

Dec. 23, 1930.

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1,785,950

SEARCHLIGHT

Original Filed Oct. 6, 1927

2 Sheets-Sheet 1

Fig. 2.

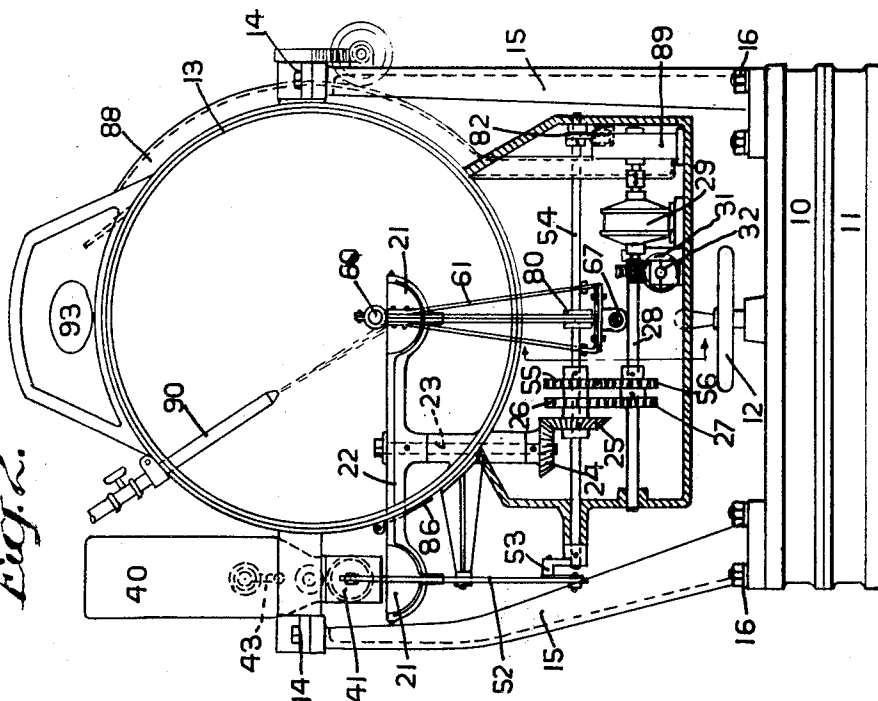
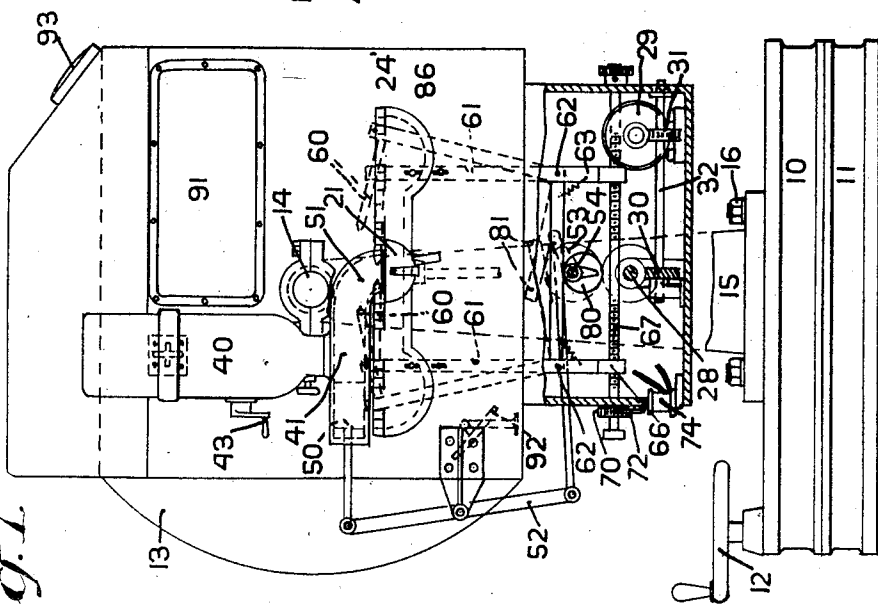


Fig. 1.



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Fig. 8.

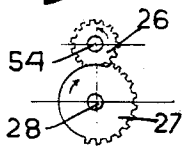


Fig. 3.

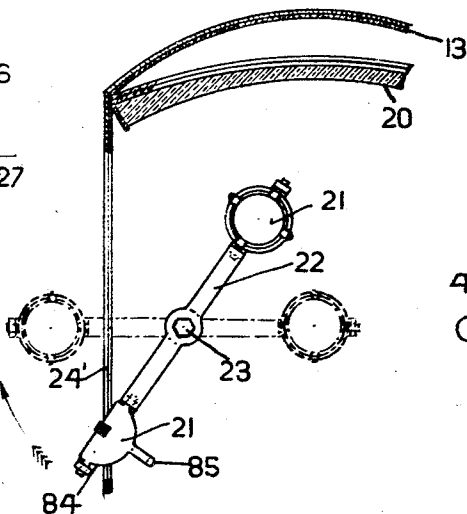


Fig. 4.

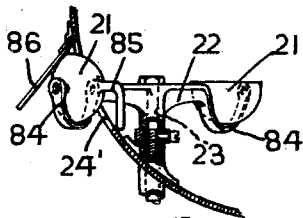


Fig. 5.

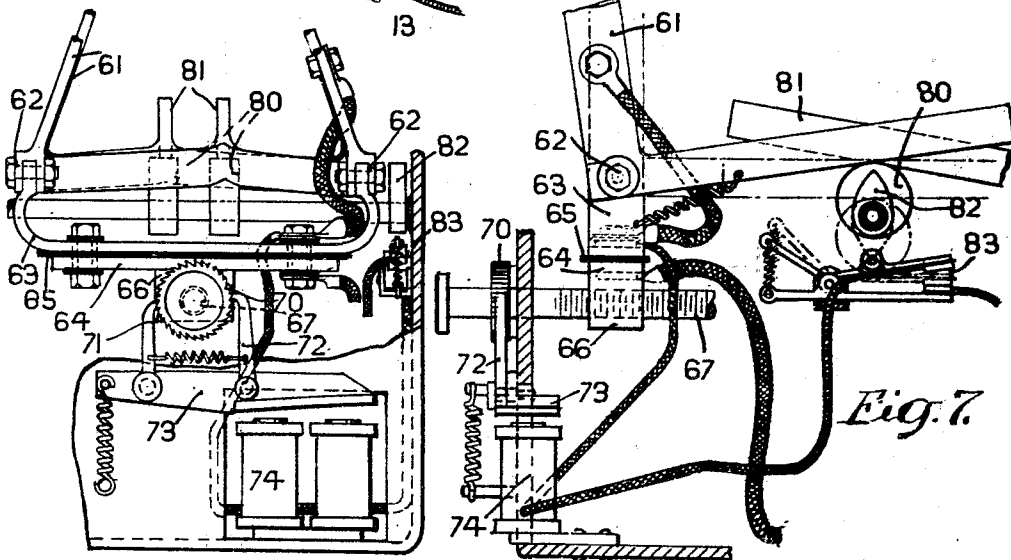
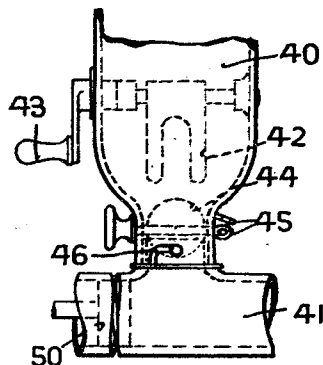


Fig. 6.

Fig. 7.

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SEARCHLIGHT

Application filed October 6, 1927. Serial No. 224,301. Renewed January 6, 1930.

This invention relates to searchlights, and more particularly, to lights of the intermittent flash type in which a combustible material is utilized for providing an intense penetrating ray.

This invention provides for intermittently applying a charge of combustible material to the searchlight and for igniting the same by means of an automatically operated electric arc. An auxiliary igniting device supplements the electric arc and is employed to prevent interruption of service due to failure thereof. A plurality of receptacles may be used which may be filled with combustible material, and successively placed in suitable position within the lamp and the material therein is then ignited by the electric arc or by the auxiliary igniting device. Mechanism is also provided for intermittently striking the arc in synchronism with the movement of the receptacles whereby the combustible material is automatically ignited as soon as it has been brought to the proper operative position.

The invention also consists in certain new and original features of construction and combinations of parts hereinafter set forth and claimed.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, the mode of its operation and the manner of its organization may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof, in which

Fig. 1 is a side elevation of a searchlight constructed in accordance with this invention;

Fig. 2 is a front elevation thereof;

Fig. 3 is a detail plan view of the cups for containing the combustible material;

Fig. 4 is a detail elevation thereof;

Fig. 5 is a detail view of the reservoir for the combustible material;

Fig. 6 is an elevation of the carbon feed mechanism;

Fig. 7 is an elevation of the carbon feed and

interrupting mechanism taken at right angles to Fig. 6; and

Fig. 8 is a detail view of the gear mechanism employed for rotating the cups.

Like reference characters denote like parts in the several figures of the drawings.

In the following description and in the claims parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art will permit.

Referring to the drawings more in detail, and particularly Figs. 1 and 2, the searchlight is shown as comprising a base 10 mounted upon a stationary sub-base 11 and adapted to be rotated thereon by any suitable means (not shown). Hand wheel 12 may be employed for causing relative rotation of the sub-base whereby the searchlight may be directed as desired.

Searchlight drum 13 is supported from base 10 by trunnions 14 which are mounted on suitable side members 15, said side members being rigidly secured to base 10 as by bolts 16. Drum 13 may include a suitable reflector (Fig. 3) for focusing and directing the rays outwardly through a lens (not shown) located at the front of the drum.

Combustible material is contained in cups 21, carried by arms 22 which are rotatably mounted on vertical shaft 23. A suitable opening 24' in the side of drum 13 is provided to permit cups 21 to pass therethrough from a filling position outside of the drum to a burning position interiorly thereof. Shaft 23 is rotated by a gear train comprising gears 24, 25, 26 and 27, said gear 27 being rigidly mounted on shaft 28 which is rotated by motor 29 by means of co-operating worm gears 30 and 31 (Fig. 1) mounted upon idler shaft 32.

Gears 26 and 27, as shown in detail in Fig. 8, are adapted to provide intermittent movement of shaft 23 and cups 21 attached thereto, the teeth of gear 27 being omitted over a portion of the periphery thereof. In case two cups are employed, as shown in Figs. 1 and 2, shaft 23 would be given a rotation of 180 degrees and then held stationary while one cup is filled and the material in the other cup is

burned. A further 180 degrees rotation would then be obtained and the operation repeated.

Cups 21 are filled from a reservoir 40 which is mounted upon the side of drum 13 and is adapted to feed into discharge chamber 41. Mixing paddle 42 may be included in said reservoir 40 and operated by a suitable handle 43 for stirring and disintegrating the material when necessary to cause the same to feed readily. Butterfly valve 44 at the lower end of reservoir 40 serves to prevent the combustible material from being removed except as authorized. A pair of eyes 45 may be attached to butterfly valve 44 and reservoir 40, respectively, through which a lock may be inserted when the valve is closed thereby preventing material from being removed except when the reservoir has been positioned at discharge chamber 41. Any desirable means may be employed for attaching the reservoir as, for example, bayonet slot 46.

When the reservoir is positioned and valve 44 opened, combustible material therefrom will be discharged into chamber 41 whence it may be forced by plunger 50 through pipe 51 into cup 21 which is located directly thereunder. Plunger 50 may be automatically operated from motor 29 as by link mechanism 52 and crank 53 attached to shaft 54, said shaft 54 being rotated by gear wheels 55 and 56. Gear 56 is mounted on shaft 28 and rotated by motor 29 in the manner heretofore described. Gear 26 is freely rotatable on shaft 54 whereby intermittent movement thereof may be obtained independent of the movement of said shaft 54 and plunger 50 operated thereby.

A carbon arc comprising a pair of carbons 60 may be employed for igniting combustible material in cups 21. For this purpose carbons 60 are mounted on arms 61 (Figs. 1 and 6) which are pivotally mounted as at 62 for movement relative to supporting member 63. Plate 64 which is insulated from supporting member 63 as by insulating material 65 carries said supporting member and the carbons attached thereto. Collar 66, rigidly secured to plate 64, is threaded to receive rod 67 which is oppositely threaded at its two ends and serves when rotated to vary the distance between said carbons 60.

One means which may be employed for rotating rod 67 comprises ratchet mechanism 70 and co-operating pawls 71 and 72 which are carried by armature 73 of electromagnet 74. Electromagnet 74 may be intermittently operated by cam 82 mounted upon shaft 54 which co-operates with switch 83 for closing the same with each revolution of the shaft. When armature 73 is attracted the above described ratchet mechanism will step wheel 70 around one notch, causing corresponding rotation of shaft 67 and consequent movement of carbons 60.

The arc between carbons 60, after being

struck, is broken by separating the carbons. For this purpose cam 80 is mounted on shaft 54 and rotates therewith, co-operating with arms 81 attached to arms 61 (Figs. 1 and 7). Cam 80, in rotating, will then intermittently raise arms 81 correspondingly tipping arms 61 and separating carbons 60.

Cups 21 are pivotally mounted as on brackets 84 and adapted to be tilted for the purpose of dumping the burned charge as the cups are passed through the side of drum 13. A lever 85 attached to the lower portion of cups 21 contacts with drum 13 as the cups are passed therethrough for tipping the same, and provides a stop means for holding the cup in upright position after the charge has been removed. A suitable shutter 86 may be attached to casing 13 for covering the opening through which the cups 21 are removed while the charge is being burned.

In order to remove vapors from the interior of the lamp, an exhaust duct 88 is provided connected with suction fan 89 which may be driven by motor 29 or other suitable means. To provide an auxiliary ignition means in case of failure of electric current, gas nozzle 90 is inserted through the wall of drum 13 and adapted to direct a flame upon cup 21 when desired. Nozzle 90 may, however, be slidably removed when not required.

In addition to the main beam, side lights may be obtained through openings 91 located on either side of the lamp, which if desired, may be covered with red or green glass to present the usual side lights used on ships. To provide a narrow intense ray of light, mirror 92 (Fig. 1) is located upon the lower portion of drum 13 and is so positioned as to reflect the rays of light upwardly through lens 93 located in the upper front part of the searchlight barrel. This narrow beam provides an auxiliary light which may be used or not as desired.

In the operation of the above described searchlight, a suitable combustible material as for example, a mixture of 50 percent aluminum powder and 50 percent magnesium powder may be inserted in reservoir 40 and utilized for filling the various cups. The motor may then be started and run at any desired speed whereby the cup 21 is positioned under the opening of pipe 51 and supplied by means of plunger 50 with a charge of powder. The cup is then rotated by shaft 23 and the above described gear mechanism to a position inside drum 13 when the arc is struck by carbon 60. Rotation of cam 80 then breaks the arc and ignites the charge in cup 21 whereby a sharp intense light is obtained, the vapor therefrom being withdrawn from the drum through pipe 88 by means of suction fan 89.

After the charge has been burned, shaft 23 is again rotated, a freshly filled cup brought within the drum and the cup containing the used charge removed. As this latter cup

passes through the side of the drum it is automatically tipped by means of lever 85 whereby the charge is dumped and the cup placed in condition for the reception of renewed charge. As the carbons become worn during use they are automatically brought together by means of threaded shaft 67 and the co-operating mechanism above described. Obviously plunger 50 must be synchronized to operate only when the shaft 23 is stationary. Cams 80 and 82 being mounted on shaft 54 are automatically synchronized with plunger 50 and operate to break the arc between carbon 60 with each revolution, and to cause a corresponding advance of the carbons by closing contacts 83 and advancing the ratchet mechanism one step.

In removing reservoir 40, butterfly valve 44 is closed and locked if desired through eye 45. The reservoir may then be turned to release bayonet slot 46 and may be removed from the machine, while a new reservoir is inserted in its place.

The above described invention provides an intermittent light which may be electrically operated and automatically timed to flash at given intervals, whereas the combustible material may be so selected as to give an extremely intense and penetrating ray such as that required for ships at sea and lighthouses. A comparatively small amount of electric current is required since it is only used for ignition purposes, the combustion material itself furnishing the luminosity. The apparatus is moreover simple and may be self-contained whereby a portable searchlight may be provided.

The provision of an auxiliary igniter enables the searchlight to be employed even though the electric current is interrupted. In this case cups 21 would be manually rotated and the charge manually placed therein.

The invention has been shown and described as applied to a solid combustible material ignited by means of an electric arc. It is evident however, that other types of combustible material may be employed, either solid, liquid or gaseous, and that other electric ignition means may be utilized in connection therewith and other suitable means may be employed in place of the receptacles shown.

In the drawings accompanying and forming part of this specification, a practical commercial embodiment of the invention is shown, but as such illustration is primarily for purposes of disclosure, it will be understood that the structure may be modified in various respects without departure from the broad spirit and scope of the invention as hereinafter defined and claimed.

What is claimed is:

1. An intermittent searchlight having a receptacle for combustible material, means

for filling said receptacle and electrical means for igniting said material, said filling means and said igniting means being automatically synchronized.

2. A searchlight having a plurality of cups mounted for rotational movement, means located exteriorly of said searchlight for placing combustible material in said cups, and electrical means located within said light for igniting said material, said last mentioned means being automatically operated when said cups are positioned within said light.

3. In an intermittent searchlight, a plurality of rotatable cups mounted therein and adapted to pass through the walls thereof, a reservoir located exteriorly of said light, a discharge chamber therefor and a plunger in said chamber, said plunger being operated synchronously with the rotation of said cups for forcing material thereto.

4. In combination, a plurality of cups adapted to contain combustible material and mounted for rotational movement about a vertical axis, means for filling said cups, and means for intermittently striking an electric arc for igniting the material therein.

5. In combination, a plurality of cups adapted to contain combustible material and mounted for rotational movement about a vertical axis, means for filling said cups, and a pair of carbons, means for intermittently operating said carbons for striking an arc and igniting the material in said cups, and means operating in synchronism with the rotation of said cups for controlling the separation of said carbons.

6. A searchlight comprising a plurality of rotatable cups, means for filling said cups with combustible material, means for bringing said cups into operative position, means for producing an electric arc for igniting said material and means for rotating said cups, striking said arc and filling said cups in synchronism.

7. A searchlight having a movable receptacle for combustible material, means for passing said receptacle through the wall of said light, means for filling said cup with combustible material while outside of said light, electrical means for igniting said material while inside thereof, and synchronous means for controlling the movement of said cup, the filling thereof, and the ignition means.

8. In combination with a searchlight, a plurality of rotatable cups, means for passing said cups through the wall of said light, and means for automatically dumping said cups while passing through said wall.

9. In an intermittent searchlight, a cup for combustible material, said cup being pivotally mounted, means for passing said cup through the wall of said searchlight, and means carried by said cup for contacting with

said wall and automatically tilting said cup to the material dumping position.

10. In an intermittent searchlight, a cup containing combustible material, a pair of carbons adapted to form an electric arc for
5 igniting said material, means for intermittently bringing said carbons together for striking said arc, and means for intermittently feeding said carbons to compensate for wear thereof.

11. In an intermittent searchlight, a cup for combustible material, means for forming an electric arc for igniting said material, comprising a pair of carbons, automatic means
15 for intermittently striking said arc, means for intermittently separating said carbons for breaking said arc and means for intermittently feeding said carbons to compensate for wear thereof.

12. In a searchlight, a plurality of cups for containing combustible material, means for alternately rotating said cups through the wall of said light and maintaining said cups stationary, means for filling said cups with
25 combustible material while stationary, electrical means for igniting said material while said cup is stationary, and means for moving said cup to material dumping position as said cup is passed through said wall.

13. In a searchlight, a container for combustible material, an electric arc for igniting said material and means for utilizing said arc as a source of light in the absence of said material.

14. In a searchlight, means for introducing combustible material thereto, electrical means for normally igniting said material and a gas jet mounted within said searchlight for igniting said material when said electrical
40 means is rendered inoperative.

15. In a searchlight, means for feeding combustible material to said searchlight, electrical means for igniting said material, and means for concentrating and directing the
45 light produced by said combustible material in a well defined, predetermined path.

In testimony whereof I have hereunto set my hand.

ETTORE F. GIANNATTASIO.

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