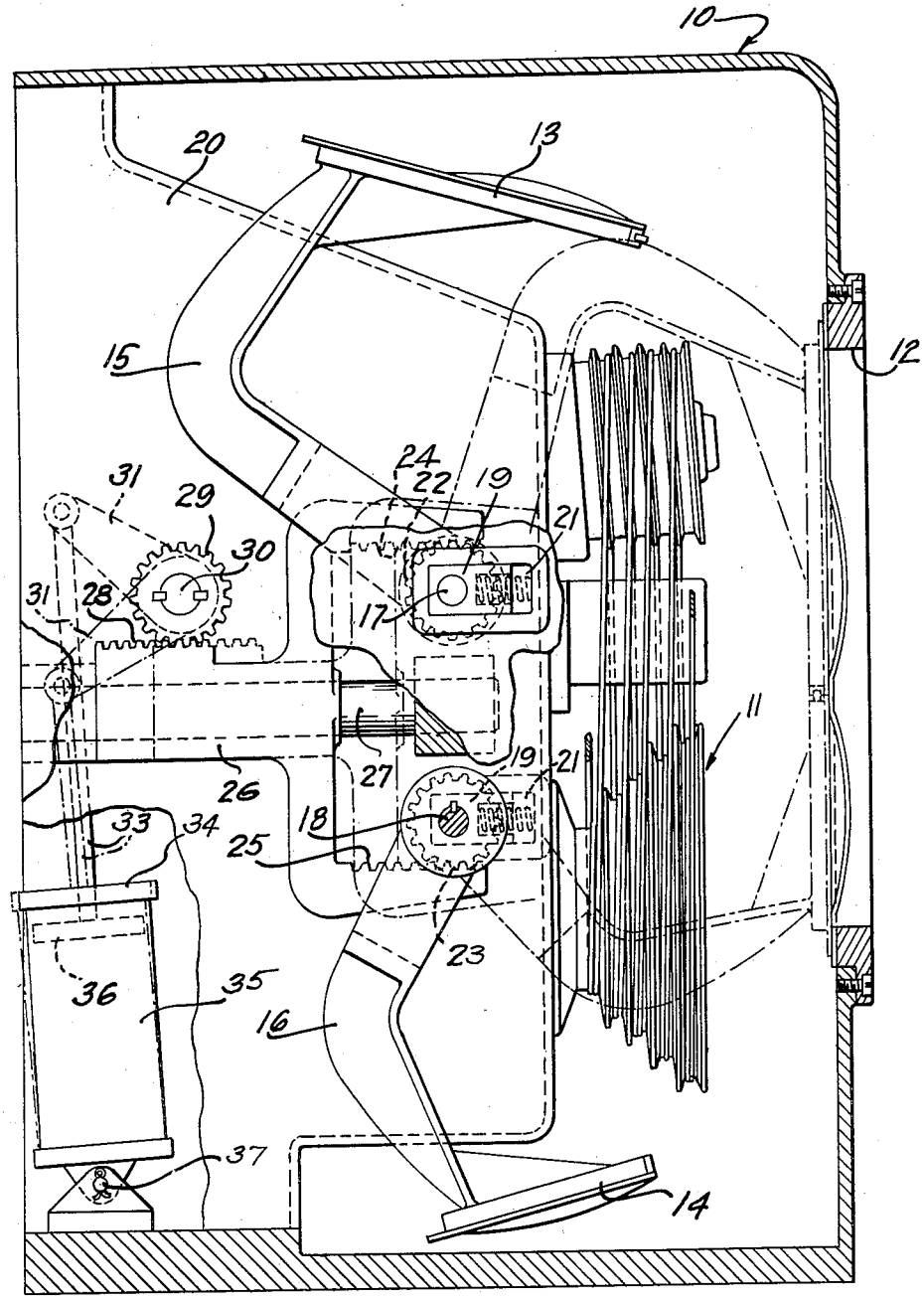
Aug. 8, 1933. E. W. LARSEN 1,921,415

DOOR OPERATING MECHANISM

Original Filed May 16, 1930



Inventor
E. W. Larsen

By E. R. Nowlan Atty.

Patented Aug. 8, 1933 1,921,415

UNITED STATES PATENT OFFICE

1,921,415

DOOR OPERATING MECHANISM

Einer W. Larsen, Chicago, Ill., assignor to Western Electric Company, Incorporated, New York, N. Y., a Corporation of New York

Original application May 16, 1930, Serial No. 453,004. Divided and this application April 10, 1931. Serial No. 529,010

8 Claims. (Cl. 268—50)

This invention relates to improvements in door operating mechanisms and more particularly to pneumatically operated doors for closing apertures of compartments.

This application is a division of my copending application, Serial No. 453,004, filed May 16, 1930.

The principal object of the invention is to provide a door or a set of doors adapted to completely close or completely open an aperture of a compartment.

In accordance with this and other objects, one embodiment of the invention contemplates the provision of a door having means for moving it through an arcuate path to position it in spaced parallel relation to an apertured wall and for subsequently moving the door laterally into engagement with the apertured wall to close the aperture.

Other objects and advantages of the invention will be better understood from the following detailed description taken in conjunction with the accompanying drawing, wherein the only figure is a vertical sectional view taken through an apertured compartment of a wire drawing machine showing the door operating mechanism in elevation.

Referring now to the drawing, there is shown a compartment 10 having a wire drawing mechanism indicated at 11, disposed therein. The compartment 10 has an aperture 12 in one wall thereof, which is arranged to be closed by swinging doors 13 and 14 having supporting arms 15 and 16 keyed to pivot shafts 17 and 18, respectively. The shafts 17 and 18 are rotatably journaled in bearings 19 which are substantially rectangular in contour and are slidably disposed in similarly shaped shaped bearing apertures of a housing 20 of the wire drawing mechanism, these bearings being normally urged to the left by springs 21. The shafts 17 and 18 have gears 22 and 23 mounted thereupon and in mesh with rack portions 24 and 25, respectively, of an actuating yoke 26. The yoke 26 is slidably mounted upon a horizontal beam 27 and has a toothed portion 28, the teeth of which mesh with a gear 29 keyed to a stub shaft 30. The stub shaft 30 is rotatably mounted in any suitable bearing (not shown) and has a lever 31 mounted upon one end thereof, the outer end of the lever having a piston rod 33 pivotally secured thereto. The piston rod 33 extends through an aperture in a cover 34 of a cylinder 35 and is fixed to a piston 36 which is movably disposed in the cylinder. A pivotal mounting 37 is provided for the cylinder so as to allow for a swinging movement thereof due to the action of the lever 31.

Any suitable means may be employed for forcing a fluid into either end of the cylinder 35 to bring about an upward or downward movement of the piston 36 therein to cause an actuation of the doors 13 and 14.

In the drawing the doors are shown in solid lines in open position and in dotted lines in closed position. In moving the doors into closed position, a fluid is passed into the upper portion of the cylinder 35 to force the piston 36 downwardly, thus moving the piston rod 33 downwardly and swinging the lever 31 in a downward arc to rotate the stub shaft 30 with the gear 29 in a counterclockwise direction. The rotation of the gear 29 in this direction causes a movement of the toothed portion 28 to the right, moving the yoke in this direction which movement causes a clockwise rotation of the gear 22 and a counterclockwise rotation of the gear 23. The rotation of these gears in the direction stated moves the doors 13 and 14 toward each other until their inner surfaces engage each other, at which time the doors will be positioned substantially parallel with the apertured wall of the compartment. Continued movement of the piston 36 and the members associated therewith to move the yoke 26 to the right will cause a lateral movement of the doors from their parallel spaced positions relative to the apertured wall to a position in engagement with the wall to close the aperture 12. This lateral movement of the doors is brought about by the gears 22 and 23 being held against rotation due to the engagement of the doors with each other, thus resulting in a lateral movement of the gears with the bearings 19 against the force of the springs 21.

In opening the doors, the pressure is released from above the piston 36 in any suitable manner and pressure is applied beneath the piston to force it upwardly and to move the yoke 26 to the left. During this movement of the yoke 26 to the left, the doors 13 and 14 will first be moved laterally by the force of the springs 21 to move the doors away from the apertured wall a predetermined distance; and after the bearings 19 have reached the limit of their movement, as shown in the drawing, the continued movement of the yoke to the left will swing the doors into the solid line position shown in the drawing.

Although this door construction has been shown as being used in a compartment for a wire drawing mechanism, it should be understood that it may be used for closing an aperture of any type of compartment and that the invention is limited only by the scope of the appended claims.

What is claimed is:

1. In an apparatus for closing an aperture, a pair of door sections, means for moving the door sections arcuately to bring them together and in alignment with the aperture, and means for maintaining the doors closed and advancing them along the line to close the aperture.

2. In a compartment having an aperture, closure means within the compartment including a member having a plurality of toothed portions, a gear meshing with one toothed portion, a bearing support, a bearing slidable therein, a rotatable shaft mounted in the bearing, a door rotatable with the shaft, a pinion keyed to the shaft and meshing with the other toothed portion of the member, and a piston for actuating the gear to rotate the shaft and slide the bearing in the support to cause the door to open or close the aperture.

3. In a compartment having an aperture, a closure means including a pair of doors, oppositely disposed pivoted arms for carrying the doors, a toothed member for controlling the arms, and means for actuating the toothed member to move the arms in opposite directions and then in the same direction by a single continuous movement to open or close the aperture.

4. In an apparatus for closing an aperture in a wall, a pair of door sections movable arcuately, and means for moving the door sections to bring them together and for moving them laterally into engagement with the apertured wall to close the aperture.

5. In an apparatus for closing an aperture in a wall, a pair of door sections, a door actuating element operatively connected to said doors, and means for imparting a predetermined continuous movement to said element for moving the door sections arcuately to bring them together and in alignment with the aperture and then move the door sections into engagement with the apertured wall to close the aperture.

6. In an apparatus for closing an aperture in a wall, a pair of door sections, means for pivotally supporting said door sections, a door actuating element operatively connected to said door sections, and means for actuating said element for moving said door sections arcuately to bring them together and for moving said pivotal supports to move said door sections adjacent the aperture in the wall.

7. In an apparatus for closing an aperture in a wall, a door, and means for moving the door through an arcuate path to position it in spaced parallel relation to the apertured wall and for subsequently moving the door laterally into engagement with the apertured wall to close the aperture.

8. In an apparatus for closing an aperture, a pair of door sections pivotally supported at spaced positions, a yoke mounted for movement and having projecting toothed portions, means for imparting movement to said yoke, and toothed means for operatively connecting said toothed portions to said door sections for moving said door sections simultaneously during the movement of said yoke for closing the aperture.

EINER W. LARSEN.