J. S. KIESEL.

INERTIA DEVICE FOR LOCOMOTIVE VALVE GEARS.

APPLICATION FILED APR. 15, 1912.

1,037,021.

Patented Aug. 27, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

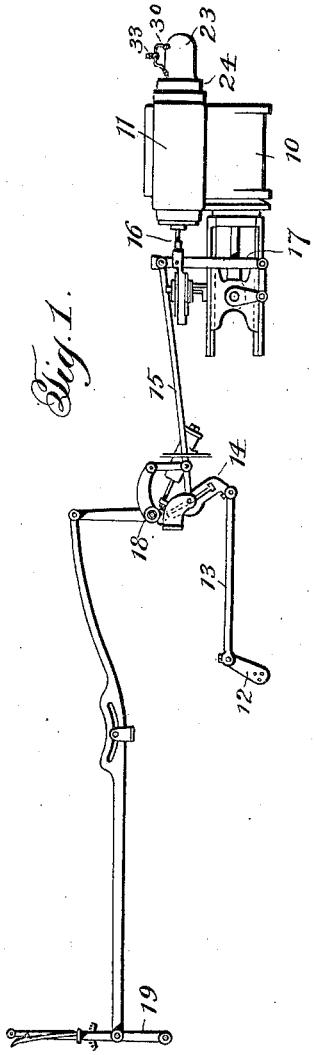


Fig. 4.

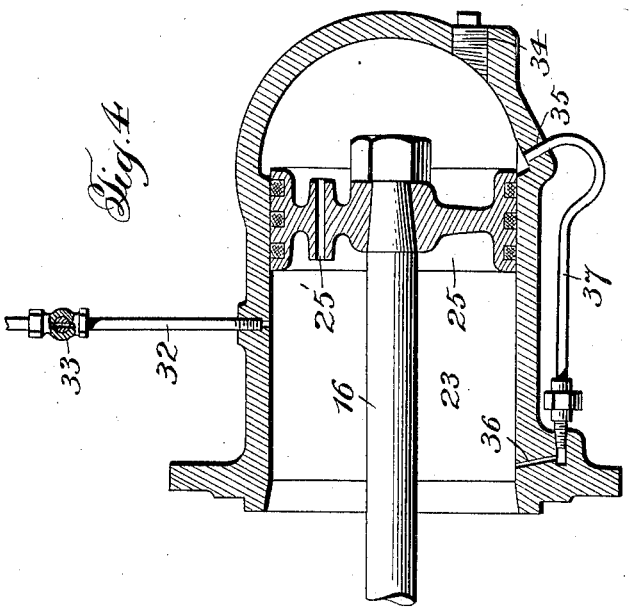
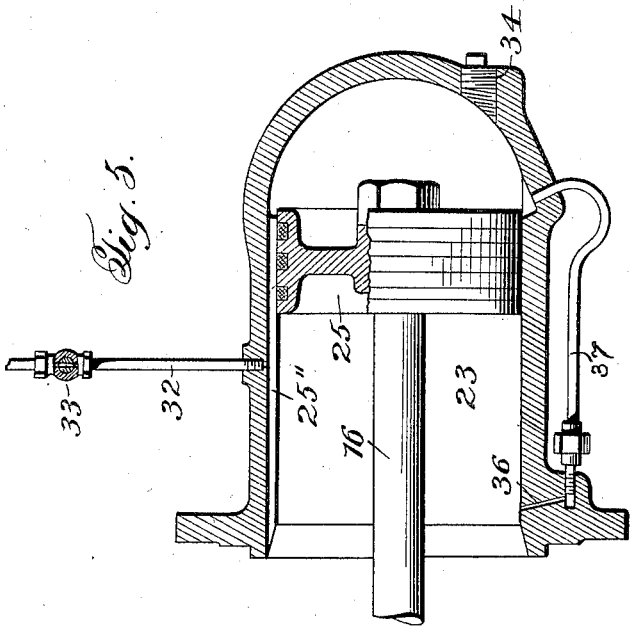


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 2.

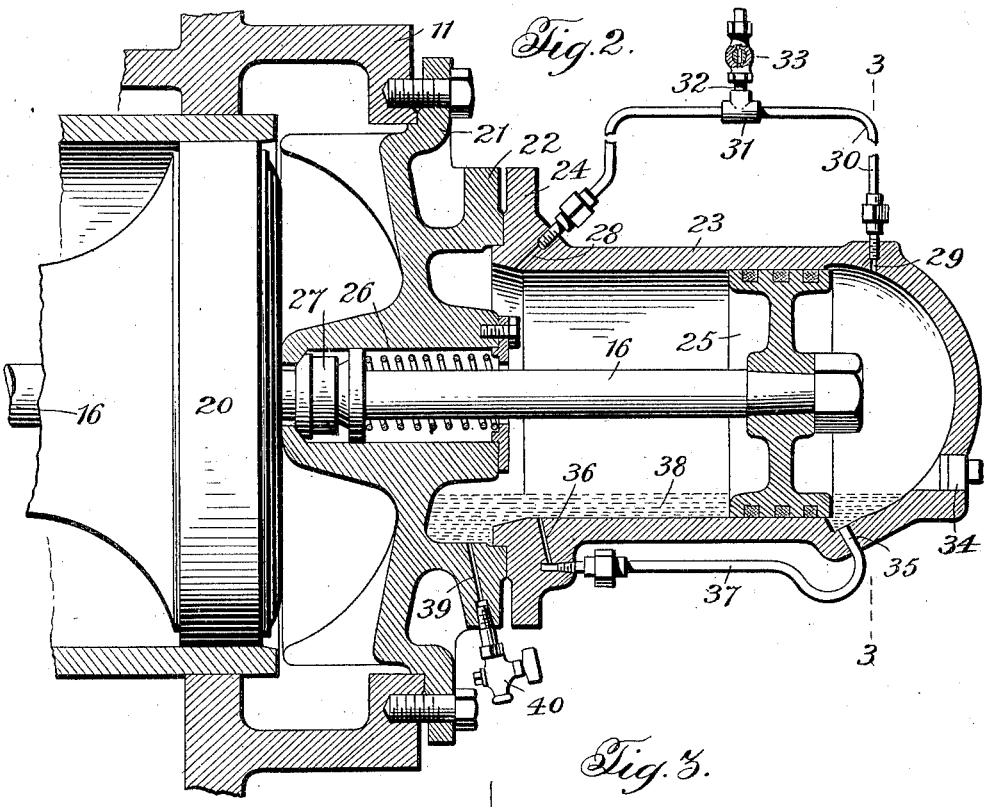
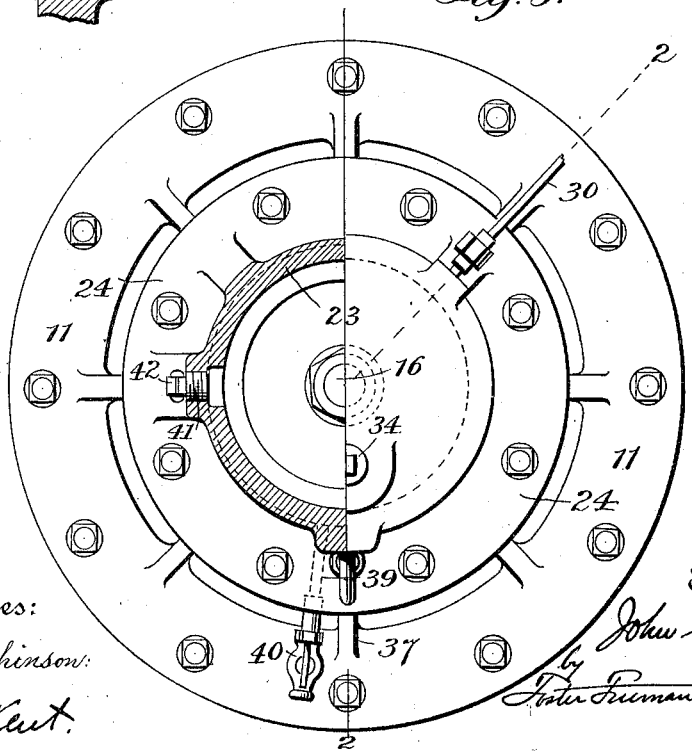


Fig. 3.



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UNITED STATES PATENT OFFICE.

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INERTIA DEVICE FOR LOCOMOTIVE VALVE-GEARS.

1,037,021. Specification of Letters Patent. Patented Aug. 27, 1912.

Application filed April 15, 1912. Serial No. 690,744.

To all whom it may concern:

Be it known that I, JOHN S. KIESEL, a citizen of the United States, residing at Altoona, Blair county, Pennsylvania, have invented certain new and useful Improvements in Inertia Devices for Locomotive Valve-Gears, of which the following is a specification.

This invention relates to locomotives and more particularly to the improvements in the valve gear therefor.

In the modern high powered locomotives the moving parts of the valve gear weigh as much as seven hundred pounds and more, and consequently the inertia forces of these parts when the locomotive is running at high speeds, as from 60 to 90 miles per hour, are very great and produce a large amount of wear on the moving parts and put such a strain on the reverse lever that it is dangerous to attempt to handle the latter, and as a matter of fact engineers do not attempt to move the reverse lever when the locomotive is running at such high speeds.

An object of this invention is to provide means for counteracting the inertia forces of the moving parts of the valve gear so as to overcome the above mentioned disadvantages. I accomplish this object by means of a dash-pot connected with the valve gear and adapted to offer practically no resistance at low speeds and a resistance at high speeds varying from one end of the stroke of the valve to the other and always counter to the inertia forces.

Another object of the invention is to provide an improved lubricating means for the dash-pot, whereby the piston thereof is thoroughly lubricated at all times regardless of the speed at which the locomotive is running.

Another object of the invention is to so arrange the dash-pot in relation to the engine valve that the spider of the valve will be held up by the piston of the dash-pot.

Other objects and the features of novelty will be apparent from the following description taken in connection with the accompanying drawings, in which:

Figure 1 is a skeleton view of a locomotive valve gear embodying my invention. Fig. 2 is a longitudinal section through the dash-pot cylinder and a portion of the valve chest on the line 2—2 of Fig. 3. Fig. 3 is a composite view, one half of which is a section on the line 3—3 of Fig. 2, and the other half of which is an end view of the dash-pot and valve chest. Fig. 4 is a longitudinal section through the dash-pot and showing another form of the invention. Fig. 5 is a view similar to Fig. 4 and showing still another form.

Referring to the drawings and more particularly to Fig. 1 it will be seen that I have illustrated a locomotive cylinder 10 having the usual valve chest 11. In connection with these parts I have shown a valve gear of the well known Walshaert type comprising the drag crank 12, connecting rod 13, link 14, the radius bar 15, valve stem 16 and the combination lever 17. For the purpose of adjusting the position of the radius bar 15 I have provided the usual rock shaft 18 arranged to be actuated by the reverse lever 19 in the usual manner.

Referring now to Figs. 2 and 3 it will be seen that I have shown in the valve chest 11 a valve 20 mounted on the valve stem 16. The valve chest is provided with the front head 21 and, in the preferred embodiment of my invention, I form a flange 22 on the valve chest head and secure to this flange the dash-pot cylinder 23, the latter being provided with a flange 24 coöperating with the flange 22 and secured to the latter in any suitable manner. The front end of the dash-pot cylinder is preferably of hemispherical form and integral with the side walls. The cylinder 23 is bored out in the usual way and has arranged therein a piston 25 which is secured to the end of the valve stem 16. The stem 16 extends through a stuffing box 26 in the valve chest head 21, the bore of the stuffing box being such as to permit free lateral movement of the stem. The stuffing box may be provided with any preferred form of packing 27, but this packing should be of such construction as to permit transverse or lateral movement of the stem 16. At one end of the dash-pot cylinder is a port 28, and at the other end is a port 29, these ports extending through the wall of the cylinder and communicating with a by-pass pipe 30. At a point preferably near the middle of the pipe 30 is a connection 31 for a supply pipe 32, the latter being provided with a valve 33 or other device adapted to restrict the flow through the pipe 32. The front end of the dash-pot may be provided with a plug 34 for the pur-

pose of introducing lubricant into the interior of the dash-pot cylinder or for any other desired purpose. At the lower side of the cylinder 23 are arranged the ports 35 and 36, these ports being connected together by means of a by-pass pipe 37. The ports 35 and 36 are preferably inclined as shown in Fig. 2 for a purpose to be hereinafter described.

In operating the mechanism and for the purpose of thoroughly lubricating the dash-pot cylinder I supply the latter with a quantity of lubricating oil indicated by the numeral 38, this oil being transferred from one side of the piston 25 to the other as the piston moves, by means of the by-pass 37. An elastic fluid, preferably air taken from the main reservoir of the air brake system, is supplied to the dash-pot cylinder by means of the pipes 32 and 30. When the piston 25 reciprocates slowly the air will be by-passed from one side of the piston to the other through the pipe 30, but when the piston 25 reciprocates rapidly the pipe 30 will so restrict the flow of air as to cause the air to be compressed by the piston, and the pressure thus created, acting on the oil, tends to force the oil into the opposite end of the cylinder through the pipe 37, the pressure causing the oil to be discharged with such velocity that it will spray the interior of the cylinder and the valve stem 16. In order to drain the oil from the interior of the cylinder, the port 39 may be provided, this port being controlled by means of a suitable valve 40. In order to test the action of the dash-pot the cylinder 23 may be provided at its opposite ends with suitable ports leading to the interior of the cylinder and normally closed by means of the plugs 41 and 42.

In the modification shown in Fig. 4 the pipe 30 is omitted and the pipe 32 communicates directly with the interior of the cylinder at a point substantially at the middle of the latter. In order to convey the air from one side of the piston 25 to the other the piston may be provided with a port 25′ extending therethrough.

In the modification shown in Fig. 5 the construction is similar to that shown in Fig. 4 with the exception that the port 25′ through the piston is omitted and a groove 25″ extending longitudinally of the cylinder is provided, whereby the air is adapted to pass from one side of the piston to the other.

In all of the modifications it is intended that the passage through which the air is transferred from one side of the piston to the other shall be of such size as to permit the air to pass freely when the locomotive is running at low speeds so that the resistance of the dash-pot will be substantially uniform throughout the length of the stroke of the valve whether this stroke be long or short. When the locomotive is running at high speeds the dash-pot piston will be reciprocated rapidly and owing to the restricted passage from one side of the piston to the other the air will be alternately compressed and expanded in the opposite ends of the cylinder so that at the beginning of a stroke of the valve the compressed air will aid in overcoming the inertia of the moving parts of the valve gear and likewise toward the end of the stroke of the valve the increase in the pressure of the air on the opposite side of the piston will counteract the inertia forces and aid in bringing the moving parts of the valve gear to rest. It will therefore be seen that the dash-pot eliminates a large part of the strain to which the reverse lever is ordinarily subjected and that this reduction in strain will also reduce the wear on the bearing surfaces.

By having the dash-pot piston arranged on an extension of the valve stem and providing a stuffing box in the valve chest head, which permits lateral movement of the valve stem, the dash-pot piston supports the forward end of the spider of the valve.

The construction, as indicated in the drawings, may be readily applied to existing locomotives and owing to the arrangement of the dash-pot at the forward end of the valve chest the added parts will not interfere in any way with the other mechanism of the locomotive.

When the dash-pot is in use the valve 33 will ordinarily be set so as to provide only an extremely small opening. This will prevent the air from passing back through the supply pipe 32 and therefore while the dash-pot is in open communication with the air supply at all times the restricted opening through the valve 33 will prevent the dash-pot from affecting the pressure in the air supply.

It will be readily understood by those skilled in the art that various changes may be made in the details of the invention within the scope of the claims, and therefore I do not wish to be limited to the details shown and described.

Having thus described the invention what is claimed as new is:

1. In a locomotive, in combination with the valve gear and valve actuated by the valve gear, a fixed dash-pot cylinder, a piston arranged in said cylinder and connected with said valve, and means adapted to establish communication between the opposite sides of the piston for all positions of the latter and arranged to offer comparatively slight resistance to the flow of fluid from one side of the piston to the other when the piston is moved at low speeds, and a re-

sistance at high speeds causing the fluid on the opposite sides of the piston to be alternately compressed and expanded.

2. In a locomotive, in combination with the valve chest, the valve gear and valve actuated by the valve gear, a dash-pot cylinder secured to the valve chest, a piston arranged in said cylinder and connected with said valve, and means adapted to establish communication between the opposite sides of said piston for all positions of the latter and arranged to offer comparatively slight resistance to the flow of fluid from one side of the piston to the other when the piston is moving at low speeds, and a resistance at high speeds causing the fluid on the opposite sides of the piston to be alternately compressed and expanded.

3. In a locomotive, in combination with the valve chest, the valve arranged in said chest and the valve gear adapted to actuate said valve, a dash-pot cylinder secured to the forward end of the valve chest and substantially in axial alinement therewith, a piston arranged in said cylinder, a rod connecting said piston with said valve, a by-pass connecting the opposite sides of said piston for all positions of the valve, and means for supplying an elastic fluid to the dash-pot.

4. In a locomotive, in combination with the valve chest, the valve arranged in the valve chest and the valve gear for actuating said valve, a dash-pot cylinder secured to the forward end of the valve chest and substantially in axial alinement with the valve, a piston arranged in said cylinder, a rod rigidly connecting said piston with the valve whereby the movement of the valve will be transmitted to the piston, a by-pass connecting the opposite sides of the piston for all positions of the piston, a fluid supply pipe connected with said by-pass, and a valve in said supply pipe.

5. In a locomotive, in combination with the valve chest and the valve arranged in the valve chest, a dash-pot cylinder secured to the forward end of the valve chest and substantially in alinement with the valve, a partition separating the dash-pot from the valve chest, a rod connected with the valve and extending through said partition into the dash-pot cylinder, a piston secured to said rod and arranged in said cylinder, and a stuffing box for said rod in said partition, said stuffing box permitting lateral movement of said rod.

6. In a locomotive, in combination with the valve chest, the valve stem, the valve secured to said stem and arranged in the chest, said stem projecting through the forward head of the chest, a dash-pot cylinder secured to the forward head of the chest substantially in axial alinement with said rod, a piston arranged in said cylinder and secured to said rod, a by-pass connecting the opposite sides of said piston, and a stuffing box for said rod in the forward head of said chest, said stuffing box permitting lateral movement of said rod whereby said piston and said cylinder are adapted to support said valve.

7. In a locomotive, in combination with the valve chest and a valve therein, a horizontally arranged dash-pot cylinder secured to the chest, a piston arranged in said cylinder, means connecting said piston with the valve, and a by-pass arranged at the lower side of said cylinder and connecting the opposite sides of said piston, for the purpose described.

8. In a locomotive, in combination with the valve chest, and a valve therein, a horizontally arranged dash-pot cylinder secured to the valve chest, a piston arranged in said cylinder and operatively connected with the valve, a by-pass arranged at the lower side of said cylinder and connecting the opposite sides of said piston, the end portions of said by-pass being directed across the interior of said cylinder, for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN S. KIESEL.

Witnesses:
CHAS. E. DARON,
JAMES T. HANLON.