

(No Model.)

2 Sheets—Sheet 1.

F. E. KINSMAN.
MEANS FOR OPERATING THROTTLE VALVES OF STEAM ENGINES.
No. 492,403.
Patented Feb. 28, 1893.

Fig. 1.

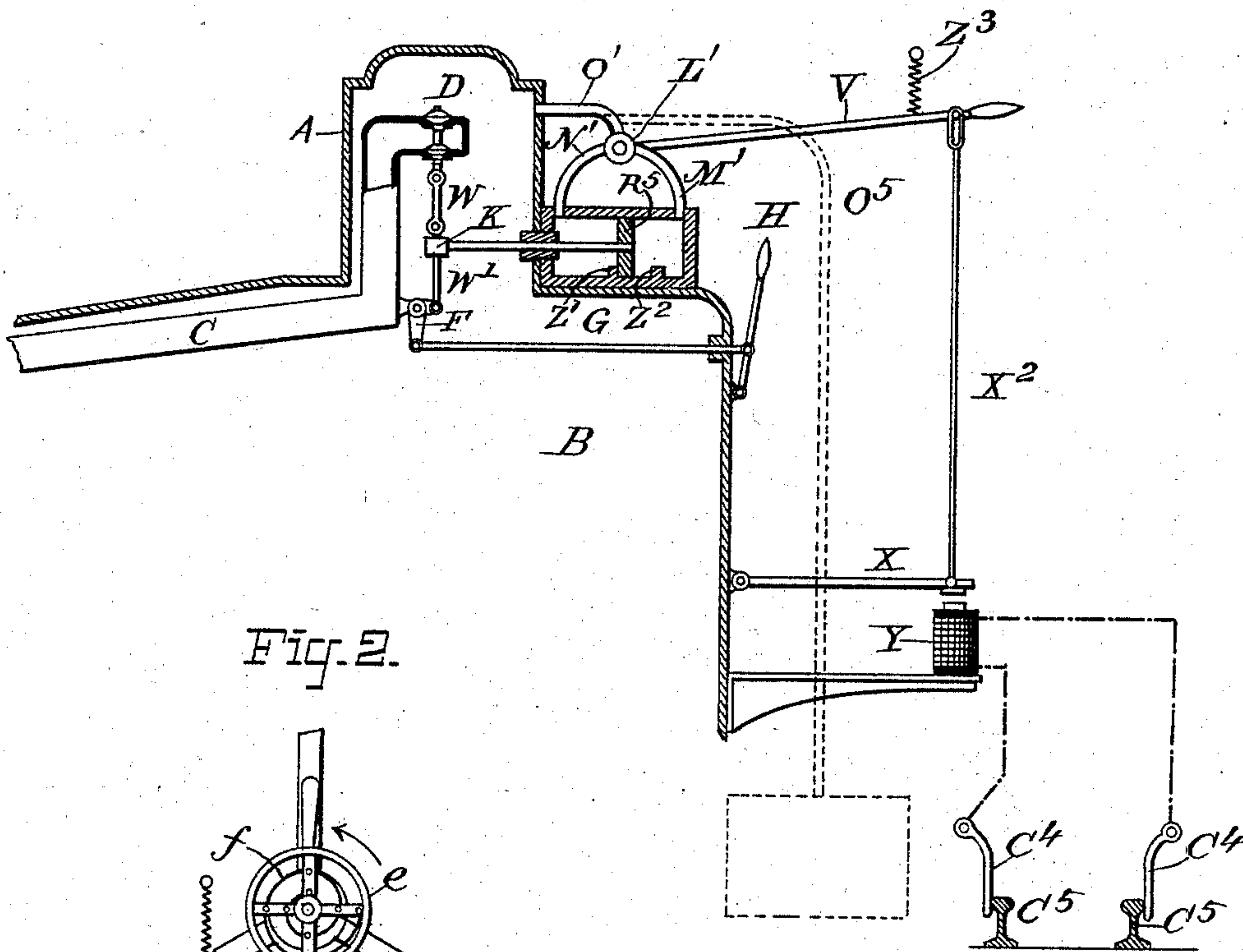


Fig. 2.

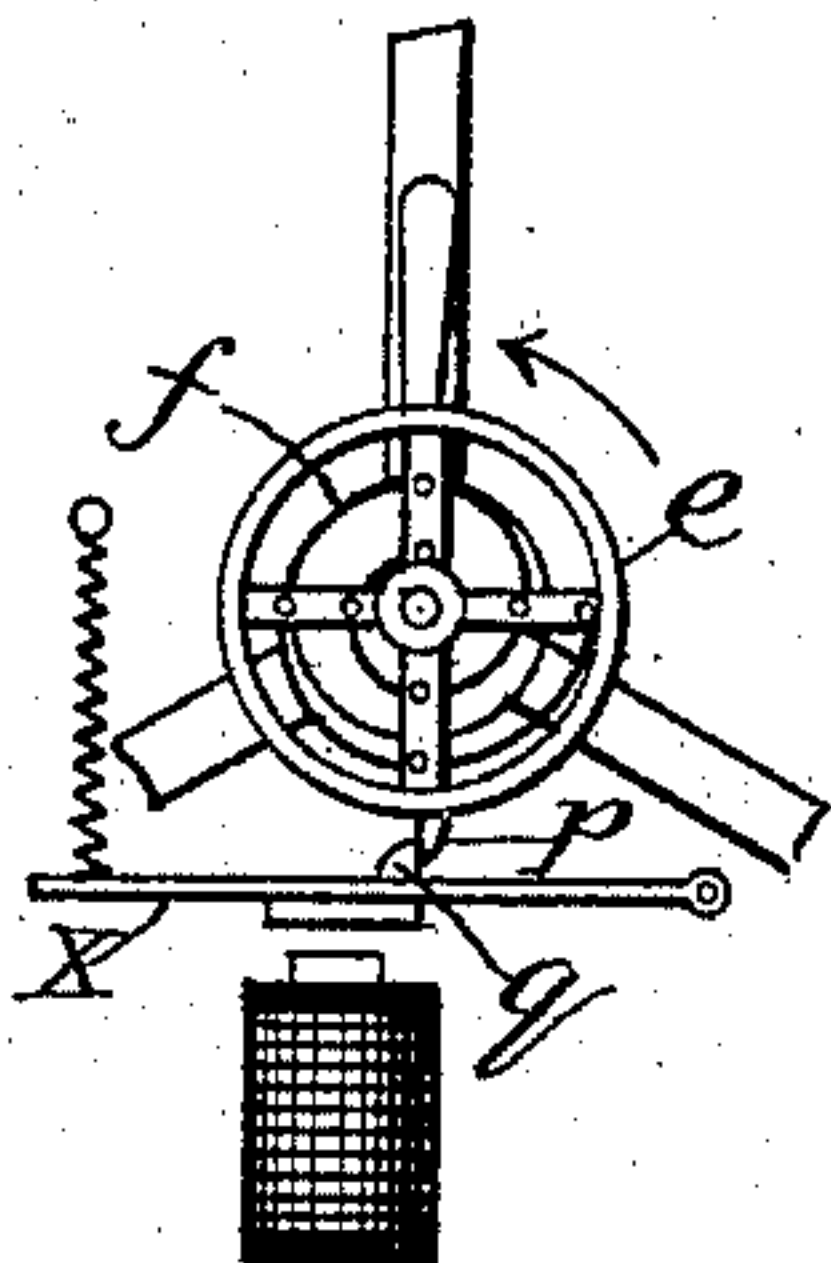
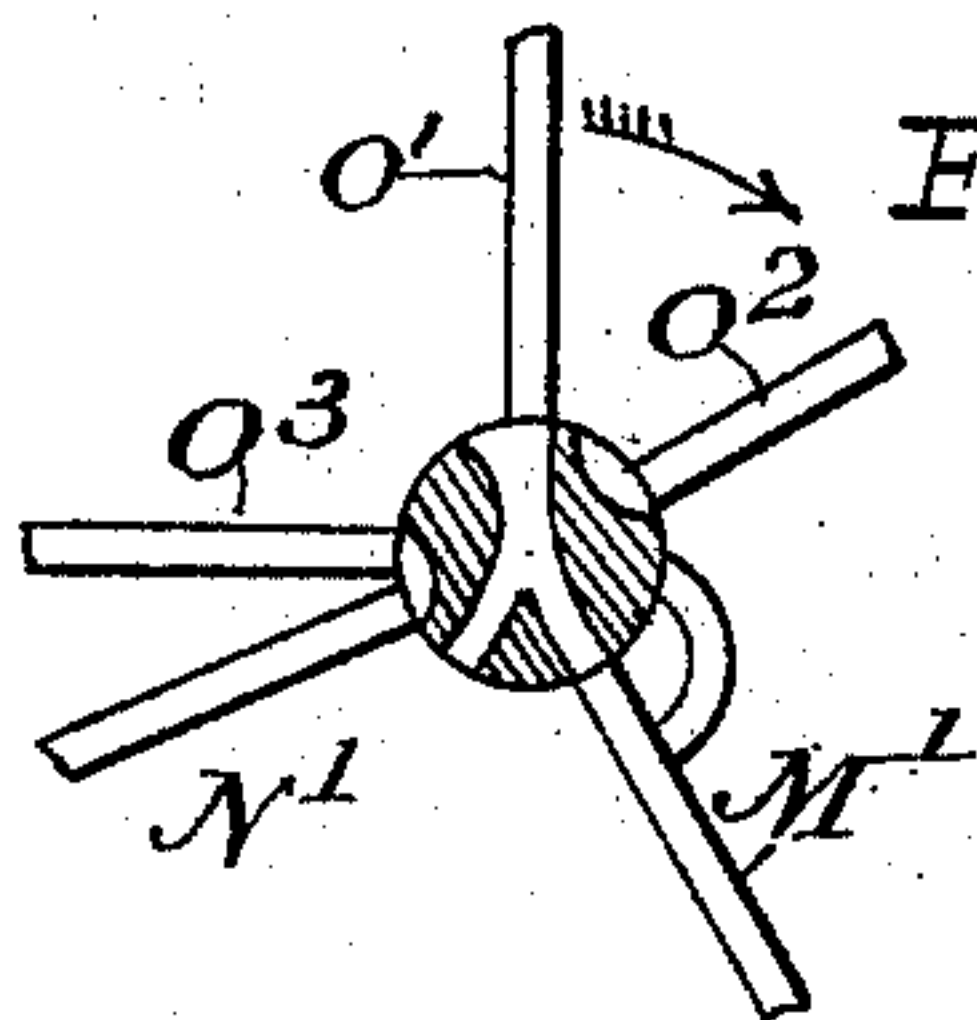


Fig. 3.



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(No Model.)

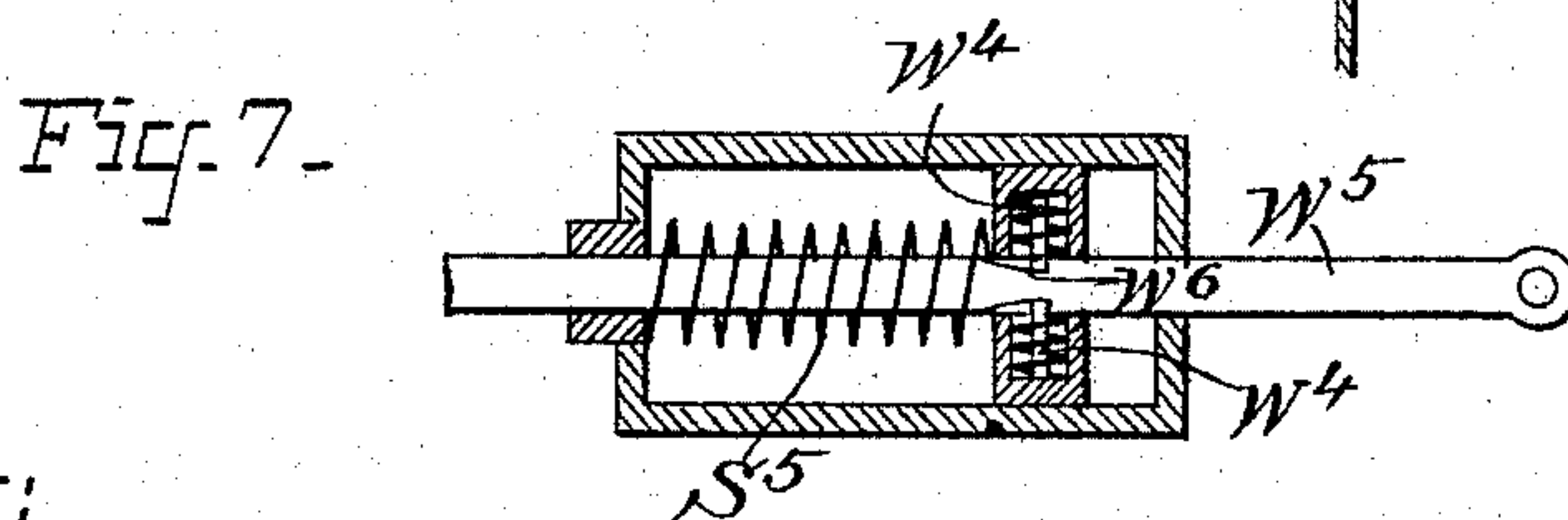
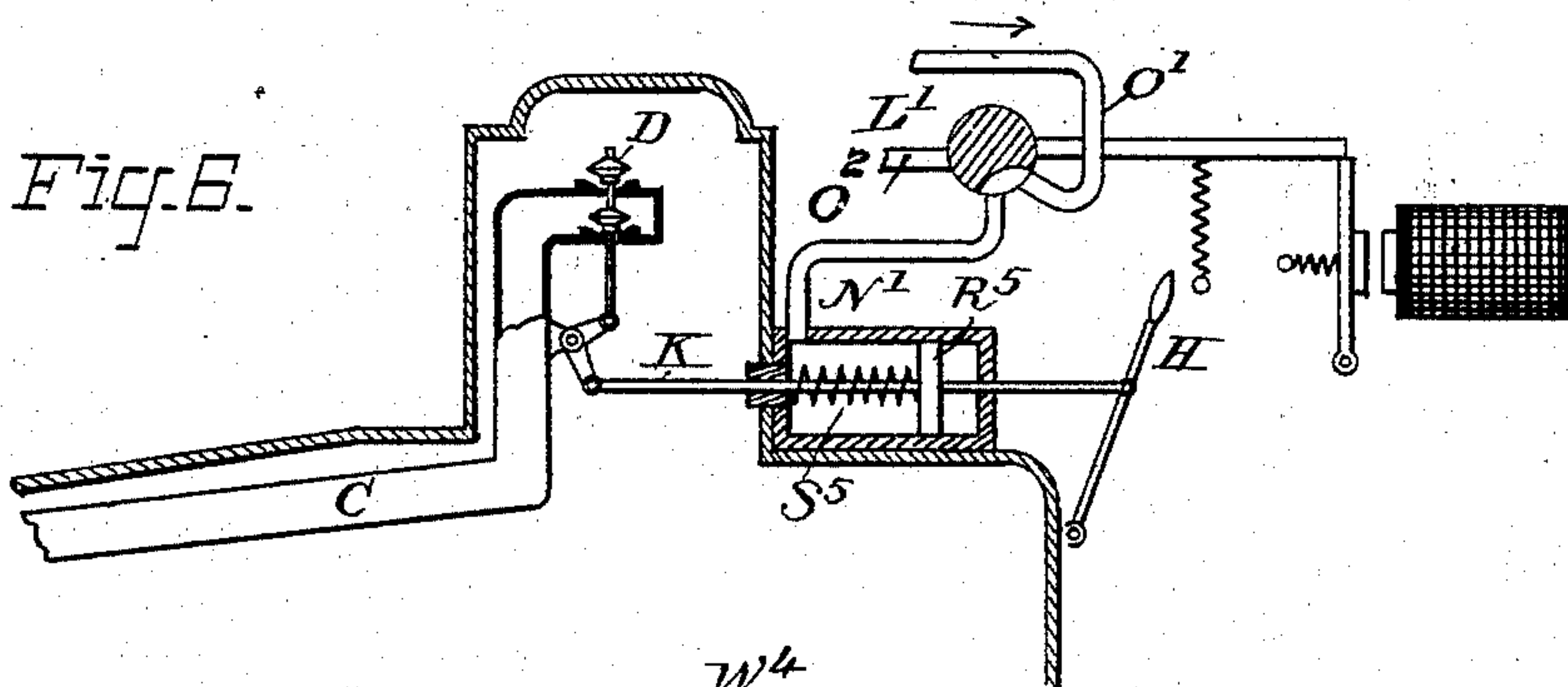
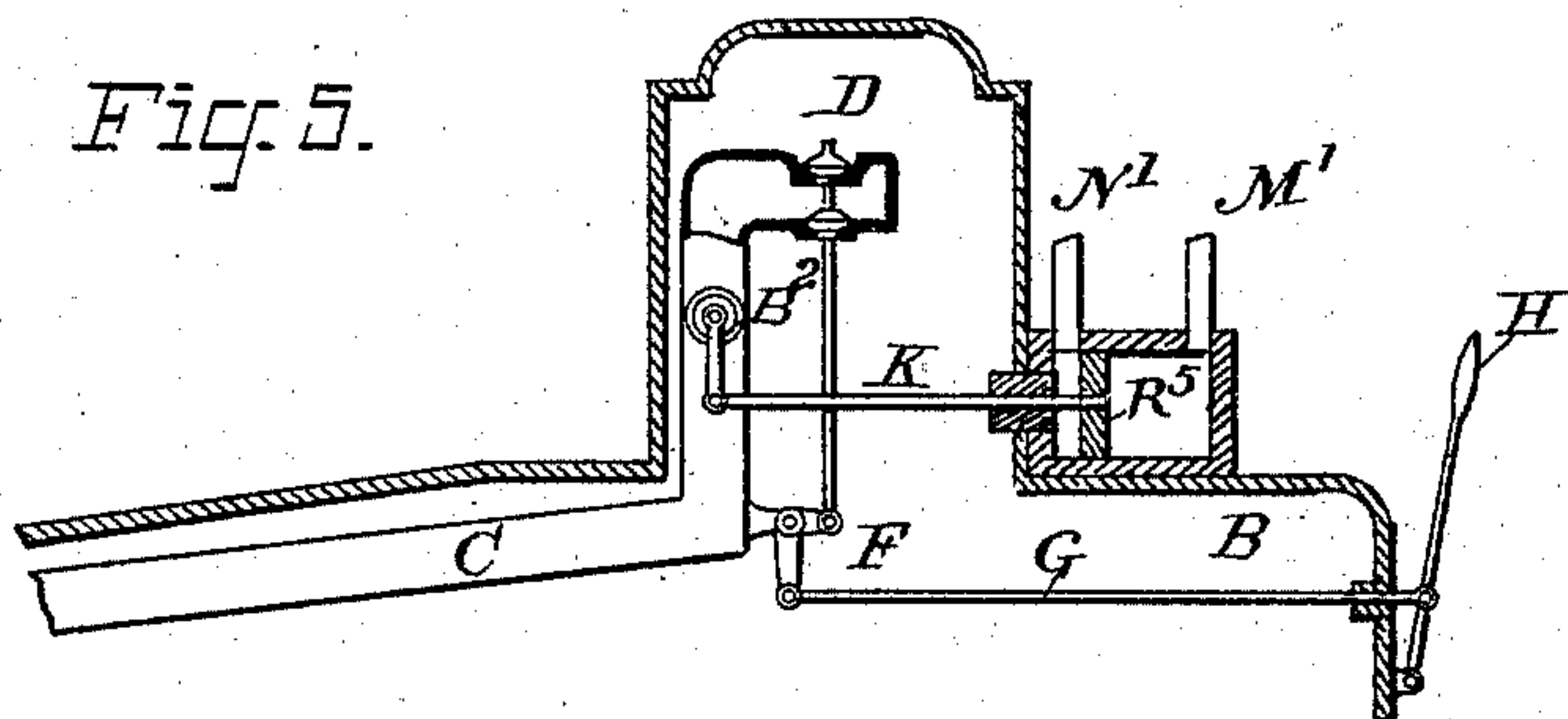
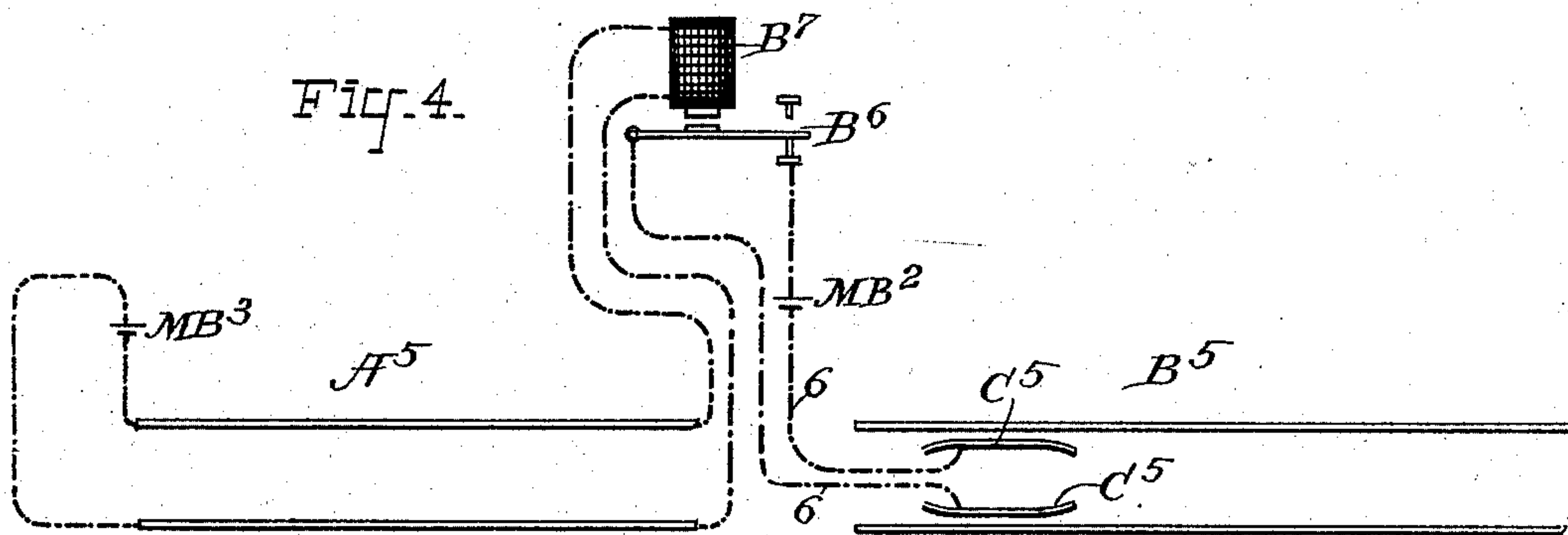
2 Sheets—Sheet 2.

F. E. KINSMAN.

MEANS FOR OPERATING THROTTLE VALVES OF STEAM ENGINES.

No. 492,403.

Patented Feb. 28, 1893.



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UNITED STATES PATENT OFFICE.

FRANK E. KINSMAN, OF PLAINFIELD, NEW JERSEY.

MEANS FOR OPERATING THROTTLE-VALVES OF STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 492,403, dated February 28, 1893.

Application filed February 24, 1892. Serial No. 422,632. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. KINSMAN, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Means for Operating Throttle-Valves of Steam-Engines, of which the following is a specification.

My invention relates to an apparatus designed for governing the operation of a throttle valve, or similar power controller of an engine by the action of an electro-magnet, and is constructed principally for use with the throttle valve or similar power controller which governs the application of the propelling power to a vehicle such, for instance, as a locomotive.

Another purpose of my invention is to provide a means whereby a railway train propelled by a steam motor may have its driving power shut off automatically through the direct action of an electro-magnet whose circuit is controlled automatically from a neighboring section of track, from a switch, a draw bridge, or by a hand electric switch or otherwise, and which circuit may be put into condition to bring the train to rest when necessity requires.

My invention consists in the combination with a throttle valve or similar power controlling device on the locomotive, of a piston or plunger connected with said throttle through suitable mechanism, and adapted to close the throttle when moved in one direction, a valve adapted to control the pressure upon said plunger to cause it to close the throttle, an electro-magnet on the locomotive having an armature for governing the movement of said valve, and devices upon the road-bed for automatically changing the condition of the magnet so as to cause the said valve to operate and make the throttle close when the locomotive passes over said devices.

My invention consists further in the combination with the motive power controlling device and a plunger for operating the same to throw off the motive power, of a manual controlling device actuated independently thereof, an electro-magnet, the armature of which is carried by the locomotive or vehicle, and devices actuated or controlled by said ar-

mature whereby said plunger may be operated to shut off the motive power.

My invention consists further in the special combinations of apparatus hereinafter described and more particularly specified in the claims.

The pressure operating upon the plunger may be that of air, steam or other fluid derived from any suitable source, as, for instance, from the boiler of the steam engine, or from the air cylinder of a brake apparatus applied to cause the movement of the plunger in both directions by positive pressure; or a spring may be used to move the plunger in one direction, and the pressure of the fluid applied or relieved on the other side of the plunger for the purpose of causing movement in either direction.

In the accompanying drawings I have illustrated my invention as applied to cutting off the steam from the cylinders of a locomotive.

Figure 1, is a side elevation of the parts combined in accordance with my invention, the valve which controls the pressure upon the plunger or piston being shown as connected with the armature of the magnet so that the power of the armature may be used for operating the valve. Fig. 2, illustrates a modification wherein the power for operating the valve is a spring and the electro-magnet acts upon a detent to relieve the springs and allow the latter to turn the valves as required. Fig. 3, illustrates in detail the arrangement of the ports that may be employed with the valve illustrated in Fig. 1. Fig. 4, is a diagram of circuits showing my invention as applied to a block system for railways. Fig. 5, illustrates a modification in the manner of combining the plunger and throttle valve. Fig. 6, illustrates the preferred manner of combining the throttle, plunger and manual controller, and shows a further modification of the invention wherein a spring is used to produce movement in one direction and the direct pressure of air, gas or steam operates said spring to produce movement of the plunger in the opposite direction. Fig. 7, shows a detail of construction.

A, indicates the steam dome of the locomotive; B, the boiler and C, the pipe which connects the steam space of the boiler with the cylinders.

D, is the throttle valve operated by means of a hand lever H, or other device connected with said throttle valve through a rod G, a bell-crank F, and an intermediate link or
5 links connected with the valve stem.

To permit the operation of the throttle by means of the plunger or piston, as will be presently described, the crank F, and the valve stem are connected with the links W,
10 W', joined together as shown. One of said links works through the collar K, which connects with the plunger or piston R⁵. When the piston is in the position shown the throttle may be operated in the usual way by a
15 handle H. The throttle is shown in closed position. If the throttle be opened, however, then the movement of the piston backward will bend the toggle joint connections or links W, W', drawing down and closing the throt-
20 tle. Movement in the opposite direction, the handle H, being retained in position to keep the throttle valve open, would result in opening the throttle.

Instead of causing the plunger or piston to
25 operate upon a throttle actuated by the hand gear, it might obviously be made to operate upon an independent throttle, as indicated in Fig. 5, where the piston or plunger is shown connected directly through a link with an arm
30 from a suitable throttle at B².

The piston or plunger R⁵, operates between suitable stops Z', Z², fastened in any suitable position. As shown, each cylinder is con-
35 nected at its opposite ends with pipes M', N', leading from a valve L'. A third pipe O', makes connection between the valve and any suitable source of air, gas or other fluid under pressure.

In Fig. 1, the pipe is connected with the
40 steam dome so that steam pressure may be utilized. The ports of the valve L', are shown more clearly in Fig. 3. A fourth pipe indicated at O², forms an exhaust port which op-
45 erates in connection with a valve way or pas- sage that, when the valve stem is turned in the direction of the arrow, opens communi-
50 cation between the pipe M', and the exhaust pipe O². Another exhaust pipe O³, is connected by a suitable port in the valve stem with the pipe N', when the valve stands in normal position.

V, is an arm connected to the valve stem, and adapted to be operated by hand or other-
55 wise. When the valves stand in the position shown in Fig. 3, it is obvious that the pipe N', will be connected to the outer atmos-
60 phere and the pressure of steam entering from O', to M', will operate to hold the piston or plunger in position to open or permit the opening of the throttle valve. If the
65 valve L', be turned in the direction of the arrow, the exhaust from N', will be closed and connection established between N', and O', while at the same time connection of M', and O', will be cut off and M', will be at the same time connected to exhaust O². Steam will then enter through pipe N', and operate

upon the opposite side of plunger R⁵, so as to close the throttle.

Instead of taking pressure from the steam
70 space, it may be taken, as indicated, by means of a pipe O⁵, from the air reservoir of the brake system, or the connections might be made to any other brake system operating by plenum or vacuum. The operation would obviously
75 be the same as in the case of steam.

As will be apparent the throwing of the valve in one direction will cause the prepon-
80 derance of pressure acting in one direction upon the plunger and thus close the throttle, while the movement of the valve in the op-
posite direction will cause the preponderance of pressure to act on the plunger in the oppo-
site way and open the throttle.

The device may be used either with or with-
85 out the hand controlling device H, and may, as before described, operate either upon the same throttle as H, or upon an independent throttle as shown in Fig. 5.

In Fig. 6, the plunger is actuated in one di-
90 rection by the pressure admitted through the pipe N', while the spring S⁵, acts on the plunger in the opposite direction and in a man-
ner to close the throttle when the pressure at the side of the piston connected to N', is less-
95 ened.

The valve L', is any suitable valve having ports and passages, adapted, as indicated, to put O' and N', into communication or, when
100 turned in the direction of the arrow, to put N' and the exhaust O², into communication with one another, the connection of N' and O', being then cut off. As will be obvious when the valve is held in normal position, as
105 shown, by the armature of the electro-magnet the pressure admitted to the cylinder will hold the plunger in the position shown, the pressure being sufficient to overcome the
110 spring S⁵. The throttle will then be in position to admit steam to the cylinder of the en-
115 gine. When the valve is released from the armature and is turned in the direction of the arrow by its actuating spring, the pressure of air, gas or other fluid will be relieved
120 behind the piston owing to the escape through the exhaust O², the connection with the pressure pipe O', being at the same time cut off. The spring S⁵, will thereupon act to reverse the movement of the plunger or piston, and the throttle valve or other power controlling
125 device will be operated in a way to cut off the motive power. When the valve L' is turned back into normal position where it re-
mains until operated by the magnet, it will be obvious that pressure of air, gas or steam
130 will be again applied to the plunger in a direction to put on the motive power.

In combination with the devices described, I employ the armature X, of an electro-mag-
135 net Y, which armature has mechanical con-
nection with the means such as the valve L', for controlling or producing a preponderance of pressure in either direction on the plunger as described. This mechanical connection is

either one such that the power of the electro-magnet operating on the armature will actuate the valve or may be a connection such as illustrated in Fig. 2, and wherein the armature operates to let off or release another power, as that of a spring, which will actuate the valve. In either case the valve will be operated and the plunger brought into connection to shut off the motive power immediately upon the operation of the armature.

The armature X, is mounted upon the locomotive in any desired manner, and the electro-magnet Y, is also preferably mounted upon the locomotive or vehicle and has its coils connected to contact arms or circuit closers C⁴, which are carried on the truck of the vehicle and properly mounted thereon to engage with contact rails or bars C⁵, placed at any desired position on the road bed. The contact bars or arms C⁴ are preferably spring pressed arms adapted to yield on engaging with the bars, although they might be rigid and the bars allowed to yield. The electro-magnet is energized by means of a battery or other generator of electricity connected to the contact bar C⁵, though the generator might be upon the engine. The circuit of the magnet is completed through devices connected into the circuit of the contact bars C⁵, as will be presently described in connection with Fig. 4. In some cases the electro-magnet Y, operating on the armature X, carried by the locomotive might be upon the road bed as described in my prior patent No. 345,700 but the preferred arrangement is that wherein contact arms are employed and the magnet is carried by the vehicle.

The armature X, connects with the valve L', by any desired mechanism. That herein shown consists of a link or rod X², joined to the armature and normally held up by a spring Z³, which serves to suspend the armature above the magnet poles but which is overcome by the influence of the magnet when the latter is excited thus drawing down the link X². The link or rod X, is slotted at its upper end and a pin projecting from the arm V, enters the slot. When the armature is moved down the arm V, is turned and the throttle is closed. When the armature is freed from the influence of the electro-magnet, the spring Z, lifts it back to its original position, but the lever V, remains in the position to which it was moved as the slot O, allows the rod X², to rise independently of the lever. The valve L' may then be reset when so desired by turning the arm V, up again.

One way of governing the circuits of the magnet Y, so as to cause the throttle to be closed is shown in Fig. 4, where I have shown the contact bars C⁵, as used in a block system, the bars themselves placed on one section B⁵, of the line of rails being connected by circuit wire 6, with a circuit closer B⁶, and the circuit 6, including a battery or other generator of electricity M, B². The circuit closer B⁶, is normally open, being kept open by any de-

sired means but when closed the circuit is completed so that any train moving on a section B⁵, and having a contact arm C⁴, will have the circuit of its magnet Y, completed, and the motive power of the vehicle will be immediately and automatically shut off.

The preferred way of controlling the circuit closer B⁶, in the block system, is by means of an electro-magnet such as indicated at B⁷, which magnet is connected to the rails of an adjoining section of track A⁵, at one end of the section, while at the other end the battery M, B³, is connected to the rails of such section. The magnet is, therefore, normally excited and holds up the circuit closer B⁶. If a train be on the section A⁵, the battery will be short circuited from B⁷, by the wheels and axles on the section A⁵, and so long as the train remains on said section, the circuit closer B⁶, will be closed, the magnet having lost its power. Hence the presence of a train on section A⁵, will automatically shut off the motive power to any train moving on the section B⁵.

Other ways of controlling the circuit for the magnet through the contact bars C⁵, are well known in the art as, for instance, by means of switches, draw bridges, and other devices and combinations of circuits. In any case the magnet will be operated in the same manner to assist in bringing the train to rest when the conditions require.

In Fig. 2, of the drawings, the armature of the magnet brings the controlling valve directly into operation whenever the magnet is excited by releasing a spring which turns the valve. The valve is connected to a wheel e, by means of which the valves may be turned or rotated automatically. Attached to the wheel is a spiral spring f, tending to rotate the valve in the direction of the arrow but normally restrained by means of a tooth or projection g, extending from the armature X, and engaging with a projection p, on the wheel e. The armature lever X, is normally upheld by a spring, as before, but when the armature is attracted the armature lever releases the wheel and spring and the valve is turned in obvious manner.

Substantially the same device is shown in Fig. 6, with the difference only that the parts are differently arranged, and the valve is operated by means of a spiral spring connected to an arm extending from the valve stem, which arm normally rests upon the armature of the electro-magnet but is released when the armature is drawn up by the magnet. In this figure I have illustrated also a preferred way of combining the throttle, the plunger, the manual actuating device, and the devices actuated or controlled by the magnet for putting the plunger into operation.

The manual actuating device consisting of the hand lever or other manual lever connects with the plunger or piston and the throttle valve by means of a slip joint and clutch connection of any desired kind adapted to

permit the plunger to move in a direction to shut off the motive power, while the manual actuator is locked or fixed, but to permit the manual actuator to connect with and operate upon the same throttle valve carrying with it in such movement the plunger, a simple form of clutch and slip joint consists of the dogs W^4 , working in ways in the plunger and actuated by suitable springs which tend to cause their ends to engage with the rod W^5 , which is joined at one end to the hand lever and at its other works in the hollow connecting rod of the plunger and throttle.

In the rod W^5 , is a groove or depression at W^6 , with which the dogs may engage. The pressure of the springs causing the dogs to engage at this point is so adjusted that the plungers may nevertheless move independently of the rod W^5 , in case the lever be locked. When therefore, the plunger operated either by the spring or the fluid pressure, moves in a direction to shut off the motive power, the dogs move over the rod W^5 , being disengaged from the depression W^6 , by a superior actuating power tending to move the plunger. When the valve is turned or set so as to admit the pressure to the plunger so as to offset, in all or any part the power, as of the spring, which tends to move the throttle in a direction to cut off the motive power, then the actuating handle may be operated to move the throttle in a direction to cut off the motive power, then the actuating handle may be operated to move the throttle forward or backward, inasmuch as the clutch devices will engage with a strength sufficient for that purpose.

It will be readily understood that under normal conditions, that is to say, when the pressure tending to move the plunger in opposite directions, are both acting, the difference of pressure should not be sufficient to disengage the clutch nor to oppose any great obstacle to the actuating of the throttle by the hand gear.

What I claim as my invention is—

1. In an apparatus for controlling the movement of vehicles, the combination of a throttle valve or similar power controller for the driving power of the vehicle, a piston or plunger operating on the throttle, a valve controlling the pressure upon said piston or plunger, an electro-magnet having an armature governing the position of said valve whereby through the action of the magnet the driving or propelling power may be shut off, means upon the road-bed controlling the condition of the magnet when the vehicle is to be brought to rest, and independent means upon the vehicle for restoring the plunger to normal position, as and for the purpose described.

2. In an apparatus for controlling the movement of vehicles, the combination, substantially as described, with a throttle valve or similar power controlling device on the locomotive, a piston or plunger connected with said throttle through suitable mechanism, and

adapted to close the throttle when moved in one direction, a valve adapted to control the pressure upon said plunger to cause it to close the throttle, an electro-magnet on the locomotive having an armature for governing the movement of said valve, and devices upon the road-bed for automatically changing the condition of the magnet so as to cause the said valve to operate and make the throttle close when the locomotive passes over said devices.

3. In an apparatus for controlling the movement of vehicles, the combination with the engine for a locomotive or other vehicle, of a throttle valve in the steam pipe leading to the operating cylinders, the piston or plunger working in a cylinder having connections to a source of air, steam or other pressure supply, an electro-magnet on the vehicle or locomotive for governing the pressure upon said piston to close the throttle, contact arms carried by the vehicle and connected to said electro-magnet, and contact bars on the road bed for closing the circuit of the generator which actuates the magnet, and manual devices upon the locomotive for restoring the plunger to normal position after the locomotive has passed said contact bars.

4. In an apparatus for controlling the movement of vehicles, the combination substantially as described, with the throttle valve for the engine of the locomotive or other vehicle, of a piston or plunger and a hand lever suitably connected with the throttle or other power controller and capable of operation independently of one another, connections from a suitable source of pressure supply whereby direct pressure may be applied to move the plunger positively in both directions, and a valve having suitable ports and connections whereby the pressure and exhaust of both pressure spaces may be governed.

5. In an apparatus for controlling the movement of vehicles, the combination with the throttle valve for the propelling steam engine, of a plunger or piston, a spring acting on the plunger in a direction to open the throttle, a manual actuating device also connected with the throttle and capable of operation or of remaining at rest independently of the plunger, and a valve for controlling the pressure and exhaust in the cylinder and placed in the connections from the steam or other pressure space to the cylinder.

6. In an apparatus for controlling the movement of vehicles, the combination with the throttle valve for a locomotive, of a plunger actuated by steam or air pressure, a valve controlling the pressure, a spring or other power operating on the valve in a direction to cause the throttle to be closed, an electro-magnet having an armature which normally detains the valve from movement, and means upon the road-bed for automatically changing the condition of the magnet to operate the throttle on the occurrence of danger conditions.

7. The combination, substantially as de-

scribed, of a motive power controller on a railway vehicle, a piston or plunger connected with said controller and serving to move the same in a direction to cut off the power, a source of pressure acting on the plunger, an electro-magnet for controlling said valve, said magnet having an armature borne upon the vehicle, means upon the road bed for controlling the circuit of said magnet, and devices upon the locomotive independent of those upon the road-bed for restoring the piston or plunger to normal position or position where the power will be applied.

8. The combination with a motive power controller on a railway vehicle, of a piston or plunger connected to said controller, a source of fluid pressure acting on the plunger, a governing cock or valve for governing the pressure, an electro-magnet having its armature borne by the vehicle, and a detent or lock for the valve governed by said armature.

9. The combination with the motive power controlling device and a plunger for operating the same to throw off the motive power,

of a manual controlling device actuated independently thereof, an electro-magnet, the armature of which is carried by the locomotive or vehicle, and devices actuated or controlled by said armature whereby said plunger may be operated to shut off the motive power.

10. The combination with a motive power controller, of a plunger or piston acting on the same in a direction to cut off the motive power from the engine, a manual actuating device having a slip joint and clutch connection with said plunger and controller, and an electro-magnet having an armature connected with controlling devices whereby the plunger may be brought into operation independently of the manual actuating device.

Signed at New York, in the county of New York and State of New York, this 23d day of February, A. D. 1892.

FRANK E. KINSMAN.

Witnesses:

WM. H. CAPEL,
THOS. F. CONREY.