S. F. ARBUCKLE.

FLUID CONTROLLED ACTUATING MEANS.

APPLICATION FILED AUG. 2, 1918.

1,398,291. Patented Nov. 29, 1921.

2 SHEETS—SHEET 1.

FIG. 1

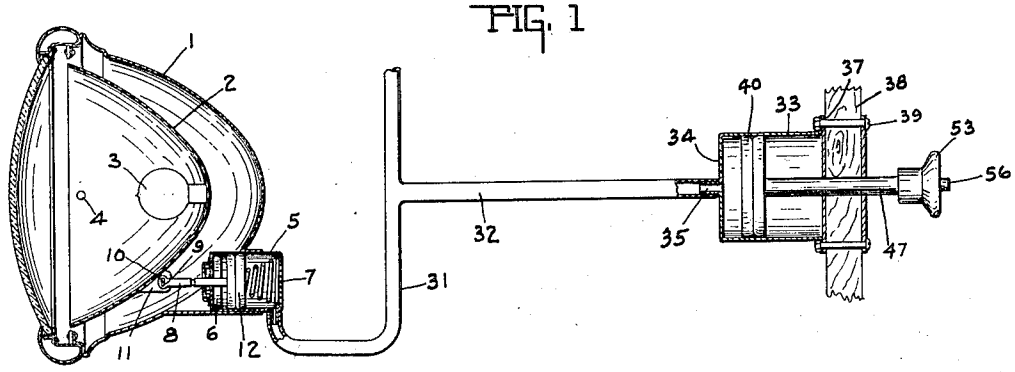


FIG. 2

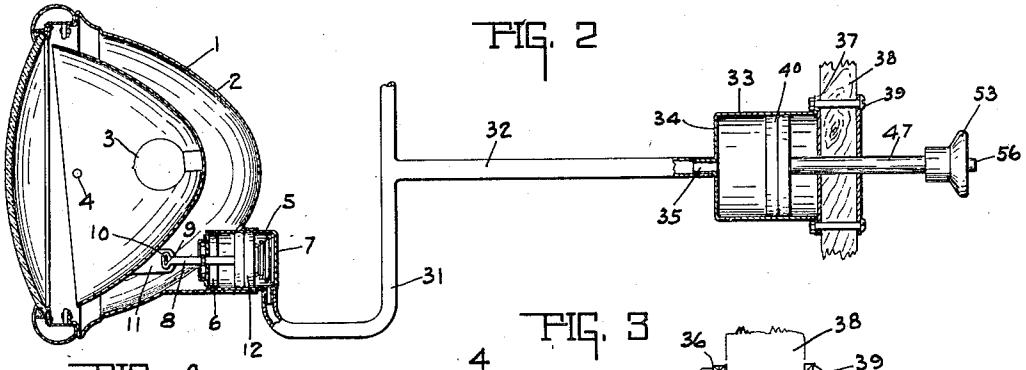


FIG. 3

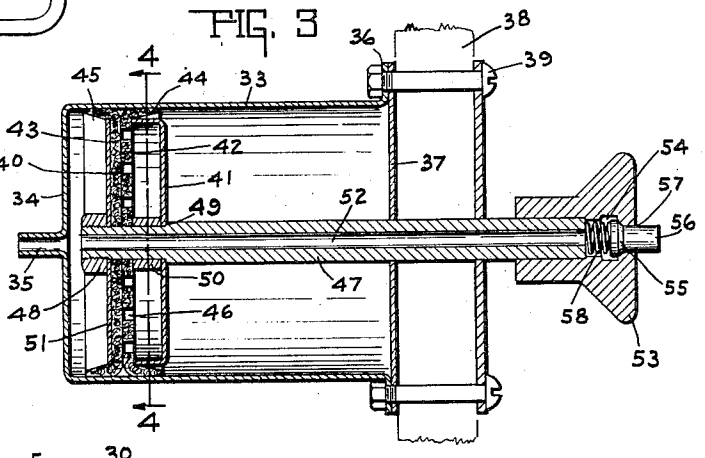


FIG. 4

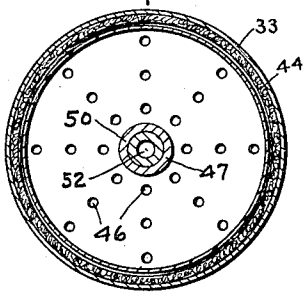


FIG. 5

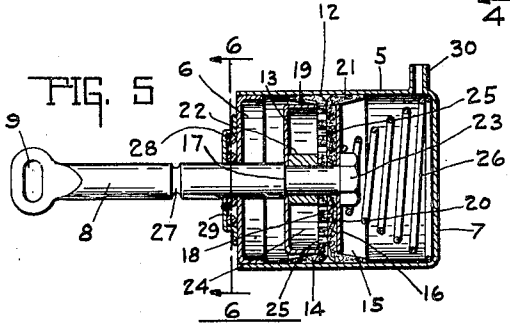
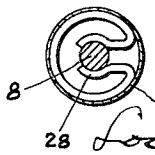


FIG. 6



INVENTOR

SAMUEL F. ARBUCKLE

BY

Lockwood & Lockwood

ATTORNEYS

S. F. ARBUCKLE.

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2 SHEETS—SHEET 2.

FIG. 7

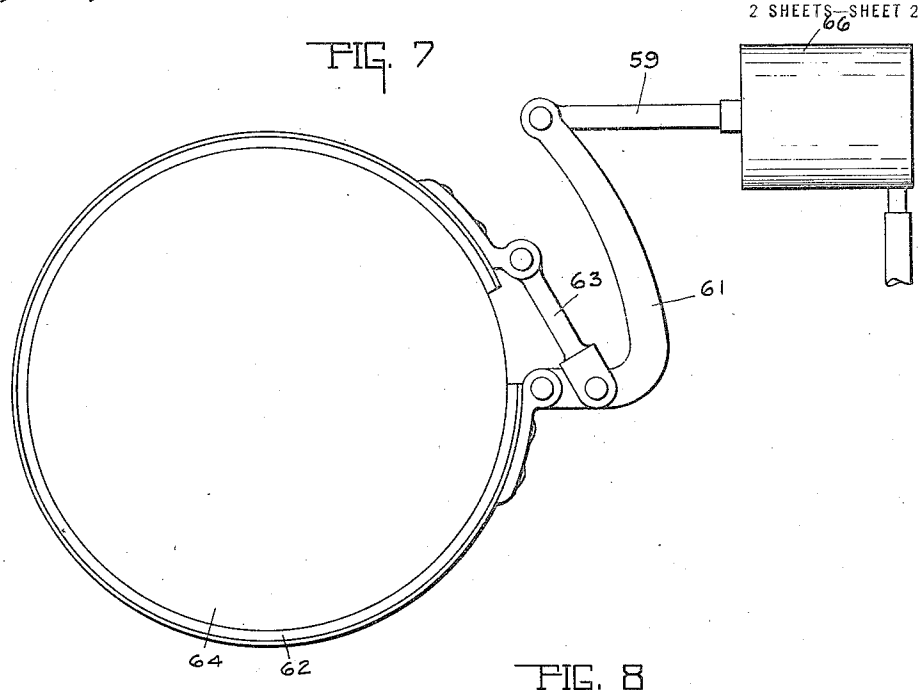


FIG. 8

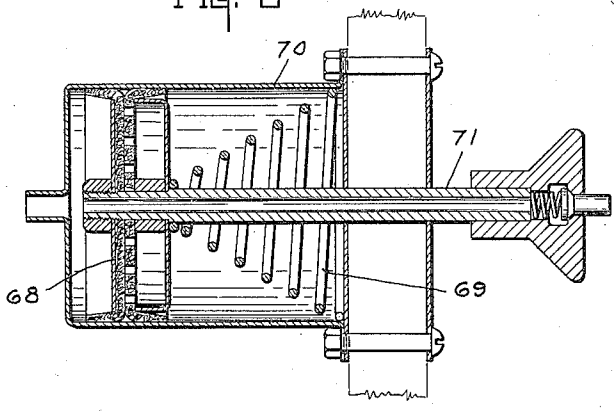
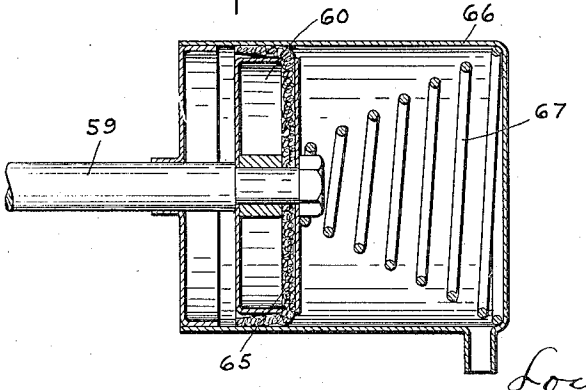


FIG. 9



INVENTOR
SAMUEL F. ARBUCKLE
BY
Lockwood and Lockwood
ATTORNEYS.

UNITED STATES PATENT OFFICE.

SAMUEL F. ARBUCKLE, OF INDIANAPOLIS, INDIANA.

FLUID-CONTROLLED ACTUATING MEANS.

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Application filed August 2, 1918. Serial No. 248,078.

To all whom it may concern:

Be it known that I, SAMUEL F. ARBUCKLE, a citizen of the United States, and a resident of Indianapolis, county of Marion and State of Indiana, have invented a certain new and useful Fluid-Controlled Actuating Means; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

This invention relates to a fluid controlled actuating means, and the prime feature of the invention is the combination of means employing a column of fluid for shifting the position of an object, and manually operated means for actuating the column of fluid, particularly.

A further feature of the invention consists in the combination of an air-tight conduit and two independent pistons operating therein with a column of air or other fluid filling the space between them, one of said pistons being relatively the actuated piston and the other the actuating piston, whereby the movement of the latter in either direction will effect a corresponding movement of the actuated piston, by the intermediate column of fluid, whether the actuating piston is pushed or pulled, but particularly when it is pulled.

A further feature of the invention is the provision of cylinders and pipe connections, and means for varying the amount of fluid within said parts.

A further feature of the invention is the provision of means for automatically retaining the parts in their initial operated position any preferred length of time when desired.

A further feature of the invention is in so constructing the fluid actuating mechanism that the column of fluid may be employed for moving the object shifting mechanism in either direction if desired.

A further feature of the invention is the provision of means for operating and controlling two or more pistons on movable objects synchronously from a single actuating means.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

In the drawings, Figure 1 is a sectional view of the controlling means, showing the same applied to use in connection with a tilting reflector of a head light or lamp, showing the reflector in normal position. Fig. 2 is a similar view showing the parts in operative position and the reflector in tilted position. Fig. 3 is an enlarged longitudinal central sectional view through the fluid actuating means. Fig. 4 is a sectional view thereof as seen on line 4—4 of Fig. 3. Fig. 5 is a central longitudinal sectional view through the reflector tilting means. Fig. 6 is a sectional view thereof as seen on line 6—6 of Fig. 5. Fig. 7 is a detailed elevation showing the fluid actuating means employed for operating the brake band of a vehicle. Fig. 8 is a central sectional view through a modified form of actuating means. Fig. 9 is a central longitudinal sectional view through the brake band operating means.

Referring to the drawings in which similar reference numerals designate corresponding parts throughout the several views, 1 indicates a lamp structure, such as is commonly used in connection with automobiles and similarly propelled vehicles, said lamp having a tilting reflector 2 carrying a light bulb 3, said parts being of the ordinary or any preferred construction, the reflector being pivoted to the lamp casing as shown at 4.

In order to tilt the reflector so as to shorten the rays of light or to project them in such manner as to prevent the light glaring to such a degree as to blind the eyes of the driver of an approaching vehicle, cylinders 5 are suitably mounted upon the housing of the lamp 1, heads 6 and 7 closing the ends of the cylinders. Projecting through the forward head 6 is a piston rod 8, the forward end thereof having a transverse slot 9 which engages a pin 10 carried by ears 11, said ears being fixed to the reflector 2. The inner end of the rod 8 is attached to a piston 12, which in this instance comprises a cup shaped shell 13, fibrous packing members 14 and 15, and a plate 16, the piston rod 8 having a shoulder 17 thereon against which the closed end of the shell 13 abuts.

The packing member 14 comprises a body portion 18 which extends over the open end of the shell 13, and a peripheral flange 19 which surrounds the side walls of the shell and rests against the interior of the cylinder 5. The packing member 15 likewise consists of a body portion 20, and a flange

21, which extends in the opposite direction from the flange 19 and bears against the inner wall of the cylinder 5, said latter flange extending over the edge of the plate 16. The packing member 14 is held in spaced relation from the end wall of the shell 13, by means of a spacing collar 22, and the plate 16 is clamped against the packing member 15 by means of a nut 23 which threads on to the free end of the piston rod 8.

By placing the packing member 14 over the open end of the shell 13 a cavity 24 is provided in the shell for the reception of lubricant and to more readily permit the lubricant to pass to the inner wall of the cylinder 5, the body portion 18 of the packing member 14 is provided with a plurality of perforations 25 whereby the lubricant will readily pass through said openings and percolate between the packing members 14 and 15 and thoroughly saturate said members with the lubricant. By providing the shoulder 17 against which the end of the shell 13 rests and by forcing the end of the spacing collar 22 against the inner face of the shell, leakage of lubricant at this point is prevented.

Between the plate 16 and the end 7 of the cylinder 5 is positioned a coil spring 26 which normally retains the piston adjacent the end 6 of the cylinder and thus holding the reflector against rotating motion. The piston rod 8 is provided with a peripheral groove 27, so positioned that when the valve 12 is moved to the rear end of the cylinder, the ends of the locking spring 28 will snap into the groove 27 and hold the piston rod and piston attached thereto against forward movement by the pressure of the spring 26, said spring 28 being mounted in a housing 29 attached to the end 6.

Each cylinder 5 is provided with a tubular extension 30 to which is attached a pipe 31, said pipe when used in connection with the lamps of an automobile, connecting the cylinders of the two lamps. The pipe 31 has an extension 32 which extends from the pipe 31 to an actuating cylinder 33, the end 34 of said cylinder having a neck 35, with which the end of the extension 32 engages. The pipe 31 and extension 32 are adapted to contain a column of fluid, which, when actuated, will operate the piston 12 for moving the same back and forth in the cylinder 5.

The cylinder 33 is substantially cup shaped, and provided at its open end with a flange 36, to which is attached a cover plate 37, the cylinder 33 being preferably attached to the dash 38 or other part of the vehicle, by means of bolts 39, which bolts also serve to hold the cover plate in engagement with the cylinder.

Mounted within the cylinder 33 is a fluid actuating piston 40 which is constructed in the same manner as the piston 12 in the cylinder 5, having a cup shaped shell 41, packing members 42 and 43, said packing members having flanges 44 and 45 respectively, which project in opposite directions and engage the inner wall of the cylinder. The body of the packing member 42 is likewise provided with openings 46 through which the lubricant will more readily pass to the outer edge of the piston.

The piston 40 is mounted upon a piston rod 47, the piston being held on to the rod by means of a nut 48 and a shoulder 49, a spacing collar 50 being positioned between the shell 41 and the packing member 42 to hold said parts in spaced relation while the nut 48 bears against a plate 51, said plate engaging the face of the packing member 43. The collar 50 and shoulder 49 likewise prevent lubricant from passing through the opening of the shell at this point.

The piston rod 47 is provided with an axial bore 52 which extends the full length of the piston rod, and the rod is of sufficient length to project a distance through the dash, even when the piston 40 is moved in to close proximity to the end 34 of the cylinder 33. The projecting end of the piston rod 47 is provided with a pull knob 53 so that said piston may be readily moved lengthwise of the cylinder 33 in either direction.

The knob 53 is provided with a central cavity 54 in which is mounted a valve 55, said valve having a stem 56 which projects through a port 57 in the outer end of the knob 53, the valve 55 closing communication through the port 57 when seated against the end wall of the cavity 54. The valve 55 is normally held seated by means of a spring 58, one end of which presses against the valve and the opposite end against that end of the piston rod 47 entering the pull knob 53.

The spring 58 is seated in the cavity 54 and is retained in proper alinement with the valve by the walls of the cavity. For convenience of illustration, one form of the present actuating means is shown attached to the reflector of an automobile head light, and another form attached to the brake band of a vehicle, although it will be clearly understood that the device can be used for changing the position of any movable or pivoted object.

In operation, when it is desired to tilt the reflector to the position shown in Fig. 2 from the position shown in Fig. 1, so as to cause the reflector to cast the rays of the light downwardly, the knob is grasped and the piston rod 47 pulled outwardly to the position shown in Fig. 2. This operation moves the column of fluid within the pipe 31 and extension 32, which will draw the piston 12 rearwardly in the cylinder 5, the

piston rod 8 giving a rearward pull to the portion of the reflector below its pivot point, thereby swinging the reflector on its pivot. This operation moves the piston rod 8 inwardly a sufficient distance to permit the locking spring 28 to snap into the groove 27 thereby temporarily holding the reflector in its tilted position.

At such time as it is desired to restore the reflector to its normal position, or to the position shown in Fig. 1 of the drawing, an inward push is given to the knob 53 which forces the piston 40 inwardly to its initial position and in view of the pressure of the spring 26 in addition to the pressure created by moving the piston 40 inwardly, the locking spring 28 will be released from the groove 27, whereupon the tension of the spring 26 will restore the piston 12 to its initial position, and will hold the piston 12 securely in this position, and hold the reflector against any pivoting movement, thus obviating any possibility of creating a flicker in the rays of light cast by the reflector.

It will be readily understood, of course, that by connecting the pipe 31 to two or more of the cylinders 5, all of the pistons will be simultaneously operated.

Should the volume of fluid be reduced within the pipe 31, by leakage or otherwise, to such an extent as to prevent the proper operation of the mechanism, when the piston 40 is operated, an additional amount of fluid is entered into the pipe by pressing inwardly on the stem 56, thereby releasing the valve 55 from its seat, and permitting the fluid to pass into the pipe 31 through the bore 52.

Should an excess amount of fluid pass into the pipe 31, so as to prevent proper operation of the piston 12, the piston 40 is moved outwardly as far as it will go, and the valve 55 then opened, and the piston 40 moved inwardly a distance, which will permit the excess fluid pressure to escape from the pipe 31 through the bore 52. The valve 55 then being closed, an additional outward pull on the piston 40 will successfully operate the piston 12 to tilt the reflector.

In that form of device shown in Figs. 7, 8 and 9, the piston rod 59 of the operating piston 60 is attached to one end of a lever 61, said lever being substantially L-shaped and having its opposite end pivotally attached to one end of a brake band 62. The opposite end of the brake band is also attached to the lever 61, between its pivoted ends, by means of a link 63, so that when a pull is given to the upper end of the lever 61 through the medium of the piston 60, the brake band will be tightened around the brake drum 64. The piston 60 is different from the piston 12 in that but one packing member 65 is used, and in this instance the means for locking the piston in operated position is dispensed with. The piston 60 is likewise mounted in a cylinder 66, and the piston is returned to its initial position so as to release the brake band by means of a pressure spring 67 introduced between the piston 60 and the closed end of the cylinder 66.

The actuating piston 68 is similar to the actuating piston employed for tilting the reflector, except that a coil spring 69 is introduced between the piston 68 and the dash attaching end of the cylinder 70, which spring returns the piston 68 to its initial position as soon as the pull on the shaft 71 is released.

The pistons 60 and 68 are so arranged that they will successfully operate the brake band without causing the pistons to move the full length of the cylinders in which they are inclosed, so that the parts of the brake band construction will be self-adjusting, that is, as the brake band and parts attached thereto become worn, such wear is compensated for by the movement of the piston, and consequently the brake will operate as successfully as when it is first placed upon the brake drum. This is also characteristic of the reflector tilting mechanism, and by maintaining a proper amount of fluid within the cylinder and pipes connecting the same, which is readily accomplished by the operation of the valve in the end of the hollow piston rod, the pistons will always be in operative condition.

The omission of the locking means for holding the piston 60 in its retracted position, and the provision of the springs 67 and 69, will cause the pistons to immediately release the brake bands when the outward pull is released from the valve rod 71.

By providing this form of device, it will be readily seen that the fluid column can be manually actuated for operating any suitable form of movable structure, and owing to the simplicity of the device can be very cheaply produced and readily applied to use. It will likewise be seen that by providing a valve for coöperation with the bore in the piston controlling rod of the actuating valve, the amount of fluid within the parts to which the piston is attached can be properly regulated and controlled, thereby enabling the operator to get a varied degree of actuation while the actuating piston is moved substantially to the same extent lengthwise.

It will likewise be seen that by providing the self lubricating pistons, that is pistons having chambers for receiving a quantity of lubricant, and having closures of fibrous substance, preferably of leather, which slowly absorbs the lubricant and conveys the same to the walls of the cylinders in which the pistons are mounted, the parts of the device will last indefinitely and the

frictional action between the parts will be reduced to a minimum, thereby causing a ready and easy operation of the parts.

The invention claimed is:

1. A fluid actuating means including expansible and contractible mechanism connected with the means to be actuated, means for creating a partial vacuum to operate said mechanism, and manually operated means in connection with said vacuum creating means to regulate the degree of vacuum created.

2. A fluid actuating means including expansible and contractible mechanism connected with the object to be actuated, manually operated expansible and contractible means, a column of incased fluid between said manually operated means and said object actuating mechanism, and means connected with said manually operated means for increasing or diminishing the volume of fluid.

3. A fluid actuating means including an incased column of fluid, means at one end of said column to be operated thereby, a manually operated piston at the other end of said cylinder for actuating the column of fluid, and means in connection with said piston for varying the volume of fluid to be actuated.

4. In a fluid actuating means, a manually operated means for producing a partial vacuum, comprising a cylinder, a piston within said cylinder, a piston rod connected to the piston, and means connected with the piston rod for regulating the degree of vacuum created by the piston.

5. A fluid actuating means including a piston for moving an object, a manually operated piston, a column of incased fluid between said pistons, and means in coöperation with the last named piston for regulating the volume of fluid.

6. A fluid actuating means including an incased column of fluid, a piston at one end thereof for actuating an object, a hollow manually operated piston rod at the other end thereof, and a valve in the passageway through said hollow piston rod for controlling the passage of fluid through the hollow piston rod.

7. In a fluid actuating means, an actuating piston, comprising an imperforate hollow shell, a pair of packing members disposed over the open end of the shell, the free edges of said packing members being disposed in opposite directions, said shell being adapted to hold liquid lubricant, a cylinder surrounding said piston and engaging the overturned edges of the packing members, and a piston rod for operating said piston.

8. A fluid actuating means including means for incasing a column of fluid, means at one end of said column to be actuated by the fluid for moving a movable object, a piston at the other end of said column of fluid for actuating the fluid, a hollow piston rod, a hollow head on the outer end of said piston rod so that there is a passageway to the open air from the column of fluid, a normally operated valve in said head for opening said passageway, and a spring in said head for holding said valve closed.

9. A fluid actuating means for moving a movable object, including an incased column of fluid, manually operated means at one end of said column for actuating the same, means controlled by said column of fluid for moving a movable object, and a spring for releasably holding the movable object in position when moved.

10. A fluid actuating means for moving a movable object, including an incased column of fluid, manually operated means at one end of said column for actuating the same, means controlled by said column of fluid for moving a movable object, a spring for releasably holding the movable object in position when moved, and another spring for returning said movable object when released.

11. A fluid actuating means including an incased column of fluid, means controlled by said column of fluid for moving a movable object, means for releasably retaining said movable object when actuated, a spring for returning said movable object when released, manually operated means for actuating the column of fluid, and means in connection with said manually operated means for regulating the volume of fluid.

In witness whereof, I have hereunto affixed my signature.

SAMUEL F. ARBUCKLE.