

No. 757,191.

PATENTED APR. 12, 1904

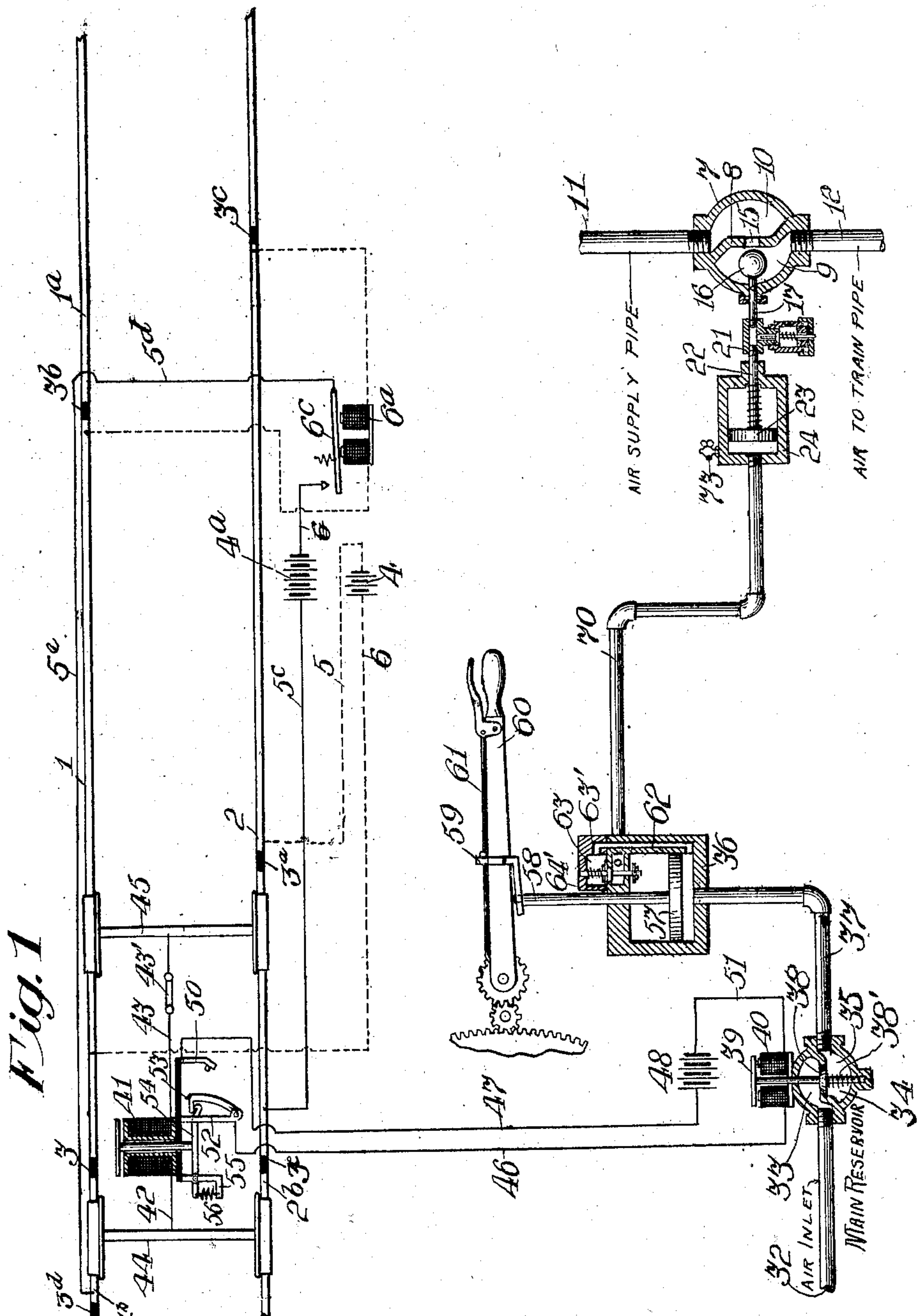
C. HOLTSMANN & J. F. BUTLER.

DEVICE FOR PREVENTING RAILWAY COLLISIONS.

APPLICATION FILED MAR. 5, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witness:

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2 SHEETS—SHEET 2.

Fig. 2

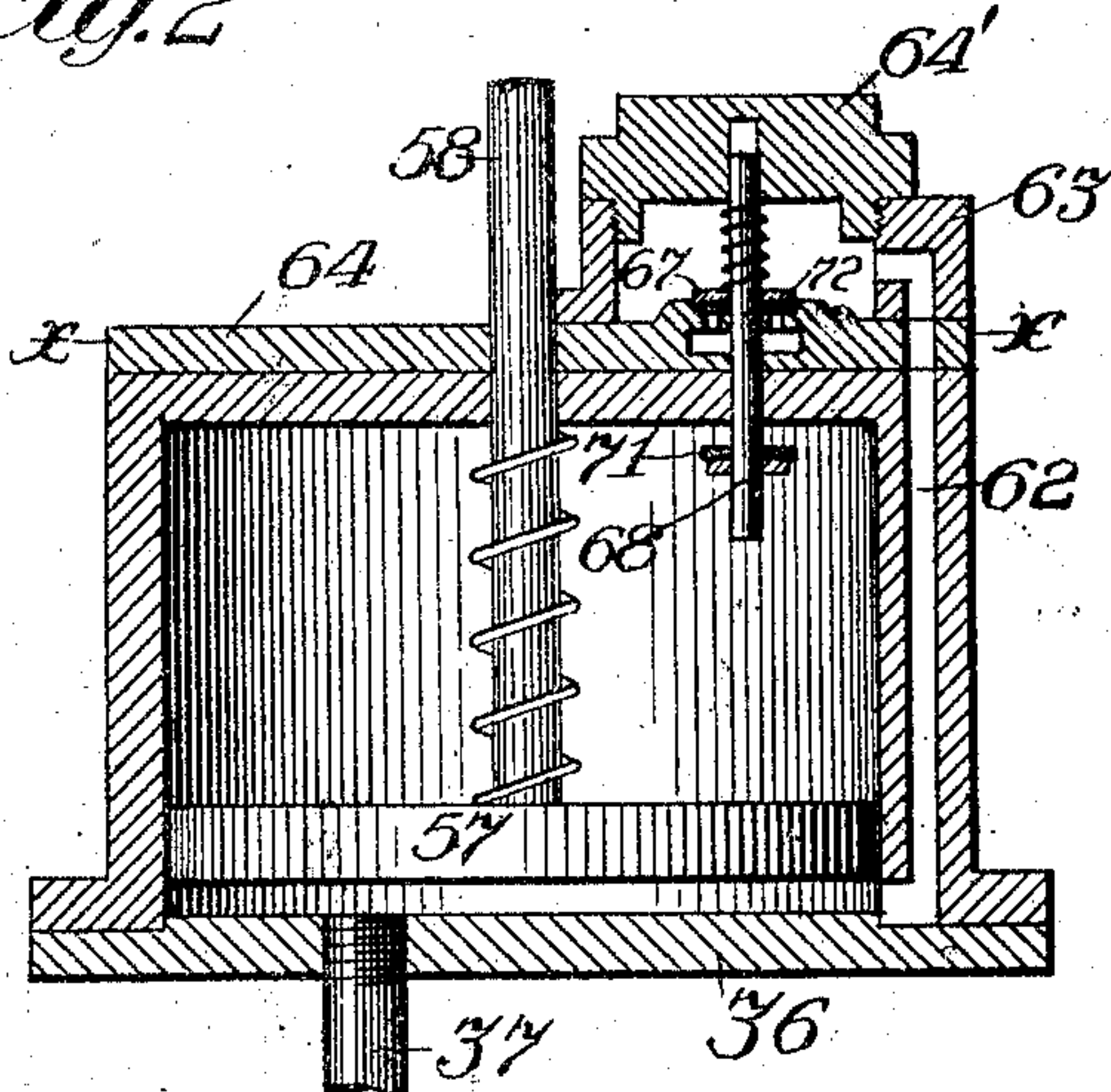


Fig. 3

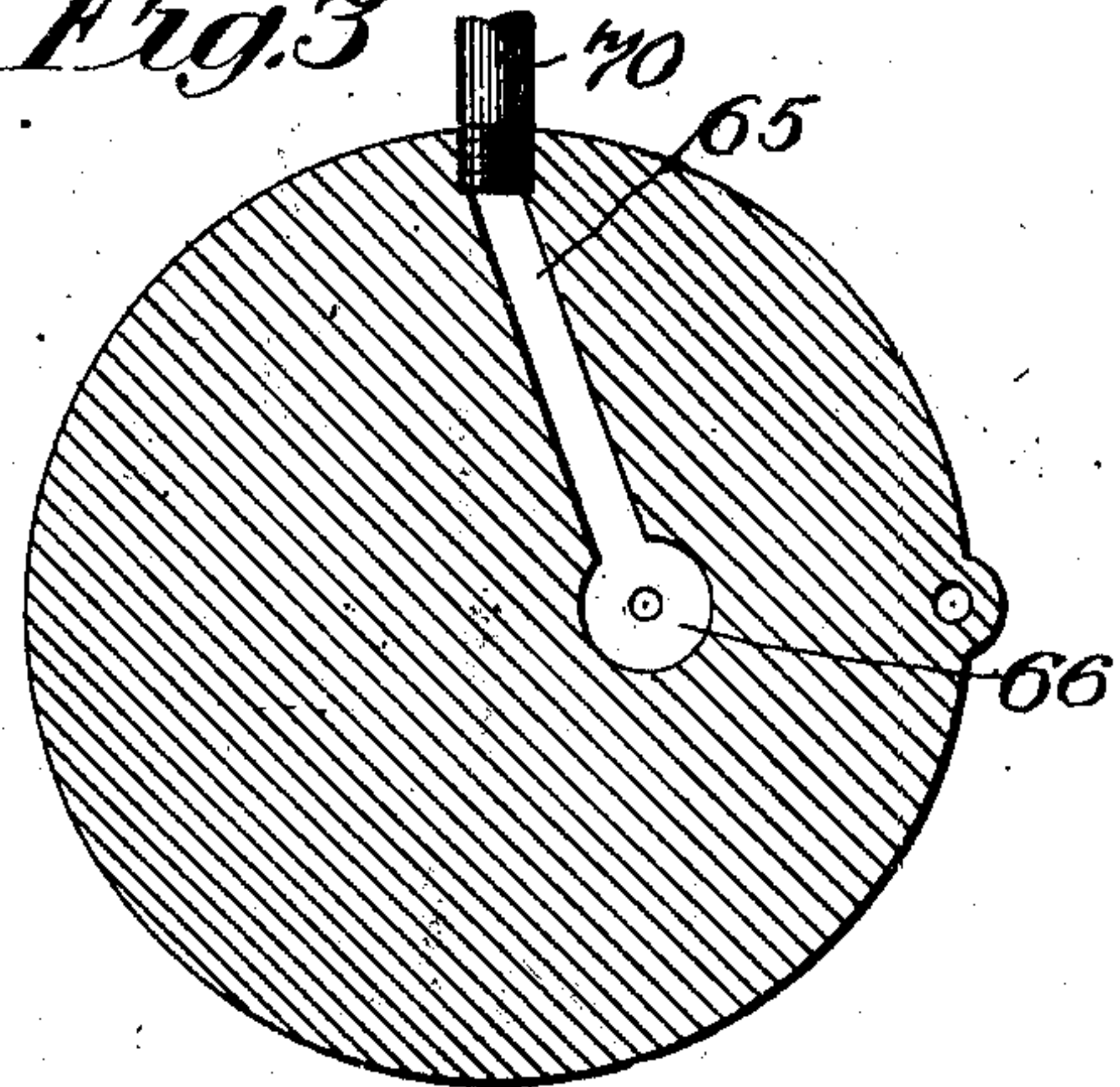


Fig. 4

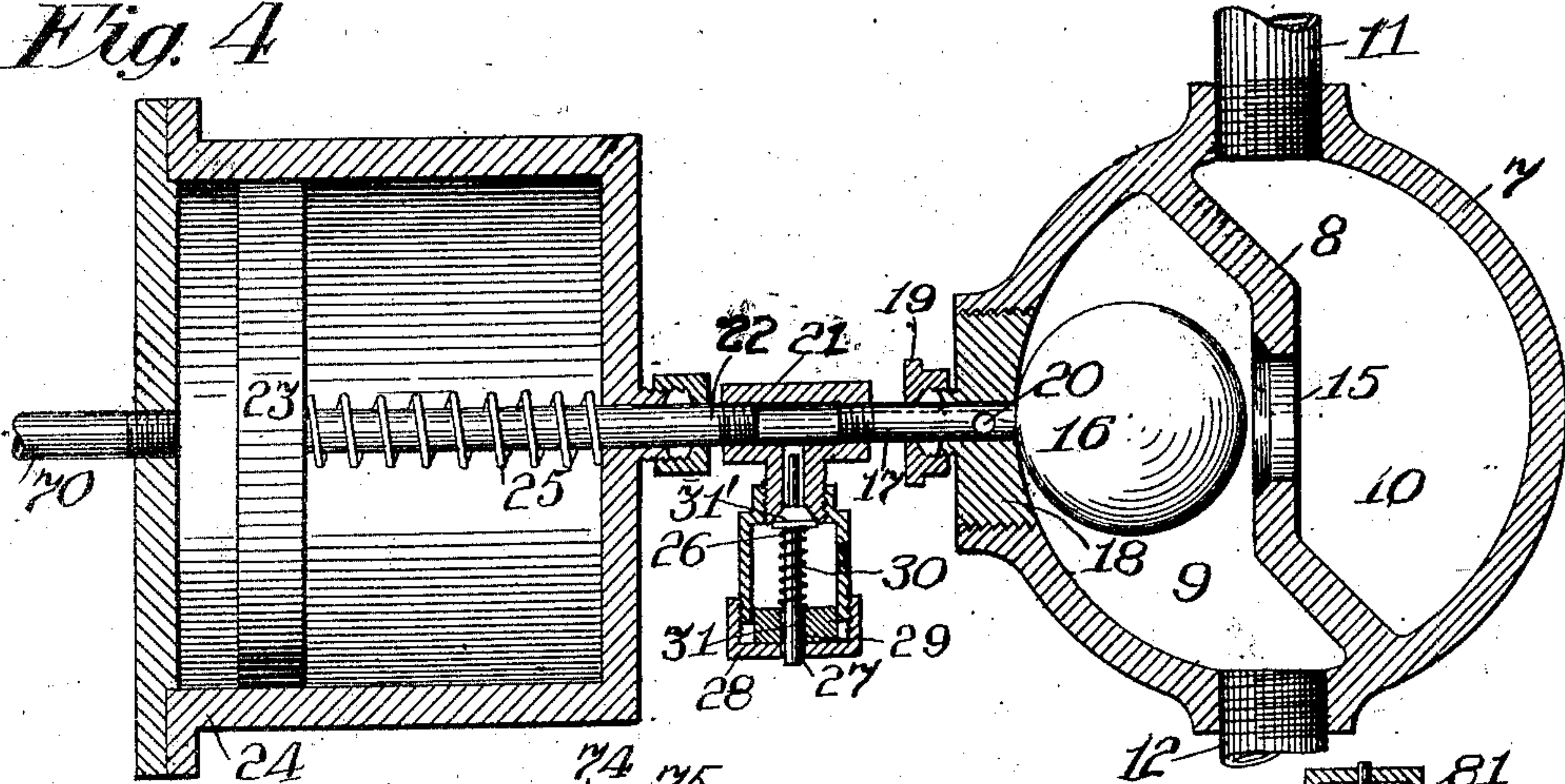


Fig. 5

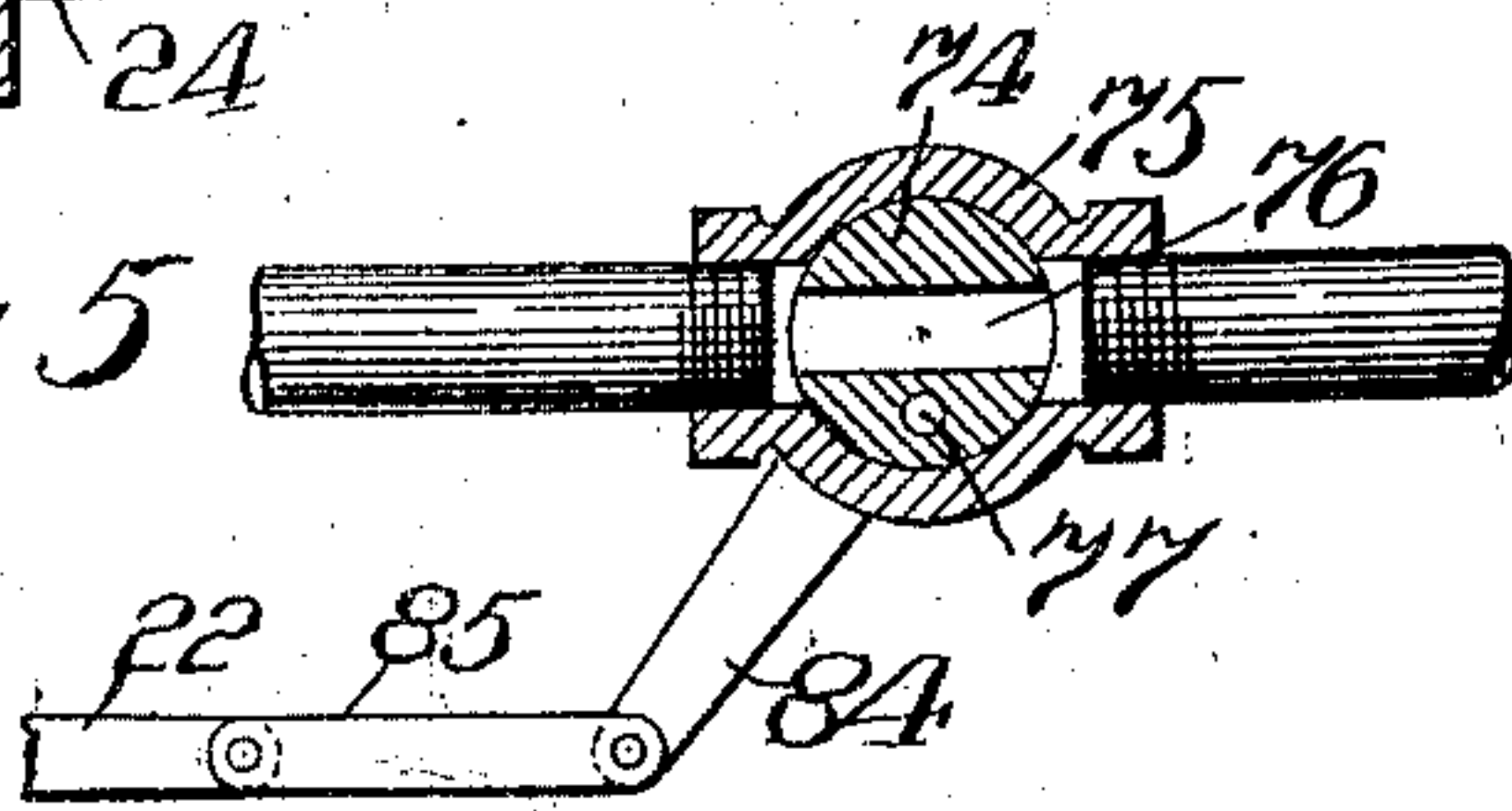
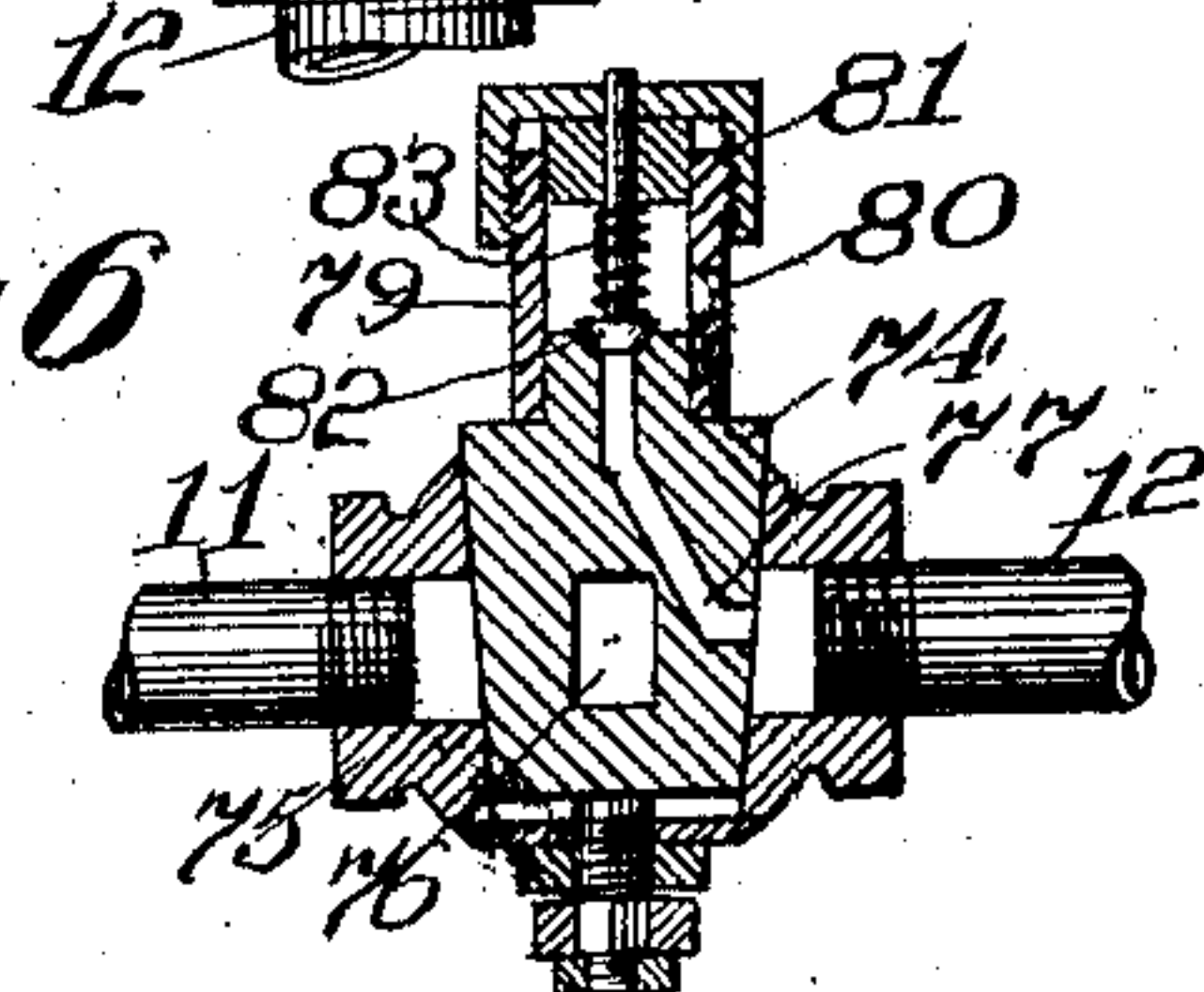


Fig. 6



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UNITED STATES PATENT OFFICE.

CHARLES HOLTMANN AND JOSEPH F. BUTLER, OF PITTSBURG, PENN-
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DEVICE FOR PREVENTING RAILWAY COLLISIONS.

SPECIFICATION forming part of Letters Patent No. 757,191, dated April 12, 1904.

Application filed March 5, 1903. Serial No. 146,318. (No model.)

To all whom it may concern:

Be it known that we, CHARLES HOLTMANN and JOSEPH F. BUTLER, citizens of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Penn-
sylvania, have invented certain new and use-
ful Improvements in Devices for Preventing
Railway Collisions, of which the following is
a specification, reference being had therein to
the accompanying drawings.

This invention relates to certain new and
useful improvements in automatic devices for
operating air-brakes to prevent railway col-
lision; and it consists in a device or apparatus,
in connection with the ordinary air-brakes,
which will set the said brakes should two
trains enter one block at the same time and
which will also automatically operate the throt-
tle to shut off the steam simultaneously with
the application of the brakes.

Briefly described, the invention comprises,
in connection with a track divided into blocks,
a controlling-magnet suitably located on the
engine and connected to the axles thereof, an
electrically-controlled valve in the air-line
and connected with an auxiliary pressure-cyl-
inder having a piston therein to operate the
throttle-lever. This cylinder is in communi-
cation through a pipe with a second auxiliary
pressure-cylinder having a piston therein, the
stem of which extends into a valve-casing in
communication with the air-supply and the
train-line and which piston-stem also controls
the exhaust of the air to apply the brakes.

All of the above construction will be here-
inafter more specifically described, and then
particularly pointed out in the appended
claims, and in describing the invention in de-
tail reference will be had to the accompany-
ing drawings, forming a part of this applica-
tion, and wherein like numerals of reference
will be employed for designating like parts
throughout the several views, in which—

Figure 1 is a diagrammatical view of our
improved apparatus, showing parts thereof
in section. Fig. 2 is an enlarged sectional
view of the auxiliary cylinder controlling the
throttle-valve. Fig. 3 is a horizontal sectional

view on the line $x x$ thereof. Fig. 4 is an
enlarged longitudinal sectional view of the
air-line valve, governor, and auxiliary pres-
sure-controlling cylinder therefor. Fig. 5 is
a longitudinal sectional view of a modified
form of valve for the air-line. Fig. 6 is a
central vertical sectional view of the same.

The insulated blocks or sections of track
and the circuit thereof may, if desired, be the
same as that shown in Patent No. 522,757,
granted July 10, 1894, to Charles Holtmann
(one of the present joint inventors) and Nick-
olous Schmidt, and the present invention is
in many respects an improvement on the in-
vention of the aforesaid patent. This prior
invention aims to automatically apply the
brakes in event of two trains occupying the
same block, and while the present invention
has the same object in view it aims to also au-
tomatically and simultaneously operate the
throttle-lever, so as to shut off the steam. As
in the prior patent, so in this, to construct
and operate the invention the track is di-
vided into blocks, the rails $1\ 1^a\ 1^b\ 2\ 2^a\ 2^b$ be-
ing insulated, as at $3\ 3^a\ 3^b\ 3^c\ 3^d\ 3^e$, these in-
sulated ends of the rails at the respective ends
of the blocks being so placed that the ends of
the rails do not come opposite to each other.
Each of these blocks is provided with a track-
battery 4, with one pole thereof connected by
a suitable conductor 5 to the rail 2 of one
block and the other pole of the battery con-
nected by a suitable conductor 6 to the rail 1
of the same block. We preferably employ
both a track-battery 4 and a local battery 4^a,
the track-battery 4 being in a closed circuit
and employed only for the purpose of throw-
ing the local battery into circuit should a rail
be broken or another train be in the block.
In case of a broken rail the closed circuit will
be opened and the relay 6^a deenergized, thereby
throwing in the local circuit, and in the case
of a train entering the block the same effect
will result by short-circuiting of the battery,
as will appear more fully hereinafter in the
description of the circuit.

In connection with the ordinary air-brakes
now in use we employ means to automatically

set the brakes when a circuit is completed and also to automatically operate the throttle. To this end we employ a valve-casing 7, having a central dividing-partition 8, which separates the chamber of the casing into compartments or chambers 9 10, respectively. The chamber 10 is in communication with the air-supply (not shown) by means of a pipe 11, while the chamber 9 is in communication with the train-line 12. The partition 8 is provided with a port 15, whereby communication is established between the chambers 9 and 10, and consequently between the air-supply and the train-line. This port 15 is closed during the application of the brakes by means of a valve 16, carried on a stem or valve-rod 17, that is mounted to reciprocate in a plug 18, screwed into said valve-casing 7, a suitable stuffing box or gland being provided around said stem or rod, as at 19. As the valve 16 will be of much greater diameter than the stem or rod carrying the same, we provide the screw-plug, as shown and described, in order to permit the placing of the valve within the valve-casing 7. The stem 17 has a port 20 extending centrally inward from the end of the rod or stem for some distance and opening out at one side thereof, this port being closed when the parts are in their normal position by reason of the port being within the plug 18. The stem or rod 17 is connected, preferably, by a T-shaped fitting 21, as shown, to the rod or stem 22 of the piston 23, which operates in the auxiliary pressure-cylinder 24. A spring 25 on said rod or stem between the wall of the cylinder and the piston holds the piston normally retracted and the valve 16 unseated from its seat against the partition 8 of the valve 7. Attached to the right-angular extending leg of the T-fitting 21 is a governor, which comprises in its construction a casing 26, having a screw-cap 28 on the outer end thereof. This cap carries an inwardly-extending plug-collar 29, which fits the interior wall of the casing 26 and is provided with a central opening registering with the central opening 27 in the screw-cap 28. The central opening in the plug-collar and the registering opening 27 in the cap 28 are of larger diameter than the valve-stem that projects through said openings in order that the air may escape through said openings around the valve-stem. The plug-collar is for the purpose of engaging the spring 30, arranged on the stem 31 of the valve 31' to regulate the tension of said spring. The tension of this valve in practice is less than the pressure of air in the train-line, whereby when communication is established through the port 20 with the governor the valve 31' will be unseated and the air will escape through the openings in the plug-collar and screw-cap 28. We preferably employ this T-shaped fitting for the connection of the governor, as this enables us to turn the governor in any position

as may be required, owing to the conditions existing under the engine. Also connected to the air-supply (not shown) or to the pipe 11 is a pipe 32, which communicates with the chamber 33 of a valve-casing 34, the chamber 35 of said valve-casing being in communication with a cylinder 36 through pipe 37. The port in the partition separating these two chambers in the valve-casing is normally closed by a valve 38, having its stem connected to the armature 39 of a pair of magnets 40, mounted on the valve 34. The valve 38 is held normally seated by a spring 38'. Suitably located in the engine is a controlling-magnet 41, connected by conductors 42 43 to the axles 44 45 of the engine and tender, respectively, the said engine and tender being insulated one from the other. This magnet is also adapted to be placed in circuit through conductors 46 47 through a battery 48 on the engine with the magnets 40. To this end the conductor 47 is connected to one pole of the battery 48 and with contact 50 of the controlling-magnet, the other pole of said battery being connected by conductor 51 with one of the magnets 40, while the other of said magnets is connected by conductor 46 to an arm 52, carried by the frame of the controlling-magnet 41. A trigger 53 is pivoted to this arm 52 and is normally held by a catch 54, attached to the core of the magnet 41, this catch being pivoted to an arm 55, carried by the frame of said magnet, and to which arm and to the free end of the catch 54 a spring 56 is attached.

The cylinder 36 has a piston 57 therein, the rod 58 of which is adapted to actuate the throttle-valve lever when the piston is moved by the action of the air. To accomplish this, the end of the piston rod or stem is connected to a yoke 59, encircling the throttle-lever 60 and connected to the rod 61, which locks said valve-lever in position. The yoke 59 is pivoted or fulcrumed at 59' to the lever 60, on which pivot or fulcrum it works when operated. The outward movement of the rod 58 will first push the longer leg of yoke 59 toward the throttle-lever and cause the yoke to raise the rod 61 and unlock the throttle-lever. The further movement of rod 58 causes the rod to abut against the throttle-lever and pushes it over, so as to turn off the steam. In order that the brakes may be applied simultaneously with the actuating of the throttle-valve lever, air must be passed from the cylinder 36 to the cylinder 24, and to this end the cylinder 36 is provided in one wall with a port 62, communicating at its lower end with the chamber of the cylinder 36 below the piston 57 and at its upper end with a chamber 63 in a casing 63', attached to the top of cylinder 36 and closed by a cap 64'. This casing is mounted on a plate 64 on top of cylinder 36, and this plate has a port 65 leading to a valve-seat 66, normally closed by a valve

67, carried on a stem 68, extending into the cylinder 36 and also extending up through the chamber 63 and working in the cap of said casing. A spring 69 normally holds this valve closed or seated. A pipe 70 establishes communication between the port 65 and the cylinder 24. We preferably provide flexible washers 71 72 on the valve 67 and stem 68, respectively, both of which act as buffers to relieve jar.

In operation, assuming a train to have entered the block, as shown in Fig. 1, and moving toward the right, so long as no other train enters this block no local circuit is established; but if a train should enter the opposite end of the block at the same time a circuit would be established as soon as the first pair of wheels passed over insulation-point 3^b. Circuit is then made from local battery 4^a over conductor 5^c to the rail 2^b through axle 45, switch 43', wire 43, relay 41, wire 42, axle 44, rail 1^b, wire 5^e, wire 5^d, switch 6^c, and conductor or wire 6, back to local battery 4^a. The energizing of magnet 41 depresses catch 54, allowing trigger 53 to fall into engagement with contact-point 50, thereby completing a circuit over conductors 46 47 through battery 48 to the magnets 40, energizing said magnets, whereby to attract the armature 39, opening valve 38, and admitting air from pipe 32 into chamber 33 through the port in partition in the valve 34 to chamber 35 and from chamber 35 through pipe 37 to auxiliary pressure-cylinder 36. The admission of air to this cylinder 36 actuates the piston 57, causing the rod or stem 58 thereof to actuate the yoke 59, so as to disengage rod 61 and permit the rod or stem 58 in its movement to push against the throttle-lever 60, so as to operate the same to shut off the steam. When the piston 57 engages the end of the valve-stem 68, it lifts the valve 67, thereby permitting the air to pass from the auxiliary pressure-cylinder 36 through port 62 into chamber 63 and from said chamber through port 65 through said port into pipe 70 to the secondary auxiliary pressure-cylinder 24. The air entering this auxiliary pressure-cylinder 24 moves piston 23 forward, actuating stem or rod 22 and valve-stem 17, forcing the latter inwardly into the valve-casing 7 and seating the valve 16, so as to close port 15. This inward movement of the stem 17 and valve 16 establishes communication between the chamber 9, communicating with the train-pipe 12, and the port 20, thus permitting the air to escape from the train-pipe 12 through said port 20, unseat the valve 31, and escape through the governor to apply the brakes. As soon as the excess pressure in the train-line is exhausted the spring 30 seats said valve 31, whereby to prevent further exhaust from the train-line. In order to permit the air to escape from behind the piston 23, and thus permit the valve 16 to unseat, we provide a cock 73 on the cylinder 24.

In Figs. 5 and 6 we show a modified form of valve which we may employ instead of the valve 7. In this form of construction the governor is connected direct to the plug-valve 74, which is mounted in the casing 75 and is provided with a transverse port 76 and a by-pass or port 77. The valve-casing 75 is connected to the train-line 12 and air-supply line 11. Connected to the upper end of the plug-valve 74 is a casing 79, having an exhaust-port 80 and provided with a screw-cap 81. Mounted in this casing and operating in the screw-cap thereof is a valve 82, which engages the seat on the upper end of the plug 74 and normally closes the by-pass or port 77, the valve being held normally seated by the spring 83. Connected to the lower end of the plug-valve 74 is a crank 84, pivotally connected by the link 85 to the piston-rod 22 of the piston 23. In Fig. 6 the plug-valve 74 is shown in position, so that the port 76 registers with the air-supply line and train-line, and in Fig. 6 this plug-valve is shown in position where to cut off communication between the air-supply line and the train-line and open communication from the train-line through port 77 to unseat the valve 82 and exhaust the air through port 86 to apply the brakes. As soon as the excess pressure in the train-line over and above the pressure of the spring 83 is exhausted this spring will seat the valve 82 and prevent further exhaust of the air from the train-line.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for automatically controlling the brakes of a railway-train and actuating the throttle-valve lever, the combination with a track and a local circuit, of a controlling-magnet carried by the engine, an electrically-controlled valve in communication with the air-supply, a throttle-actuating controlling-cylinder in communication with said valve and connected to the throttle-lever, a valve-casing in communication with the air-supply and train line, a controlling-valve in said casing, a secondary cylinder and a piston therein for actuating said valve, and a governor in communication with said valve-casing, substantially as described.

2. In an apparatus for automatically controlling the brakes of a railway-train and simultaneously operating the throttle-valve lever, the combination with a normally closed track-circuit including a magnet, a normally open local circuit including the armature of the magnet of the local circuit, of a controlling-magnet carried by the engine and adapted to be energized by current passing through the track-circuit, means interposed between the throttle-valve lever and the air-supply for actuating said throttle-valve lever through the medium of the air-supply, and means interposed between the air-supply and train line and in communication with the throttle-valve-

lever-actuating means for applying the brakes simultaneously with the actuating of the throttle-valve lever, substantially as described.

3. In a device for automatically controlling the brakes of a railway-train and actuating the throttle-valve lever thereof, the combination with a normally closed track-circuit including a magnet having an armature and a contact-point, a normally open local circuit including the armature and contact of the track-circuit magnet, of means carried by the engine and connected with the throttle-valve lever and electrically operated for actuating said lever, means also carried by the engine and operated by the air-pressure to exhaust the air and apply the brakes, and a local battery carried by the engine for establishing a circuit and permitting said means to operate when the track-circuit is closed, substantially as described.

4. In an apparatus for automatically controlling the brakes of a railway-train and automatically actuating the throttle-valve lever to shut off the steam, the combination with the controlling-lever for the throttle-valve, a yoke pivoted thereto and adapted to release the locking-dog of said lever, means operative through a track and local circuits for actuating said lever through connection with the yoke, and means also operative through said circuits for simultaneously applying the brakes with the actuating of the throttle-valve lever, substantially as described.

5. In an apparatus for simultaneously actuating the throttle-valve of an engine to shut off the steam and exhausting the air to apply the brakes automatically, the combination with the brake apparatus, of means including a track-circuit, a local circuit and a controlling-magnet, an air-cylinder, a piston therein with its rod or stem connected to a yoke pivoted to the throttle-lever and adapted to release the locking-dog of the same and connections between said cylinder and an air-supply for actuating the piston to operate the throttle-valve, and means in communication with said air-cylinder whereby the brakes are applied

automatically and simultaneously with the actuating of the throttle-valve lever, substantially as described.

6. In an apparatus for automatically actuating the throttle-valve lever of an engine to shut off the steam and exhaust the air to apply the brakes, the combination with the brake apparatus, of brake-actuating means and throttle-lever-actuating means both operative through the medium of a normally closed track-circuit including a magnet its armature and a contact-point the armature and contact-point being included in a normally closed track-circuit, and a controlling-magnet mounted on the engine and adapted when energized to complete a circuit to cause the brake-actuating means and throttle-actuating means to operate and respectively apply the brakes and shut off the steam.

7. The herein-described means for simultaneously actuating the throttle-valve lever of an engine to shut off the steam and exhaust the air to apply the brakes, embodying a brake-governor, a valve for normally closing the communication between the governor and the train-line of the brake apparatus, an air-cylinder with a piston therein for actuating said valve, a second air-cylinder with a piston therein having its stem pivotally connected to the throttle-valve lever, a valve-casing in communication with said second cylinder, and with an air-supply, an electrically-controlled valve in said casing, connections between said second cylinder and the brake-controlling cylinder, a controlling-magnet on the engine, and means for completing a circuit through said magnet for actuating the electrically-controlled valve in the valve-casing to admit air to said cylinders, as and for the purpose described.

In testimony whereof we affix our signatures in the presence of two witnesses.

CHARLES HOLTSMANN.
JOSEPH F. BUTLER.

Witnesses:

A. M. WILSON,
E. E. POTTER.