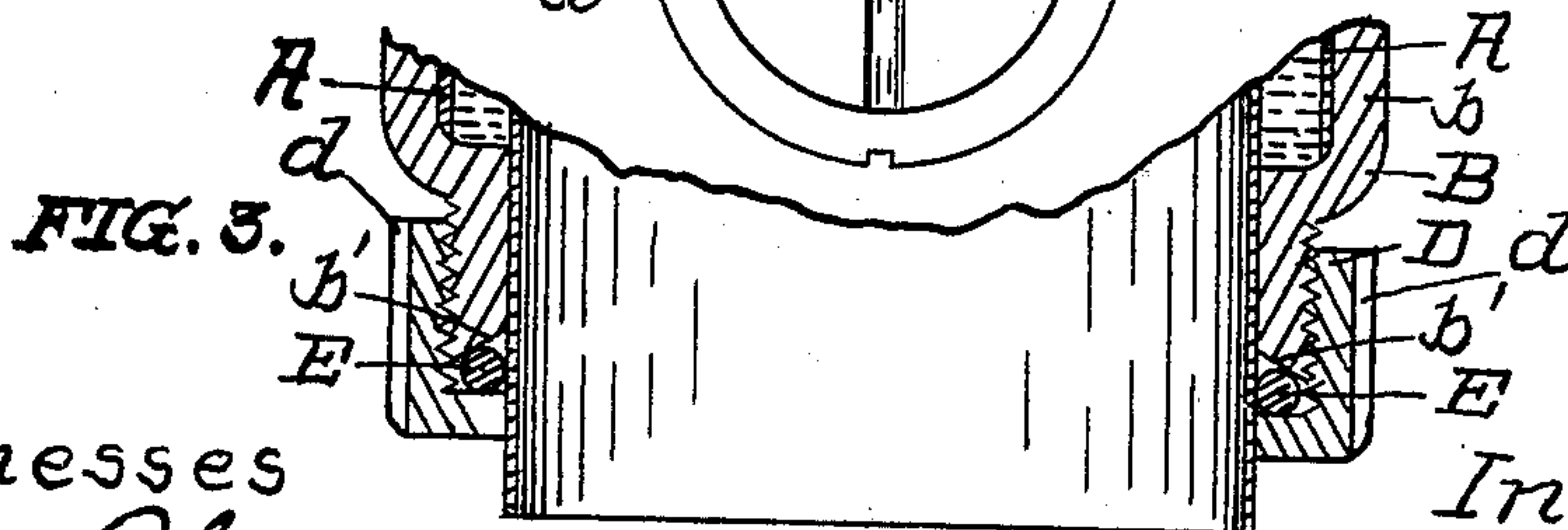
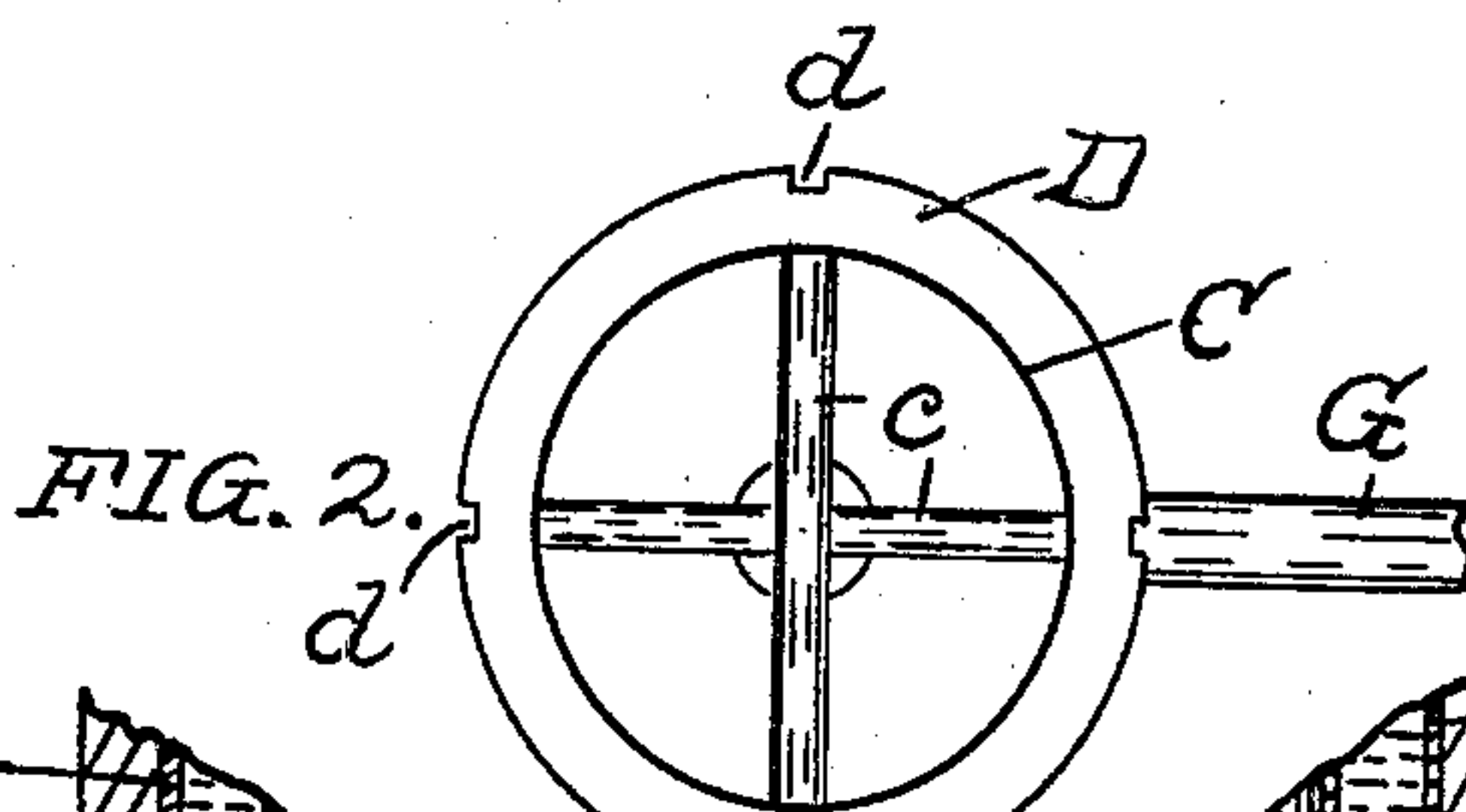
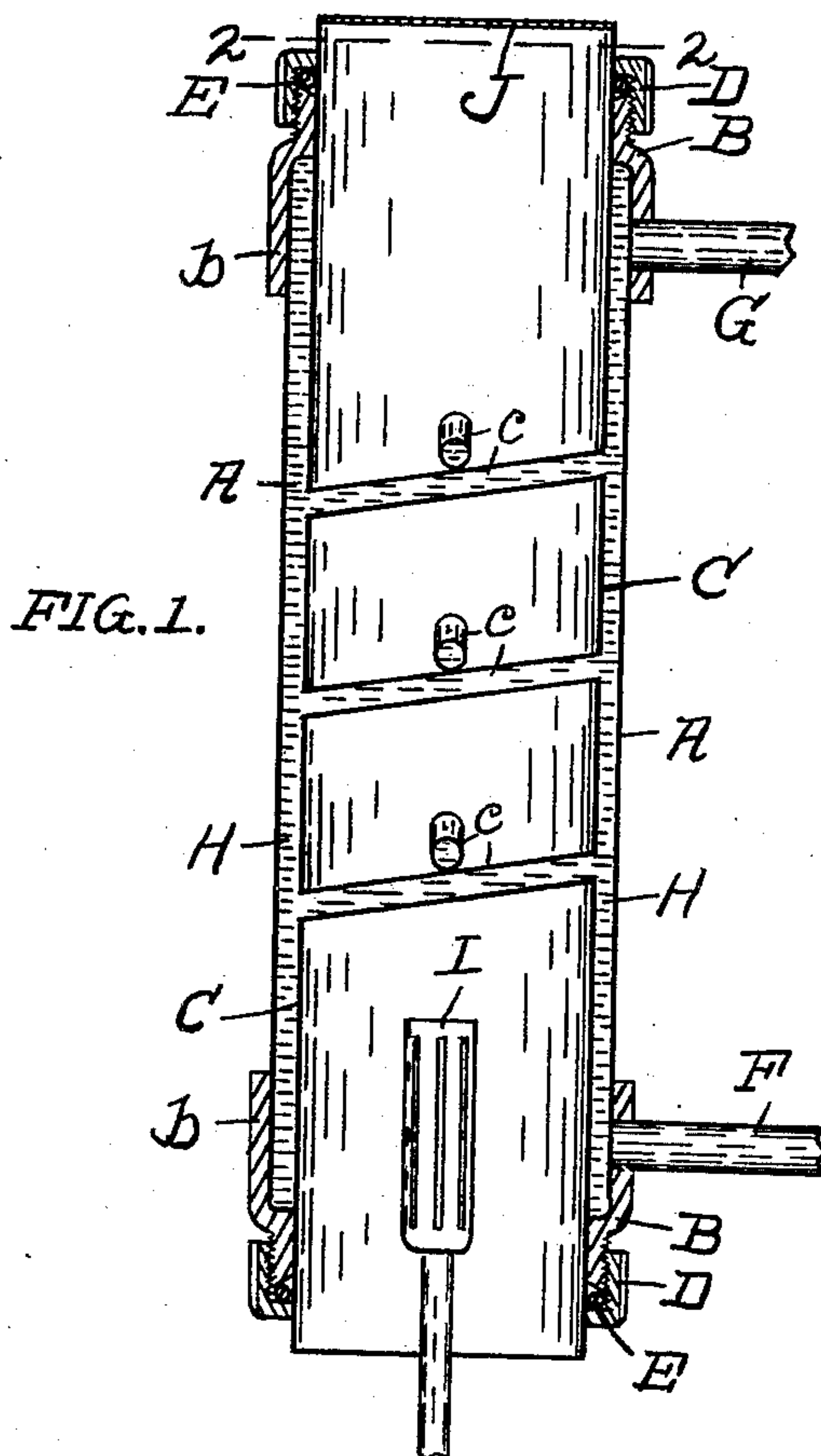


No. 863,651.

PATENTED AUG. 20, 1907.

E. ROOCH.
WATER HEATER.

APPLICATION FILED MAY 7, 1906.



Witnesses
Agnes B. Grant.
Earle R. Passel

Inventor
Edward Roach
By Parkinson & Richards
Attorneys

UNITED STATES PATENT OFFICE.

EDWARD ROOCH, OF NORWOOD, OHIO.

WATER-HEATER.

No. 863,651.

Specification of Letters Patent.

Patented Aug. 20, 1907.

Application filed May 7, 1906. Serial No. 315,583.

To all whom it may concern:

Be it known that I, EDWARD ROOCH, a citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain
5 new and useful Improvements in Water-Heaters, of which the following is a specification.

The object of my invention is to provide an improved water heater of simple and economical construction, and my invention consists in the combination and ar-
10 rangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a vertical section of a heater embodying my invention; Fig. 2, a section on line 2—2 of Fig. 1; and Fig. 3, an enlarged section through the bottom of the heater.

15 To form the outer wall and frame of the heater, a tube A, preferably of brass, is secured between upper and lower casings B, preferably by sweating the ends of the tube into flanges *b*. In this manner the use of screw threads or other means of attachment on tube A
20 is avoided thus permitting the use of a comparatively light tube. Within tube A and casings B is a tube C preferably of copper. The tube C passes freely through casings B and is secured in position by means of caps D which are threaded to casings B. Round packings
25 E are imprisoned between caps D and inclined ends *b'* of casings B so as to contact with the sides of tube C. In the edges of caps D are notches *d* which may be engaged by a wrench to tighten or loosen the caps. It
30 will be seen that by tightening caps D, packings E are squeezed out against the sides of tube C to form flexible connections to support the tube and at the same time permit expansions and contractions thereof when heated or cooled. By loosening the caps D, the tube
35 C may be readily removed for cleaning. At intervals, inclined water tubes *c* are secured across tube C and serve to increase the heating surface and circulation while at the same time they brace the walls of the tube against collapse from outside pressure. Intake pipe F
40 and outlet pipe G communicate with the space H between tubes A and C. A suitable burner I is mounted in the lower part of tube C. Over the top of tube C is secured a small mesh brass screen to retard the outflow

of the heated gas but permits sufficient circulation to support combustion.

By this construction, it will be seen, that I provide 45 a water heater of very simple and economical construction and operation and which may be readily taken apart for cleaning.

I claim as my invention:—

1. In a water heater, the combination of an upper and 50 lower casing; an outer tube secured between the casings; an inner tube passing through the outer tube and casings and longitudinally movable relatively thereto; members adapted to be secured to the casings; packings imprisoned by the members and adapted to contact with the inner 55 tube; inlet and outlet pipes communicating with the space between the tubes; and a suitable burner for supplying heat to the inner tube, substantially as specified.

2. In a water heater, the combination of an upper and lower casing; an outer tube secured between the casings; 60 an inner tube passing through the outer tube and casings and longitudinally movable relatively thereto; inclined water tubes secured across the inner tube; members adapted to be secured to the casings; packings imprisoned by the members and adapted to contact with the inner 65 tube; inlet and outlet pipes communicating with the space between the tubes; and a suitable burner for supplying heat to the inner tube, substantially as specified.

3. In a water heater, the combination of casings B having flanges *b* and inclined ends *b'*; tube A sweated be- 70 tween flanges *b*; tube C passing through casings B and tube A and longitudinally movable relatively thereto; caps D secured to casings B; packings E imprisoned between caps D and inclined ends *b'* and contacting with tube C; suitable inlet and outlet pipes; and a suitable 75 burner for supplying heat to tube C, substantially as specified.

4. In a water heater, the combination of casings B having flanges *b* and inclined ends *b'*; tube A sweated be- 80 tween flanges *b*; tube C passing through casings B and tube A and longitudinally movable relatively thereto; screen J secured across the top of tube C; inclined water tubes *c* in tube C; caps D threaded to casings B; pack- 85 ings E imprisoned between caps D and inclined ends *b'* and contacting with tube C; suitable inlet and outlet pipes; and a suitable burner for supplying heat to tube C, substantially as specified.

EDWARD ROOCH.

Witnesses:

AGNES B. GRANT,
BRAYTON G. RICHARDS.