Nov. 28, 1950 R. F. LANDWEHR 2,531,632

CIGARETTE LIGHTER

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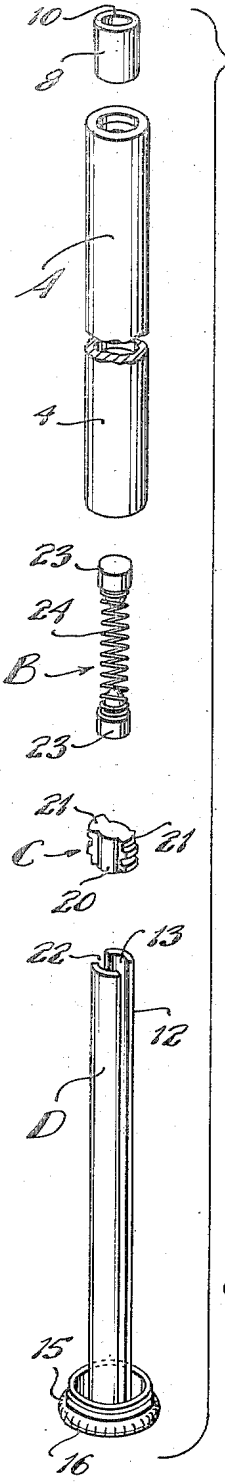


Fig. 2.

Fig. 1.

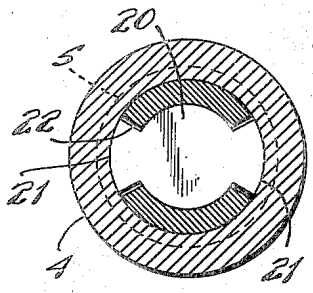


Fig. 3.

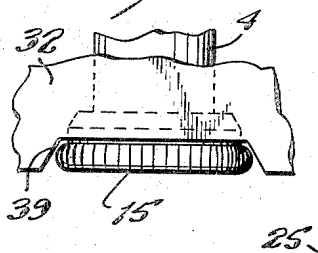


Fig. 4.

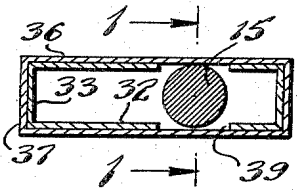
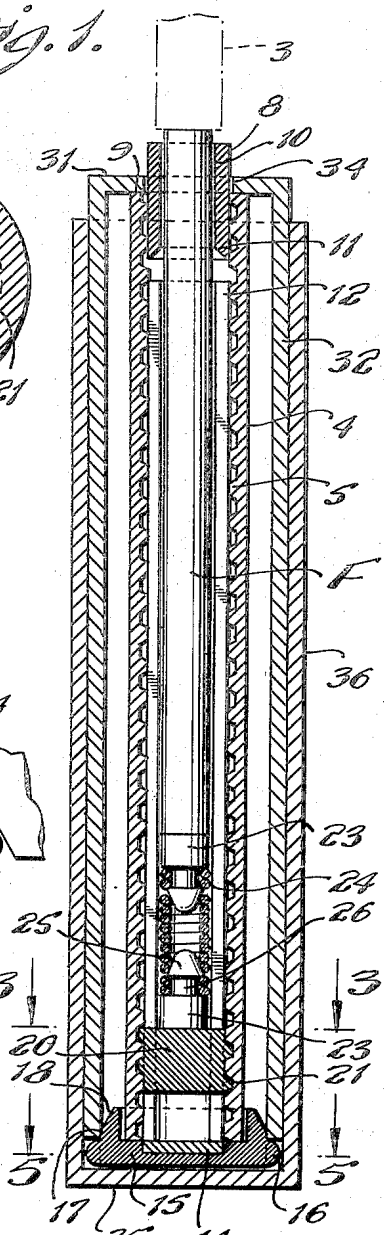


Fig. 5.



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CIGARETTE LIGHTER

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5 Claims. (Cl. 67—7.1)

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This invention relates generally to pocket cigarette lighters employing flints for spark igniting purposes and more particularly to the flint holding and advancing means.

One of the objects of the invention is to provide an improved flint supporting and advancing mechanism.

A further object is to provide a flint tube assembly which will permit the more efficient utilization of the flint and the use of longer flints.

A still further object of the invention is to provide a flint advancing mechanism which will properly support the flint along its length and apply uniform pressure over its entire undersurface to prevent jamming.

A still further object of the invention is to provide a flint tube assembly which will permit ready and easy replacement of flints.

Still another object of this invention is the provision of a flint tube assembly of such construction as will be easily and cheaply manufactured and assembled.

These and other objects are secured by this invention as will appear more fully from the disclosure hereinafter.

In the usual forms of cigarette lighter now found on the market, it is customary to use one or more relatively short flint sections approximately for example one-quarter inch more or less in length, loosely contained within the flint tube and subjected to advancing spring pressure to advance a flint section through the discharge mouth of the tube against the flint wheel.

In the customary cigarette lighter, the advancement of the flint section or sections is effected through the manual manipulation of a member at the lower end of a flint tube and, as a result, where only one section is employed, the spring has to be almost the length of the flint tube itself. Where such a spring is of the spiral type, that length will subject the spring to buckling and also thereby reduce its effectiveness. In addition, such type spring will have its upper end engage the lower end of the flint section off-center so that tilted movement will be imparted to the flint. The mouth of the flint tube has sufficient tolerance for free passage therethrough of the flint section. Where a number of short flint sections are inserted to shorten the spring this will increase the adequacy of the spring pressure but will also introduce the additional problem that the flint sections will not be maintained in alignment since they are free to tilt slightly with reference to each other.

Another problem incident to the use of one or more short sections of flint is that the active section in engagement with the flint wheel, because of its short length and the tolerance enlargement of the tube mouth opening, will itself tend to tilt slightly and strike the flint wheel at an angle which will cause the flint to be ground down at an acute angle to its length, even to an extent where it will wedge between the flint tube mouth and flint wheel. This usually occurs when the flint section has been worn to approximately one-eighth inch in length and at this time the flint section must be discarded with a resulting waste of approximately as much as 50% of the flint. I have found that a flint length substantially the length of the tube itself will overcome a number of the aforementioned objections, but that this will not be fully effected unless the flint is maintained in the exact center of the tube for its full length. In the construction of my invention, a flint approximately five times as long as the sections mentioned is used, and is nested within a supporting and advancing assembly in such manner that lateral play is eliminated at all times during use or adjustment of the flint. Consequently no jamming is possible either within or above the flint tube, and the flint is entirely utilized.

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For the attainment of these and other objects of my invention which will hereinafter appear or be pointed out, I employ a new and special construction of flint tube assembly, one embodiment of which is illustrated in the drawings, wherein:

Fig. 1 is an enlarged vertical section through the cigarette lighter and flint tube assembly taken on line 1—1 of Fig. 5;

Fig. 2 is an exploded view showing the improved flint tube assembly;

Fig. 3 is a horizontal section through the flint advance actuating member taken on line 3—3 of Fig. 1 and omitting the lighter casing and fluid tank;

Fig. 4 is a side elevational view of the bottom end of the lighter with the outer casing removed; and

Fig. 5 is a horizontal section taken on line 5—5 of Fig. 1.

My invention is shown in the exploded view of Fig. 2 as a flint tube assembly comprising broadly a flint tube A, a floating spring assembly B, a flint advancing member C and an activating member D. The flint tube assembly is illustrated for use with a conventional type pocket cigarette lighter shown in Figs. 1 and 5, as having an inner casing or fluid tank, open at the bottom, with a

top wall 31, side walls 32 and end walls 33. An outer casing having a bottom wall 35, side walls 36 and end walls 37, for telescoping cooperation with the walls of the fluid tank covers the lower opening thereof and the flint tube assembly which is contained therein. The flint tube assembly extends through and is supported from the top wall 31 of the fluid tank being inserted through and seated within an opening 34 therethrough.

The flint tube A of my invention comprises a tubular member 4 whose inner bore is larger than the thickness of the elongated flint F for providing an annular space surrounding the flint to accommodate the remainder of the flint supporting and advancing mechanism. The tubular member is provided with a restricted opening to guide the upper end of the flint as it emerges from the tube for proper engagement of the flint wheel 3. The flint tube is also provided with an external shoulder 9 for seating against the under side of the fluid tank top wall and within the opening 34 therein to properly position the restricted mouth of the tube with respect to the flint wheel. The flint tube is internally cammed or threaded at 5 to provide means for advancing the member C. In my preferred embodiment illustrated in the drawings, the flint tube is fabricated from two separate tubular members, tube 4 and nipple 8 avoiding the necessity for expensive machining operations. Tube 4 is threaded internally for its full length. To provide a greater bearing surface for the flint advance actuating member D as well as less friction to oppose rotation of the threaded advancing member C, these threads are shown as of a shallow flat type whose apices define a cylindrical surface. In accordance with a preferred practice, a length of commercial stock tubing of uniform bore is tapped completely therethrough to form these threads and this length is cut into the individual tubes, 4, of the required length. In accordance with this practice, the reduction to provide the restricted opening is allowed by the use of the separately formed nipple 8 of relatively short length which is inserted part way into the upper end of tube 4, with a force friction fit to form the locating shoulder 9. The nipple extends through the opening in the cover and is secured in any suitable manner, preferably by electric soldering at shoulder 9. The bore 10 of the nipple, is of a size to permit sliding tolerance with the elongated cylindrical flint F, and at its lower end is provided with a tapered surface 11 for guiding the flint and spring assembly B, which will be described hereinafter, into the nipple.

The actuating member D comprises a base member for manual rotation and a portion upstanding therefrom, which may be slid into the flint tube A for guidance by and frictional engagement with the apices of the threads therein. The upstanding portion, which preferably is nearly as long as flint tube A, is provided with a bore along its length to receive for sliding engagement and bearing guidance all of the remaining parts of the assembly, namely advancing member C and spring assembly B, as well as flint F. The wall of this portion is of a thickness to entirely occupy the space between the flint and the flint tube while permitting the flint to slide vertically without excessive lateral play. Further, an opening is provided in the wall of the bore to permit the projection therethrough of a portion of the advancing member, shortly to be described, in order to impart turning movement from the actuating member to the advancing member while the latter engages the threads of the flint tube.

The opening also serves to permit the actuating and advancing members to move axially with respect to each other and is so formed as to provide guiding and bearing surface engagement for such axial movement. These functions and objectives may be performed by many types of construction, as for example by rectangular, cylindrical or tubular members provided with an inner bore and one or more axial slots. I have found that these functions are performed in an extremely satisfactory manner by the construction illustrated in the drawings wherein two diametrically spaced semi-tubular portions 12 define a tubular bore for seating the flint whose wall is broken only by two axial slots 22 closely conforming in shape to the cooperating portion 21 of the advancing member, hereinafter described. In my preferred practice, the semi-tubular portions 12 are fabricated from a rectangular blank of flat stock widened at its center. The blank is formed with a curvature at 13 corresponding in radius to that of the bore 10 of the nipple. The formed blank is then punched through a die to a U-shape having semi-tubular sides and a cup 14 at the bottom. The sides define a bore approximating that of the nipple and whose wall is broken only by the presence of wedge shaped slots 22 inherent in the manner of forming. Cup 14 is permanently secured by any suitable method, preferably by soldering, within a central recess in cap 15. The cap is provided with a knurled outer edge 16 for manual manipulation, and a projection 17, preferably annular, having a tapered or beveled surface 18. Upon inserting the actuating member D into the tube 4, the tapered surface 18 bears against the casing walls 32 to properly align the tube 4 and cap 15 centrally of the fluid tank and permit application of the bottom closure or outer casing. The sides of the fluid tank are cut away at 39, see Figs. 4 and 5, to permit fingering of the cap.

The advancing member of my invention embodies a portion to be held in sliding engagement within the bore 13 of actuating member D, and forming a proper support for the spring assembly and flint to exert axial movement thereto, and a second portion extending from the first through the open wall of the actuating member to engage the camming surface 5 of tube 4 whereby rotational movement of the actuating member will serve to rotate the advancing member and cause axial movement thereof upwardly or downwardly. In my preferred construction illustrated in Figs. 2 and 3, advancing member C is formed with a cylindrical central portion 20 having a diameter equal to the thickness of the flint. Two wedge shaped extensions 21 protrude from the center with their bases outwardly. These are threaded on their base surfaces for rotational engagement with the threads 5. The wedges, because of their shape, provide maximum area for threads and at the same time interfit exactly in form with the wedge shaped slots 22 of member 12 for receipt of turning movement therefrom and proper sliding engagement therewith.

Seated on the advancing member and slideably within the bore of the actuating member is a relatively short spring assembly B comprising an upper cap member for supporting the flint, and a lower cap for resting on the advancing member, both cap members being interlocked with a helical coil spring 24. Preferably the two caps 23 are disk-like in form with a diameter equal to that of the flint 12 and that of the coil 24. Each cap is provided with means for inter-

locking with the spring. In the preferred construction, this means comprises a conical or ball shaped projection 25 having a maximum diameter slightly larger than the internal diameter of the coil and an annular recess 26 having a diameter slightly less than the internal diameter of the coil. The spring coil is formed with flattened turns at the ends for flush seating against the adjacent flat cap surfaces. The tapered projection of each cap is pushed into an end of the coil spreading it slightly until approximately two end turns latch into the recess 26. Thereafter the spring assembly may be inserted into or removed from the lighter without danger of separation or loss of the caps. Further, since a number of spring turns are utilized for latching purposes within the grooves 26, the effective length of the spring is thereby advantageously reduced and on expansion or contraction the spring responds with more tension as if it were shorter. The spring caps as well as portion 20 of advancing member C are provided with flat seating surfaces for properly engaging each other or against the bottom of the flint, to provide for vertical movement of the flint without tilting upon rotation of member C.

The operation of my invention is as follows: To initially provide or replace a flint, the advancing member C is dropped into the actuating member D with projections 21 sliding along and being guided by slots 22. Next the spring assembly is dropped into bore 13 of the actuating member followed by the flint F. This entire nested assembly of interfitted, axially slideable and rotatable components is then inserted upwardly into tube 4, the resilience of the two upstanding tubular segments 12 of member D bearing against the thread surfaces 5 serving to hold the assembly against the action of gravity. Rotation in a clockwise direction of cap 15 and integrated member 12, will now engage the threads of advancing member C with those of tube 4 to screw the former upwardly while its projections slide within the slots of the actuating member as if on bearings. The spring assembly, whose upper spring cap forms a seat for the flint, and the flint are lifted in a straight line axially of the assembly until the top of the flint strikes the flint wheel. Thereafter further rotation of the cap in one direction or the other compresses or extends the spring assembly to exert the proper pressure of the flint against the wheel. As the flint is worn by use this adjustment is repeated until the flint is entirely used. When the flint has become very short the spring assembly will have been guided into the nipple 8 by the taper 11. The caps of the spring assembly are of sufficient length so that the length of two caps exceeds the length of the nipple. This ensures that all of the flint will be utilized and when this occurs the advancing member C will not yet have reached the nipple or the end of the actuating member. Since the flint and spring assembly are of equal diameters and nested for a very large proportion of their cylindrical surfaces in bearings formed by the nipple and the tubular segments 12 of the actuating member D, there is no possibility of tilting the flint during adjustment and use. The actuating member and advancing member are similarly supported over the greater part of their sliding surfaces, as if in bearings, to aid in accomplishing the same purpose. The flat surface engagement of the advancing member with the lower spring cap and between the flint and upper spring cap also assists in meeting

the same objective. The flint supporting and advancing assembly, comprising members B, C and D, may be removed as a unit for purpose of adding a new flint, by counterclockwise rotation of cap 15. As long as advancing member C is not positioned at the very top of tube 4, the cap 15 may be lowered below the bottom of the inner casing for facility in manipulation and still permit engagement of the actuating member with the advancing member, to move the flint either upwardly or downwardly.

It will be apparent that I have devised a new and useful construction of a flint tube assembly for cigarette lighters. The invention is not limited to the detailed construction shown, nor to usage with long flints alone. A single or plurality of shorter flint sections may be used in place of a single long one. The construction provides for properly supporting such flints for adjustment without tilting or jamming. I do not, therefore, desire to be limited to the exact construction shown, but rather to the scope of the invention as defined by the appended claims.

I claim:

1. For use with a cigarette lighter, a casing defined by side and end walls and a top wall having an opening for receiving the upper end of the flint holding tube therethrough, a flint holding tube whose upper end is to be engaged through said opening in the top wall, means engaging the bore of the tube to advance the flint, said means including a manually rotatable member to be located at the bottom of the casing and an upstanding inwardly beveled flange provided on the upper end of said member which engages the bottom edges of the side walls whereby the lower end of said flint holding tube is guided to center itself with respect to the lower edges of the side walls.

2. A flint tube assembly for a cigarette lighter including a fluid reservoir casing and comprising; a tube internally threaded for its full length, a tubular nipple member of an outer diameter approximating that of the bore of the tube and inserted into one end of the tube for at least a sufficient distance to maintain its engagement by force fit and to provide an external shoulder at one end of the tube for attachment to the said fluid reservoir casing, said nipple member having a bore smaller than that of the tube and slightly larger than the thickness of flint to be received therethrough, said bore being tapered at its lower end to a mouth of diameter equal to the outer diameter of the nipple, a flint supporting assembly within the tube having a seat for the bottom of the flint, said assembly including an element in threaded engagement with said tube for advancing the flint seat whereby an elongated cylindrical flint may be centrally supported, spaced from the threads within said threaded tube, and advanced and guided by the nipple into proper engagement with a flint wheel regardless of its length, and actuating means within the tube having a manipulating portion accessible from the exterior of said tube for causing said element to advance the flint seat within the said tube.

3. A flint tube assembly for a cigarette lighter comprising; a tubular member having a restricted opening at one end, a tapered portion leading to said opening and the remainder of its bore threaded, a flint advance actuating member having a cylindrical portion whose outer surface frictionally engages the apexes of the threads of the tubular member and a cap portion for rotational

actuation outside the tubular member, said cylindrical portion being provided with a central bore and a wedge shaped axial slot to its outer surface, a flint advancing member having a cylindrical section seated for sliding fit within the bore of the actuating member and a wedge shaped projection extending radially from the cylindrical section with its base outermost, said projection passing through and interfitting with the slot of the actuating member, said projection base being threaded for engagement with the threads of the tubular member, and a spring assembly resting upon said flint advancing member including two round cap members with a coil spring between, said cap members having uninterrupted flat surfaces for full support of a flint or full engagement with said flint advancing member, said restricted opening, central bore of the actuating member, cylindrical portion of the advancing member and spring cap members all having substantially the same diameter.

4. A flint tube assembly constructed as set forth in claim 3 wherein the threads formed in the tubular member have their apexes flattened and curved to define a substantial bearing surface for frictionally bearing against the outer surface of the cylindrical portion of the actuating member.

5. A flint tube assembly for a cigarette lighter comprising; a tubular member having a restricted opening at one end, a tapered portion leading to said opening and the remainder of its bore threaded, a flint advance actuating member having a cylindrical portion whose outer surface frictionally engages the apexes of the threads of

the tubular member and a cap portion for rotational actuation outside the tubular member, said cylindrical portion being provided with a central bore and a wedge shaped axial slot to its outer surface, a flint advancing member having a cylindrical section seated for sliding fit within the bore of the actuating member and a wedge shaped projection extending radially with its base outermost from the cylindrical section, through and interfitting with the slot of the actuating member, said base being provided with threads for engagement with the threads of the tubular member, spring means carried on said flint advancing member including a coil spring and cap affixed thereto, said cap being round and having an uninterrupted flat surface for full support of a flint.

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