

Dec. 9, 1941.

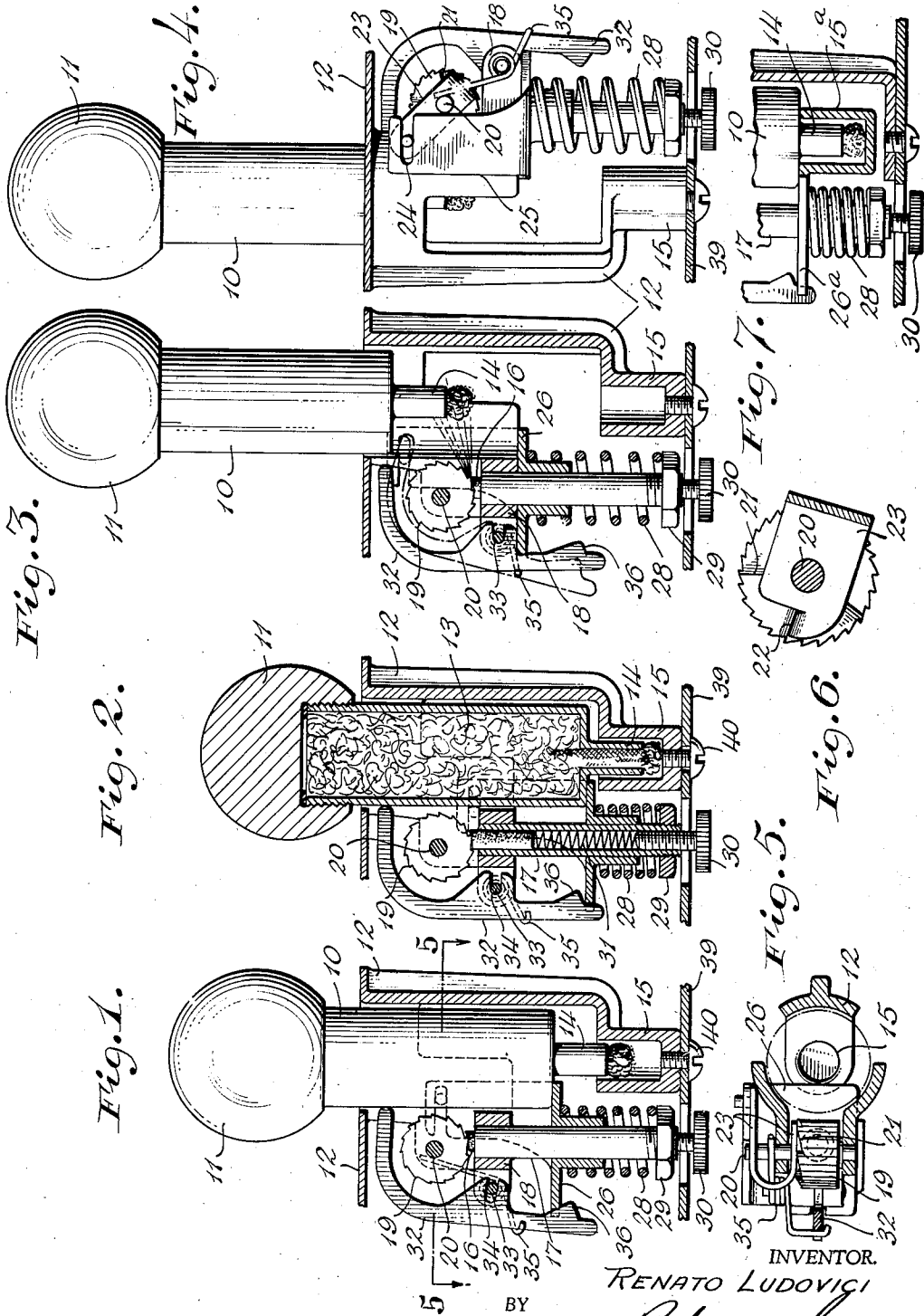
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2,265,761

PYROPHORIC LIGHTER

Filed Dec. 13, 1940

2 Sheets-Sheet 1



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Fig. 8.

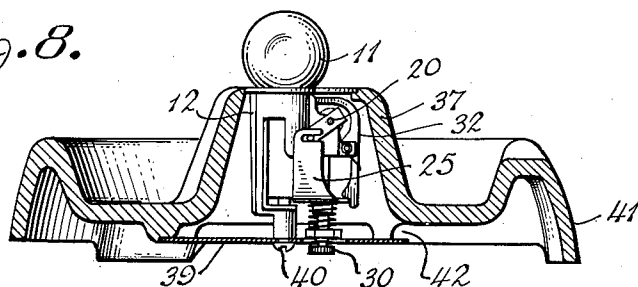


Fig. 9.

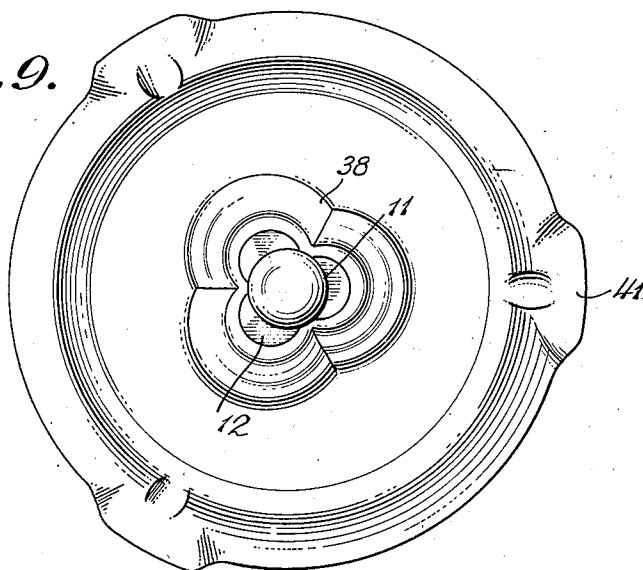
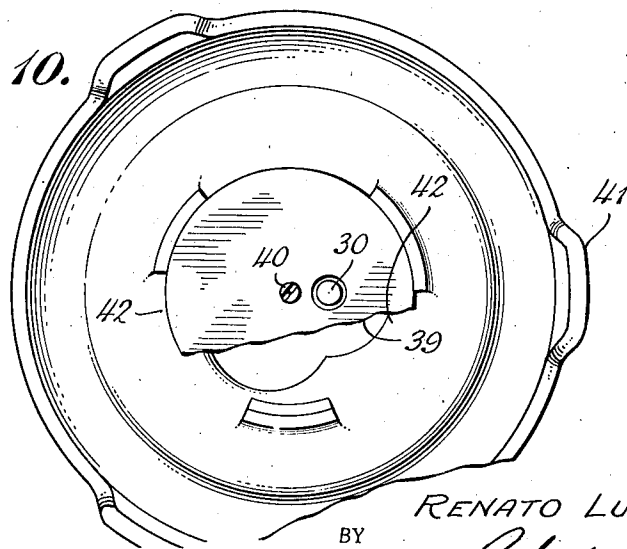


Fig. 10.



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PYROPHORIC LIGHTER

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9 Claims. (Cl. 67—4.1)

This invention relates to a pyrophoric lighter and has particular reference to a cigar or cigarette lighter and the like which can be actuated automatically by the withdrawal of a torch member from its frame or casing.

The principal object of the invention is to provide a pyrophoric spark-producing mechanism of the aforesaid type which is mechanically simple, susceptible of economical and easy manufacture, possessing sturdy and rugged construction and which is quickly responsive to even a slight impulse.

Another object of the invention is to provide a lighter with an improved energy-storing mechanism for actuating the spark-producing means in which the energy is stored in response to the torch-inserting movement and which is released by the withdrawal of the torch member.

A further object is to provide a lighter having a casing and means for providing a direct flue throughout the same.

Various further objects and advantages inherent in the invention will become apparent from the following description which is taken in conjunction with the accompanying drawings.

It will be understood, however, that this description and disclosure is not by way of limitation but the invention may lend itself to a variety of expressions within the scope of the appended claims.

In the drawings:

Figure 1 is a vertical sectional view, partly in elevation, of a lighter according to the invention, showing the torch member in position for the energy-storing movement.

Figure 2 is a sectional view, also partly in elevation, showing the torch member completely inserted into the frame.

Figure 3 is another sectional view, partly in elevation, showing the device with the torch member withdrawn from the frame.

Figure 4 is a section, partly in elevation, of the opposite side of the spark-producing mechanism.

Figure 5 is a section taken along the line 5—5 of Figure 1.

Figure 6 is a detailed view of the spark-producing wheel.

Figure 7 is a sectional view similar to Figure 1 of a modification.

Figure 8 is a sectional view, partly in elevation, showing the lighter embodied in an ash tray.

Figure 9 is a top plan view of the device shown in Figure 8.

Figure 10 is a bottom plan view thereof.

Referring in greater detail to the drawings in

which the same reference characters indicate the same or similar parts, the invention comprises a torch member 10 having a handle 11. The torch member is adapted to be reciprocated in the frame or casing 12.

The torch member 10 is hollow and is packed with wick-forming material 13. The torch member 10 is recessed adjacent the end and terminates in a nipple 14 through which the wick 13 protrudes. This nipple and wick are adapted to be received in the snuffing box 15. In the modification shown in Figures 1 to 4, the snuffing box is made part of the casing or frame 12.

The handle 11 may be unscrewed for the purpose of charging the wick material 13 with fuel.

The spark-producing mechanism is arranged adjacent one side of the torch member 10. The spark-producing mechanism comprises a pyrophoric element 16 which is held in the tubular support 17. This support is mounted in the bracket 18 which is soldered or otherwise suitably secured to the frame 12. The spark-producing wheel 19 is freely rotatable on a fixed bolt or pivot 20 on the frame 12. The wheel 19 is provided with notches or cams 21 at one side thereof as shown in Figures 5 and 6 and which are adapted to be engaged by the pawl 22 of the crank member 23.

The crank member 23 engages the slot 24 of the projection 25. The projection 25 is in turn carried by the flanged sleeve or bracket 26 which is reciprocable on the support 17.

The flanged sleeve or bracket 26 is adapted to be engaged by the recessed surface of the torch member 10. In this manner the flanged sleeve 26 will be depressed upon the support 17 when the torch member is inserted into the frame 12. This downward movement of the sleeve 26 in turn causes the pawl 22 to ride over the cams 21. The energy-storing mechanism comprises a helical expansion spring 28 inserted between the flanged sleeve 26 and the adjusting nut 29, which latter screw-threadedly engages the support 17. By means of the nut 29, the tension of the spring 28 can be regulated. It will thus be understood that the bracket 26 is depressed into the frame by the inserting movement of the torch member 10 against the spring 28.

The knurled thumb-screw 30 and the spring 31 in the hollow support 17 serve to hold the pyrophoric element 16 in engagement with the spark-producing wheel 19.

The latching lever or trigger mechanism 32 is pivoted to the pin 33 on the frame by means of the slot 34. The spring 35 serves to keep the

slot in resilient engagement with the pin 33. In this manner the pivotal axis of the trigger may be displaced.

One arm of the trigger abuts against the torch member 10 when the latter is inserted into the frame, as shown in Figures 1 and 2. The other arm is provided with a cam or nose 36 adapted to co-act with the flange or bracket 26 to lock the spring in compressed condition. The spring 35 is so arranged that it keeps the cammed arm of the trigger in resilient engagement with the flange 26.

The bracket engaging surfaces of the cam taper toward a point. In this manner the spring-actuated flange or bracket 26 will exert an upward-outward force on the cammed arm. This force is held in restraint by the opposing combined forces of the spring 35 and the torch member 10 when the latter is inserted into the frame and when the energy-storing mechanism is located in position as shown in Figure 2. As soon as the torch-engaging arm of the trigger has reached the recessed portion of the torch member upon the withdrawal of the latter from the frame, the opposition to the force of the spring 28 is partially removed and the force of the latter being greater than the force exerted by the spring 35, the cammed arm of the trigger will be pushed aside. The released energy stored in the spring 28 thus becomes effective to actuate the crank member 23 and the spark-producing wheel 19.

In the embodiment shown in the drawing, the lighter according to the invention is incorporated in an ash-tray or similar article having a central, hollow, raised portion 37 into which the lighter frame 12 is fitted. The lighter frame may be provided with a covering plate 38 of suitable design. The lighter mechanism is held in position in the raised portion 37 by means of the bottom plate 39 and screw 40. The plate 39 is raised above the supporting surface by means of the leg members 41. An opening is provided in the bottom plate for the thumb screw 30. Other openings 42 are provided between the raised portions 37 and the bottom plate 39 for the admission of air so that there will be a direct flue from the bottom to the top of the raised portion 37. By virtue of this arrangement the efficiency of the lighter is increased.

When the lighter mechanism is to be actuated, the handle 11 of the torch member 10 is grasped manually and moved upwardly. During such upward movement, the parts remain in the position as shown in Figures 1 and 2 until the recessed surface forming the portion 14 passes the trigger arm. The spring 28 will then push the cammed arm of the trigger outward and become released to actuate the crank member 23 and the spark-producing wheel 19 with a snapping action. As a result, a step of rotative movement is imparted to the wheel 19, the latter co-acting with the pyrophoric element 16 to produce a shower of sparks which passes along a path extending toward the nipple 14 and the wick protruding therethrough. The swinging motion of the trigger, however, is only momentary and as soon as the flanged portion 26 has passed the cam 36, the spring 35 will return it to its normal position, as shown in dotted lines in Figure 3.

In this connection it will be noted that the pyrophoric element is slightly off center of the spark-producing wheel 19. In this manner the shower of sparks will have an upward direction,

The timing is such that the shower of sparks will be produced just as the exposed wick is about abreast with the pyrophoric element 16. As a result the fuel-charged wick is ignited to produce a flame which may be utilized for any desired purpose as, for instance, lighting cigars, cigarettes, pipes, candles, or the like, and in so doing the torch member may be passed from hand to hand as desired.

When the torch member 10 has served its intended purpose, it may be returned into the frame 12 as shown in Figure 1. In so doing, the exposed wick and the recessed portion 14 engage the snuffing box which extinguishes the flame. After engagement has been effected between the flanged bracket 26 and the recessed surface of the torch member 10, continued downward movement of the torch member will press downward the flanged bracket 26 to compress the spring 28. By reason of the slotted pivot arrangement and the provision of the spring 35, the cammed arm of the trigger will give way to the flange 26 until it engages the lower surface of the cam 36. In this position the bracket and the spring will become locked against recoil, as shown in Figure 2.

In the modification shown in Figure 7, the snuffing box 15a is made part of the flanged bracket 26a. In this manner, the flame will be snuffed out as soon as the torch member engages the bracket 26a.

A lighting mechanism of the character herein described is reliable and efficient in operation. The simple act of inserting the torch member in the frame stores energy in the spring from which the power is to be obtained for the subsequent automatic operation. Withdrawal of the torch member a predetermined distance from its normal position caused the power-supplying means to trip the trigger mechanism and the energy thus released will cause the production of sparks which ignite the fuel-charged wick.

Although the invention has been described with respect to certain particularly preferred examples which give satisfactory results, it will be understood by those skilled in the art, after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention, and it is intended, therefore, in the appended claims to cover all such changes and modifications.

What is claimed is:

1. A pyrophoric lighter comprising a frame, a fuel-charged torch member reciprocable in said frame, a spark-producing mechanism for igniting said torch member, means adapted to have energy stored therein in response to the torch inserting movement and means for releasing the energy thus stored to actuate said spark-producing mechanism, said last-mentioned means normally being restrained by said torch member and having a camming surface engaging said energy-storing means, said camming surface being so constructed that the tension of the stored energy will actuate said energy-releasing means upon the withdrawal of said torch member.

2. A pyrophoric lighter comprising a frame, a fuel-charged torch member reciprocable in said frame, a spark-producing mechanism for igniting said torch member, spring means for actuating said spark-producing mechanism, said spring means being adapted to be wound by the inserting movement of said torch member into said frame, trigger means for restraining the recoil of

said spring means, said trigger means normally being restrained by said torch member and having a camming surface engaging said spring means, said camming surface being so constructed that the tension of said spring means will release said trigger means upon the withdrawal of said torch member.

3. A pyrophoric lighter comprising a frame, a fuel-charged torch member reciprocable in said frame, a spark-producing mechanism for igniting said torch member, spring means for actuating said spark-producing mechanism adapted to become compressed by the insertion of said torch member into said frame, trigger means for restraining the expansion of said compressed spring means, said trigger means normally being restrained by said torch member and having a camming surface engaging said spring means, said camming surface being so constructed that the tension of said spring means will release said trigger means upon the withdrawal of said torch member.

4. A pyrophoric lighter comprising a frame, a fuel-charged torch member reciprocable in said frame, a spark producing mechanism for igniting said torch member, spring means for actuating said spark-producing mechanism, said spring means being adapted to be wound by the inserting movement of said torch member into said frame, a latching lever for restraining the recoil of said spring means, one arm of said latching lever engaging said torch member and restrained thereby, the other arm having a camming surface engaging said spring means, said camming surface being so constructed that the tension of said spring means will push said latching lever aside upon the withdrawal of said torch member.

5. A pyrophoric lighter comprising a frame, a fuel-charged torch member reciprocable in said frame, a spark-producing mechanism for igniting said torch member, said spark-producing mechanism including a wheel adapted to co-act with a pyrophoric element to produce a shower of sparks, a crank member for said wheel, spring means for actuating said crank member, said spring means being adapted to be wound by the inserting movement of said torch member into said frame, trigger means for restraining the recoil of said spring, said trigger means normally being restrained by said torch member and having a camming surface engaging said spring means, said camming surface being so constructed that the tension of said spring means will release said trigger means upon the withdrawal of said torch member.

6. A pyrophoric lighter comprising a frame, a fuel-charged torch member reciprocable in said frame, a spark-producing mechanism for igniting said torch member, said spark-producing mechanism including a wheel adapted to co-act with a pyrophoric element to produce a shower of sparks, a crank member for said wheel, spring means for actuating said crank member, a reciprocable bracket associated with said spring means and being adapted to be actuated by the inserting movement of said torch member into said frame, an arm carried by said bracket adapted to actuate said crank member, trigger means for restraining the recoil of said spring means, said trigger means normally being restrained by said torch member and having a camming sur-

face engaging said bracket, said camming surface being so constructed that the tension of said spring means will actuate said trigger means upon the withdrawal of said torch member.

7. A pyrophoric lighter comprising a frame, a fuel-charged torch member reciprocable in said frame, a spark-producing mechanism for igniting said torch member, said spark-producing mechanism including a wheel adapted to co-act with a pyrophoric element to produce a shower of sparks, a crank member for said wheel, a support for said pyrophoric element, a reciprocable member on said support adapted to be engaged by said torch member and having an arm for actuating said crank member, spring means adapted to have energy stored therein in response to the torch-inserting movement of said reciprocable member, and means for releasing the energy stored in said spring means to actuate said spark-producing mechanism, said last-mentioned means normally being restrained by said torch member and having a camming surface engaging said reciprocable member, said camming surface being so constructed that the tension of said spring means will actuate said energy releasing means upon the withdrawal of said torch member.

8. A pyrophoric lighter comprising a frame, a fuel-charged torch member reciprocable in said frame, a spark-producing mechanism for igniting said torch member, said spark-producing mechanism including a wheel adapted to co-act with a pyrophoric element to produce a shower of sparks, a crank member for said wheel, a support for said pyrophoric element, a reciprocable member on said support adapted to be actuated by said torch member and having an arm for actuating said crank member, spring means adapted to be wound in response to the torch inserting movement of said reciprocable member, trigger means for restraining the recoil of said spring, said trigger means normally being restrained by said torch member and having a camming surface engaging said reciprocable member, said camming surface being so constructed that the tension of said spring means will actuate said trigger means upon the withdrawal of said torch member.

9. A pyrophoric lighter comprising a frame, a fuel-charged torch member reciprocable in said frame, a spark-producing mechanism for igniting said torch member, said spark-producing mechanism including a wheel adapted to co-act with the pyrophoric element to produce a shower of sparks, a crank member for said wheel, a support for said pyrophoric element, a reciprocable member on said support adapted to be actuated by said torch member and having an arm for actuating said crank member, spring means adapted to be wound in response to the torch inserting movement of said reciprocable member, trigger means for restraining the recoil of said spring means, said trigger means normally being restrained by said torch member and having a camming surface engaging said reciprocable member, said camming surface being so constructed that the tension of said spring means will actuate said trigger means upon the withdrawal of said torch member.

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