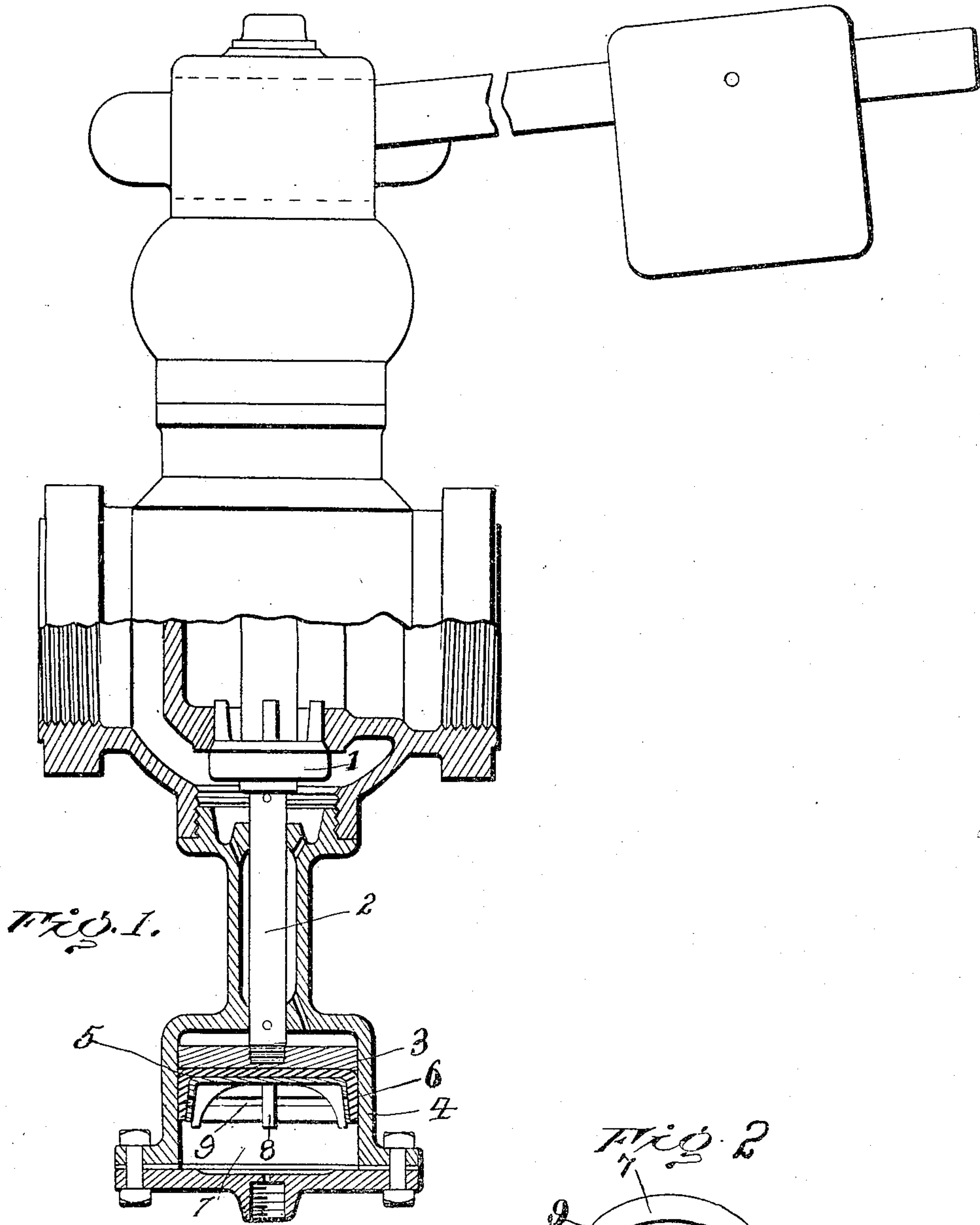


No. 816,455.

PATENTED MAR. 27, 1906.

L. B. FULTON.
DIAPHRAGM FOR CONTROLLING VALVES.
APPLICATION FILED MAR. 1, 1904.



Witnesses

J. M. ...
Samuel C. West.

Fig. 2
by *J. M. ...*
Attorney

Inventor
Louis B. Fulton

UNITED STATES PATENT OFFICE.

LOUIS B. FULTON, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE
CHAPLIN - FULTON MANUFACTURING COMPANY, OF PITTSBURG,
PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

DIAPHRAGM FOR CONTROLLING VALVES.

No. 816,455.

Specification of Letters Patent.

Patented March 27, 1906.

Application filed March 1, 1904. Serial No. 196,006.

To all whom it may concern:

Be it known that I, LOUIS B. FULTON, of
Pittsburg, in the county of Allegheny and
State of Pennsylvania, have invented certain
5 new and useful Improvements in Diaphragms
for Controlling Valves; and I do hereby de-
clare the following to be a full, clear, and ex-
act description of the invention, such as will
enable others skilled in the art to which it ap-
10 pertains to make and use the same.

It is well known that in the use of con-
troller-valves, pump-governors, &c., wherein
a valve or valves are to be moved under
counter-pressures, better results are ob-
15 tained by employing a diaphragm against
which bears a head or piston-like end of the
valve-rod, since the parts are thereby capa-
ble of being more freely moved than is the
case with tight-fitting pistons. The principal
20 objection to a diaphragm is that it can sel-
dom stand much usage, since it is liable to
break or become punctured. Then, again,
considerable trouble is involved and time re-
quired in replacing a damaged diaphragm.

25 The object of my invention is to enable a
diaphragm obviating these objections to be
employed in connection with a pump-gov-
ernor.

30 The invention will be hereinafter fully set
forth, and particularly pointed out in the
claims.

In the accompanying drawings, Figure 1
shows my invention as employed with a
pump-governor. Fig. 2 is a view of the
35 chair.

In Fig. 1 I have shown my improved dia-
phragm as employed in connection with a
pump-governor, which, as is well known,
comprises a balanced valve 1, from which de-
40 pends a rod 2, having a piston-like head 3,
movable in a lower pressure chamber or cyl-
inder 4. In lieu of providing a diaphragm
flexible across the area of the head and se-
cured at its edges between the parts of the
45 cylinder I employ a diaphragm 5 in the form
of an imperforate cup—that is to say, the
diaphragm bears directly against the head 3,
when pressure is admitted beneath the dia-
phragm, and is formed with a cylindrical por-
50 tion 6, which fits snug against the wall of cyl-
inder 4. This diaphragm is made of a rub-
ber composition known as "paranite," the
flexibility of which is such that under pres-

sure the cylindrical portion of the diaphragm
will expand uniformly at every point and fit 55
snug against the wall of the cylinder and yet
permit the piston-like head to freely move
when the unseating pressure exceeds that by
which the valve is normally held closed. No
securing or retaining means being required, 60
the diaphragm is free of all holes or openings,
the presence of which tends to impair the
usefulness of the diaphragm, since thereby
steam or water may get between the latter
and the piston-like head. 65

7 designates a protecting-chair which is of
substantially the same form as the cupped
diaphragm, but on a smaller scale, so as to fit
snugly therein; but it is not secured thereto.
This chair is equipped with lugs 8, extending 70
slightly beyond the lower edge of the dia-
phragm, so that when pressure forces the
piston-like head 3 downward, carrying with
it the diaphragm, the seating will be on these
lugs. Thereby I am enabled to prevent any 75
rupture of the diaphragm or escapement of
pressure consequent upon any disengagement
between the wall of the diaphragm and the
inclosing cylinder. To allow the pressure to
expand the circular wall of the diaphragm, 80
and thereby make close contact, the circular
wall of the chair is formed with a continuous
annular opening 9. This sustaining-chair is
necessary in pump-governors, since on the
admission of steam, there being no corre- 85
sponding balancing-pressure on the other
side, the cup naturally descends to the bot-
tom. After the proper pressure is restored
through the governor the diaphragm will of
course perform its ordinary functions inde- 90
pendently of the chair. Although I have
shown the chair within the diaphragm in
Fig. 1, it may rest on the bottom of the cylin-
der, it being sufficient if the chair is concentric
with the interior of the diaphragm, so that 95
the latter will rest thereon when at its lowest
point of travel.

The advantages of my invention are appar-
ent from what has been herein stated. It is
obvious that should the diaphragm become 100
worn or injured it may be readily removed
and a new one substituted without the trouble
and time now required to replace a broken or
punctured diaphragm.

I claim as my invention—

1. The combination with the cylinder and 105

a piston-like head movable therein, of a freely-movable cup-shaped imperforate diaphragm in said cylinder, and means concentric with but not secured to the diaphragm 5 for protecting the same from engagement with the end of said cylinder.

2. The combination with a cylinder having a piston-like head movable therein, of a diaphragm bearing against but not secured 10 to such head and having a cylindrical portion fitted against the wall of the cylinder, and a chair concentric with the interior of such diaphragm and having a portion or portions designed to project beyond the outer edge of 15 the latter when the chair is within the diaphragm, as set forth.

3. The combination with a cylinder hav-

ing a piston-like head movable therein, of a diaphragm bearing against but not secured to such head and having a cylindrical portion 20 fitted against the wall of the cylinder, and a chair concentric with the interior of such diaphragm conforming thereto and having an annular opening, and lugs designed to project beyond the outer edge of the diaphragm 25 when the chair is within the latter, as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

LOUIS B. FULTON.

Witnesses:

L. B. D. REESE,
ALICE E. DUFF.