No. 886,523. PATENTED MAY 5, 1908.

E. A. LA HAR.

SPARK PLUG FOR EXPLOSION ENGINES.

APPLICATION FILED AUG. 30, 1907.

Fig. 1.

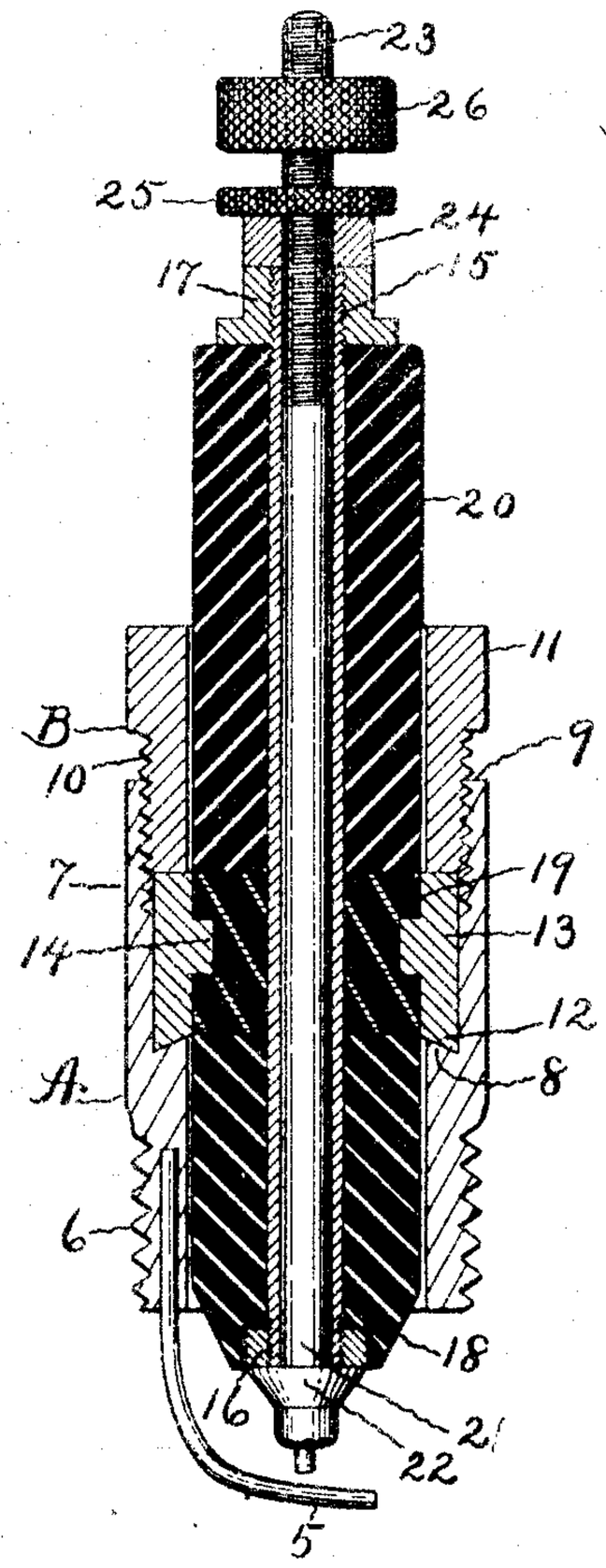

Fig. 2.

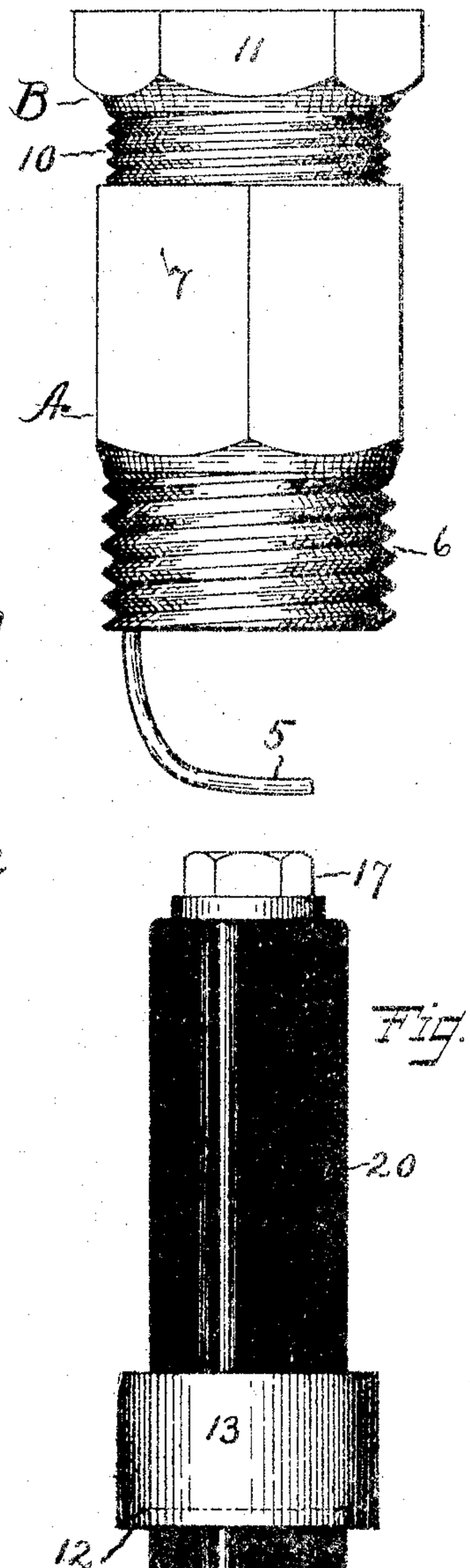

Fig. 3.

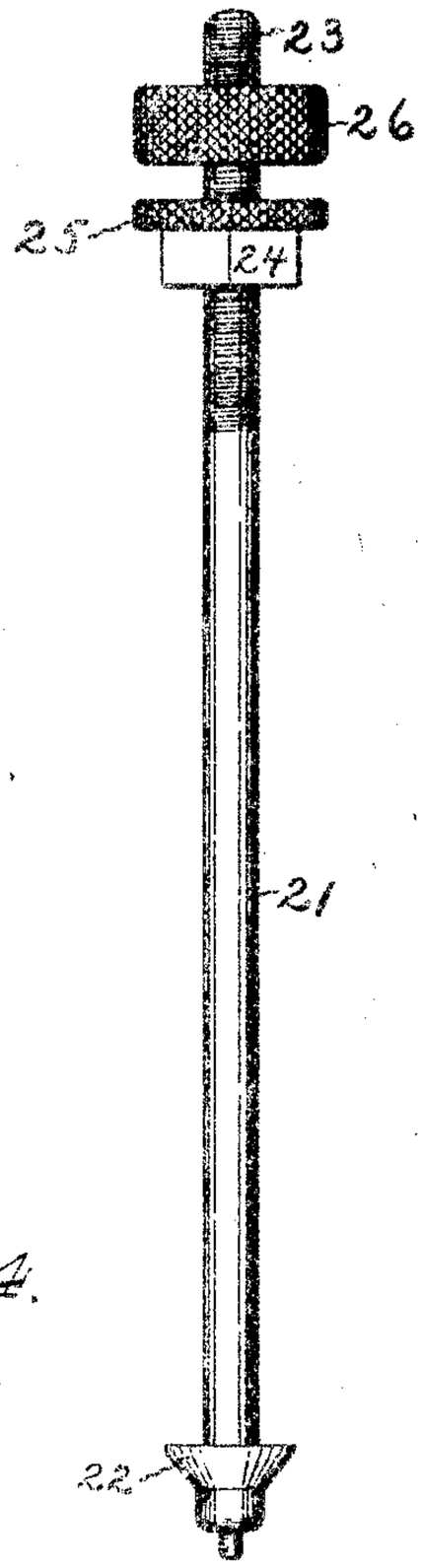

Fig. 4.

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UNITED STATES PATENT OFFICE.

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SPARK-PLUG FOR EXPLOSION-ENGINES.

No. 886,523. Specification of Letters Patent. Patented May 5, 1908.

Application filed August 30, 1907. Serial No. 390,844.

To all whom it may concern:

Be it known that I, ELLSWORTH A. LA HAR, a citizen of the United States, residing at Forestville, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Spark-Plugs for Explosive-Engines, of which the following is a specification.

My invention relates to improvements in spark plugs for explosive engines and the objects of my improvement are simplicity and economy in construction with convenience and efficiency in use.

In the accompanying drawing:—Figure 1 is a sectional elevation of my plug, the plane of section being longitudinal and central. Fig. 2 is a side elevation of the holding socket and its tubular cap. Fig. 3 is a side elevation of the spark rod and attached nuts and washers as removed from the insulator. Fig. 4 is a side elevation of the insulator and connected metallic sleeve by means of which sleeve the insulator is held within the socket, the said insulator being removed from the socket.

A designates a socket or shell having a connected electrode 5, an externally threaded neck 6, an angular portion 7 for the application of a wrench, an internal shoulder or seat 8 of a conoidal form and an internally screw threaded mouth 9. B, designates a tubular cap, having an exterior thread 10 and angular portion 11, the bore of the said cap being substantially the same as the smaller bore of the socket A. These parts are of an ordinary construction excepting that I make the shoulder or seat of a conoidal form. The socket is screwed into the engine in the ordinary way.

I form my insulator, whether of one or many pieces, complete in itself with all the parts intact, and permanently connect it with a surrounding metallic sleeve or bushing so that the complete insulator may be held in place by holding the said sleeve or bushing within the socket between the shoulder 8 and the inner end of the tubular cap B. In the particular form shown the lower end 12 of the sleeve 13 is undercut or concavely beveled to fit the internal and conoidal seat 8 of the socket A, as shown in Fig. 1 and as indicated by broken lines in Fig. 4. I prefer to form an inner rim 14 near the longitudinal middle of the sleeve making the sleeve at that point of a smaller internal diameter than at its ends. I build up the insulator as shown in Figs. 1 and 4, on a body tube 15 that is threaded at each end for the reception of nuts 16 and 17. The body of the insulator, that is the insulating material, is shown as composed of a lower porcelain tube 18, mica disks 19, and a porcelain tube 20. The mica disks are of two sizes to fit the two different inner diameters of the sleeve. The porcelain tubes are of about the same diameter and are small enough to be received within the socket and tubular cap without crowding, because the insulator is held by the sleeve instead of by its fit to the socket, and consequently it is not necessary to have the insulating material come in contact with the socket A or its tubular cap B. The holes in the mica disks and the inner bore of the porcelain tubes are such as to receive the body tube 15 and substantially fit the same. After properly placing the tubes, disks and metallic sleeve on the body tube, they are all firmly secured together in a single structure by screwing up one of the nuts on the ends of the body tube. The mica disks permit of a sufficient yielding so that the porcelain tubes are not broken by screwing up the nut.

The spark rod 21 is substantially of an ordinary construction, having a shoulder 22 at its lower end while its body is of a size to be received within the body tube and its upper end 23 is threaded. The usual nut 24 for holding the rod in the insulator, and the nut or washer 25 and nut 26 for binding a conducting wire are applied to the said threaded end. The general operation of the plug is the same as that of similar plugs now in use.

By my invention, I provide a detachable insulator that is complete in itself independently of the spark rod so that the spark rod can be readily removed for cleaning or repairs or for substituting a new rod while the insulator is intact. By the employment of a metal sleeve permanently connected with this insulator, the complete insulator may be held in the socket through the said sleeve, instead of through the more fragile insulating material that is liable to crumble or break. By this sleeve, especially when fitted to a beveled seat, a gas tight joint is formed so that there is no leakage of gas through the socket from the engine. By the employment of a body tube and metal sleeve I am enabled to use mica disks for elasticity within the sleeve and more substantial but less elastic porcelain outside of the sleeve.

It is apparent that some changes from the specific construction herein disclosed may be made and therefore I do not wish to be understood as limiting myself to the precise form of construction shown and described, but desire the liberty to make such changes, in working my invention, as may fairly come within the spirit and scope of the same.

I claim as my invention:

1. A spark plug comprising a holding socket, having an internal seat, a tubular cap for said socket, an insulator complete in itself and a middle sleeve permanently connected with the said complete insulator, the said sleeve being fitted within the said socket and to the said seat therein for holding the insulator in the socket through the said sleeve.

2. A spark plug comprising a holding socket having an internal seat of a conical form, a tubular cap for said socket, an insulator complete in itself, and a middle sleeve within which the said insulator is mounted, the lower end of the said sleeve being under cut to fit the conoidal seat of the said socket.

3. A spark plug comprising an insulator consisting of an insulating body, a middle sleeve of a larger diameter than that of the said body portion, which body portion projects from each end of the said sleeve, and a central tube by means of which the said sleeve and insulating body are held together as one complete and detachable insulator.

4. A spark plug comprising an insulator consisting of an insulating body formed of different pieces, a middle metallic sleeve surrounding the middle portion of the said insulating body, and a central body tube connecting as one part the several parts of the complete insulator.

5. A spark plug comprising an insulator consisting of an insulating body portion composed of mica and porcelain, a middle metallic sleeve surrounding the middle portion of the said insulating body, a central body tube having a threaded end and a nut for binding the several parts as one on the said body tube.

6. A spark plug comprising an insulating body portion, a middle sleeve surrounding the said insulating body portion, a central body tube by means of which the said insulating body and sleeve are held together, and a separately formed detachable spark rod fitted within the said tube.

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