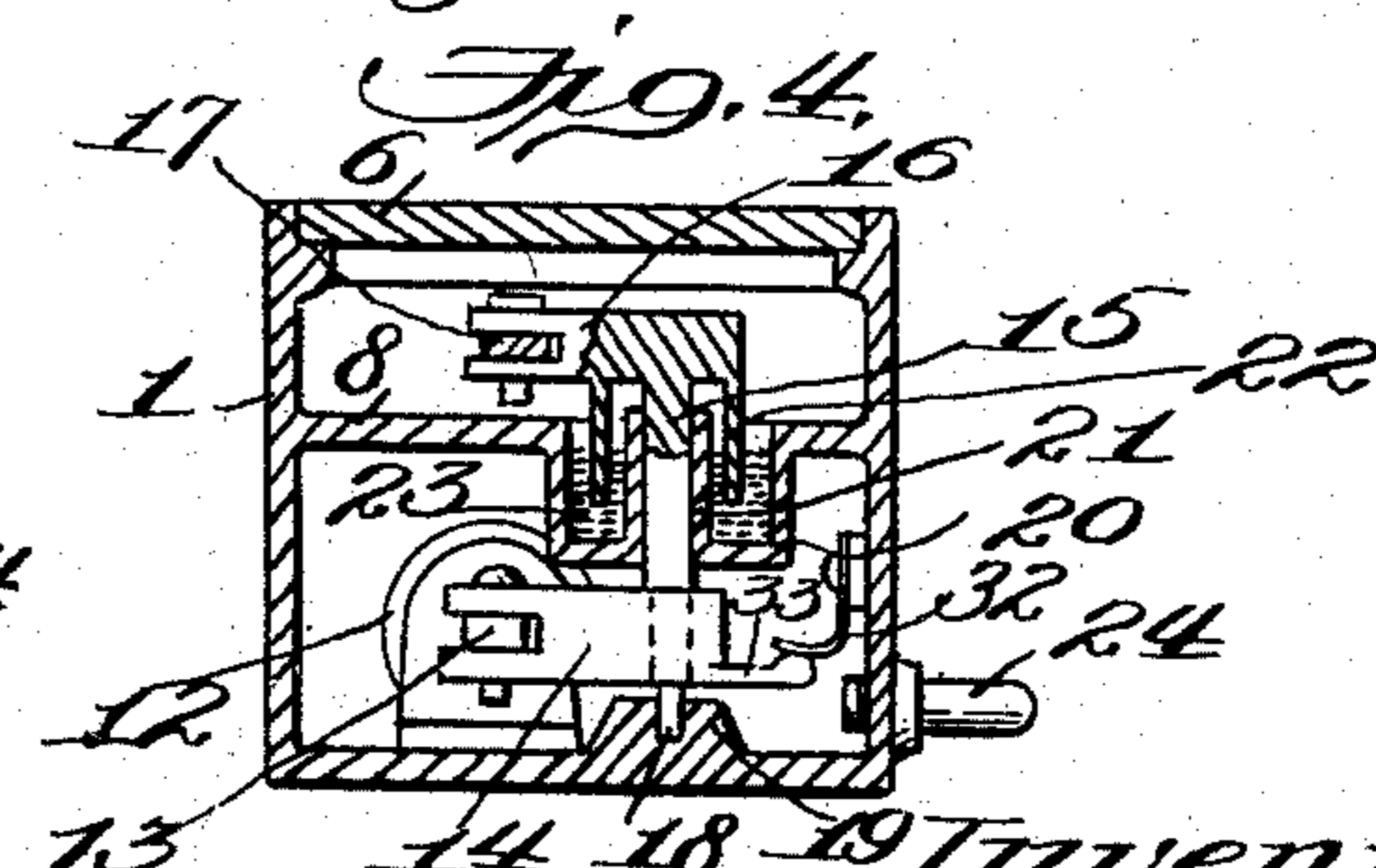
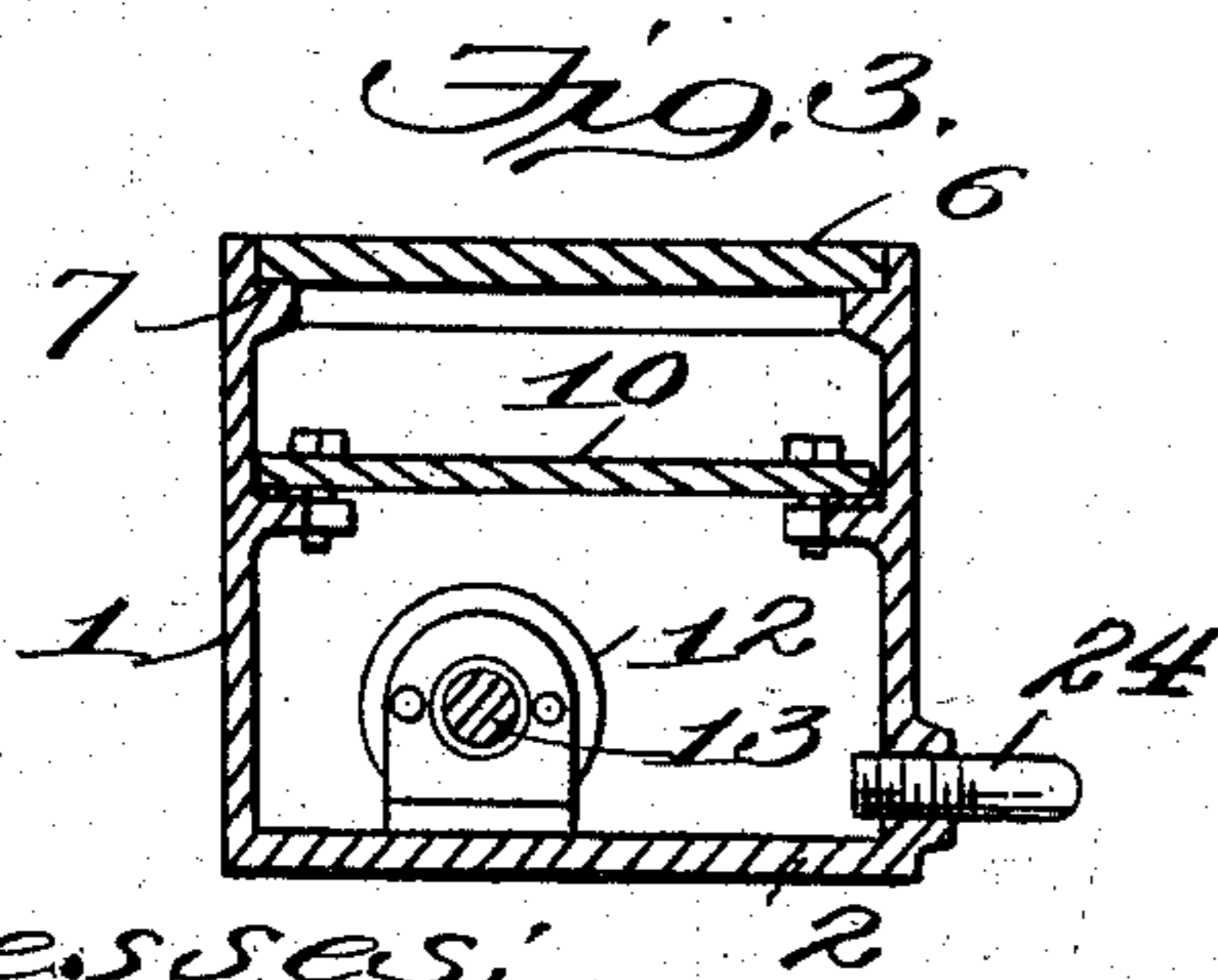
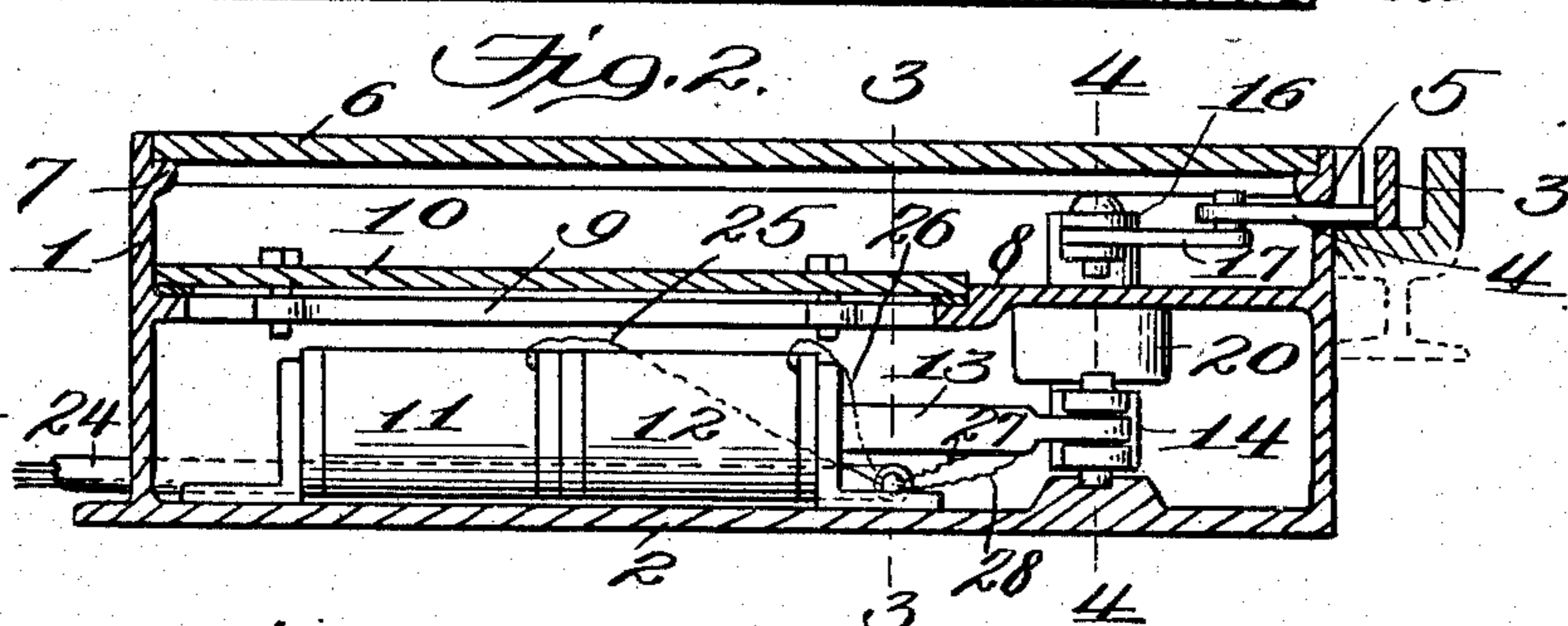
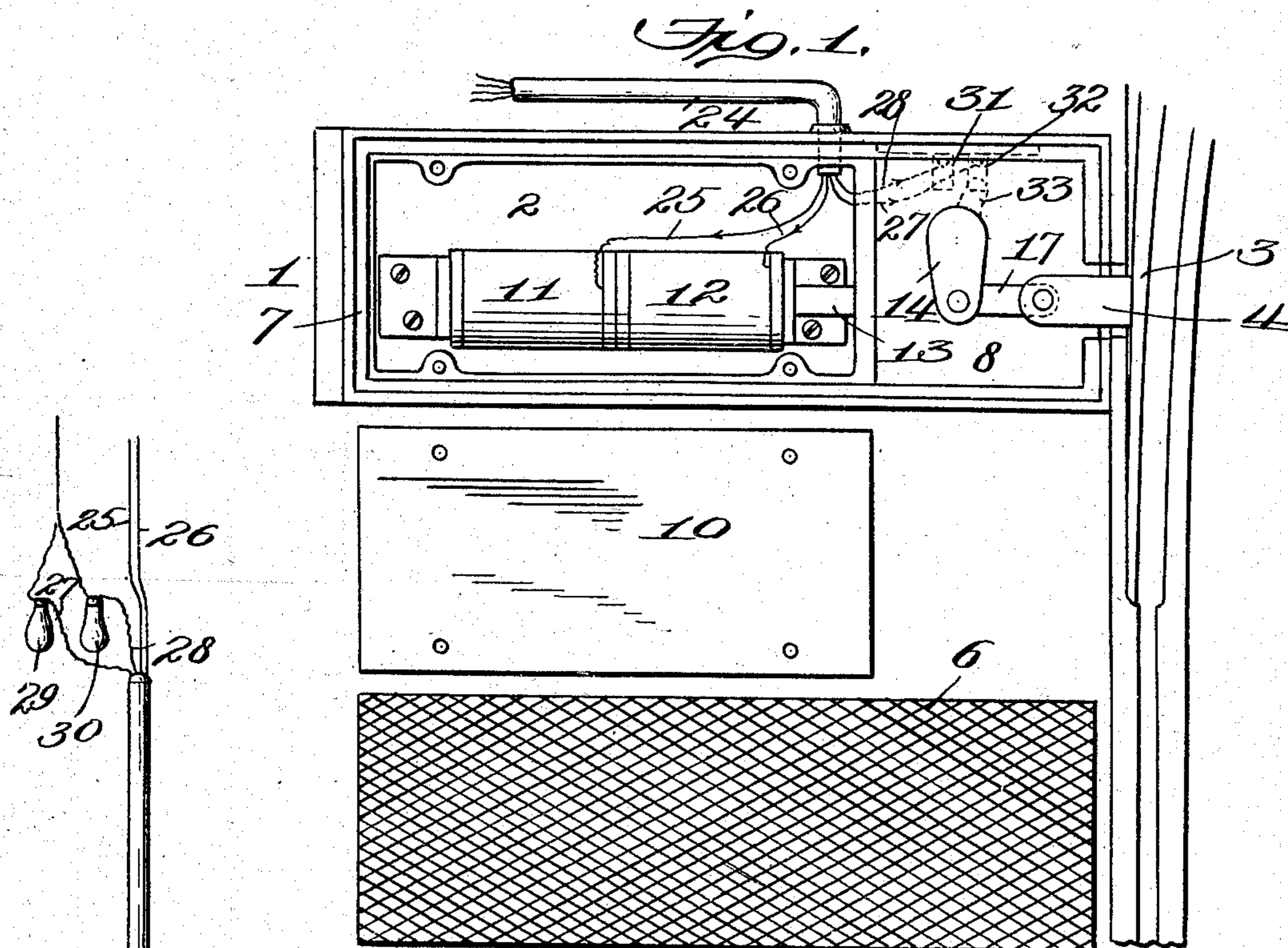


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 SWITCH OPERATING MECHANISM.
 APPLICATION FILED MAY 6, 1909.

947,053.

Patented Jan. 18, 1910.



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UNITED STATES PATENT OFFICE.

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SWITCH-OPERATING MECHANISM.

947,053.

Specification of Letters Patent.

Patented Jan. 18, 1910.

Application filed May 6, 1909. Serial No. 494,250.

To all whom it may concern:

Be it known that I, ROBERT V. CHEATHAM, a citizen of the United States, residing at St. Matthews, in the county of Jefferson and State of Kentucky, have invented new and useful Improvements in Switch-Operating Mechanism, of which the following is a specification.

My present invention relates to improvements in switch operating devices and more especially to the class that operate electrically and wherein the switch-throwing mechanism is contained in a box or housing embedded in the pavement or track adjacent to the switch, and it has for its object primarily to provide a mechanism of this class wherein the solenoids or other electrical parts of the mechanism are effectually sealed from moisture or water that might otherwise drain into the housing and injure the mechanism, although the housing containing the mechanism is in the present instance provided with means whereby access may be had to the mechanism.

Another object of the invention is to provide a novel and effective water seal between the switch-throwing parts and the operating means therefor whereby entrance of water to the latter is prevented although such seal is of a nature as will not resist the operation of the mechanism, certainty of operation being thereby insured.

To these and other ends, the invention consists in certain improvements, and combinations and arrangements of parts, all as will be hereinafter more fully described, the novel features being pointed out particularly in the claims at the end of the specification.

In the accompanying drawing: Figure 1 shows a plan view of a switch-throwing mechanism constructed in accordance with my present invention, the same being shown connected to the switch point while the cover for permitting access to the mechanism and the lid for the housing are removed; Fig. 2 represents a central vertical section through the housing, the switch operating mechanism therein and the switch, the signal lights being shown diagrammatically; Fig. 3 represents a transverse section of the mechanism and housing on the line 3-3 of Fig. 2; and Fig. 4 represents a transverse section on the line 4-4 of Fig. 2.

Similar parts are designated by the same reference characters in the several views.

The present invention provides means for effectually sealing switch operating mechanisms from moisture or water, and it is especially applicable to that class of switch-throwing mechanism which is used upon urban railways wherein the housing containing the switch-throwing mechanism is embedded in the street, pavement or the track adjacent to the switch, the present invention providing means for effectually sealing the mechanism from the entrance of moisture or water that might drain from the pavement into the housing.

In the accompanying drawing, I have shown one form of the invention and it will be understood that the invention is not limited to the specific construction shown, as but one embodiment of the invention is illustrated as an example, it being furthermore understood that certain modifications or changes may be made in order that the invention may be applied to the best advantage in each particular case.

In the present instance, the switch-throwing mechanism is inclosed within a housing 1 which may be in the form of a cast iron box of suitable shape, it being usually rectangular, the box having a bottom 2 which may be formed integral with the sides and ends so as to prevent entrance of water or moisture from the under side of the housing, and this housing is arranged adjacent or in proximity to the switch point 3 which is to be operated, the latter having preferably a lug 4 attached thereto and extending through a slot or opening 5 in the adjacent end of the housing whereby such lug may be suitably connected to the switch operating mechanism. The top of the housing is preferably closed by a removable lid 6 which may rest upon an internal surrounding flange 7 formed within the sides and ends of the housing, and the housing is divided into upper and lower compartments by means of a partition 8 which may be cast integral with the box or formed separately therefrom and suitably fitted so as to exclude water from the lower compartment, this partition being preferably provided with an opening 9 through which access may be had to the mechanism which is inclosed in the lower compartment. A cover 10 is provided which may be bolted to the upper side of the partition so as to close the opening therein, a gasket being preferably used so as to in-

sure a moisture or water-tight joint that will prevent any accumulation of water on the upper side of the partition from draining into the lower compartment.

5 The switch-throwing mechanism which is inclosed in the lower compartment of the housing may be of different forms, and I have shown in the present instance as an example an electric switch-throwing mechanism which comprises a pair of solenoid magnets 11 and 12 which are suitably secured within the lower compartment of the housing, and a core 13 is arranged to operate in these magnets, its end being pivotally attached by a knuckle-joint or otherwise to a crank 14. The means for throwing the switch-tongue consists of a shaft 15 which preferably extends vertically through the partition of the housing and carries at its upper end a crank 16, the latter being suitably connected such, for instance as by a link 17, to the lug 4 on the switch point, turning movements of the shaft causing the switch-tongue to be thrown into the different positions. The shaft 15 is suitably attached to the lower crank 14 which is operated by the solenoid magnets, it being shown squared in the present instance at its lower end so as to detachably fit the lower crank 14, and the bottom of the shaft 15 may, if so desired, be provided with a journal 18 and a step bearing 19, the latter being preferably formed as part of the bottom of the housing.

35 In order to prevent water draining from the pavement or track into the lower compartment of the housing which contains the electrical switch operating mechanism, I provide according to the present invention a water seal between the solenoid magnets and the switch tongue, this water seal in the present instance surrounding the connecting shaft and consisting in the instance shown of a liquid trap. This trap in the present embodiment of the invention is formed of a depending basin 20 which is preferably supported by and depends from the partition 8 and it has a central or inner sleeve 21 which forms a bearing for the shaft 15 and also has means for confining the sealing liquid in the basin. By so constructing the basin 20 for the seal that it depends below the plane of the partition 8, the seal may be accommodated within the box or receptacle without increasing the height of the box from top to bottom, this being advantageous if not necessary, owing to the fact that the box ordinarily must fit between the top of the ties for the rails and the surface of the track or pavement. The shaft 15 or a part movable therewith is provided with a flange or inverted cup 22 which in the present instance depends into the basin 20 and surrounds the central sleeve 21 thereon.

In order to exclude water from the lower compartment, a liquid 23 is supplied to the cup 22, this liquid being of a specific gravity greater than that of water. Mercury is generally preferred, and as the flange or cup 22 depends into the sealing liquid in this basin which liquid is of a greater specific gravity than that of water, obviously, any water that may collect in the upper portion of the housing cannot pass through the liquid seal or trap and thereby enter the lower compartment of the housing which contains the electrical switch operating mechanism. While the liquid seal effectually prevents the entrance of water to the lower compartment of the housing or the compartment containing the electrical switch-throwing mechanism, obviously such a seal does not offer any appreciable resistance to the turning of the shaft and hence while the electrical switch operating mechanism is sealed from moisture or water, certainty of operation thereof is insured. The wires for conducting the current to the solenoid magnets for operating the switch point and also the wires which serve to close the circuit for suitable signal lights preferably enter that part of the housing containing the solenoids through a pipe 24 which may be threaded into a side wall of the housing and thereby prevent entrance of water or moisture at this point, the wires 25 and 26 conveying a current to operate the solenoid magnets 11 and 12 in the present instance, while the wires 27 and 28 serve to complete the circuit through suitable signal lights 29 and 30 which may, for instance, be red and green so as to indicate to the motorman the position occupied by the switch as a car approaches it. The wires 27 and 28 for the signal lights are connected in the present instance to a pair of contacts 31 and 32 which may be located in that compartment of the housing which contains the solenoids, and an arm 33 on the crank 14 for instance may serve to alternately ground these light circuits according to the position occupied by the switch point.

The present invention provides means for housing switch-throwing mechanism whereby the entrance of water or moisture thereto is effectually prevented, and moreover, the operation of the mechanism is not interfered with in any way.

I claim as my invention:

1. An apparatus of the class described comprising a housing, a switch-throwing device adapted to be connected to a switch, operating means connected to and adapted to operate said switch-throwing device and inclosed in said housing, a horizontal partition separating said switch-throwing device and operating means, and a seal interposed between said switch-throwing device and said operating means embodying a cap depend-

ing from said partition and containing a body of liquid having a specific gravity greater than water for excluding water from the operating means.

5 2. An apparatus of the class described comprising a housing provided with a horizontal partition forming a liquid-tight compartment, a switch-throwing device arranged exteriorly of said compartment, operating means connected to said switch-throwing device and contained in said compartment, and a seal interposed between said switch-throwing device and said operating means embodying a cup depending from
10 said partition and containing a body of mercury for excluding water or other liquid from the said compartment.

3. An apparatus of the class described comprising a housing, switch operating mechanism inclosed in a compartment therein and having a part extending through a wall of said compartment, a switch-throwing device connected to said part, and a seal surrounding that part of the switch operating mechanism which extends through
20 the wall of the compartment embodying a cup depending from said wall and containing a liquid of a specific gravity greater than water for excluding water therefrom.

30 4. A switch-throwing mechanism comprising a housing provided with a partition forming a liquid-tight lower compartment, a switch-throwing device arranged above said partition and having a crank adapted for connection to a switch point, electromagnetic switch operating mechanism contained in the compartment beneath said partition and having a crank shaft extending through the partition and connected to said
35 crank of the switch-throwing device, and a mercury seal for preventing the passage of water between said partition and the operating part extending therethrough embodying a mercury containing cup on the partition and a flange carried by said crank and immersed in the mercury in said cup.

5. A switch-throwing mechanism comprising a housing provided with a partition forming a lower compartment therein, a switch-throwing device arranged above said partition, switch-operating mechanism contained in the compartment beneath said partition and having a shaft extending through the partition and connected to the switch-throwing device, and a seal surrounding said shaft embodying a cup depending from said partition and containing a body of mercury forming a liquid-tight joint between it and
45 said partition.

60 6. An apparatus of the class described comprising a housing provided with a partition forming an inclosed compartment, a switch-throwing device arranged at one side of said partition, switch operating mechanism

inclosed in said compartment at the opposite side of said partition, and a seal located below the plane of said partition for preventing the entrance of water or moisture to said compartment embodying a liquid having a specific gravity greater than
65 that of water.

7. A switch-throwing mechanism comprising a housing provided with a partition forming a lower inclosed compartment, a switch-throwing device arranged at the outer side of said partition, switch operating mechanism inclosed in said compartment at the lower side of said partition and having a shaft extending through the latter and connected to the switch-throwing device, and means for preventing the entrance of water to said compartment comprising a basin depending from said partition and containing a liquid having a specific gravity greater than that of water, and a flange
75 depending into said liquid.

8. A switch-throwing mechanism comprising a housing provided with a partition forming a compartment beneath it, a switch-throwing device arranged above said partition, switch-operating mechanism inclosed in said compartment beneath said partition and having a rotatable shaft extending through the partition and connected to said switch-throwing device, and means for preventing the entrance of water to said compartment comprising an annular basin surrounding said shaft and depending below said partition, and a flange also surrounding the shaft and rotatable therewith, said
80 flange depending into said basin, the latter containing a liquid having a specific gravity greater than that of water.

9. A switch-throwing mechanism comprising a housing provided with a partition forming an inclosed compartment beneath it, a switch-throwing device arranged above said partition, switch operating mechanism inclosed in said compartment beneath said partition and embodying a shaft which extends through the partition and is connected to said switch-throwing device, a basin supported by and depending below said partition and having an inner sleeve forming a journal for said shaft, a body of mercury contained in said basin, and an annular flange surrounding said shaft and depending into the body of mercury to form a water seal between the opposite sides of
85 said partition.

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

ROBERT V. CHEATHAM.

Witnesses:

FLORENCE BAUER,
JOHN SUKER.