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T. W. WARREN

1,968,665

APPARATUS FOR MAKING SPARK PLUGS

Filed Sept. 17, 1931

3 Sheets-Sheet 1

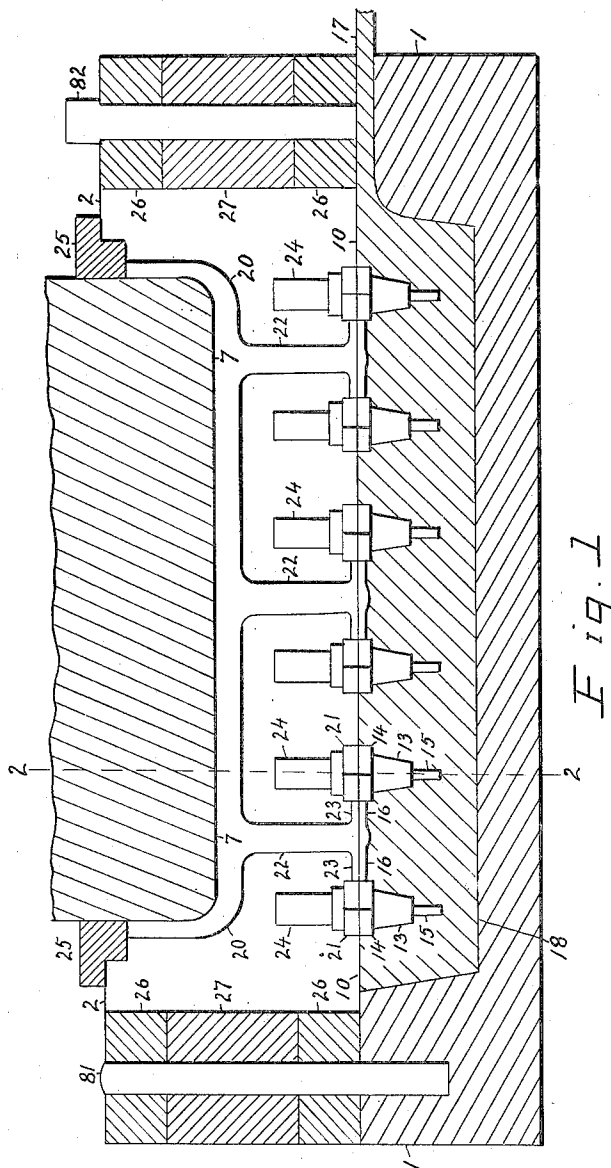


Fig. 1

INVENTOR

Thomas William Warren

By

Samuel A. Sisson

ATTORNEY

July 31, 1934.

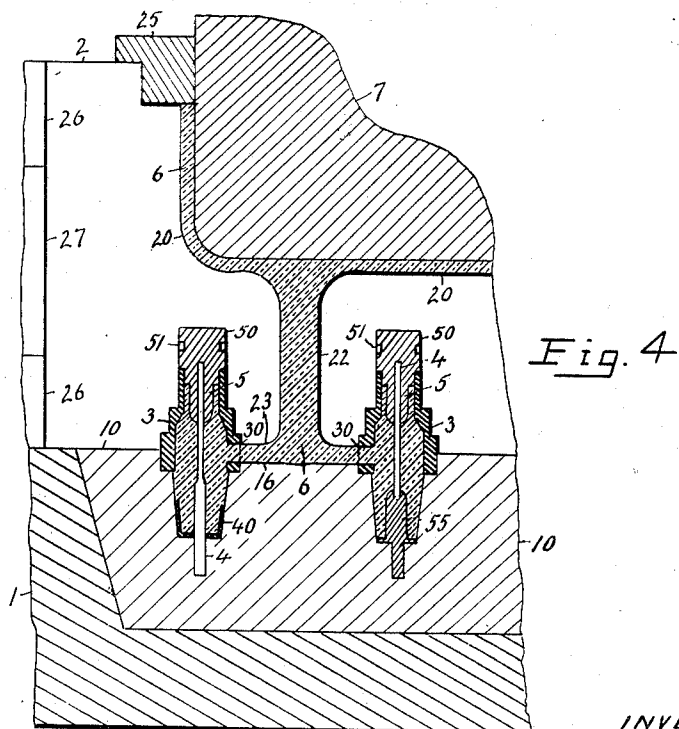
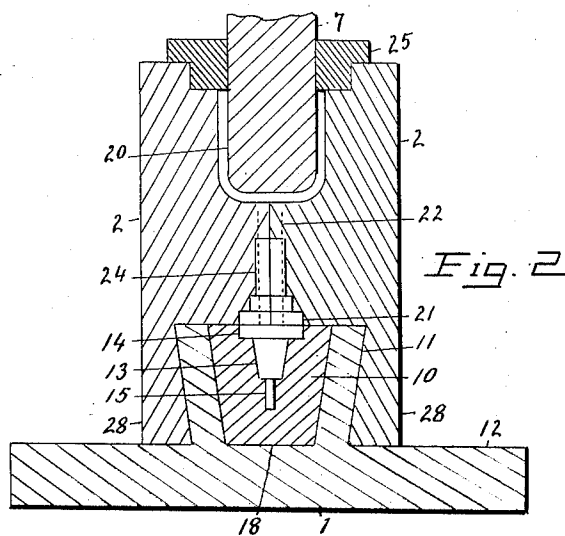
T. W. WARREN

1,968,665

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3 Sheets-Sheet 2



INVENTOR

Thomas William Warren

By

Harvey A. Suddon

ATTORNEY

July 31, 1934.

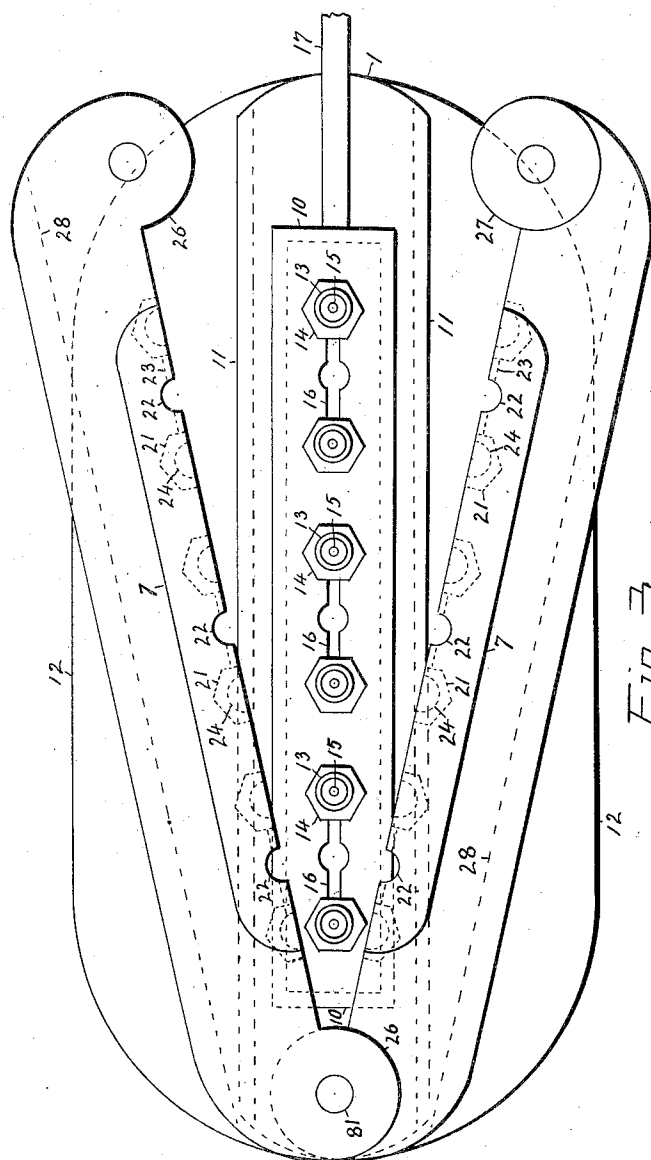
T. W. WARREN

1,968,665

APPARATUS FOR MAKING SPARK PLUGS

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3 Sheets-Sheet 3



INVENTOR

Thomas William Warren

By

Samuel A. Sadorn

ATTORNEY

UNITED STATES PATENT OFFICE

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APPARATUS FOR MAKING SPARK PLUGS

Thomas William Warren, Montreal, Quebec,
Canada

Application September 17, 1931, Serial No. 563,347

6 Claims. (Cl. 49—66)

This invention relates to the method and apparatus for making spark plugs and has for its object to provide a simple efficient and rapid method of operation and mechanism for making spark plugs of improved form. The invention particularly relates to making spark plugs in which the core of molten glass is forced into the casing through an aperture in its wall. Further object is to provide the mold in which a plurality of spark plugs can be made by a single operation. The particular feature of my invention is that it produces by one operation a practically complete spark plug.

References are made to the accompanying drawings in which;

Figure 1 is a vertical cross section through axis of the mold showing the inner face of one of the hinged cover sections.

Figure 2 is a vertical cross section on the line 2, 2 of Figure 1.

Figure 3 is a plan view of the mold with the top sections opened outward.

Figure 4 is a detail vertical cross section similar to Figure 1, and showing the glass in position after insertion in the casing.

The mold comprises a base 1 with inclined sides 11 and extended bottom 12 with oblong cavity 18 to receive the tray 10. The top sections 2 are hinged at one end on the pin 81 set in the base 1, by hinges 26 and 27 at the opposite ends of the top sections 2, 2, and are secured in a closed position by pin 82. The top sections have inclined downward extensions 28 to enclose the inclined sides 11 of the base 1. The tray 10 has a series of cups 13 cut along its center lines. These cups have bores 15 and annular hexagonal grooves 14 round their upper edges. The cups 13 are slightly conical and the bores are in the axis of the cups. When it is desired to make spark plugs with an intensifying chamber, plugs 55 as shown in Figure 4 on the right, are inserted in the cups 13. The top sections 2, 2 have semi-cylindrical dies 24 with hexagonal grooves 21. They are cut in their surfaces to correspond with the cups 13 in the tray 10. The upper part of the top sections 2, 2 is cut away to form the glass receiving chamber 20. From this chamber are a series of vertical passages 22 which end in the cross channels 23. The tray 10 is cut with channels 16 to correspond with channels 23. The chamber 20 has a packing ring 25 at its upper edge through which the plunger 7 is adapted to reciprocate vertically. The tray 10 has a handle 17 by means of which it can be readily moved to and from the mold. Means are provided to feed the chamber

20 with a supply of molten glass when the plunger 7 has been raised.

The tray when removed from the mold has its cavities filled first with the electrode 4 on which are mounted caps 40. These electrodes 4 are inserted in the bores 15. The casings 3, preferably preheated, are then set in the annular hexagonal grooves 14 with their apertures 30 facing the channels 16. The plug 5 is then mounted on the electrode 4 and inserted in the top of the casing 3. The plug 5 has an upper portion 50 with annular grooves 51 to assist in the removal of the spark plug after the tray has been taken from the mold.

When the tray 10 has been fitted up with a set of heated casings, plugs and electrodes, it is then placed within the cavity 18 and top sections 2, 2 are closed, the extensions 26 embracing the inclined sides 11 of the base 1, and are then locked by the pin 82. The mold is then ready to receive the glass, and the plunger 7 is raised above the packing ring 25 to admit the charge of glass. The glass in molten condition of suitable quantity is then fed into the chamber 20 and the plunger 21 is forced downwards through the packing ring 25 into the chamber 20, pressing the molten glass through the channels 22, 23, and 16 and then through the apertures 30 of the casings 3 filling the interior of the casing 3, the cup 13 and the cap 40. The mold can be then unlocked and opened and the tray 10 removed. The glass connecting the pairs of spark plugs is broken off at the aperture 30 of the casing 3. The spark plugs are then taken out of the tray 10 and the plugs 5 withdrawn from the casings 3.

In carrying out this method a number of trays would be employed and would provide for a charged tray being ready to be inserted in the mold, immediately on removal of the tray with completed spark plugs. This tray on removal carries with it the glass which filled the feed chamber and the channels leading to the spark plug casings. This glass is then broken off and returned to the melting pot. The plugs are then lifted off of the electrodes and out of the spark plugs and are ready to be used with another tray. All the operations are simple and can be performed by unskilled labour. The apparatus shown in the drawings is adapted to turn out six spark plugs simultaneously, but the trays may be made to accommodate more or less.

By this means spark plugs of this construction can be produced rapidly and efficiently.

What I claim is:—

1. An apparatus for making spark plugs com-

- prising a mold having a base, a rectangular cavity having outwardly inclined walls extending upwardly from the base, a tray adapted to seat in the cavity, having a handle extending beyond the mold at one end, a series of pairs of conical cups cut along the centre line of the tray having hexagonal annular grooves, axial bores in the bottoms of the cups, hinged top sections to the mold meeting on such centre line, having dies cut therein to correspond with the cups in the tray and adapted to enclose the walls of the base cavity, a glass feed chamber in the top sections having channels leading to each pair of dies and cups, and a plunger adapted to reciprocate in such chamber.
2. An apparatus for making spark plugs with glass cores, comprising a mold having a base, a cavity having outwardly inclined walls extending upwardly from the base, a tray to seat in the cavity having a handle at one end, a series of pairs of conical cups cut along the center line of the tray, having hexagonal annular grooves, adapted to seat metal casings to be cored, hinged top sections to the mold having dies cut to correspond with the cups in the tray, plugs to fit the upper part of the dies, a glass feed chamber in the top sections with channels leading to the sides of each pair of cups and a plunger adapted to reciprocate in the glass feed chamber.
3. An apparatus for making a plurality of spark plugs with glass cores, by one operation, comprising a mold having a base, a cavity in its upper surface, a removable tray to seat in the cavity, a series of cups in pairs with connecting channels cut in the tray, adapted to seat the casings to be cored, hinged top sections to the mold, having semi-cylindrical dies cut to correspond to the cups in the tray, a glass feed chamber in the top sections with passages leading to the connecting channels, and a plunger adapted to reciprocate in the feed chamber.
4. An apparatus for making a plurality of spark plugs with glass cores by one operation, comprising a mold having a base and hinged top sections, a cavity in the base, a removable tray adapted to seat in the cavity, a series of cups in pairs cut along the center line of the tray, adapted to seat the casings to be cored, channels connecting each pair of cups, with dies cut in the top sections corresponding to the cups, a glass feed chamber in the top sections with passages leading to the connecting channels, and a plunger in the feed chamber adapted to reciprocate.
5. An apparatus for making a plurality of spark plugs with glass cores in one operation, comprising a mold, having inwardly inclined sides and extending bottom, a cavity therein with outwardly inclined sides, a removable tray adapted to seat in the cavity, top sections hinged to meet on the center line of the tray, having lower extensions adapted to embrace the inclined sides of the base, a series of cups in pairs with connecting channels cut in the center line of the tray, having annular hexagonal grooves adapted to seat the casings to be cored, semi-cylindrical dies cut in the contacting surfaces of the top sections with hexagonal grooves, corresponding to the cups, plugs fitting the upper ends of the dies, a glass feed chamber in the top sections having passages leading to the connecting channels, and a plunger in the feed chamber adapted to reciprocate.
6. An apparatus for making a plurality of spark plugs with glass cores by one operation, comprising a mold, having a base with inwardly inclined sides and an extended bottom, a cavity therein with outwardly inclined sides, a removable tray adapted to seat in the cavity, top sections hinged to meet on the center line of the tray, having lower extensions adapted to embrace the inclined sides of the base, a series of conical cups in pairs with connecting channels, cut in the center line of the tray, having annular hexagonal grooves adapted to seat the casings to be cored, semi-cylindrical dies cut in the contacting surfaces of the top sections with hexagonal grooves corresponding to the cups, plugs fitting the upper ends of the dies, plugs fitting the bottoms of the cups, a glass feed chamber in the top sections with passages leading to the connecting channels and a plunger in the feed chamber adapted to reciprocate.

THOMAS WILLIAM WARREN.

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