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The image contains seven technical drawings of a mechanical device, labeled Fig. 1 through Fig. 7:

- Fig. 1:** A side view of a mechanical assembly. It features a central cylindrical component labeled 'A' with a threaded section. To its right is a lever arm labeled 'B' with a handle 'B³'. A vertical rod 'A¹' passes through the assembly, with a nut 'A²' and a washer 'A³' at the top. A bracket 'B²' is attached to the side of the cylinder.
- Fig. 2:** A cross-sectional view of the device, showing the internal components. It includes a central shaft 'A' with a nut 'A¹' and a washer 'A²'. A lever arm 'B' is shown with a handle 'B¹' and a bracket 'B²'. A vertical rod 'A³' passes through the assembly, with a nut 'A⁴' and a washer 'A⁵' at the top.
- Fig. 3:** A side view of a lever arm assembly. It shows a handle 'C¹' connected to a lever 'C²' by a pin 'C³'. The lever is positioned over a central component 'A'.
- Fig. 4:** A top-down view of the device. It shows a circular base 'C' with a central shaft 'A' and a lever arm 'B' with a handle 'B³'. A vertical rod 'A¹' passes through the assembly, with a nut 'A²' and a washer 'A³' at the top.
- Fig. 5:** A side view of a lever arm assembly. It shows a handle 'C¹' connected to a lever 'C²' by a pin 'C³'. The lever is positioned over a central component 'A'.
- Fig. 6:** A side view of a lever arm assembly. It shows a handle 'C¹' connected to a lever 'C²' by a pin 'C³'. The lever is positioned over a central component 'A'.
- Fig. 7:** A side view of a lever arm assembly. It shows a handle 'C¹' connected to a lever 'C²' by a pin 'C³'. The lever is positioned over a central component 'A'.

Witnesses:
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UNITED STATES PATENT OFFICE.

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REVERSING-GEAR.

976,727.

Specification of Letters Patent.

Patented Nov. 22, 1910.

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To all whom it may concern:

Be it known that I, ROBERT B. CRUMP, a citizen of the United States, residing in Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Reversing-Gear, of which the following is a specification.

The object of this invention is to provide means for operating the reversing gear of locomotives and other engines.

In the development of railway locomotives, the enlargement of the engines and all the parts, has made it difficult to move the great weight of the ordinary reversing gear by muscular effort.

This invention is intended to reduce the labor of the engine driver by using a steam, air or fluid pressure to operate the valves and reversing gear of a locomotive engine or other engines. It is also applicable for controlling the brake system of railway cars and the steering gear of automobiles.

In the accompanying drawing forming part of this specification: Figure 1 shows the complete apparatus as it will be connected to the locomotive. Fig. 2 is a section of a cylinder and the parts belonging thereto. Fig. 3 is a sectional elevation of the valve construction. Fig. 4 is a sectional plan of the valve and valve case at line 4-4. Fig. 5 is a sectional view of the exhaust valve. Fig. 6 is an elevation of an indicating gage.

Like figures refer to like parts.

The piston B in the cylinder A is the means through the piston rod B² and the connecting link B³, by which the valve gear of an engine, or the steering gear of an automobile is operated; the piston being acted on in the cylinder by a fluid pressure at each side of the piston. Pipe connections A¹ and A² are made with the valve mechanism in the valve case C.

D is the valve in the case C having a flat ground face fitting into the bottom of the case C and kept in contact by a screw C² and a spring C³. The lower part of the valve D can have the apertures extended as shown in dotted lines in Fig. 4.

C¹ is a handle fixed to the valve D.

D¹ and D² are passage-ways in the valve D leading to the pipes A¹ and A² and crossing a central opening D³ in which is a round valve E.

D⁴ is a groove or passage-way entirely around the valve D and opposite the air supply pipe A³.

The round valve E has a circular groove E⁴ and a flattened portion at the upper end E⁵, the extreme upper end E⁶ being forked to admit of the bell crank lever E¹ which is connected by a rod E² to a hand lever E³, the valve being held in contact with the lever E¹ by a spring resting on the screw C².

In Fig. 6 is shown the application of a simple gage G, connected by a tube B⁴ to a piston B¹ in the piston rod B²; the tube B⁴ being stationary in the cylinder, and the gage G and the tube B⁴ and the chamber in the piston rod B² having a suitable volume of oil or other fluid inclosed.

The action of this device is as follows: Fluid pressure is supplied through a pipe A³ to a valve D, a handle C¹ being placed so as to bring passages opposite openings in the case C leading to pipes A¹ and A² so that pressure can be brought against the piston B on either, or both sides. By depressing a lever E³, the valve E will take position as shown in Fig. 5, reducing the pressure on one side of the piston, consequently moving the piston. By releasing the lever E³, the valve E closes the exhaust passage and the piston is held in a corresponding position in the cylinder A. The handle C¹ is fixed to the valve D and arranged to turn one half revolution, enabling the operator to turn the exhaust to either side, or place it in an intermediate position. The gage G indicates the position of the piston B by the rise or fall of the fluid contained therein, governed by the variable capacity of the chamber in the piston pressing against the column of fluid.

Having described my invention what I claim and desire to secure by Letters Patent is:

1. A mechanism for controlling a reversing gear comprising a cylinder, a piston in the cylinder, a piston rod connecting the piston to the reversing gear, pipes connecting the ends of the cylinder to a cylindrical valve case, a rotatable valve within the case having ports connecting to the pipes, a hand lever connected to the rotatable valve, an exhaust valve central in the rotatable valve, mechanism for moving the exhaust valve in the rotatable valve by the grip of the hand

on the hand lever, substantially as shown and described.

2. A mechanism for controlling a reversing gear comprising a cylinder, pipes connecting the cylinder with a rotary or oscillating valve, a handle connected to the rotatable valve, a mechanism on the handle for controlling an exhaust valve in the center of the rotatable valve, a piston in the cylinder, a piston rod connecting the piston to the reversing gear, a chamber in the piston rod, a

piston in the chamber in the piston rod and secured in a fixed position to the cylinder head, a pipe connecting the chamber in the piston rod with an indicator outside of the cylinder combined substantially as shown and described. 15

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