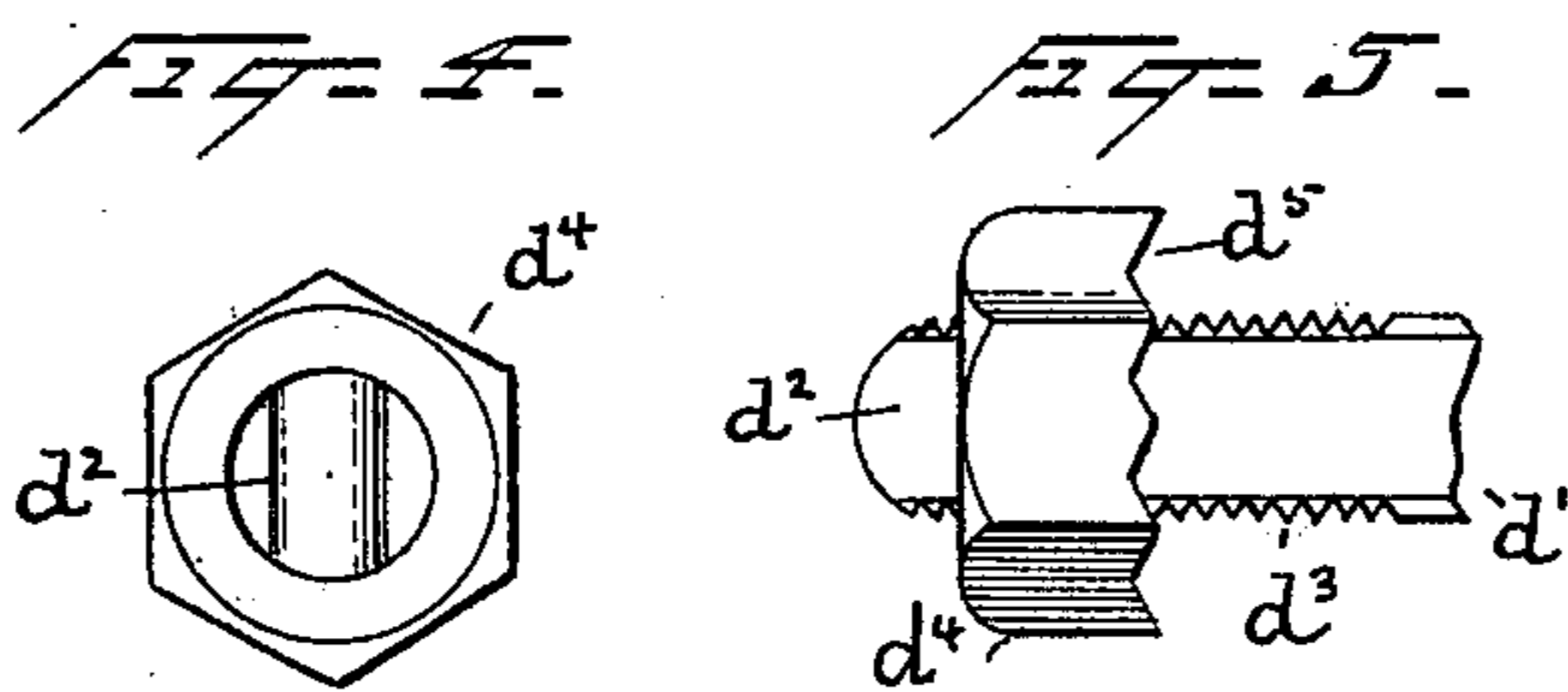
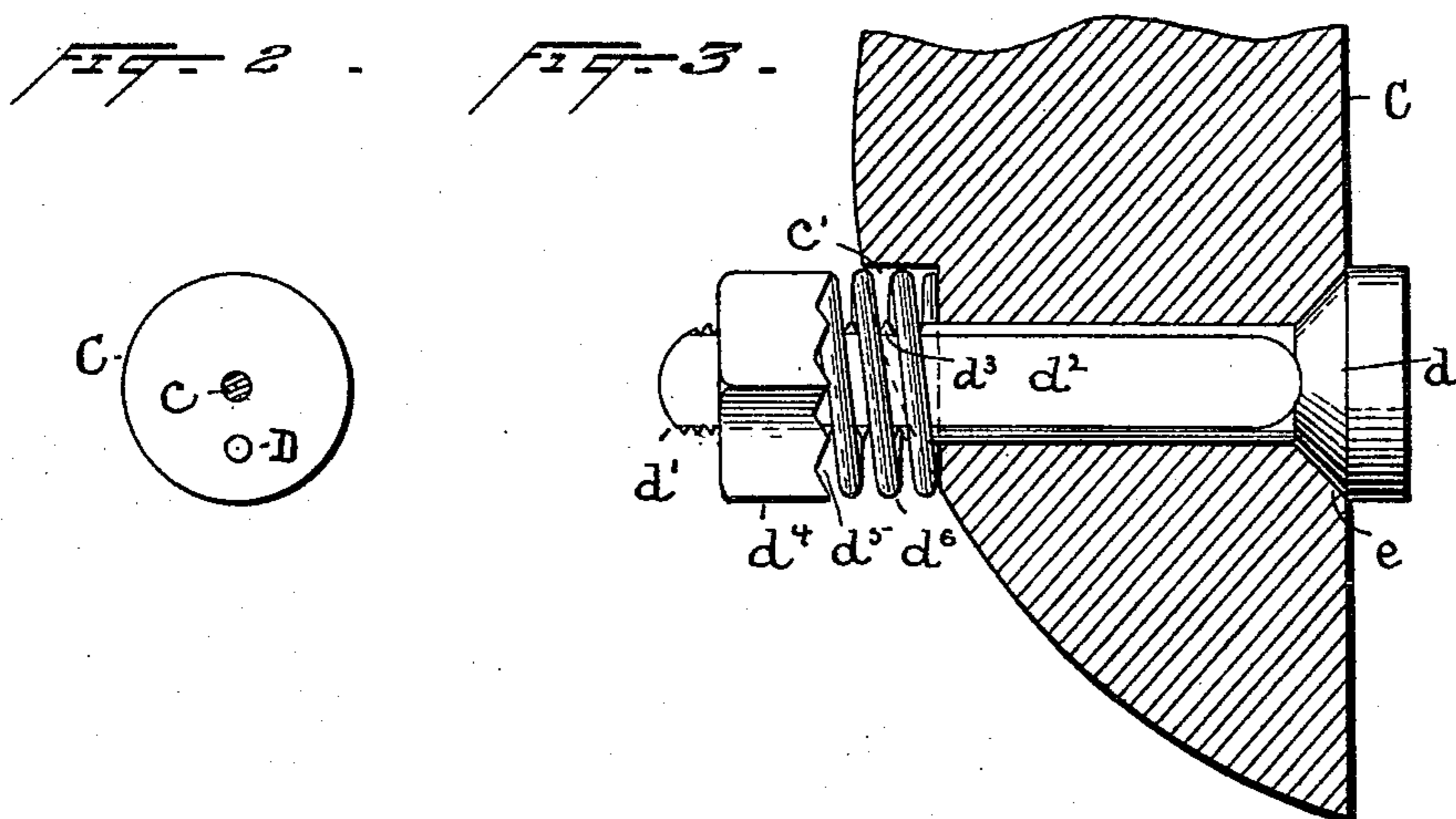
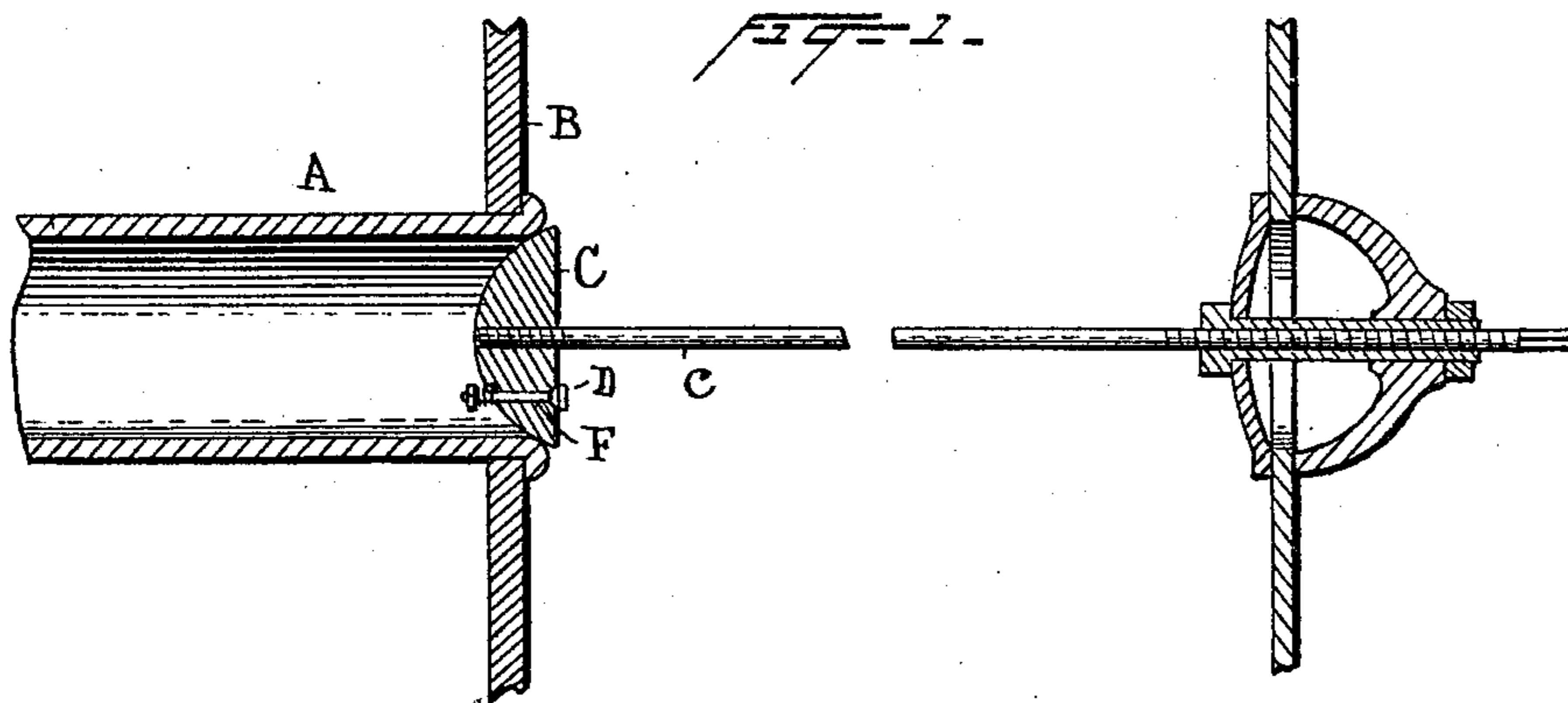


(No Model)

J. C. HENDERSON.
TUBE PLUG.

No. 583,054.

Patented May 25, 1897.



Witnesses
Morris H. Clark.
John R. Taylor.

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UNITED STATES PATENT OFFICE.

JOHN C. HENDERSON, OF NEW YORK, N. Y.

TUBE-PLUG.

SPECIFICATION forming part of Letters Patent No. 583,054, dated May 25, 1897.

Application filed February 20, 1896. Serial No. 580,004. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. HENDERSON, a citizen of the United States, residing at New York city, in the county and State of New York, have invented a certain new and useful Improvement in Tube-Plugs, of which the following is a specification.

My invention relates to mechanism for plugging tubes, such as those commonly employed in boilers. While capable of use in other connections, it is especially applicable in that type of boilers in which are employed water-tubes having plugs forming part of the construction and situated inside, means being provided for operating the same from the outside. In this type of boilers the plugs are commonly mounted upon screw-rods and are held directly in front of the mouth of the tubes but sufficiently distant therefrom as to preclude interference with circulation through the tubes. Should a tube burst or become otherwise impaired, the plugs are commonly inserted in such tube from both ends of the boiler, so as to immediately stop the leak. In performing this operation, however, there is always the danger that in plugging the tube as quickly as possible a perfect tube may be accidentally plugged at both ends. If now the boiler be kept in operation, the pressure within such plugged tube will increase to such an extent as to cause the tube to burst, thereby causing great damage. The present invention is directed to overcoming this difficulty. To this end, I employ a plug of any approved construction and mounted in any suitable manner, so that it may be quickly forced into the mouth of a tube. This plug I provide with a safety-valve so adjusted as to resist a certain degree of pressure, but so constructed as that upon such pressure being increased the valve will be forced from its seat to permit the escape of the agent employed. Manifestly with such a construction the inadvertent plugging of a sound tube at both ends will be unaccompanied by danger.

In the drawings, Figure 1 is a sectional view of my improved tube-plug, showing an approved means of operating the same. Fig. 2 is an end view of the plug, the adjusting-rod being shown in cross-section. Fig. 3 is a view on enlarged scale and partly in section

illustrating the safety-valve in position. Fig. 4 is an end view of the valve detached, and Fig. 5 is a detail illustrating more clearly the inner end of the valve.

Referring to the drawings, in which similar letters denote corresponding parts, A designates a tube secured to the tube-sheet B in the usual manner.

C designates the tube-plug. In the present instance this is shown as hemispherical in form and slightly greater in size than the interior of the tube A. The plug C is provided with the adjusting-rod *c*, by means of which it is forced into the tube. Any suitable means may be employed for imparting motion to the rod *c* and the plug carried thereby. The means shown in the drawings being a form commonly in use need not, therefore, be described further than to say that the rod *c*, being threaded and passing through a fixed and similarly-threaded sleeve or block, will on being turned force the plug into the tube.

D designates the safety-valve, operating within the perforation F in the plug C. This safety-valve comprises in the present instance the beveled annular valve proper, *d*, coacting with the valve-seat *e*, formed in the exterior of the plug.

d' designates the valve-stem, consisting of a bolt with flat sides *d*² and screw-threaded at *d*³ near its outer end.

*d*⁴ designates a nut adapted to be screwed upon the inner end of the valve-stem and preferably having its surface nearest the plug serrated or toothed at *d*⁵, as clearly shown in Figs. 3 and 4. Between the nut *d*⁴ and the plug is located a coil-spring *d*⁶, so adjusted as to maintain the valve in the position shown in Fig. 3 under ordinary pressure in the tube.

The inner face of the plug C is preferably recessed at *c'* to afford a secure seat for the spring *d*⁶. Thus, as will be readily understood, should two plugs be driven into a sound tube the excess pressure would escape through the valve D. Should the tube be injured and leaking, however, the valve under the influence of the spring *d*⁶ and the boiler-pressure will remain inoperative.

Although I have described herein a specific embodiment of my invention, I do not wish to limit myself thereto, as many modifica-

tions thereof may readily be made without departing from the spirit of the invention. Thus, for instance, I may employ, if desired, a hollow or partially-hollow adjusting-rod
5 passing through the plug and communicating with the confined space. A valve of suitable construction located in said rod would operate in the same manner as the device above described. Again, if desired, the safety-valve
10 may be located in a cap or plate placed over the end of a tube, such cap or plate being in effect a plug.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—
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1. In a boiler, the combination with a tube,

of means for closing the same, comprising or provided with a valve normally inoperative but made operative by excess of pressure within the tube, substantially as set forth. 20

2. In a boiler, the combination with a tube, of a plug for closing the same, a vent extending through said plug, and a valve in said vent for the escape of excess pressure, substantially as set forth. 25

This specification signed and witnessed this 18th day of February, 1896.

JOHN C. HENDERSON.

Witnesses:

JOHN F. LANGAN,

G. DE WITT WILLIAMSON.