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2,477,590

DISTRIBUTING VALVE

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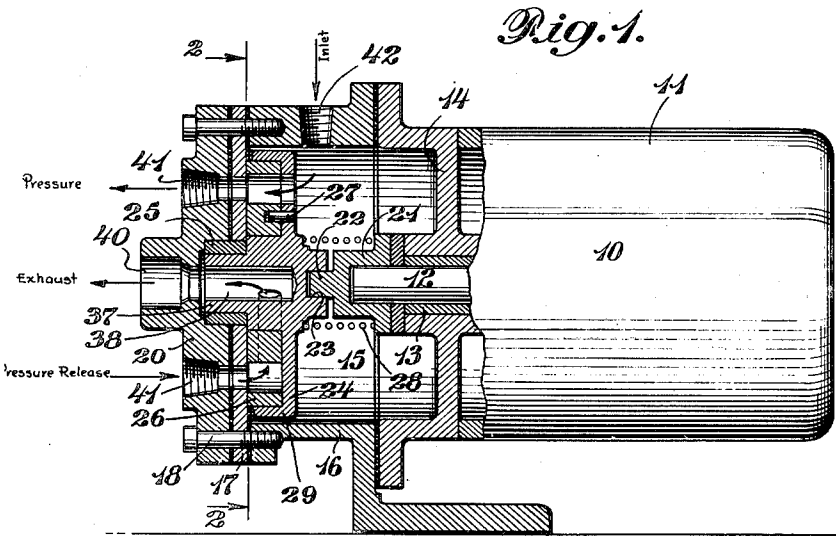


Fig. 3.

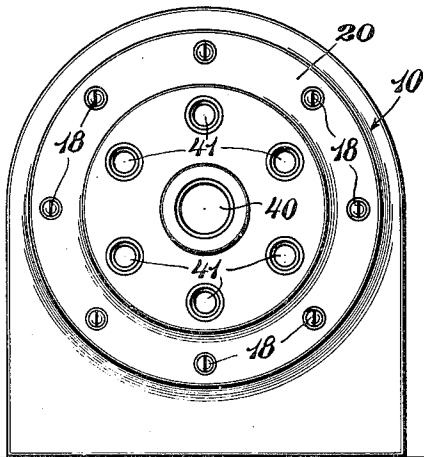
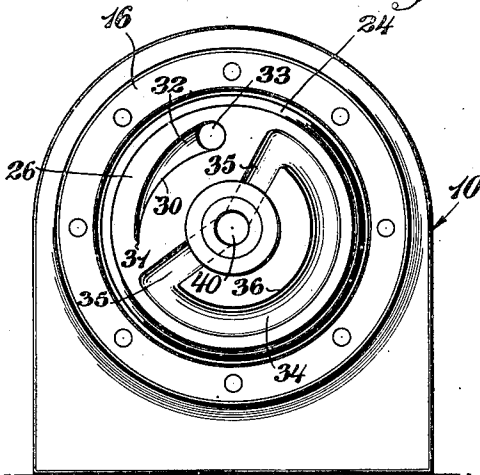


Fig. 2.



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DISTRIBUTING VALVE

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4 Claims. (Cl. 251-84)

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This invention relates to a distributing valve and has for an object to provide an improved form of distributing valve especially intended for cyclically distributing fluid pressure to a plurality of ports and thereafter connecting the same ports to an exhaust.

A further object of this invention is to provide a distributing valve especially useful in connection with an aviator's anti-blackout massage suit.

A still further object of this invention is to provide a distributing valve which will serve to distribute slugs of pressure cyclically through a plurality of ports and then cyclically connect the same ports to an exhaust opening.

With the foregoing and other objects in view, the invention consists in the construction, combination and arrangement of parts hereinafter described and illustrated in the drawing in which:

Fig. 1 is a partly sectional, partly elevational view of the distributing valve of this invention.

Fig. 2 is a detailed view of the face, of the rotor being on line 2-2 of Fig. 1, and

Fig. 3 is an assembly end view of the connection end of this device.

The distributing valve 10 of this invention includes a metal case 11 which contains an electric motor and suitable reduction gearing for rotating a shaft 12 at a desired rate, in this particular case at about 15 R. P. M. This shaft 12 extends through a bushing 13 in a chamber wall 14 into a pressure chamber 15 provided between the chamber wall 14, a supporting annulus 16, and the distributing valve seat 17. The distributing valve seat 17 is secured by studs 18 between the end of the annulus 16 and a tap connecting plate 20. The end of the shaft 12 is provided with a cap 21 having a key 22 fitting into a keyway 23 on the back of a rotor 24.

The rotor 24 is journaled in a bushing 25 extending through valve seat 17 and into the tap connecting plate 20. The rotor 24 is flanged as shown at 29 and is provided with a valve face 26 pinned therein as at 27 and extending beyond the end of the flange 25 so that only the valve face 26 will come in contact with the valve seat 17. The valve face 26 is forced firmly against the valve seat 17 by means of a coil spring 28 located between the cap 21 and the back of rotor 24.

The valve face 26 on rotor 24 is shaped as shown in Fig. 2 and is provided with a pressure groove 30 beginning as a point or fine line as at 31 gradually increasing at about a 75°-80° arc to

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a maximum size at 32 and connecting to an opening 33 extending completely through the valve face 26 and rotor 24 into the chamber 15. This rotor 24 is intended to rotate counterclockwise as shown in Fig. 2, that is, rotate in the direction of the point 31.

The pressure groove extends from the point 31 about 75° to 80° to end abruptly at the pressure opening 33. A discharge groove 34 begins abruptly at a maximum depth radially of the valve face 26 and is carried to within 20° of the pressure groove or a sufficient arc to insure an adequate seal between the pressure and discharge grooves. The radial portions 35 of the groove are connected by an arc portion 36 extending about 200° around the rotor. The radial portions 35 are carried through a central bearing 37 and terminate in a central aperture 38 extending axially through the bearing 37 to an exhaust port 40 in the tap connecting plate 20. This tap connecting plate 20 is provided with as many tap ports 41 as may be desired, here shown as six, each of these ports 40 and 41 being suitably threaded for connection to suitable conduits.

In operation, a source of pressure is connected through a pressure inlet port 42 in the annulus 16 to the pressure chamber 15. When used with the aviator's anti-blackout massage suit referred to above, the pressure differential between the inlet port 42 and the outlet port 40 is preferably about one and one half pounds per square inch while the rotor 24 is so geared to the motor so as to rotate preferably about 15 R. P. M. As the rotor rotates it causes the pressure groove 30 to rotate over each of the pressure ports 41 fifteen times per minute, commencing gradually at the point 31 and building it up to the maximum at 32 until the opening 33 has crossed the particular pressure port 41. The pressure thus built up through this port is maintained momentarily while the rotor turns about 20° and the exhaust groove 34 connects to the port 41 permitting the pressure built up through such port to exhaust itself through groove 34 and radial opening 35 to the exhaust port 40. The various ports 41 being connected to various successively located portions of a pressure suit, it will be apparent that this distributing valve 10 will have the effect of sending about fifteen pulses of pressure into each of the portions of the suit per minute, thus providing a massaging effect by the suit to the aviator.

Other modifications and changes in the number and arrangement of the parts may be made by those skilled in the art without departing from

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the nature of the invention, within the scope of what is hereinafter claimed.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

What is claimed is:

1. A distributing valve comprising a casing forming a pressure chamber having an inlet port adapted to be connected to a source of pressure, one end of said casing having a valve seat with one face within said chamber and a tap connecting face without said chamber, said valve seat having a plurality of annularly disposed pressure outlet ports therethrough to said tap connecting face, rotary valve including a valve face adapted to be rotated over said valve seat to cyclicly connect said chamber to said outlet ports, said rotary valve face having an annular pressure groove therein and an inlet aperture leading thereto from said pressure chamber, the area of said pressure groove starting at a minimum in advance of its inlet aperture in the direction of rotation and gradually increasing to a maximum at its inlet aperture and a second annular groove in said rotary valve face connecting to a radial groove leading to an exhaust port through said tap connecting plate.

2. A distributing valve comprising a casing forming a pressure chamber having an inlet port adapted to be connected to a source of pressure, one end of said casing having a valve seat with one face within said chamber and a tap connecting face without said chamber, said valve seat having a plurality of annularly disposed pressure outlet ports therethrough to said tap connecting face, a rotary valve including a valve face adapted to be rotated over said valve seat to cyclicly connect said chamber to said outlet ports, said rotary valve face having an annular pressure groove therein and an inlet aperture leading thereto from said pressure chamber, the area of said pressure groove starting at a minimum in advance of its inlet aperture in the direction of rotation and gradually increasing to a maximum at its inlet aperture and a second annular groove in said rotary valve face connecting to a radial groove leading to an exhaust port through said tap connecting plate, said exhaust port being located axially of said rotary valve.

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3. A distributing valve comprising a casing forming a pressure chamber having an inlet port adapted to be connected to a source of pressure, one end of said casing having a valve seat with one face within said chamber and a tap connecting face without said chamber, said valve seat having a plurality of annularly disposed pressure outlet ports therethrough to said tap connecting face, a rotary valve including a valve face adapted to be rotated over said valve seat to cyclicly connect said chamber to said outlet ports, said rotary valve face having an annular pressure groove therein and an inlet aperture leading thereto from said pressure chamber, the area of said pressure groove starting at a minimum in advance of its inlet aperture in the direction of rotation and gradually increasing to a maximum at its inlet aperture and a radial groove leading to an exhaust port extending axially through said tap connecting plate.

4. A distributing valve comprising a casing forming a pressure chamber having an inlet port adapted to be connected to a source of pressure, one end of said casing having a valve seat with one face within said chamber and a tap connecting face without said chamber, said valve seat having a plurality of annularly disposed pressure outlet ports therethrough to said tap connecting face, a rotary valve including a valve face adapted to be rotated over said valve seat to cyclicly connect said chamber to said outlet ports, said rotary valve face having an annular pressure groove therein and an inlet aperture leading thereto from said pressure chamber, the area of said pressure groove starting at a minimum in advance of its inlet aperture in the direction of rotation and gradually increasing to a maximum at its inlet aperture and a second annular groove in said rotary valve face leading to an exhaust port through said tap connecting plate.

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