Nov. 13, 1923. 1,473,634

W. P. LOUDON

VALVE OPERATING MECHANISM

Filed April 5, 1918 2 Sheets-Sheet 1

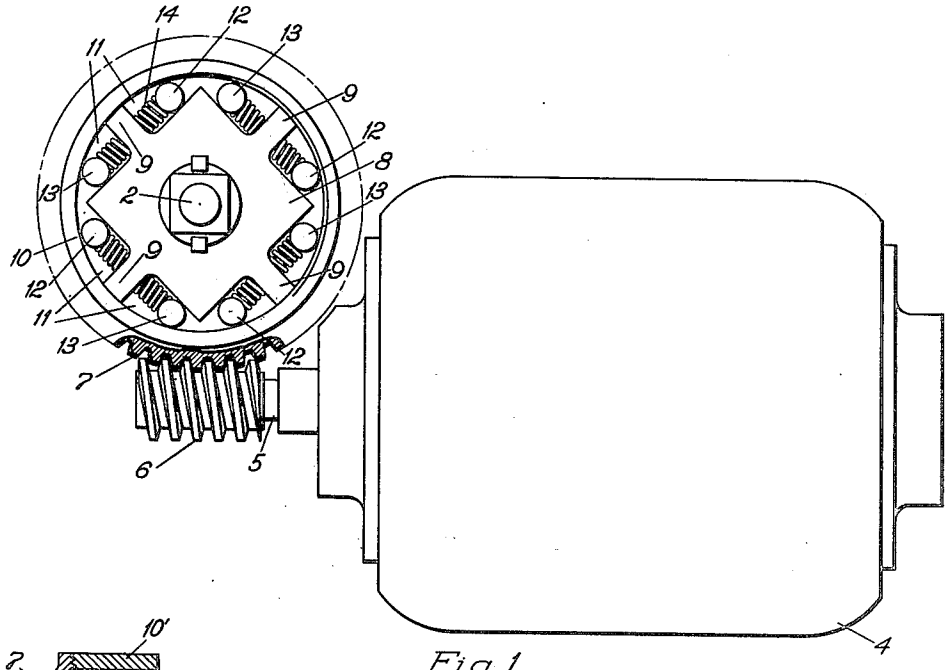


Fig. 1

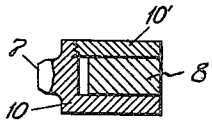


Fig. 3

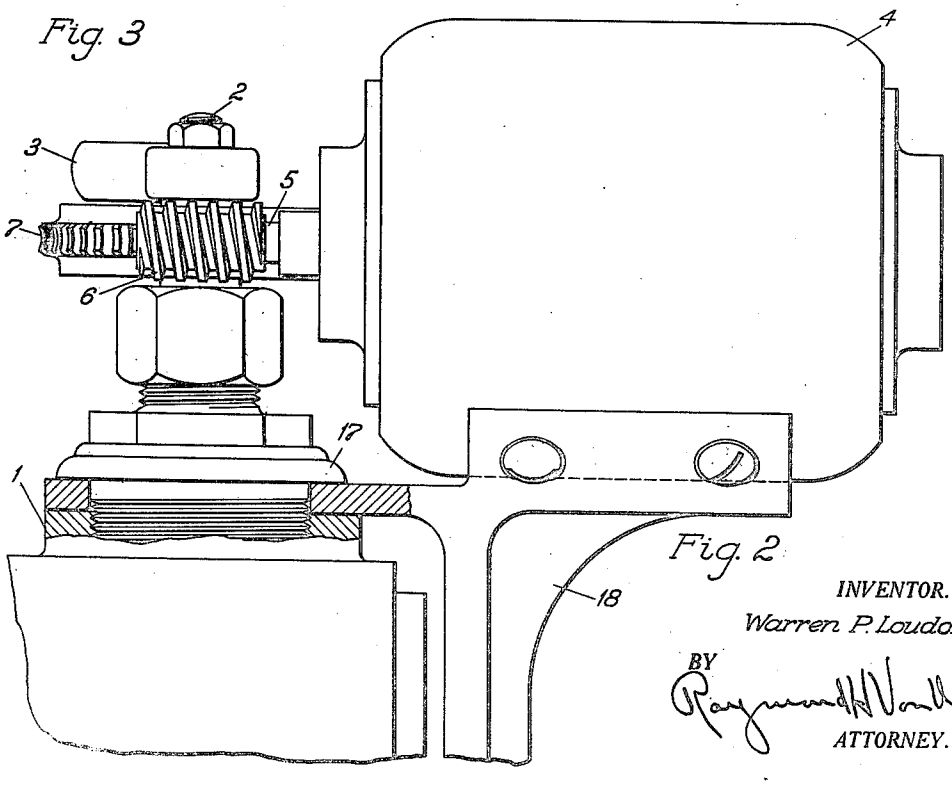


Fig. 2

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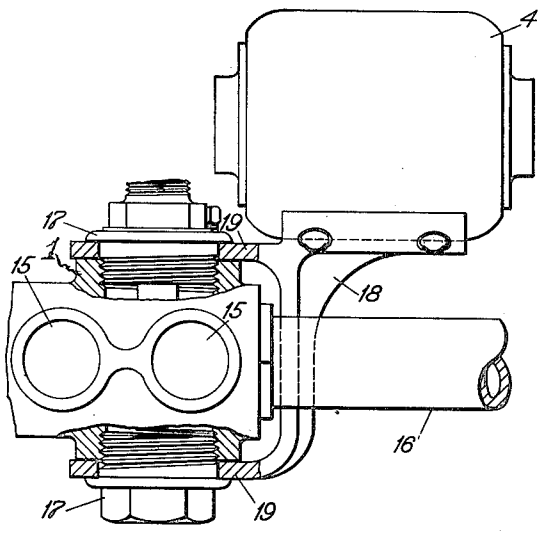


Fig. 4

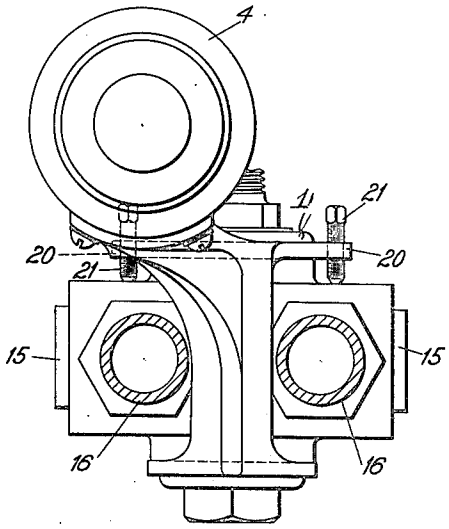


Fig. 5

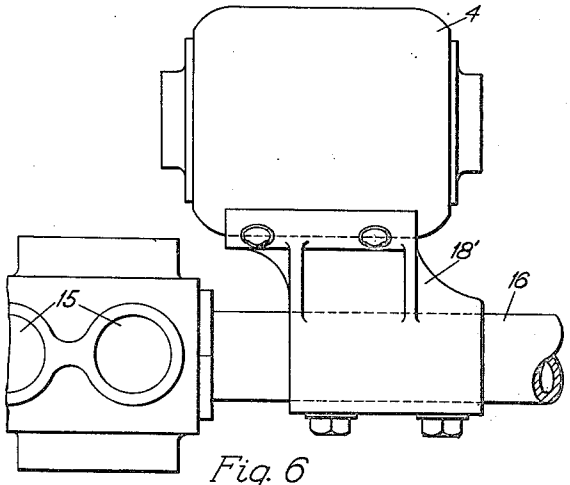


Fig. 6

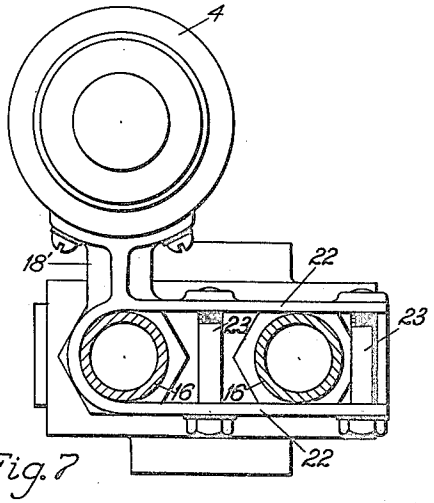


Fig. 7

WITNESS:

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UNITED STATES PATENT OFFICE.

WARREN P. LOUDON, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO VAPOR CAR HEATING COMPANY, INC., OF CHICAGO, ILLINOIS, A CORPORATION OF NEW YORK.

VALVE-OPERATING MECHANISM.

Application filed April 5, 1918. Serial No. 226,867.

To all whom it may concern:

Be it known that I, WARREN P. LOUDON, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented new and useful Improvements in Valve-Operating Mechanism, of which the following is a specification.

The present invention relates to valve operating mechanism.

In certain systems involving valves, as for instance, steam heating systems for railway cars, it is desirable to provide motor means for operating said valve. Inasmuch as said valves are frequently located in places where there is but little room to provide motor means, it has been a serious problem to economically dispose of the various parts whereby a motor of the requisite torque may be used.

An object of the present invention is to provide valve operating mechanism which may be operated either in a direction to open or close the valve either manually or by means of a motor.

A further object is to provide a novel clutch mechanism which may be combined with the valve stem whereby said stem may be turned in either direction, either manually or by means of a motor and which will occupy a minimum of space.

A further object is to provide a novel arrangement of valve, motor and means for mounting the motor whereby a minimum of space will be required.

Further objects will be apparent as the description proceeds.

Referring to the drawings:—

Fig. 1 is a plan view of one embodiment of the present invention with certain parts removed and certain other parts broken away.

Fig. 2 is a side elevation of the embodiment illustrated in Fig. 1.

Fig. 3 is a fragmentary view representing a detail.

Figs. 4 and 5 represent in side and end elevation respectively one means for mounting the motor.

Figs. 6 and 7 represent in side and end elevation respectively a modified form of mounting the motor.

Referring first to Figures 1 and 2, the body of a valve is represented by the numeral 1. Said valve is provided with a valve stem 2 which will have mounted thereon a handle 3 whereby the valve stem 2 may be manually operated. The numeral 4 represents a motor having a shaft 5 upon which is mounted a worm 6. The worm 6 is mounted to engage with a gear 7 which constitutes part of a clutch mechanism for turning the valve stem 2.

Proceeding now to a description of the clutch mechanism whereby the motor 4 may operate the valve stem 2, said valve stem 2 has mounted thereon a member 8 which may be keyed or otherwise securely fastened to said valve stem 2. The member 8 may be of polygonal outline. In Figure 1 the member 8 is represented as being rectangular. Each face of the member 8 is provided with an outstanding abutment 9. The member 8 with its outstanding abutments 9, is located within a cup-shaped member 10. Said cup-shaped member 10 has a bearing on stem 2 and is adapted to rotate thereon. Upon its outside said member 10 carries the gear 7. As illustrated in Fig. 3, the gear 7 is integral with the cup-shaped member 10. A cover 10′ will be provided for closing the cup-shaped member 10. Said cover 10′ should fit the stem 2, whereby to assist the cup-shaped member 10 to resist stresses due to the worm 6. As will be noted from an inspection of Fig. 1, each face of the member 8 forms a chord of a circle with the inside of the cup-shaped member 10, whereby to provide a plurality of segmental spaces 11, 11. Located adjacent to one end of each segmental space is a roller 12, while adjacent the other end of each segmental space is a roller 13. A spring 14 is mounted between each roller and its corresponding abutment 9. When the parts are at rest, the springs 14 should preferably not be in a state of compression, though they should be designed to hold the rollers 12 and 13 at the ends of the segmental spaces 11, 11, whereby to be instantly operative upon rotation of the cup-shaped member 10. The member 8 may be of other outline than the polygonal outline illustrated, so long as one or more spaces 11 are provided having converging walls at opposite ends. The abutments 9 should preferably form a bearing for the cup-shaped member 10, though such construction is not necessary.

It will be clear from an inspection of Figure 1 that if the windings of the motor 4 are so energized as to cause rotation of the worm 6 to produce a counter-clockwise rotation of the cup-shaped member 10, said cup-shaped member will roll the balls 13 into wedging engagement with the corresponding faces of the member 8, at the same time, rolling the balls 12 away from wedging engagement with said member 8 whereby there will result a rotation of said member 8 and the valve stem 2 in a counter-clockwise direction. Conversely, if the windings of the motor 4 are so energized as to produce a clockwise rotation of the member 10, each roller 12 will be rolled into wedging engagement between said cup-shaped member 10 and the corresponding face of the member 8, whereby there will result a clockwise rotation of the member 8 and valve stem 2. If it should be desired at any time to operate the valve stem 2 manually in either direction, it may be done without interference with the motor means. If the operator moves the valve stem 2 by means of the handle 3 in a counter-clockwise direction, each of the faces of the member 8 will be moved away from wedging engagement with the balls 13. Movement of the member 8 in a counter-clockwise direction will result in the movement of the abutments in that direction, whereby the rollers 12 will ride free of wedging engagement and no interference will be had with the cup-shaped member 10. Similarly the valve stem 2 may be manually moved in the clock-wise direction without interfering with the cup-shaped member 10. It will be obvious that regardless of the position in which the valve stem may be left after manual operation, the motor means will be instantly operative to turn said stem.

One means for mounting the motor is illustrated in Figs. 4 and 5 and also in Fig. 2. In certain valves which are in common use in steam heating systems for railway cars, a number of ports are provided whereby steam pipes extending in any of a number of directions may be accommodated. Certain of said ports are indicated by the numeral 15. Steam pipes 16, 16, are illustrated as being connected to two of said ports. It will be understood, of course, that the remaining ports will be blocked. The pipes 16, 16 which are connected to the valve 1 are illustrated as being adjacent to one another and extending in the same general direction, inasmuch as this is a layout frequently provided. It is common to provide nuts 17, 17, on the upper and lower sides of the valve 1, the lower nut 17 serving to permit assembling and inspection of the moving parts of the valve and the upper nut 17 serving to provide a packing gland for the valve stem. These nuts 17 are utilized in the embodiment of the invention chosen for illustration to provide holding means for the electric motor.

The numeral 18 represents the mounting means for the motor. The mounting means 18 is provided with a pair of members 19, 19, adapted to embrace the valve 1 and to be secured thereto by the nuts 17, 17. The electric motor may be suitably secured to said mounting means 18. As indicated in Fig. 5 the mounting means 18 is located between the pipes 16, 16, thereby conserving space and providing means whereby the greatest dimension of the electric motor, which is ordinarily in the direction of its shaft, may be in the same general direction as the pipes 16, 16. Inasmuch as the motor 4 may thus be mounted adjacent to the pipes 16, 16, and have its greatest dimension lying in the same general direction of said pipes, a minimum of space will be required. As illustrated in Fig. 5, the mounting means 18 may be provided with a pair of outstanding lugs 20, 20, each carrying a set screw 21. These set screws 21 will aid the nuts 17, 17 in holding the mounting means 18 against movement. If desired, the set screws 21, 21, may be provided with cup-shaped points which will dig into the metal of the valve, whereby to prevent any tendency of the mounting means 18 to turn around the valve stem as an axis.

A modified means for mounting the motor is illustrated in Figs. 6 and 7. In Figs. 6 and 7 the mounting means 18′ upon which the motor 4 is mounted, is provided with a pair of laterally extending clamping jaws 22, 22, which are adapted to embrace the pipes 16, 16. Bolts 23 will be provided for holding the jaws 22, 22, in secure engagement with the pipes 16, 16. The mounting means illustrated in Figs. 6 and 7 also has the advantage that the motor may be mounted adjacent to the pipes with its greatest dimension extending in the same general direction as said pipes.

It will be obvious that in the mounting means illustrated in Figs. 4 and 5, and also that illustrated in Figs. 6 and 7, the embracing members may be spaced apart a distance greater than the width of the parts they are meant to embrace, whereby, by the use of shims the vertical position of the motor 4 may be adjusted.

One embodiment of the present invention has been described in detail. Many modifications will occur to those skilled in the art. It is intended in this patent to cover all such modifications that come within the scope of the present invention as defined by the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is—

1. The combination with a member to be turned, and means for turning the same, of

clutch mechanism for effecting an operative connection between said member and means comprising two clutch members providing between them a space having converging walls at opposite ends, rollers in said space, one adjacent to each end thereof, and a spring capable of exerting pressure between each roller and one of said clutch members, whereby said rollers will assume a cramping position between said converging walls only when said means is operated and will be moved from their cramping position by the movement in either direction of one of said clutch members with relation to the other.

2. The combination with a valve stem and motor means for turning said stem, of clutch mechanism for effecting an operative connection between said valve stem and said motor means comprising two clutch members providing between them a space having converging walls at opposite ends, rollers in said space and a spring member capable of exerting pressure between each roller and one of said clutch members, whereby said rollers will assume a cramping position between said converging walls only when said motor means is operated and will be moved from their cramping position by the movement in either direction of said valve stem with relation to one of said clutch members.

3. The combination with a valve stem, manually operable means for turning said stem and motor means for turning said stem, of clutch mechanism associated with said valve stem and motor means whereby either said manual or motor means may be instantly available to turn said stem in either direction, comprising members forming between them a space providing surfaces converging at opposite ends, rollers in said space adjacent to said ends, and a spring operative between one of said members and each of said rollers, whereby said rollers will assume a cramping position between said converging surfaces when said motor means is operated in either direction and will be moved to their neutral position by the movement of said valve stem effected by said manually operable means.

4. The combination with a valve stem, manually operable means for turning said stem and motor means for turning said stem, of clutch means automatically effective to connect said stem with said motor means when said motor means is operated in either direction, said connection being made ineffective automatically by the turning of said stem in either direction by said manually operable means.

5. The combination with a member having a polygonal outline and provided on each of its faces with abutment means, of an encircling member having a cylindrical inner wall with which the faces of said polygonal member form chords of a circle, rollers in each of the segments formed by said chords, and springs between each of said rollers and one of said abutment means, whereby certain of said rollers assume a cramping position between the faces of said polygonal member and the inner wall of said encircling member when said encircling member is moved in either direction; the angularity of the faces of said polygonal member with relation to the inner wall of said encircling member being adapted to permit said rollers to be moved to their neutral positions by the movement in either direction of said polygonal member with relation to said encircling member.

6. In combination, a valve having a stem, a motor for turning said stem, said valve being provided with a pair of nuts in alignment with said stem, and holding means for said motor including a pair of members embracing said valve, said members being held in place by said nuts.

7. In combination, a valve having a stem, a motor for turning said stem, said valve being provided with a pair of nuts, and holding means for said motor including a pair of members embracing said valve, said members being held in place by said nuts, one of said members being provided with extensions carrying adjusting screws adapted to engage said valve.

In witness whereof, I have hereunto subscribed my name.

WARREN P. LOUDON.