

No. 891,317.

PATENTED JUNE 23, 1908.

K. WILLNER.

ARRANGEMENT FOR TIGHTENING PISTON RINGS.

APPLICATION FILED MAY 25, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

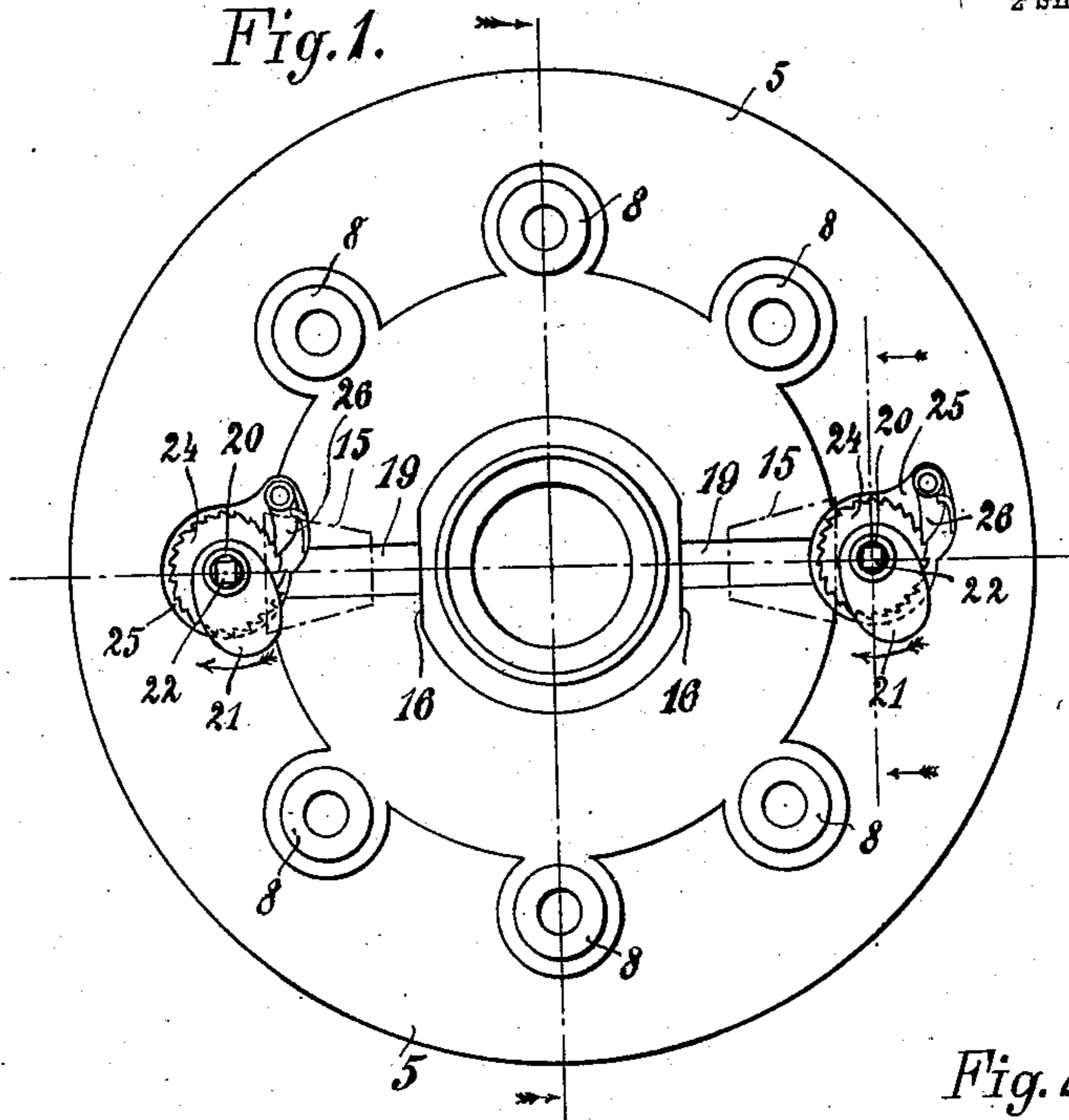


Fig. 2.

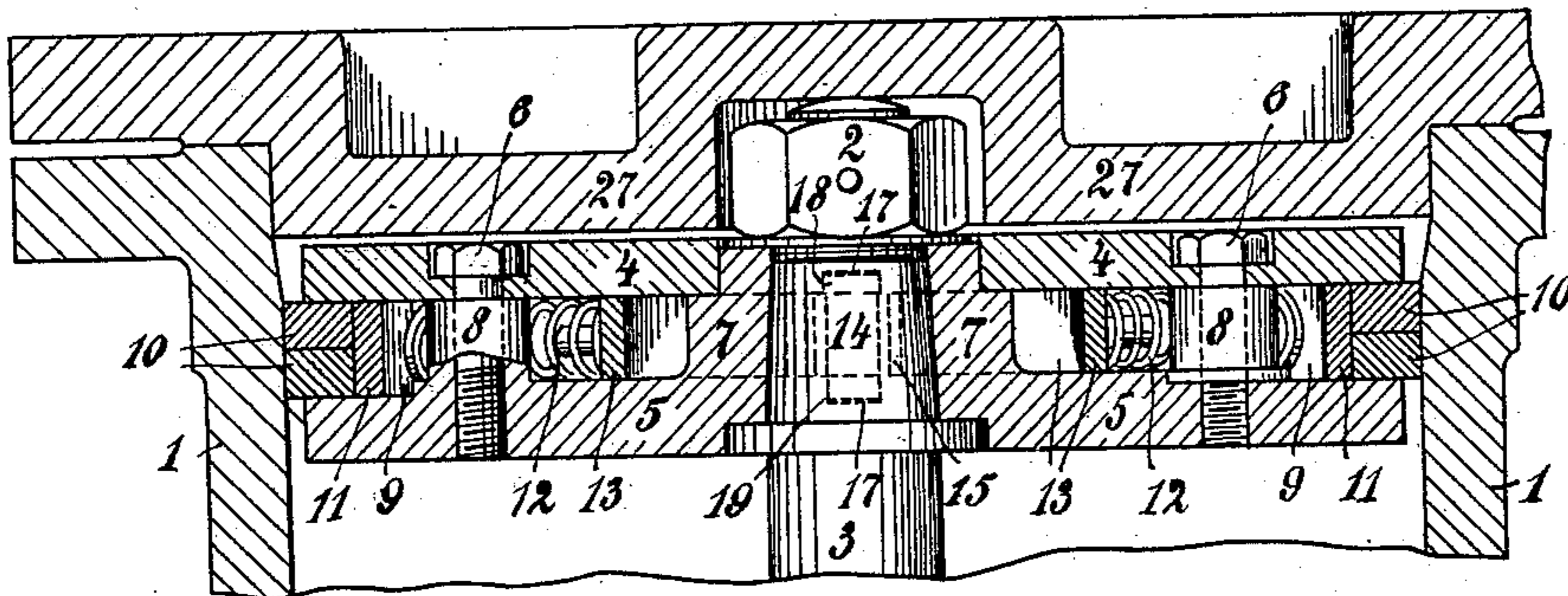


Fig. 6.

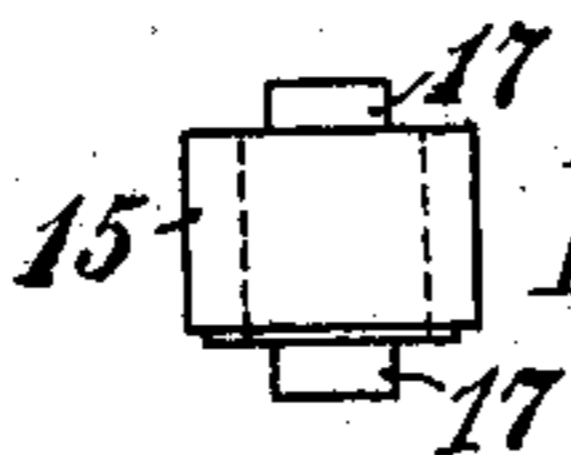


Fig. 7.

Fig. 9.

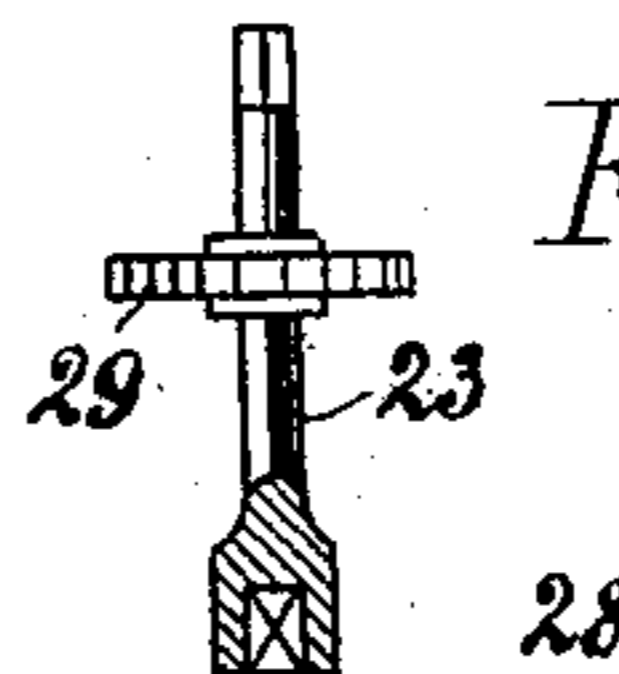
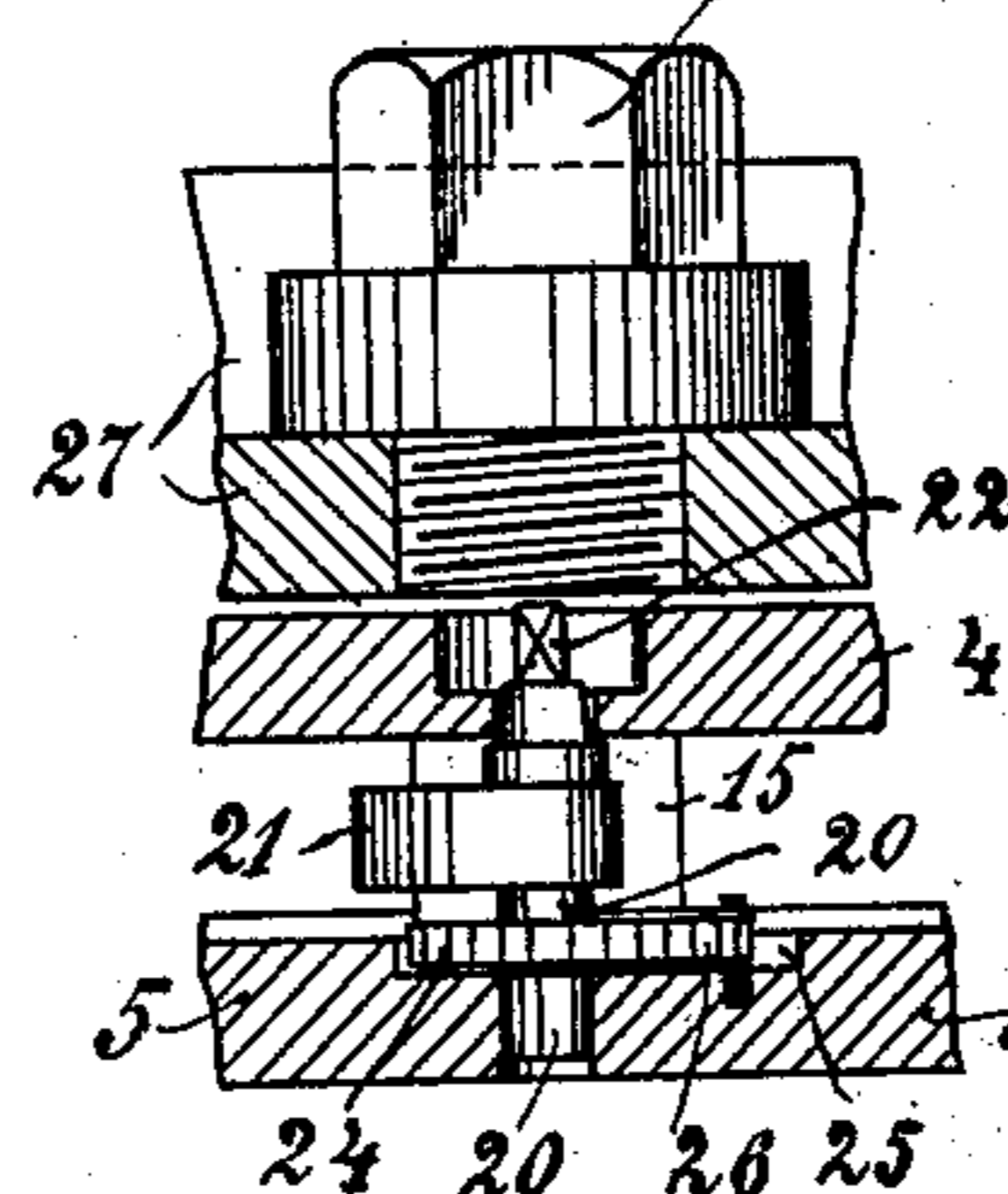


Fig. 8.



Witnesses:

Gustav Hilbrook

Wilhelm Grunfeldt

Inventor:

Karl Willner

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APPLICATION FILED MAY 26, 1906.

2 SHEETS—SHEET 2.

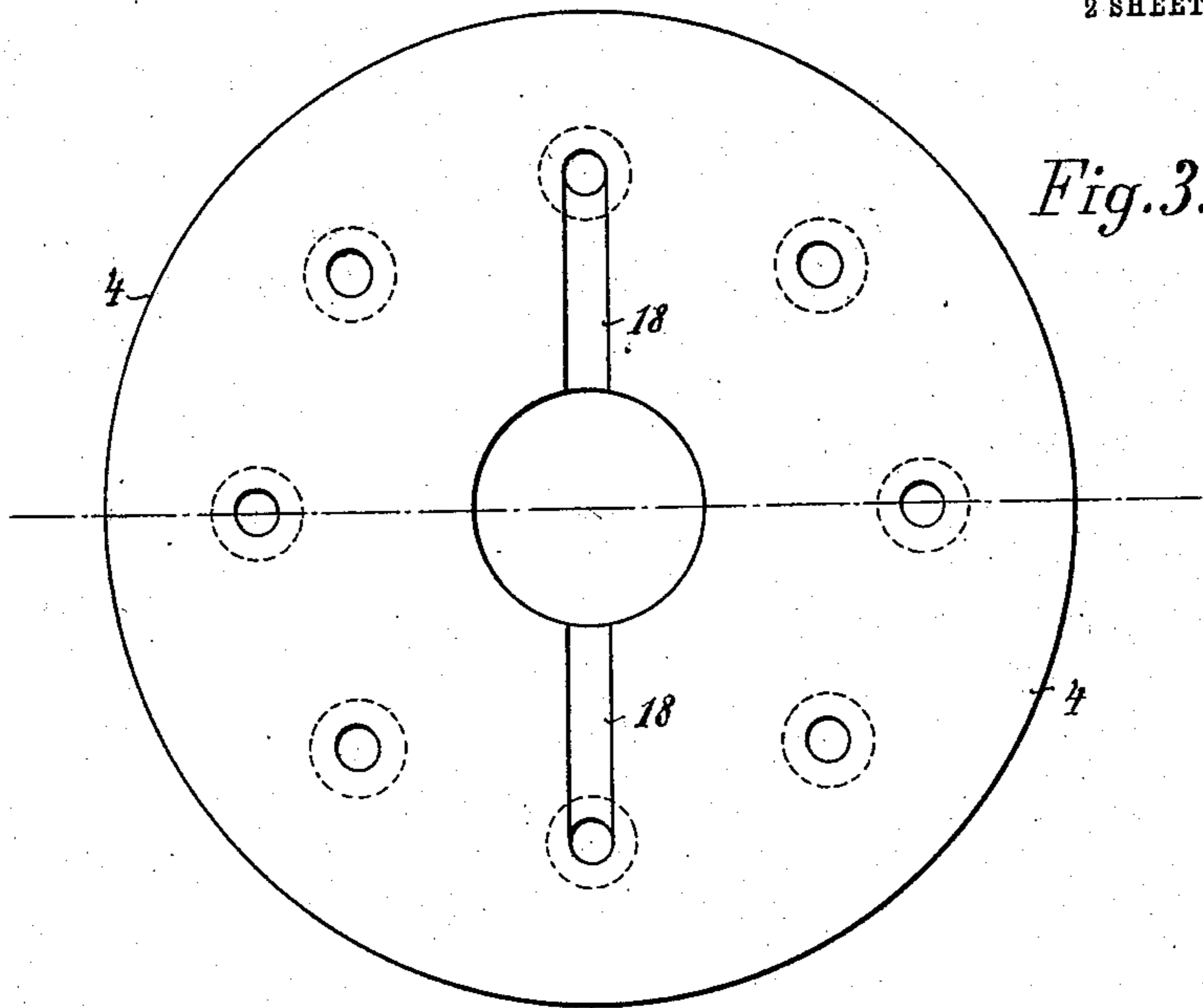


Fig. 3.

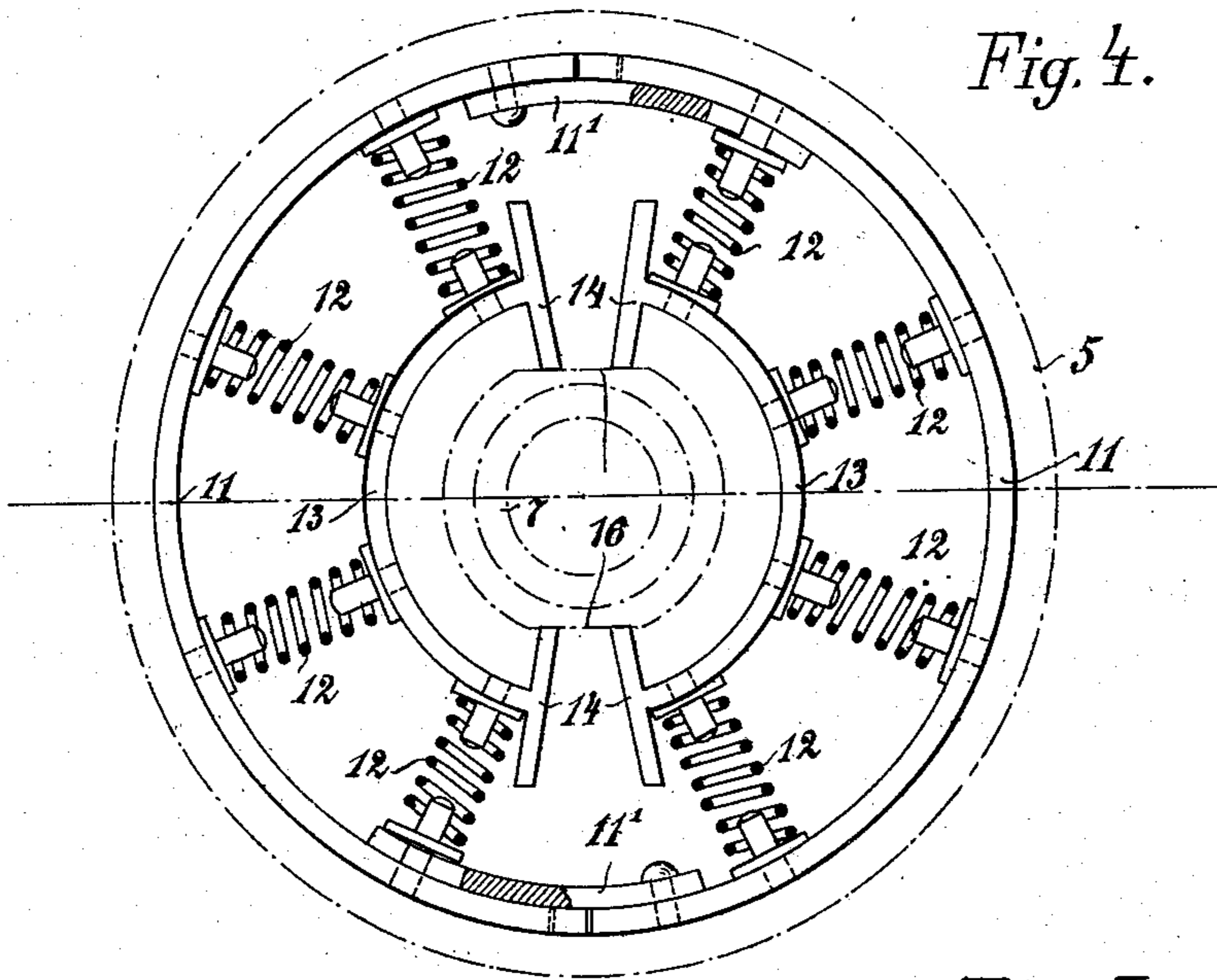


Fig. 4.

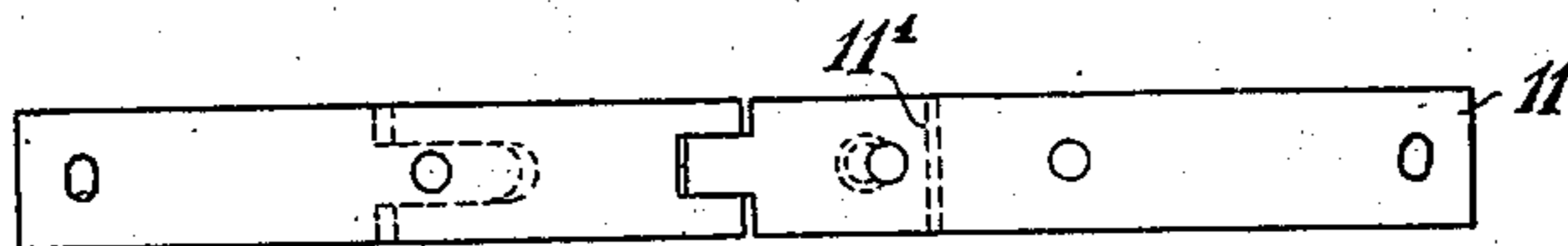


Fig. 5.

Witnesses:

Gustav Hilbroch

Wilhelm Grunfeldt

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UNITED STATES PATENT OFFICE.

KARL WILLNER, OF GÖRLITZ, GERMANY.

ARRANGEMENT FOR TIGHTENING PISTON-RINGS.

No. 891,317.

Specification of Letters Patent.

Patented June 23, 1908.

Application filed May 25, 1906. Serial No. 318,755.

To all whom it may concern:

Be it known that I, KARL WILLNER, mon-
teur, a subject of the King of Prussia and
German Emperor, residing at Görlitz, Bahn-
hofstrasse 23, in the Kingdom of Prussia and
German Empire, have invented certain new
and useful Improvements in Arrangements
for Tightening Piston-Rings, of which the
following is a specification.

The present invention refers to an arrange-
ment for tightening the piston rings in en-
gines with reciprocating pistons particularly
in stationary steam engines, locomotives,
and the like.

The present invention has the purpose to
allow of quickly readjusting the piston rings
uniformly to all sides, without it being nec-
essary to remove the piston from the cylinder
in which it works, or even the cylinder head.

In the accompanying drawings a mode of
carrying out the present invention is exem-
plified, Figure 1 being the top view of the up-
per half of the piston, consisting of two parts
joined in a line at right angles to the piston
rod. Fig. 2 is a section through the piston
and part of the surrounding cylinder, in di-
rection of the piston rod. Fig. 3 is a bottom
view of the other half of the piston. Figs. 4
and 5 show the tightening arrangement in
plan and side view, Figs. 6 and 7 on a larger
scale one of the wedges operating the tight-
ening arrangement in front and top view.
Fig. 8 is a side view of the arrangement for
operating the wedges, Fig. 9 is a side view of
the spanner used for turning said arrange-
ment.

The piston reciprocating in the cylinder
—1— is secured by means of screw —2— or
other suitable means to the piston rod —3—
and consists of two parts —4— and —5—
connected with each other by means of
screws —6— arranged in a circle concentric
with the axis of the piston rod. Part —5—
carries a boss —7— having a shoulder at its
upper end and a number of eyes —8— corre-
sponding to the connecting screws, by means
of which parts —4— and —5— are held to-
gether in such a manner that a hollow space
—9— is formed for receiving the elastic pis-
ton rings and the below described arrange-
ment for tightening said piston rings. In
place of several piston rings also one single
elastic piston ring can be used.

The piston rings —10— are continuously
forced outwards by means of an elastic ring
—11— made of steel or other suitable mate-

rial, and cut open at two places diametrically
opposite each other, said ring resting against
the inside surface of the piston ring. The
ends of the ring —11— which meet, are suit-
ably made to overlap in a manner shown in
Fig. 5 their joints being covered on the inside
by means of fish plates —11'— riveted to
one of the ends and lying loose against the
other. Instead of a ring split in two parts
also rings split into several parts can of
course be employed, when however all parts
should be of equal length. Ring —11— is
connected by means of a number of radially
arranged and suitably exchangeable springs
—12— with two or more concentrically to
the piston center provided straps —13—
which have radial flanges at their ends
—14—. In the design shown in the draw-
ings 8 such springs —12— are provided
which are suitably arranged between each
two of the screws —6—. The flanges —14—
of the straps —13— form wedge shaped
guides pointing towards the center of the
piston to take the adjusting wedges —15—,
Fig. 6 and 7, the inside edges of said flanges
resting each pair together against surfaces
—16— straight and parallel to the axis of the
piston rod, which surfaces are suitably pro-
vided on the boss —7— of the piston, Fig. 1;
on the wedges being tightened these flanges
will be forced out. The wedges —15— have
a trapezoidal section and have shoulders
—17— on top and bottom, intended as
guides for the wedges in corresponding
grooves —18—, —19— of the piston parts
—4—, —5—. The wedges —15— are moved
by means of eccentrics —21—, —21— on
bolts —20—, —20— pivotally arranged in
the piston parts —4—, —5—, Fig. 8, said
eccentrics —21— working against the outer
surfaces of wedges —15. The upper ends of
the bolts —20— are made as square heads
—22— to take a socket wrench —23—, Fig.
9, for turning the bolt —20— or the eccentric
—21— respectively. At its lower end the
bolt —20— carries a ratchet wheel —24—
arranged in a suitably provided recess —25—
in the part —5—, and meshing with a catch
or pawl —26— under action of a spring, so
that eccentric —21— and bolt —20— are
prevented from turning back.

In the cylinder head —27— holes are pro-
vided corresponding with the eccentric spin-
dles, said holes being ordinarily closed by
means of screw plugs —28— and when open
allowing of inserting the wrench —23— for

turning the eccentric and thereby tightening the piston rings, without the cylinder heads having to be removed. On the cylinder head or on the part —4— a graduation can be provided, which will facilitate a uniform adjustment of the eccentric the wrench —23— being provided with a toothed wheel —29— Fig. 9, the division of which and the pitch circle of which is equal to that of the ratchet wheel —24—, so that it can be ascertained from outside, by how many teeth the eccentric has been turned.

On turning the eccentrics —21— the wedges —15— are moved between the flanges —14— of straps —13— towards the inside and thereby bend the said straps and move them towards the outside so that by means of the springs —12— and the elastic ring —11— the packing rings —10— are forced quite evenly to the wall of the cylinder all around. When after some time the packing rings are worn, they can be easily readjusted without having to remove the cylinder head.

Owing to the constant and uniform pressure of the packing rings, a considerable amount of coal and steam is saved, the walls of the cylinder is not worn one sided or unevenly, and as the packing has nowhere to do any overwork, it will wear very slowly, and so greatly reduce the costs for repairs. Furthermore the pistons are more easily fitted into the cylinder.

Having now described my invention, what I claim and desire to secure by Letters Patent of the United States is:

1. In combination with a two-part piston for reciprocating engines packing rings supported by a plurality of radial springs, circular straps supporting the inner ends of said springs, converging flanges provided at the ends of said straps and means for forcing outward or relieving said flanges substantially as described.

2. In combination with a two-part piston for reciprocating engines packing rings supported by a plurality of radial springs, circular straps supporting the inner ends of said springs converging flanges provided at the ends of said straps guiding surfaces provided for the inner edges of said flanges at the boss

of the piston and means for forcing outward or relieving said flanges, substantially as described.

3. In combination with a two-part piston for reciprocating engines packing rings supported by a plurality of radial springs, circular straps supporting the inner ends of said springs converging flanges provided at the ends of said straps guiding surfaces provided for the inner edges of said flanges at the boss of the piston, wedges guided in grooves of the piston intended to be pressed between the said flanges, and means for displacing said wedges radially, substantially as described.

4. In combination, with a two-part piston for reciprocating engines rings supported by a plurality of radial springs, circular straps supporting the inner ends of said springs, converging flanges provided at the ends of said straps guiding surfaces provided for the inner edges of said flanges at the boss of the piston, wedges guided in grooves of the piston intended to be pressed between the said flanges, eccentrics mounted upon bolts within the hollow piston and pressing upon the outer faces of said wedges and means for turning and tightening said eccentrics, substantially as described.

5. In combination with a two-part piston for reciprocating engines packing rings supported by a plurality of radial springs, circular straps supporting the inner ends of said springs, converging flanges provided at the ends of said straps guiding surfaces provided for the inner edges of said flanges at the boss of the piston, wedges guided in grooves of the piston intended to be pressed between the said flanges, eccentrics mounted upon bolts within the hollow piston and pressing upon the outer faces of said wedges, the said bolts being provided with square heads at their free ends and with ratchet wheels meshing with a pawl, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

KARL WILLNER.

Witnesses:

KARL GOLDNER,
PAUL WAMLETT.