

(No Model.)

P. W. WILLANS, Dec'd.

W. D. BALDWIN, Administrator.

METALLIC PACKING.

No. 519,314.

Patented May 8, 1894.

FIG. 1

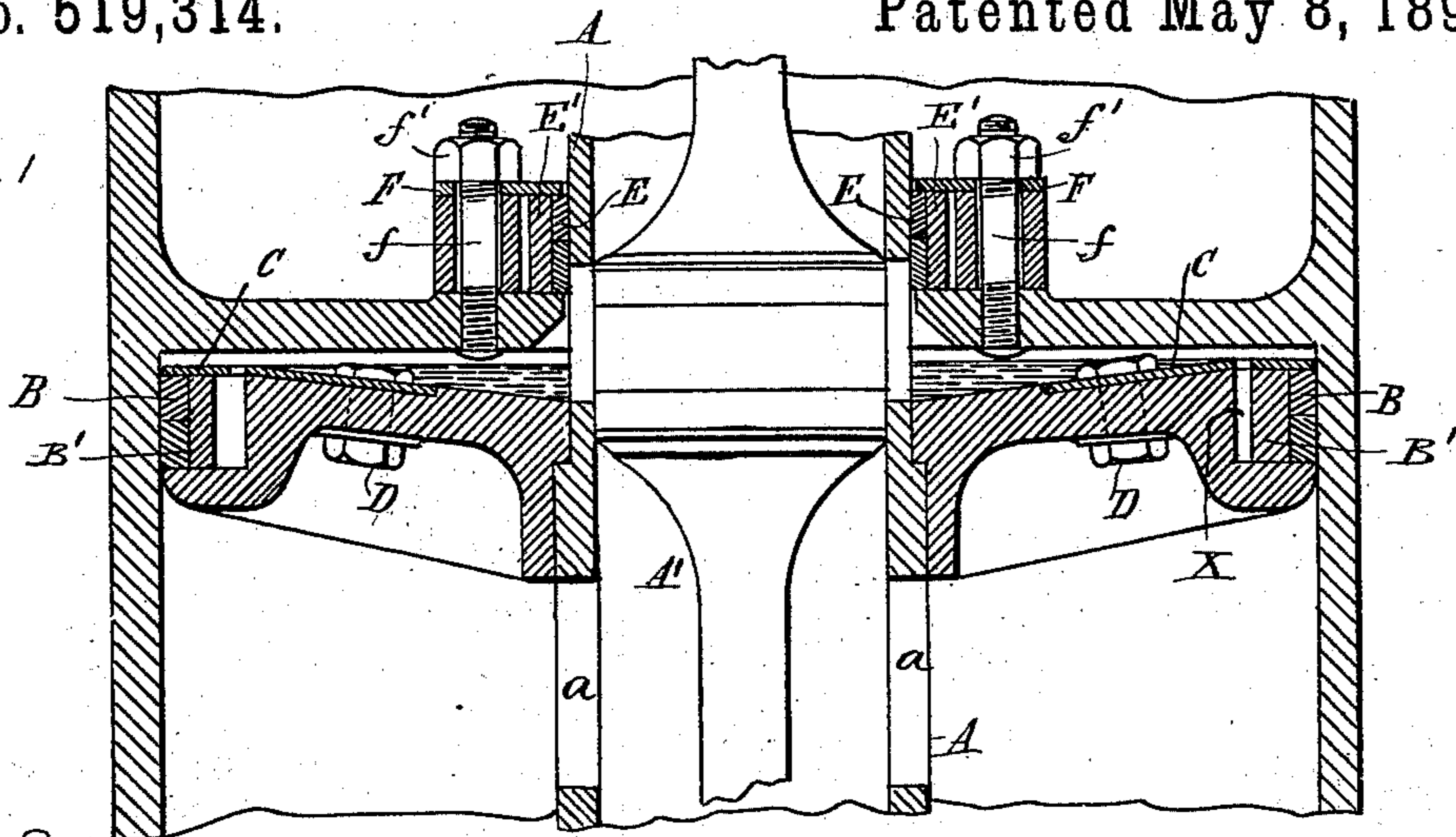


FIG. 2

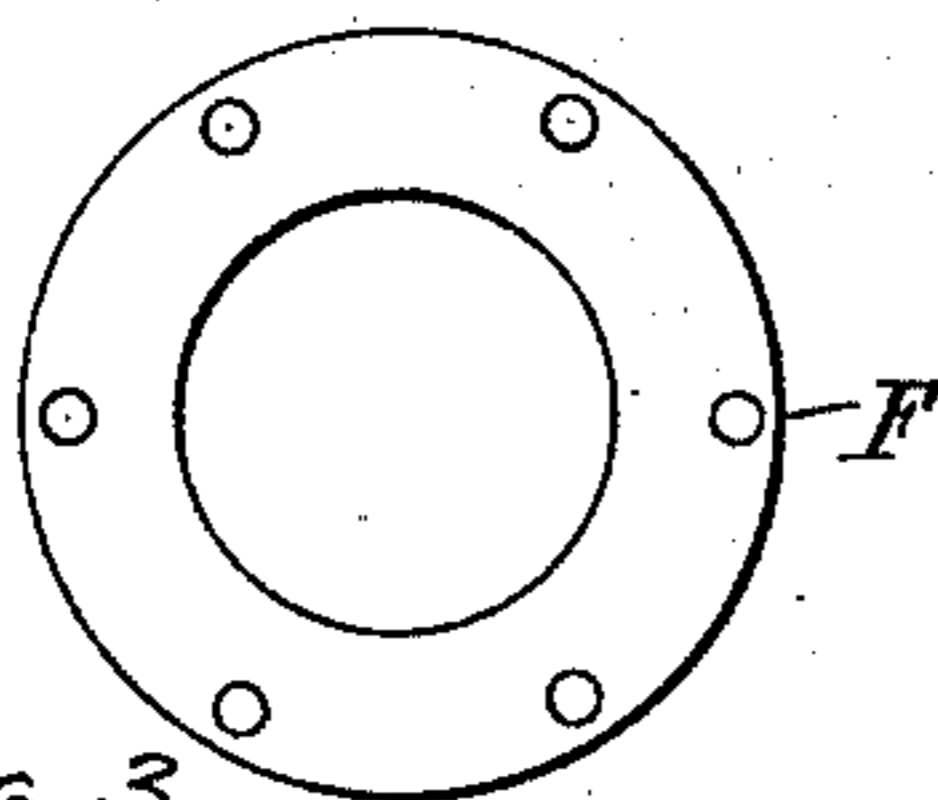


FIG. 3

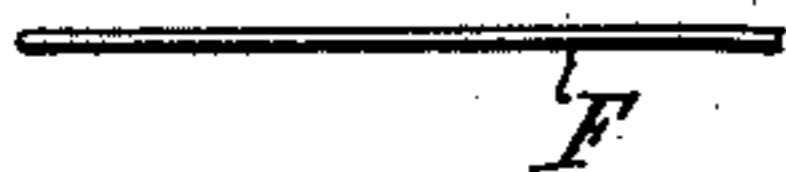


FIG. 4

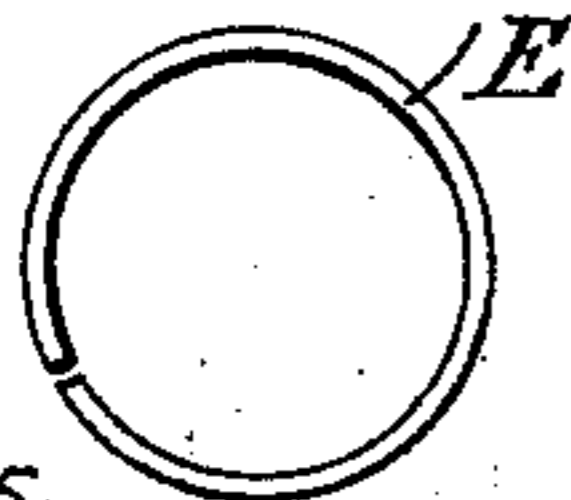


FIG. 5

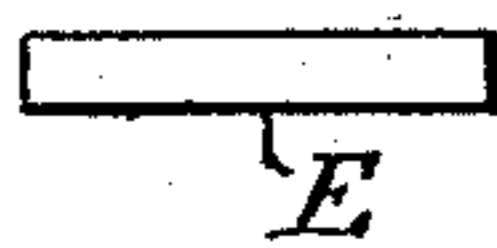


FIG. 6

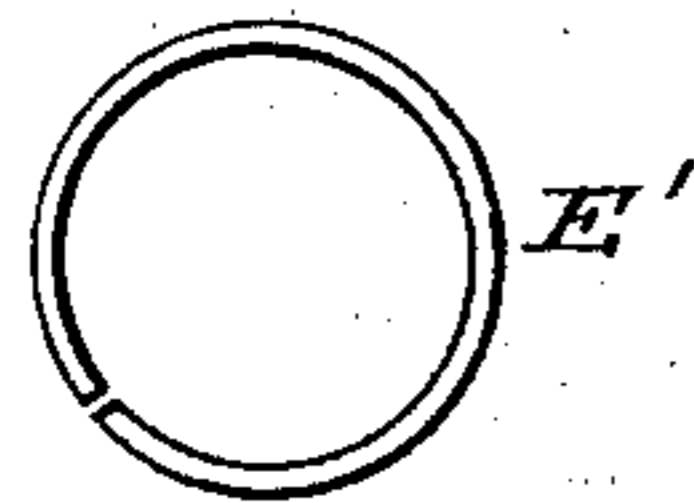


FIG. 7



FIG. 8

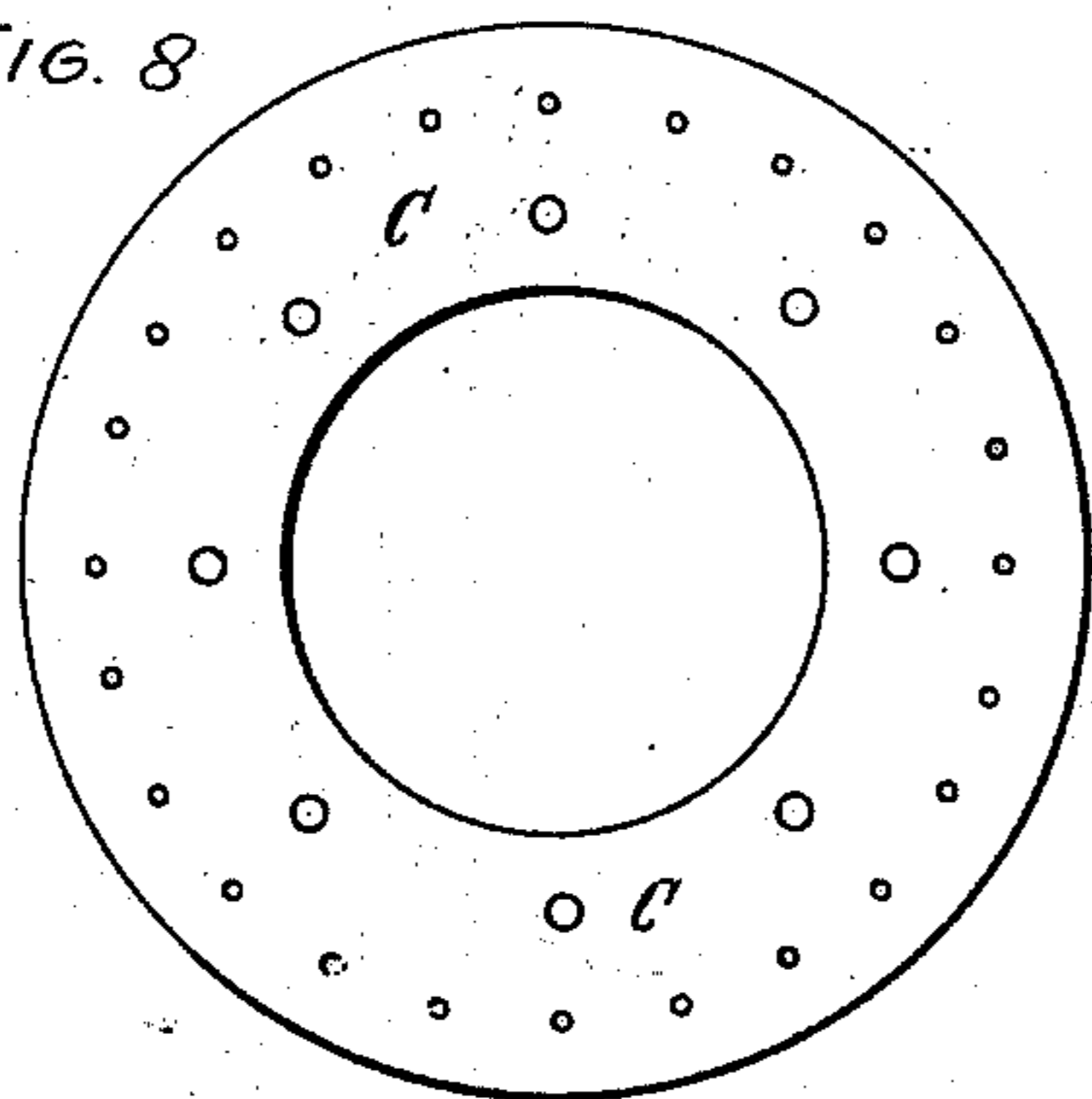


FIG. 9

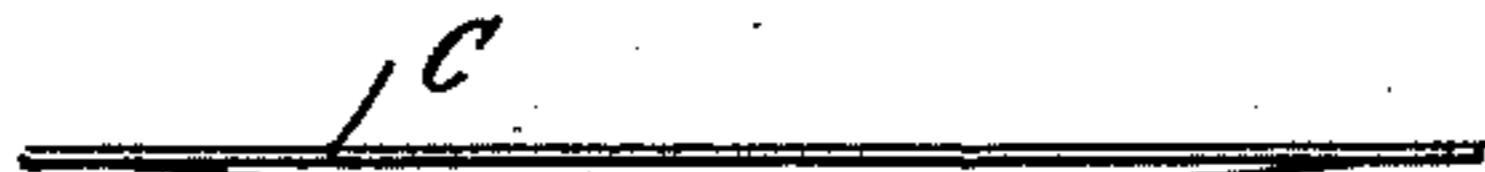


FIG. 10

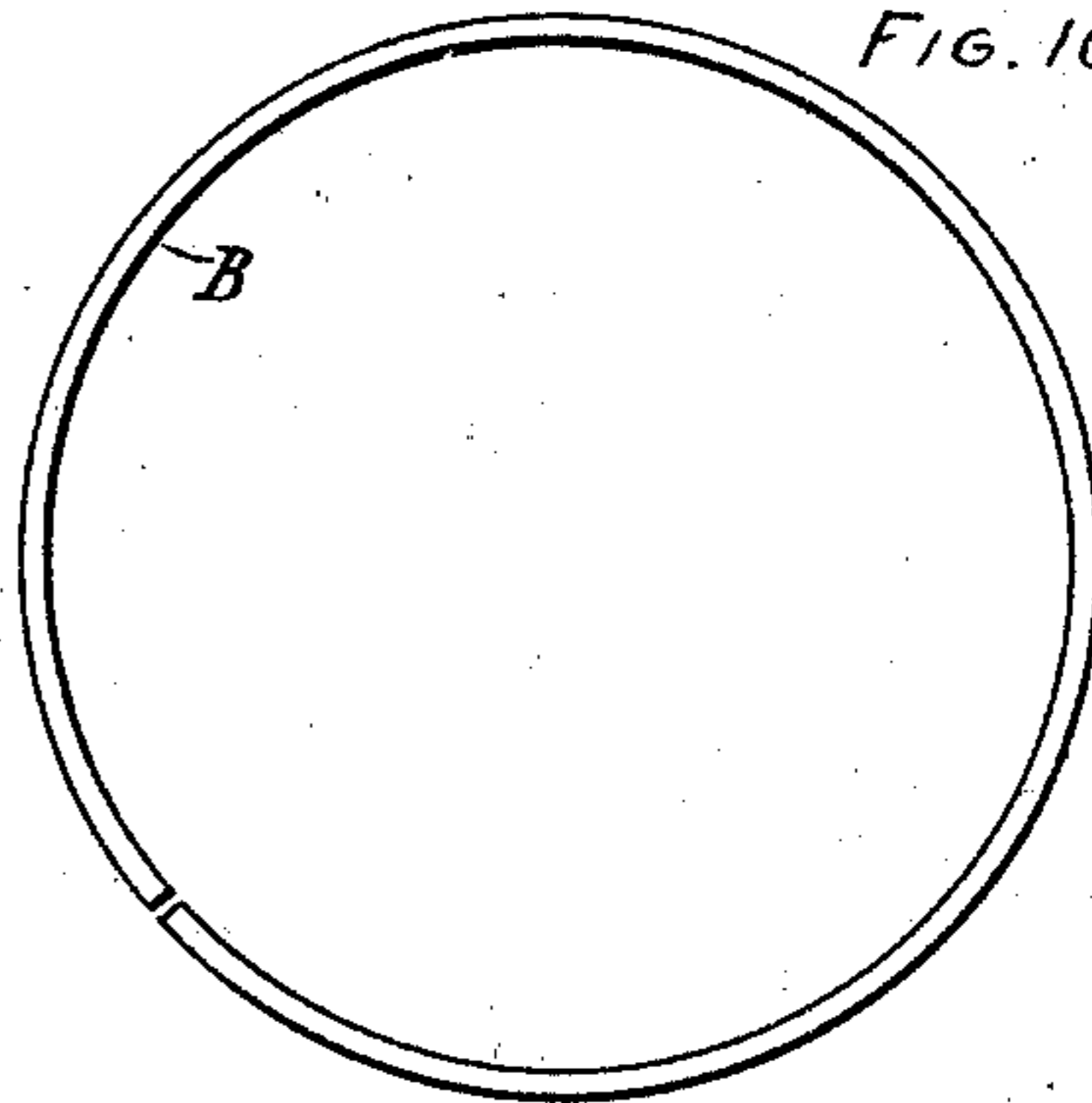


FIG. 11

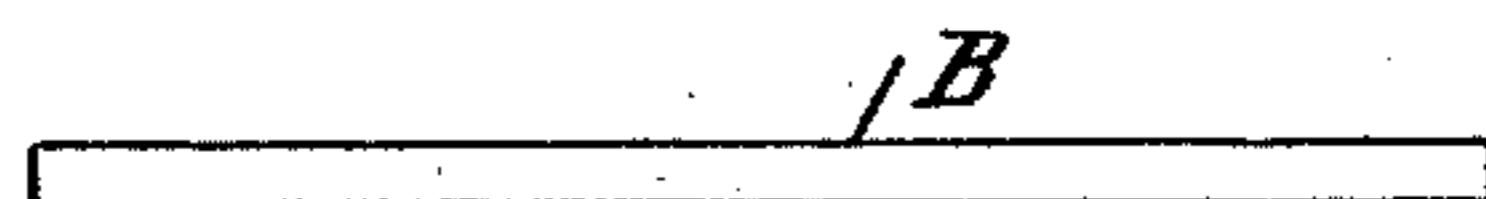


FIG. 12

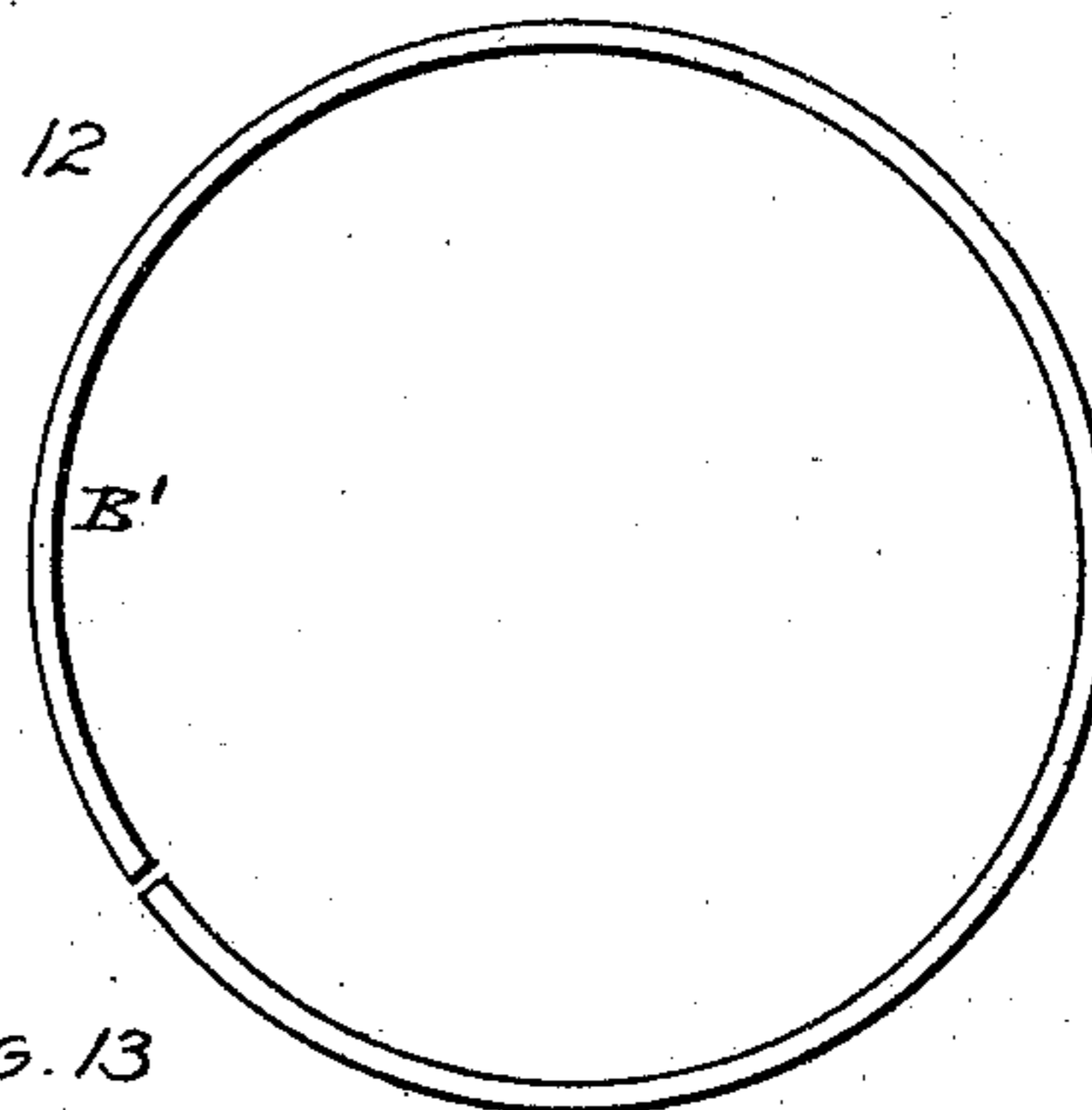
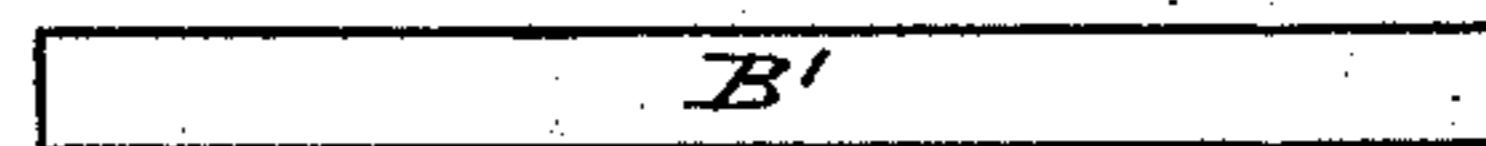


FIG. 13



Witnesses,

C. M. Brooke.

Battus D. Long.

Inventor.

W. D. Baldwin, Administrator of
P. W. Willans deceased.

by his attorneys,

Baldwin, Davidson & Wright

UNITED STATES PATENT OFFICE.

WILLIAM D. BALDWIN, OF WASHINGTON, DISTRICT OF COLUMBIA, ADMINISTRATOR OF PETER WILLIAM WILLANS, DECEASED, ASSIGNOR TO EDITH ELLEN WILLANS, OF LONDON, ENGLAND.

METALLIC PACKING.

SPECIFICATION forming part of Letters Patent No. 519,314, dated May 8, 1894.

Application filed June 8, 1893. Serial No. 476,979. (No model.) Patented in England April 25, 1891, No. 7,189.

To all whom it may concern:

Be it known that PETER WILLIAM WILLANS, formerly a subject of the Queen of Great Britain, lately residing at the Wilderness, Frimley Lock, Pinbright, London, in the county of Surrey, England, deceased, (WILLIAM D. BALDWIN, of Washington, District of Columbia, administrator of said WILLANS,) did in his life-time invent certain new and useful Improvements in Metallic Packing, (for which British Letters Patent No. 7,189 were granted to him April 25, 1891,) of which improvements the following is a specification.

This invention relates to metallic packing for pistons and piston rods, especially to those of single-acting engines, in which the fluid pressure on the opposite sides of the packing is sometimes equal and sometimes different; the preponderating pressure, however, where such exists, being always exerted on one and the same side of the packing.

In order to carry out the invention in the best way known to said WILLANS, an annular groove or recess is formed, in which the packing rings lie. These rings are three in number, of that well-known class cut in one place only, so that each constitutes a single transversely cut ring, in contradistinction to the equally well-known segment-rings; the single ring being preferred because its own elasticity or resilience keeps it in contact with the surface against which it rubs. Two of these rings lie side by side in contact with this working surface. The third ring is wide enough to overlap the other two, and lies on the side directly exposed to pressure. The rings are made with plane ends, closely fitting the corresponding sides of the grooves or recesses in which they lie, and one of these sides is made capable of slight movement laterally relatively to the rings, and is pressed against them either by its own elasticity or by a spring or springs. This movable or elastic side is that which is exposed to the greatest pressure so as to press the rings closely against the fixed or solid side of the recess in which they lie.

Suitable provision is made for admitting the fluid pressure to the back of the rings, or that side opposite their rubbing surfaces, so

as to force them into close contact therewith. The pressure of the springs endwise or laterally against the rings, combined with the pressure of the fluid upon them, keeps the rubbing or working face of the rings in close contact with the fixed part of the piston or gland box, and prevents the passage of the fluid from behind the rings in a radial direction.

The subject-matter claimed is hereinafter specifically designated.

The accompanying drawings represent these improvements as applied to a single-acting central-valve engine; the piston-rod being hollow to contain the valve, and having ports or passages in its sides. Such ports only are shown as are necessary to illustrate the invention claimed. Unless otherwise indicated, the apparatus is of usual construction.

Figure 1 represents a longitudinal central section, through the engine, showing two forms or modifications of the packing. Figs. 2 and 3 are respectively plan and edge views of spring-plates used in the gland form of the packing. Figs. 4 and 5 are respectively plan and edge views of one of the split-spring rubbing-rings of this packing, and Figs. 6 and 7, similar views of the wider bearing or pressure rings thereof. Figs. 8 and 9 are respectively plan and edge views of the spring-plates used in the piston-head form of the packing. Figs. 10 and 11 are similar views of one of the split-spring rings thereof, and Figs. 12 and 13 are similar views of the bearing or pressure-rings thereof.

A hollow or tubular piston-rod A, is shown as provided with the usual ports or passages a, and an internal slide-valve A'. An annular groove or recess X, is formed in the piston-head, the inner or lower side wall of which recess is fixed or integral with the piston-head. The packing-rings B, B', lie in this groove, with their inner or lower edges in contact with this fixed side-wall. The narrow rubbing-rings B, lie side by side in contact with the cylinder, while the wider bearing or pressure-ring B', lies inside them. The elastic, resilient or movable side-wall of the groove or recess is shown as consisting of a spring-disk or plate C, preferably of steel, secured to the piston-head or body by bolts D; and is so

formed and fixed that it exerts a constant lateral pressure upon the spring-rings B B', so as to prevent their end play, and compensate wear. Such end wear of the rings, however, is very small, as, owing to the absence of any initial clearance between the rings and the sides of the groove in which they fit, such end-play should not occur. The elasticity of the steel plate-spring C, may be increased by radial cuts in it, and it may be perforated to allow steam to pass behind the springs. See Fig. 8.

The above-described organization or arrangement is of course applicable only in a single-acting engine, where the pressure below or on one side of the piston does not ordinarily exceed that above or on the opposite working or pressure side.

The drawings—Figs. 1 to 7, both inclusive—also show the invention applied to a gland-ring, E, E' being the rings springing inward to clasp the piston, and F the spring-plate held down by bolts, studs and nuts. The body of the gland-box is made very slightly shallower than the width of the rings, so that the spring-plate may press laterally upon them when the nuts are tightened on their studs.

The operation will readily be understood from the foregoing description; the fluid pressure in all cases acting on the back of the rings, and keeping them pressed against the cylinder and piston, as the case may be; and also co-operating with the spring-pressure acting laterally on the rings, keeping their sides close against the side-walls of the groove or recess in which they lie.

What is claimed herein as new and as of the invention of said WILLANS is—

1. The combination, substantially as here-
inbefore set forth, of a piston having a groove
or recess in its periphery, a series of spring
rings mounted in the groove or recess and
adapted to press against the working surface
of the cylinder, a spring plate secured di-
rectly to the piston and having a yielding
spring edge overlapping the groove or recess
in the piston and bearing upon the rings, said
overlapping edge having perforations to ad-
mit steam into the recess behind the rings.

2. The combination, substantially as here-
inbefore set forth, of the piston head having
an annular groove or recess in its periphery,
the separate overlapping spring rings mount-
ed in the recess and by their own elasticity
pressing against the sides of the cylinder, the
spring disk or plate secured directly to the
piston head and having an outer edge over-
lapping the recess and bearing directly on
the rings, said overlapping edge having per-
forations communicating with the space in
the recess in rear of the rings, the organiza-
tion being such that the spring plate is ex-
posed to steam pressure to supplement its
elasticity in bearing upon the rings to hold
them in place, and the steam pressure ad-
mitted through the perforations of the plate
supplements the elasticity of the rings to
cause them to pack the joint.

In testimony whereof I have hereunto sub-
scribed my name.

WM. D. BALDWIN,
*Administrator of Peter William Willans, de-
ceased.*

Witnesses:

C. M. BROOKE,
B. W. MILLER.