal threaded sleeve 55 at its inner end for adjustable threaded engagement upon the outer end of the casing 25. The outer end of the sleeve carries a supporting and centralizing disc 56 which has a threaded flange for adjustable engagement in the outer end of the sleeve 55 and which has a central opening through which is supported an inner reflector 57. The reflector 57 is provided with a cylindrical outer end portion terminating in a flange 58 which overlaps the disc 56 and which serves as a seat for the inner end of an outer second reflector 59. The reflector 59 has a central opening 60 through its inner end for passage of reflected light rays from the inner reflector 57, and is provided at its outer marginal edge with an outturned flange 61 adapted to seat against the inner side of a lens 62. The lens 62 is held against the outer reflector 59 by the outer marginal edge portion of the head shell 54, as shown in Figure 1.

The combined lamp and switch slide is operated from the exterior of the flashlight casing 25 by a thumb piece 63 which, as shown in Figures 10 and 11, may be given any suitable exterior configuration and is in the form of a curved plate provided intermediate its ends with flanges 64 projecting from the opposite edge portions of the thumb piece 63 and which are of sufficient length to project through the opening 30 and in the casing 25. The flanges 64 are spaced apart a distance sufficient to snugly receive the spring arms 43 of the switch slide therebetween, and the flanges 64 have at their inner edges overturned portions 65 which overlap the inner side of the slide to hold the thumb piece 63 from pulling away from the casing. The flanges 64 are of sufficient length to fit in the depressions 44 in the

outer edges of the spring arms 43 and are yieldingly held from longitudinal sliding movement on the arms 43 by the opposed shoulders 45. As before stated, these shoulders are constructed to admit of the longitudinal sliding of the arms 43 from between the flanges 64 when abnormal pressure is exerted upon the slide to withdraw it from the end of the casing. The thumb piece 63 is provided with an outer cover plate 66 which is interposed between the thumb piece and the outer side of the casing and has slots 67 therein through which the flanges 64 may pass, the flanges 64 holding the plate 66 for movement with the thumb piece, and the plate 66 being of sufficient length to at all times cover the opening 30 in the side of the casing. The flanges 64 are of less length, longitudinally of the thumb piece, than the length of the opening 30 in the casing so that the thumb piece and the switch slide may move together into various adjusted positions lengthwise of the casing.

Means is provided for locking the slide and thumb piece in retracted or "off" position. The means comprises a button 68 which is slidably mounted in a depression or cup 69 provided in the intermediate portion of the thumb piece 63. The button 68 has an outstanding flange 70 at its inner end against which bears a spring 71 of the leaf type having its opposite ends engaging the cover plate 66 so as to normally urge the button 68 outwardly, the flange 70 of the button bearing against the open bottom of the cup 69 to hold the button 68 in the thumb piece. The inner end of the button has a short stud 72 which projects through a central opening 73, Figure 10, and the stud is of sufficient length to engage through the slot 47 of the switch slide to bear against the locking rib 35 of the spring tongue to retract the rib out of the slot 47 and remove the locking shoulders 37 from the path of the projections 48 so that the thumb piece and slide may be moved forwardly by thumb pressure while the locking plate 32 remains stationary in the casing. The spring 71 has a two-fold purpose. First it holds the button 68 against vibration and rattling at all times, and second it maintains the stud 72 out of interlocking engagement with the slot 47 and adjacent parts of the switch slide.

Thus, when the slide is moved outermost the flanges 64 of the thumb piece engage the outer marginal edge of the opening 30 in the casing so that the thumb piece cannot move outward to any further extent. The switch slide may now be grasped at its angle portion, the head shell 54 being first removed, and be drawn forcibly outward with sufficient pressure to cause the shoulders 45 to ride over the edges of the flanges 64, compress the arms 43 toward each other and thus permit the switch slide to be drawn outwardly from and release the thumb slide.

In operation, the "off" position is shown in Figure 1. Here the slide is fully retracted and the contacts 39 and 59 are spaced apart to open the circuit through the lamp 52. In this position of the parts, as shown more in detail in Figure 14, the rib 35 of the stationary spring tongue 34 engages in the slot 47 with the shoulders 37 in the path of the slide projections 48. The shank 36 of the tongue moves between the projections 48 so as to permit the shoulders 37 and the rib 35 to extend out into the slot 47 sufficiently to interlock the slide to the stationary tongue 34.

To use the flashlight, the operator first depresses the button 68 and forces the stud 72 thereof against the rib 35 and retracts the latter from the slot 47, thus releasing the slide from the tongue 34. The button 68 is held depressed while the thumb piece is slid outwardly until the slot 47 is carried out of registry with the rib 35 of the tongue 34. In this retracted or "off" position the tongue 34 serves as a locking means for the switch slide, and can be released only by depression of the button 68.

After releasing the slide, the same may be moved outwardly into the first "on" position by merely pressing lengthwise on the thumb piece 63. During this movement the slide advances and brings the second slot 46 into register with the rib 35 of the stationary spring tongue 34. The rib 35 snaps into the slot 46 as far as the tongue shank 36 permits, the latter being of greater width than the slit between the spring arms 43 of the slide and engaging the lower edges of the slot 46, as shown in Figure 15. The slot 46 and the bead 35 with its parts are so proportioned that the locking shoulders are held from engagement with the lower edge of the slot 46 and consequently no locking takes place. However, the rib 35 engages in the slot 46 sufficiently to provide a friction stop and indicating means that the slide is in a certain predetermined position. In this first position the contacts 39 and 59 are brought together for closing the flashlight circuit and lighting the lamp 52. The slide also advances and holds the lamp 52 into and at the first focal position in the inner reflector 57.

Further outward adjustment of the slide is effected by pressure on the thumb piece 63 sufficient to overcome the tension of the spring tongue 34 for snapping the rib 35 out of the slot 46, and to slide the lower portions of the slide arms over the rib 35 until the thumb piece flanges 64 strike the outer edge of the casing opening 30. This outermost position is shown in Figures 2 and 4, and the lamp 52 is then approximately in the focal center of the outer reflector 58. The lamp 52 may be moved into differently adjusted positions throughout the range of sliding movement of the slide, the flashlight circuit being closed and maintained closed throughout all adjustments excepting the innermost "off" position with the contact 59 moved inwardly from the battery contact 39.

The tongue 34 serves as a locking means for holding the flashlight parts in "off" position, as a yieldable stop means for determining at least one "on" position of the flashlight, and as a tension means for retaining the slide frictionally in various other desirable "on" positions. The cooperative structures of the tongue 34 and the slide effect these various operations and adjustments.

When it is desirable to remove the slide from the casing, the head shell 54 is first removed so that access may be had to the angle portion of the slide. The slide is then slid out into full forward position, as shown in Figures 2 and 4. The thumb piece flanges 64 are stopped by the outer end of the casing opening 30 and cannot slide outwardly any further. The casing 25 is held in one hand and the outer end of the slide is grasped in the other hand and pulled outwardly with a force sufficient to cam the shoulders 45 over the inner edges of the flanges 64 of the thumb piece. This operation springs the arms 43 toward each other and forces the flanges 64 from the depressions 44 in the arms, as shown in Figure 5. The slide may now be drawn outwardly from the casing through the slot 29 in the end wall 27, and the arms 43 free the flanges 64 so that the thumb piece 63 with its parts may be

removed from the outer side of the casing 25. The tongue plate 32 may now be removed from the ledges 31 through the casing opening 30. The switch slide and the thumb piece, with their cooperating parts, may thus be easily separated and removed from the casing, and may as easily be returned to their interlocked positions.

What is claimed is:

1. In a flashlight, a casing having a stationary spring tongue therein, a combined lamp and switch slide mounted in the casing and having spaced cross slots therein with opposed projections separating the slots and providing a passage therebetween, said tongue having a rib normally urged into one of said slots when said slide is in retracted circuit open position, said rib having locking shoulders thereon for engagement with said projections to lock the slide against movement from its retracted position and having a shank extending from between the projections to permit the shoulders to engage the projections, means for retracting said rib out of the slot to release the slide, and means for shifting the slide to close the circuit and focus the lamp, said tongue adapted to project the rib into the second slot when the latter registers therewith and the said shank adapted to engage the edge of the second slot and hold the shoulders out of interlocking engagement therewith, whereby the rib is adapted to frictionally stop the slide and indicate a predetermined focal position of the lamp.

2. In a flashlight, a casing, a combined lamp and switch slide in the casing adapted to be slid backwardly into "off" position and forwardly into "on" position and into at least one focusing position with the light on, said slide having a shank with at least two cross slots therein and opposed short projections separating the slots with a wide channel therebetween, and a combined locking and latching plate fixed on the casing and having a spring tongue bearing against the shank of said slide, said tongue having a rib thereacross with locking shoulders at one side and a narrow shank between the shoulders, said rib adapted to engage in one slot and with its shank between said projections and its shoulders bearing against the projections for locking the slide against movement in the casing, means for retracting said spring tongue to withdraw the rib from said slot and release the slide, said rib adapted upon the forward movement of the slide to engage in the second slot and with its shank bearing against the edge of the slot remote from the projections to hold the rib shoulders out of contact with said edge of the second slot and yieldingly hold the slide in a forward position.

3. In a flashlight, a casing having a locking member therein, a combined lamp and switch slide mounted in the casing and bearing against said locking member, an exterior thumb piece mounted on the casing and connected therethrough to said slide, said slide adapted to be retracted into circuit open position and having cooperating means for register with said locking device when the slide is in retracted position to lock the slide in the casing against movement, and means for releasing said locking device to free the slide for outward movement into circuit closing and lamp focusing positions, said slide having a second cooperating means adapted to register with said locking means on the casing, and further having a structural abutment to prevent complete interlocking of the slide and admit of the adjustment thereof under pressure.

4. In a flashlight, a casing having a spring locking tongue, a combined lamp and switch slide mounted in the casing and movable over the tongue, means for operating the slide to retract the same into circuit open position, said slide having a locking portion for registry with the locking tongue when the slide is retracted to hold the slide against adjustment, and means for releasing the locking tongue, said slide having a second locking means thereon for cooperation with the tongue to lock the slide in an advanced position and said locking tongue having means cooperating with the slide to hold the locking means against interlocking engagement with the slide in said advanced position of adjustment.

5. In a flashlight, a casing having an opening in one side with inwardly offset ledges at the opposite sides of the opening, a locking plate seated on said ledges and having opposite end flanges to engage the ledges and hold the plate against lengthwise movement in the casing, a thumb piece fitted against the side of the casing and having a pair of spaced flanges extending inwardly through said opening of the casing and being of a length less than that of the opening to admit of the longitudinal sliding of the thumb piece, said flanges having their inner edges turned inwardly toward each other and being of sufficient depth to bear against the outer side of said locking plate to hold the same on said ledges, and a combined lamp and switch slide having a shank portion engaging in the casing and slotted at its inner end to provide a pair of edgewise springing arms adapted to be compressed between the flanges of the thumb piece, said arms having shallow depressions in their outer edges with stop shoulders at opposite ends of the depressions, said flanges adapted to engage in said depressions and against said shoulders for holding the slide and thumb piece for movement as a unit, the shoulders of said depressions being relatively shallow and adapted to be cammed over the edges of said flanges to contract said springing arms for freeing the slide from the thumb piece upon application of increased outward pressure on the slide after the thumb piece has moved to the outer end of said opening in the casing, said springing arms having spaced slots therein and said locking plate having a spring tongue with a transverse bead for interlocking engagement in said slots when the slide is moved into the corresponding positions of registry with the bead of the tongue, said tongue and one of said slots having cooperating structural means for admitting interlocking of the slide with the tongue to hold the slide in retracted position, and means for releasing the tongue from the slide, said tongue and the slide at the second slot having cooperating means to prevent interlocking of the slide and to hold the same frictionally in adjusted position.

6. In a flashlight, a casing having a stationary spring tongue therein, a combined lamp and switch slide mounted in the casing and having a cross slot therein, said tongue having a rib normally urged into said slot when the slide is in retracted circuit open position, said rib having locking shoulders thereon for engagement with the marginal edge of said cross slot to lock the slide against movement from its retracted position, means for retracting said rib out of the slot to release the slide, and means for shifting the slide when released to close the circuit and focus the lamp.

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