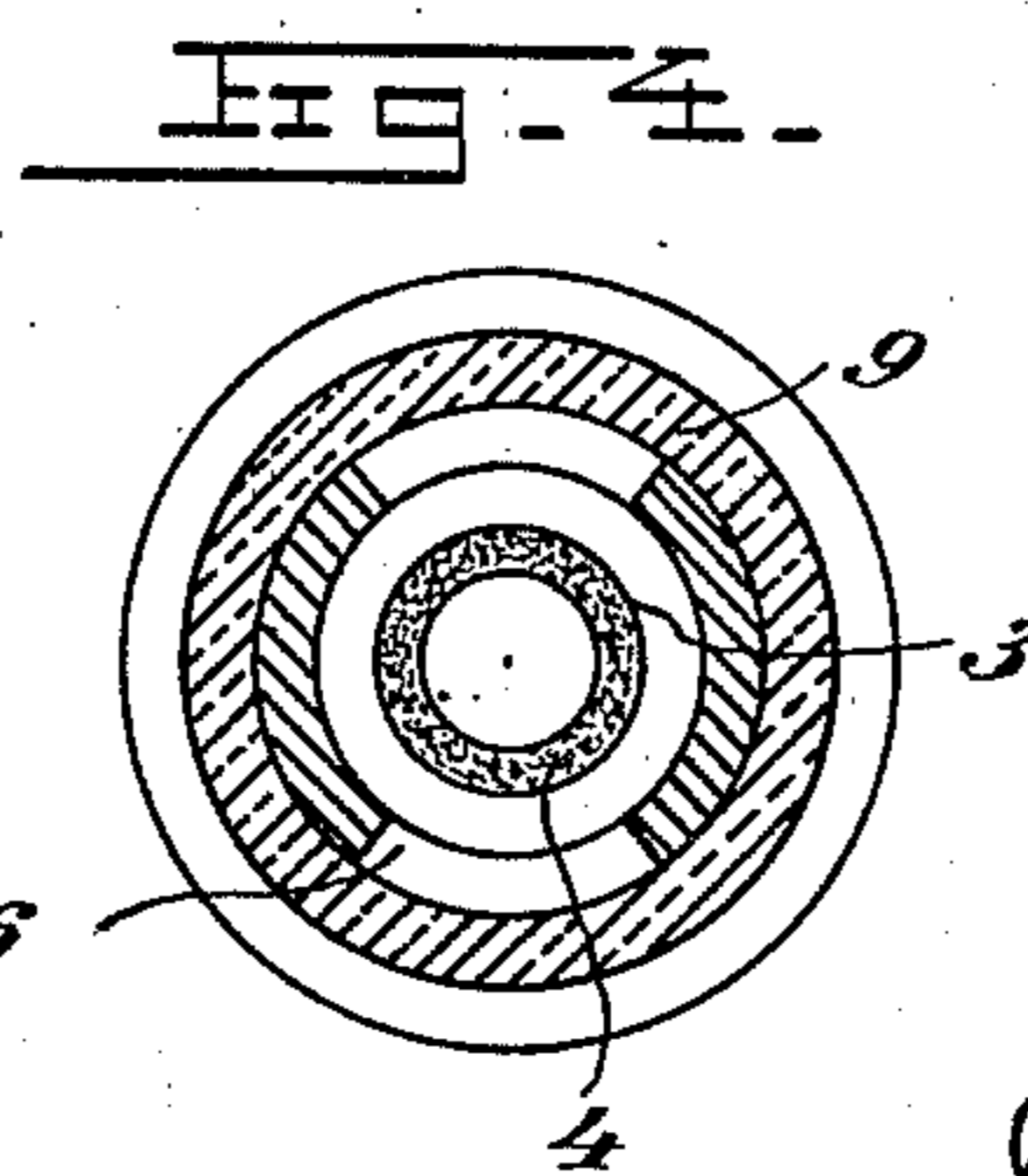
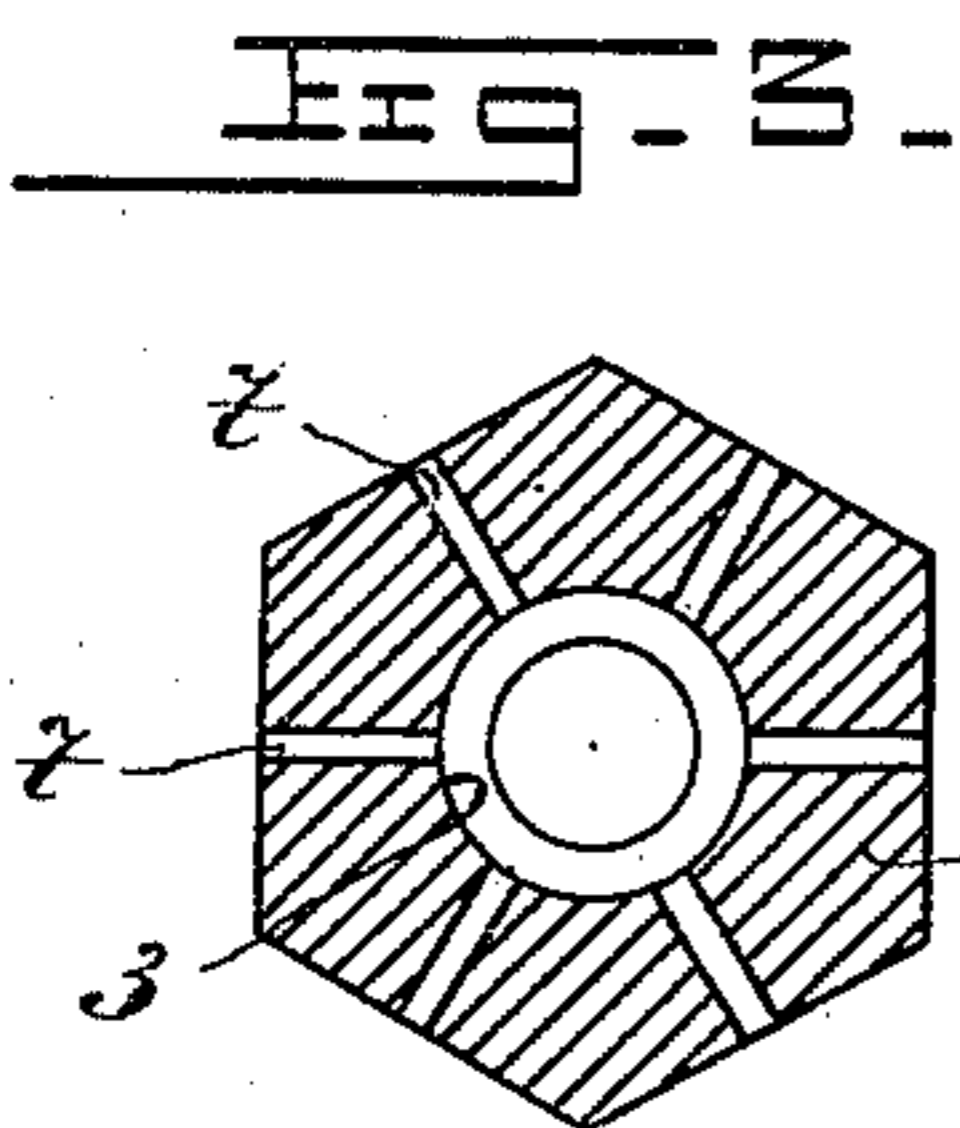
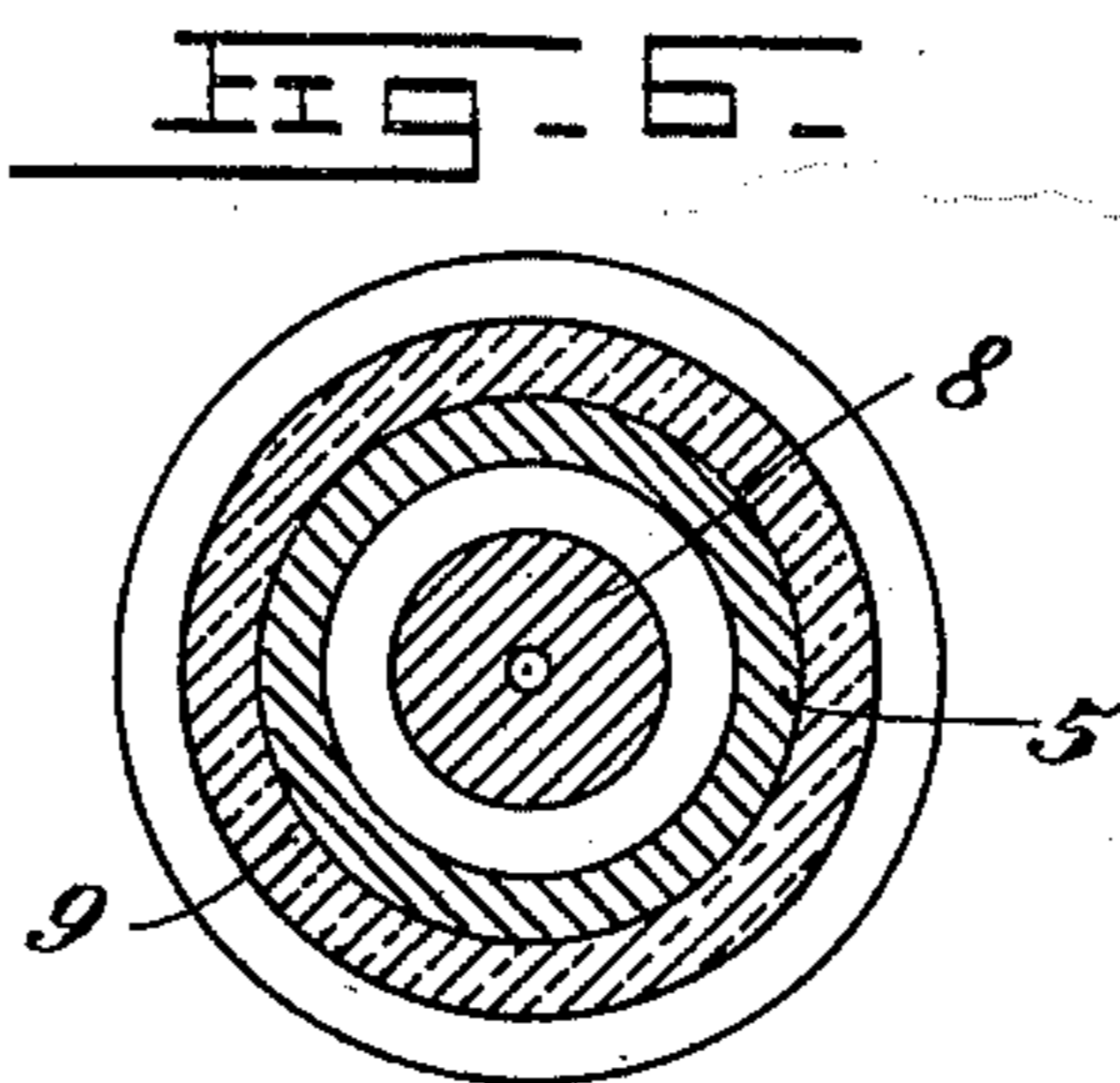
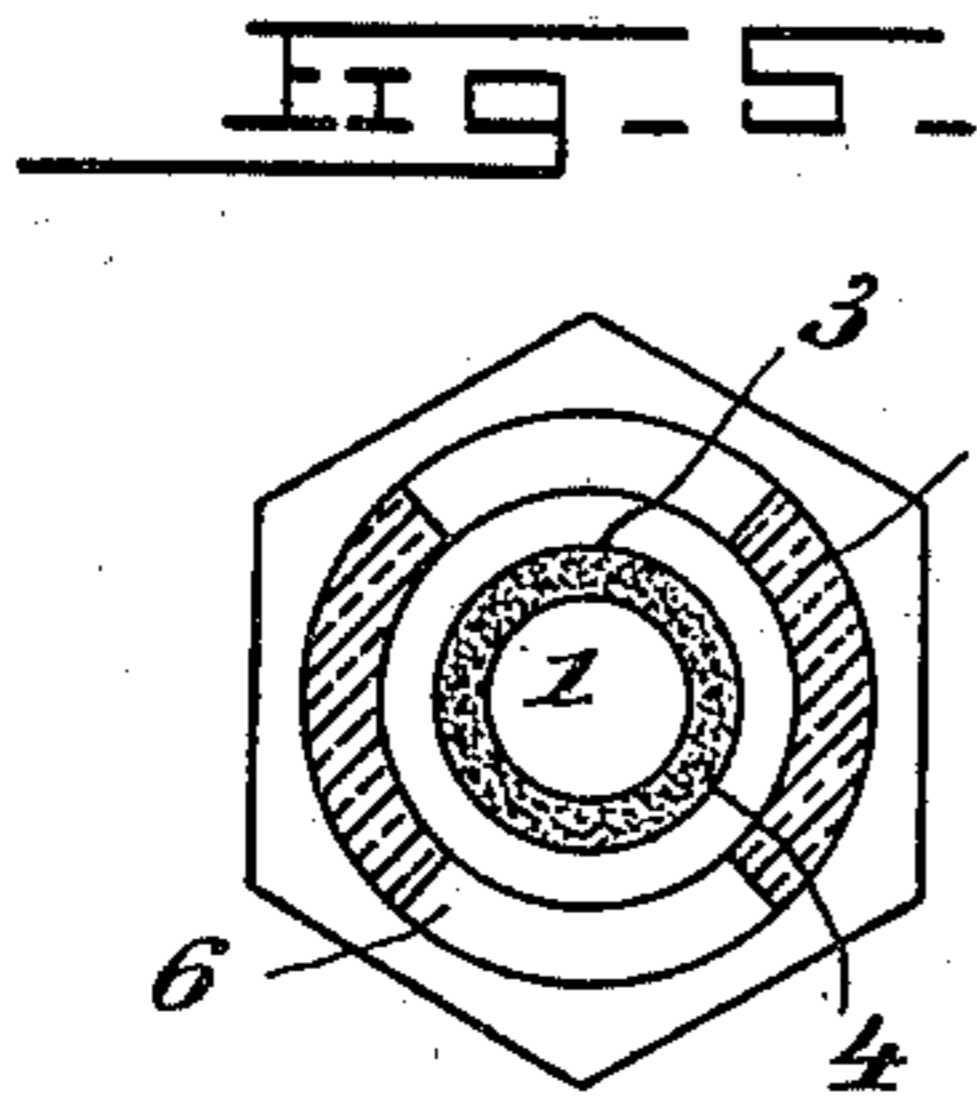
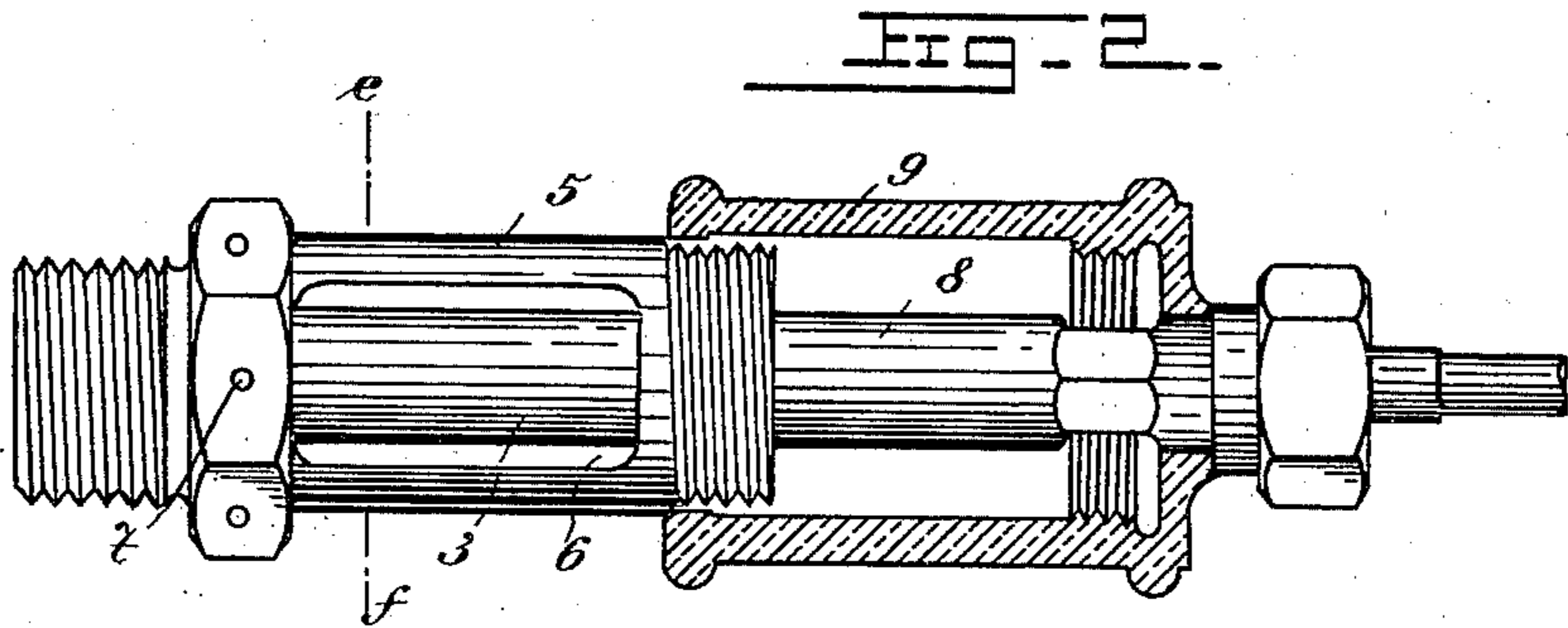
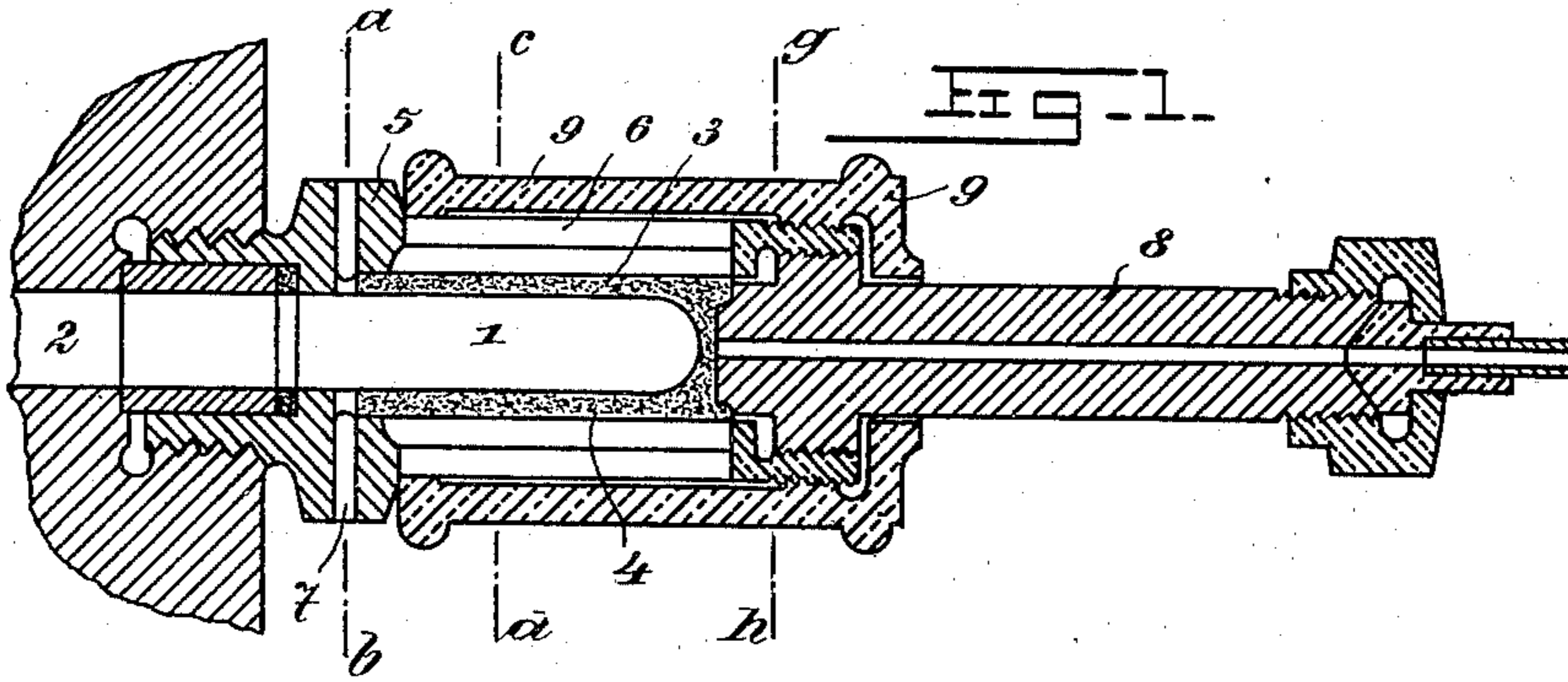


No. 653,341. Patented July 10, 1900.  
**ANTON CODELLI VON FAHNENFELD & ERNST STADLER VON WOLFERSGRÜN.**  
**TUBE IGNITER FOR EXPLOSIVE ENGINES.**

(No Model.)

(Application filed Mar. 31, 1900.)



Witnesses  
 H. M. Gellman, Jr.  
 Edwin Cruise

Inventors  
 Anton Codelli von Fahnenfeld  
 Ernst Stadler von Wolfersgrün  
 by *Paul H. H. H. H.*  
 Attorneys.

# UNITED STATES PATENT OFFICE.

ANTON CODELLI VON FAHNENFELD, OF SCHLOSS THURN, NEAR LAYBACH,  
AND ERNST STADLER VON WOLFERSGRÜN, OF LAYBACH, AUSTRIA-  
HUNGARY.

## TUBE-IGNITER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 653,341, dated July 10, 1900.

Application filed March 31, 1900. Serial No. 11,006. (No model.)

*To all whom it may concern:*

Be it known that we, ANTON (FREIHERR) CODELLI VON FAHNENFELD, a resident of Schloss Thurn, near Laybach, and ERNST STADLER VON WOLFERSGRÜN, a resident of Laybach, Austria-Hungary, subjects of the Emperor of Austria-Hungary, have invented a new and useful Improvement in Igniting Devices for Explosion-Engines, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to an igniting device for explosion-engines employing igniting tubes or pins. In an igniting device according to this invention the igniting tube or pin is not, as has hitherto been usual, kept glowing by the aid of a separate flame, but is kept in a glowing condition by means of an explosive mixture which in circulating around it is ignited and keeps the igniting tube or pin in the requisite state of incandescence.

In the drawings illustrating a constructional form of the invention, Figure 1 is a longitudinal section of the improved igniting device, the latter being shown in its operative position. Fig. 2 is a plan, partly in horizontal section, showing the parts in the position for preparatory heating of the igniting tube or pin. Figs. 3 and 4 are sectional views on the lines *a b* and *c d*, respectively, of Fig. 1. Fig. 5 is a section on the line *e f*, Fig. 2; and Fig. 6 is a section on the line *g h*, Fig. 1.

In an igniting device according to this invention there is utilized the known property of certain substances to condense gases in themselves, so that they thereby become heated to their ignition temperature and then burn. The heat produced by the combustion is then used for heating the igniting tube or pin to the temperature necessary for producing ignition. By altering the pressure under which the combustible mixture is admitted to the igniting tube or pin the distance from the explosion-chamber of the point of maximum incandescence of the firing tube or pin may be varied and the ignition thus started at a different point in the piston's stroke.

In an example of a device according to this

invention the igniting tube or pin 1 is connected in the ordinary way with the explosion-chamber 2 of the engine, and surrounding the igniting tube or pin is another tube 3, (hereinafter called the "outer" tube,) preferably of the same material as the igniting-tube, (platinum,) while the space between the two tubes is filled with platinum shavings 4. The igniting tube or pin is closed at the end remote from the explosion-chamber; but the outer tube is open at both ends. Around this outer tube 3 is a sleeve 5, (hereinafter called the "inner" sleeve,) which is screwed into the wall of the engine and is provided with a projecting nut portion adjacent to the said wall. This sleeve has in it two openings 6, one hundred and eighty degrees apart, through which access may be had to the outer tube, and in the nut portion there is provided a number of radial passages 7, through which the space between the igniting tube or pin 1 and the outer tube 3 communicates with the atmosphere. The feed-pipe 8 for the explosive mixture is tightly screwed into the front end of the inner sleeve 5 and opens into the annular space filled with platinum shavings between the igniting tube or pin 1 and the outer tube 3. Over the inner sleeve 5 is arranged another sleeve 9, (hereinafter called the "outer" sleeve,) which is guided upon the feed-pipe 8 and held in place by a screw-thread on the inner sleeve 5. The outer sleeve 9 may advantageously be provided with a handle, and the screw-thread may advantageously be half removed, so that the outer sleeve 9 may be firmly secured in place by a revolution through one hundred and eighty degrees.

The method of working of this igniting device is as follows: To set the apparatus into operation, the outer sleeve 9 is pushed back, Fig. 2, and the outer tube, with the platinum shavings in it, is then heated up through the openings 6 in the inner sleeve 5. This may be done either by a suitable hand-lamp or by a special flame supplied by a branch from the pipe supplying the explosive mixture. The combustible mixture intended for the heating of the igniting tube or pin 1 is then admitted

thereto through the feed-pipe 8. The mixture on reaching the platinum shavings 4 is condensed in them and is thereby so heated that it ignites and burns, and consequently brings the igniting tube or pin 1 itself to the requisite temperature for igniting the explosive mixture and maintains it thereat. The products of combustion of the combustible mixture pass between the igniting tube or pin 1 and the outer tube 3 to the passages 7 in the nut portion of the inner sleeve 5 and escape through them into the open air. When the outer tube 3 has been sufficiently warmed by the external flame for the platinum shavings to heat the entering combustible mixture to the ignition temperature, the external flame is removed or turned off, and the outer sleeve 9 is pushed over the inner sleeve 5 to protect the outer tube 3 and screwed up thereon against the projecting nut portion. The whole ignition device is then completely closed in and protected, so that it can neither miss fire nor be injured by external influences.

Instead of making the outer sleeve 9 to slide it may be made simply to rotate upon the inner sleeve 5 and be also provided with two openings, so that the outer tube 3 can be warmed up, as aforesaid, through them and the openings 6 in the inner sleeve 5, while the openings in the inner sleeve can be covered during working by rotating the outer sleeve 9. In this case the outer sleeve 9 when screwed up must lie close against the nut portion of the inner sleeve 5.

We claim—

1. An igniting device for explosion-engines, embodying in combination: the tube 3 surrounding the igniting tube or pin 1 rigidly secured to the explosion-chamber 2, a body of platinum shavings 4 in the space between the said tube 3 and the igniting tube or pin 1, a passage connecting the said space with the feed-conduit 8 for the combustible mixture, and discharge-openings 7 connecting the said space with the atmosphere, to allow of the combustible mixture admitted to the previously-heated body of platinum shavings being condensed and ignited by the latter, to thereby heat the said igniting-pin, and to al-

low of the products of combustion generated being discharged, the part 5 surrounding the igniting-pin and having the openings 6, and the removable sleeve 9 adapted to close the said openings during the operation of the device and for the protection of the igniting tube or pin.

2. In an igniting device an outer tube provided with lateral openings and having an end portion adapted to be applied to the explosion-chamber of an explosion-engine and another end portion adapted to have a conduit for the combustible mixture applied thereto, an igniting tube or pin secured in the one end portion so as to project into the said outer tube, an inner tube surrounding the said igniting tube or pin within the said outer tube, a body of platinum shavings within the space between the said outer and inner tubes, discharge-openings in the outer tube, connecting the said space with the atmosphere, a feed-conduit for the combustible mixture, communicating with the said space and secured to the other end portion of the said outer tube, and an adjustable sleeve mounted on the latter to partly open and close the said lateral openings in the same, all combined substantially as described.

3. In an igniting device for explosion-engines a chamber communicating at opposite ends with the feed-conduit for the combustible mixture and with the atmosphere, respectively, and containing an igniting tube or pin and a tube surrounding the said igniting tube or pin at such distance therefrom as to leave an intermediate space capable of being filled with platinum shavings, lateral openings in said chamber, means as described for closing said openings and for varying their width when opened, substantially as and for the purpose described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ANTON CODELLI V. FAHNENFELD.  
ERNST STADLER VON WOLFERSGRÜN.

Witnesses:

ALVESTO P. HOGUE,  
AUGUST FUGGER.