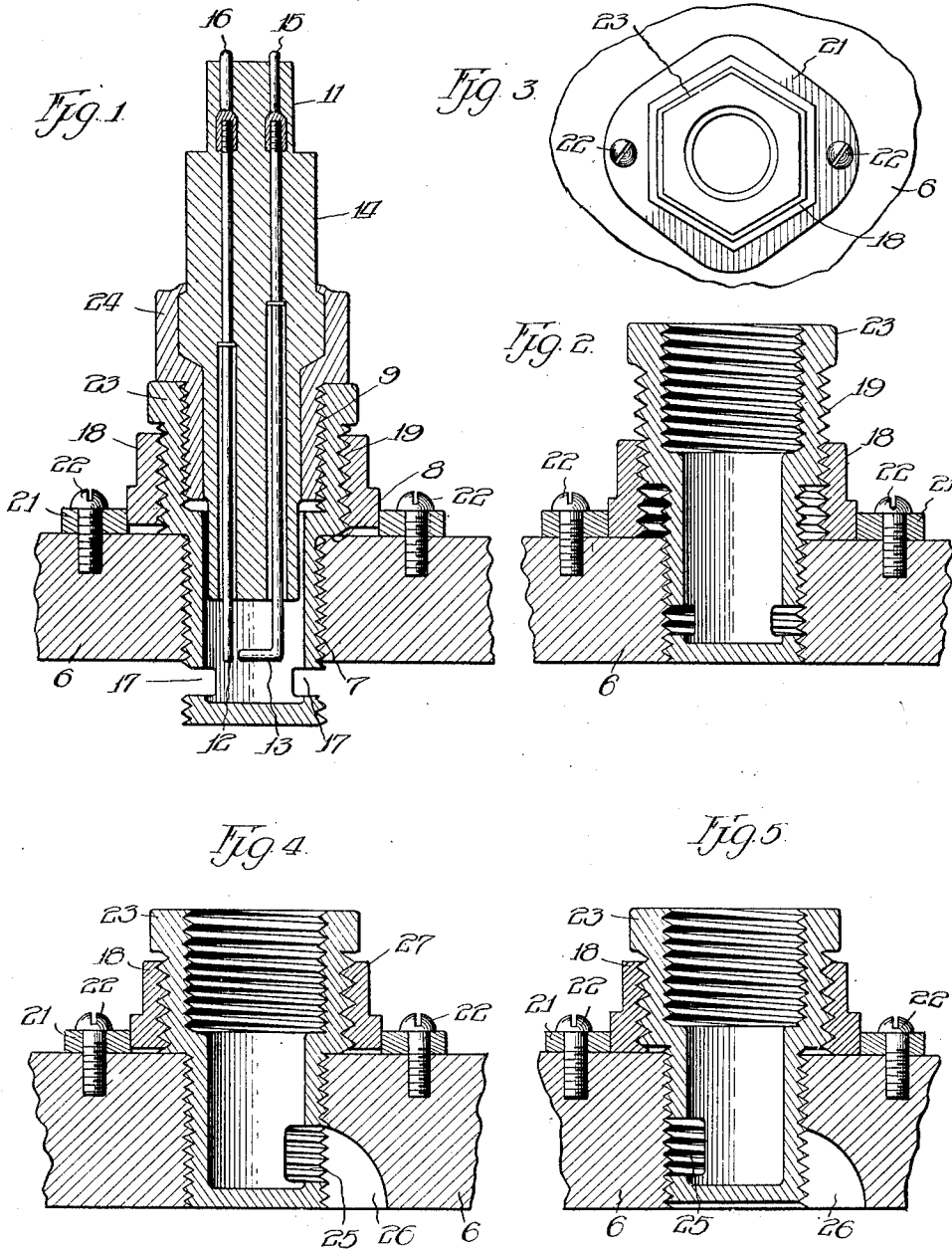


A. CAMPORINI AND J. RENA,
SPARK PLUG CHANGER.
APPLICATION FILED SEPT. 26, 1919.

1,343,348.

Patented June 15, 1920.



WITNESSES:
A. J. Sauter,
A. Burkhardt.

INVENTORS.
August Camporini
John Rena
BY Bondell Wilson
ATTORNEYS.

UNITED STATES PATENT OFFICE.

AUGUST CAMPORINI AND JOHN RENA, OF CHICAGO, ILLINOIS.

SPARK-PLUG CHANGER.

1,343,348.

Specification of Letters Patent.

Patented June 15, 1920.

Application filed September 26, 1919. Serial No. 326,547.

To all whom it may concern:

Be it known that we, AUGUST CAMPORINI, a citizen of the United States, and JOHN RENA, a subject of the King of Italy, both residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Spark-Plug Changers, of which the following is a specification.

10 This invention relates in general to gas engines and has more particular reference to the mounting for the spark plugs.

15 In some types of gas engines, particularly those employed for the propulsion of airplanes, the spark plugs become frequently and quickly foul so that one or more of the cylinders misses. When this occurs it has heretofore been necessary for the aviator to land in order that the dirty spark plug might be cleaned.

20 One of the primary objects of our present invention is to provide means whereby a spark plug may be changed without stopping the engine, thus obviating the necessity of landing by an aviator every time a spark plug becomes foul.

25 With this end in view we have devised a spark plug changer which consists essentially of a holder adapted to be threaded into the usual spark plug opening of an engine cylinder and also adapted to accommodate the spark plug, the holder being so constructed that by a simple manipulation it will shut off the spark plug from the interior of the engine and at the same time close the cylinder so that the spark plug may be removed and changed without relieving the compression in the cylinder.

30 For the purpose of facilitating an understanding of our invention we have illustrated preferred embodiments thereof in the accompanying drawings, from an inspection of which, when considered in connection with the following description, our invention and many of its inherent advantages should be readily understood and appreciated.

35 Figure 1 is a longitudinal sectional view showing a fragment of a gas engine cylinder equipped with our invention;

40 Fig. 2 is a similar view with the spark plug removed from the holder, showing the engine cylinder closed;

Fig. 3 is a plan view of the holder locking device;

Fig. 4 is a view similar to Fig. 1, with the spark plug removed of a modified form of my invention; and

Fig. 5 is a similar view showing another position of the parts.

Referring to the drawings, particularly Figs. 1 to 3 thereof, reference character 6 indicates the wall of an ordinary gas engine cylinder provided with a tapped opening to receive a spark plug. Instead of 65 threading the spark plug directly into this opening, as is customary, we employ what may be termed a spark plug holder consisting of a socket exteriorly threaded throughout a portion of its length, as indicated at 70 7, having threaded engagement with the spark plug opening of the cylinder. Above this threaded portion the holder is provided with a shoulder 8 and above this shoulder the holder is enlarged in diameter and 75 interiorly threaded at 9 to receive a spark plug indicated generally by reference character 11.

The spark plug holder or socket may be made in various sizes, preferably standard, 80 the lower portion being adapted to fit standard spark plug openings and the upper portion to accommodate standard spark plugs. Any preferred type of spark plug may be employed in connection with our invention 85 but we have shown in the present instance a special plug entirely insulated from the engine cylinder and comprising two insulated terminals 12 and 13 respectively carried by an insulating plug 14 and adapted 90 to be connected at their upper ends with terminals 15 and 16 connected respectively with the battery or magneto and with a ground by means of wiring.

The lower end of the holder is closed as 95 shown, but near this end there are one or more openings 17 through the side wall of the holder so that when the holder is fully projected into the cylinder the interior of the holder below the spark plug is in direct 100 communication with the interior of the cylinder; consequently the cylinder will be fired from the plug. In order that the plug may be removed from the holder without relieving compression in the cylinder, it is 105 only necessary to partially unscrew the

holder from the position shown in Fig. 1 to that shown in Fig. 2, whereupon the interior of the holder is completely sealed from the interior of the cylinder and the

5 plug may be removed from the holder and replaced by another without relieving the compression in the cylinder.

For the purpose of limiting the unthreading movement of the holder with respect to the cylinder so that the use of two wrenches, one to hold the holder and the other to unscrew the spark plug therefrom, may not be necessary, we have made provision for locking the holder against unthreading movement after it is unthreaded sufficiently to seal the cylinder from the atmosphere. This locking device consists of a nut 18 threaded on to the holder above and outside the cylinder. This nut is interiorly threaded and the spark plug holder is exteriorly threaded at 19 for engagement with the nut, and these threads are of greater pitch than the threads on the lower portion of the holder and in the spark plug opening of the cylinder. It will be manifest that owing to the difference in pitch of the threads 7 and 19 if the nut 18 is held against rotation, unthreading movement of the holder from the position shown in Fig. 1 to that shown in Fig. 2 will cause the nut 18 to move downwardly relatively to the cylinder until it is engaged firmly therewith, whereupon further turning movement of the holder will be precluded and the holder will be locked so that the spark plug can be unscrewed therefrom with one wrench. Any preferred means may be employed for holding the nut 18 against rotating movement but permitting a slight longitudinal movement thereof, but in the present instance, for purposes of illustration, I have shown a ring 21 loosely fitting the hexagonal exterior of the nut and fixedly secured to the cylinder wall by means of tap bolts 22 or other preferred fastening means.

To assemble our invention on an engine the nut 18 is threaded on to the holder and the holder is then fully screwed into the spark plug opening of the cylinder. The nut 18 is then adjusted so that it has a slight clearance above the cylinder, whereupon the ring 21 is slipped over the nut and secured to the cylinder by the screws 22, whereupon the invention is ready for use. During normal running of the engine the charge in the cylinder will be ignited through the lateral opening 17 in the lateral walls of the holder. Should the spark plug become foul the operator simply applies a wrench to the upper end 23 of the holder and unscrews the holder from the cylinder as far as such movement is permitted by the nut 18. The parts are so proportioned that when the holder has been

unthreaded sufficiently to close opening 17 and seal the cylinder the nut 18 will be brought into engagement with the outer wall of the cylinder and lock the holder against further rotative movement. The wrench is then removed from the holder and applied to the hexagonal portion 24 of the spark plug and the plug is thereupon removed and replaced without releasing the compression in the cylinder. After replacement of the plug the holder is again threaded inwardly to project its inner end into the cylinder and establish operative relation between the plug and the interior of the cylinder.

The construction just described is applicable to any engine but that disclosed in Figs. 4 and 5 requires a special engine cylinder construction. In this instance the holder is provided with but one lateral opening designated by reference character 25 and the wall 6 of the cylinder is cut away adjacent the spark plug opening to provide a channel or passage 26. The normal operative position of the parts is shown in Fig. 4 and with a spark plug in the holder the charge will be ignited through the opening 25 and the channel 26. The threads 27 connecting the lock nut with the holder are in this instance of still greater pitch than those previously described and the clearance between the lock nut and the top of the cylinder is less, so that the holder will be locked against further rotative movement upon one-half a revolution. In this construction, therefore, it is only necessary to turn the holder one-half a revolution from the position shown in Fig. 4 to that shown in Fig. 5 before the holder becomes locked and the cylinder sealed. Consequently a more speedy spark plug change may be made with this type of device than with that disclosed in Figs. 1 to 3 inclusive, wherein several turns of the holder are necessary to seal the cylinder and lock the holder.

It is believed that our invention and many of its attendant advantages will be fully understood from the foregoing without further description, and while we have shown and described those embodiments which at present seem preferable, it should be manifest that the invention is not restricted to the embodiments illustrated and described but is capable of wide modification without departing from the spirit of the invention as defined in the following claims.

We claim:

1. A device of the character described, comprising a spark plug holder adapted to be inserted in the spark plug opening of a gas engine cylinder and constructed to receive and hold a spark plug, said holder having provision for establishing communi-

cation between the spark plug and the interior of the cylinder and for shutting said spark plug off from said cylinder upon partial rotation only of said holder in the
5 cylinder.

2. The combination of a gas engine cylinder having a spark plug opening and a channel establishing communication between one side of said opening and the interior of the
10 cylinder, a spark plug holder adapted to be threaded into said opening, said holder having a closed inner end and a lateral opening through one of its side walls adapted to register with said channel, and means for
15 limiting the rotative movement of said holder in said opening to less than a complete turn so that communication between the interior of said holder and the interior of said cylinder may be established or shut
20 off by turning said holder within the limits of its movement.

3. The combination of a gas engine cylinder provided with a spark plug opening and a channel communicating with one side thereof, a spark plug holder adapted to be
25 threaded into said opening and having a closed inner end and a lateral opening, and means for limiting the rotative movement of said spark plug in the opening so that in one extreme position communication between the interior of the cylinder and the
30 interior of the holder will be established and in the other extreme position such communication will be shut off.

35 4. A device of the class described, comprising a spark plug holder threaded for engagement with a gas engine cylinder and adapted to receive a spark plug, said holder having a closed inner end and a lateral opening adjacent said end, and means engaged
40 with the holder outside of said cylinder for limiting the movement of said holder relatively to said cylinder.

5. A device of the character described,
45 comprising a spark plug holder interiorly threaded to receive a spark plug at its upper

end and closed at its inner end and provided near its inner end with a lateral opening, said holder being exteriorly threaded for connection in the spark plug opening of
50 a gas engine cylinder, said threaded connection permitting adjustment of said holder relatively to the cylinder to close or open said opening, and means for limiting the adjusting movement of said holder. 55

6. A device of the character described, comprising a socket threaded exteriorly for connection with a gas engine cylinder and interiorly to receive a spark plug and provided above said exterior threads with
60 threads of a greater pitch, and a non-rotatable lock nut engaged with said last mentioned threads.

7. The combination of a gas engine cylinder, a spark plug holder threadedly connected therewith, a spark plug carried by
65 said holder, and means outside of the cylinder wall for limiting the unthreading movement of said holder from said cylinder.

8. The combination with a gas engine
70 cylinder of a spark plug holder adjustably connected therewith, a spark plug carried by said holder, and means engaging said holder outside of the spark plug opening in the cylinder for limiting the adjusting move-
75 ment of said holder with respect to the cylinder.

9. The combination with a gas engine cylinder of a spark plug holder threaded exteriorly throughout a portion of its length
80 for connection in the spark plug opening of said cylinder and provided above said threads with threads of a greater pitch, a lock nut engaged with said last mentioned threads, and means permitting vertical
85 movement of said lock nut but retaining the same against rotative movement whereby said holder is limited in its longitudinal movement with respect to the cylinder.

AUGUST CAMPORINI.
JOHN RENA.