F. F. SCOVILLE.

VALVE OPERATING LEVER.

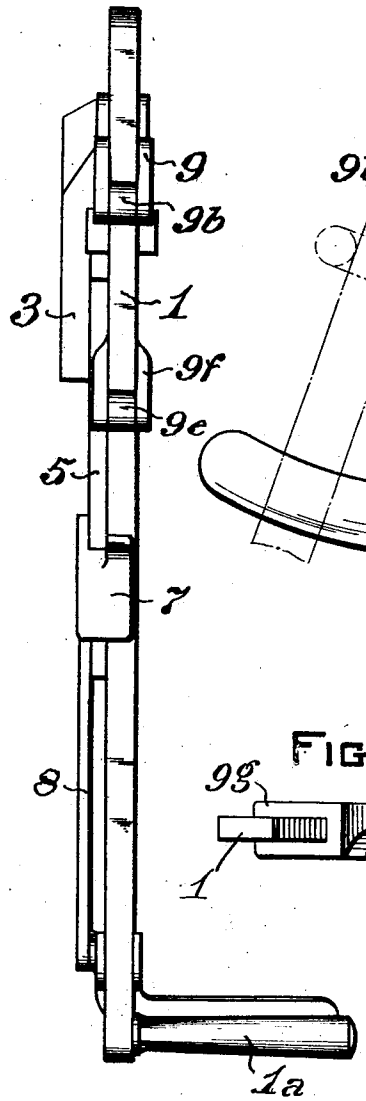
APPLICATION FILED NOV. 1, 1919.

1,366,502.

Patented Jan. 25, 1921.

2 SHEETS—SHEET 1.

-FIG. 2 -



-FIG. 1 -

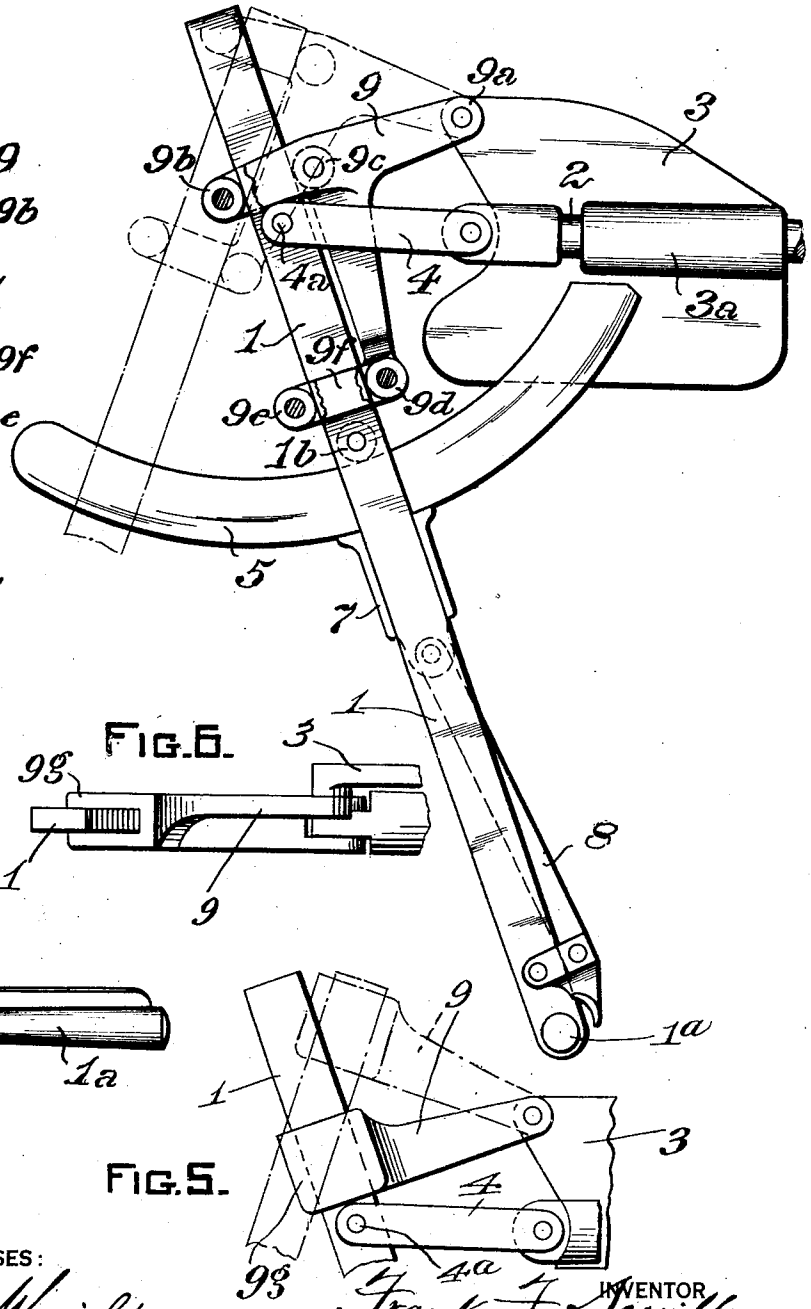


FIG. 6.

FIG. 5.

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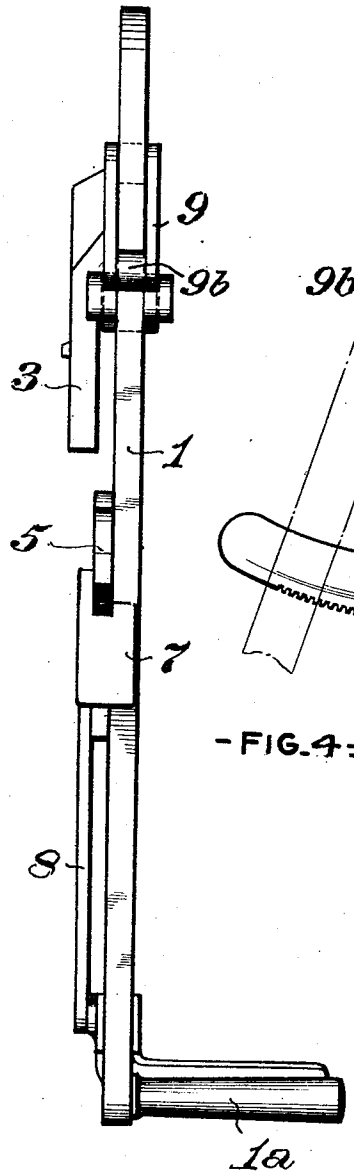
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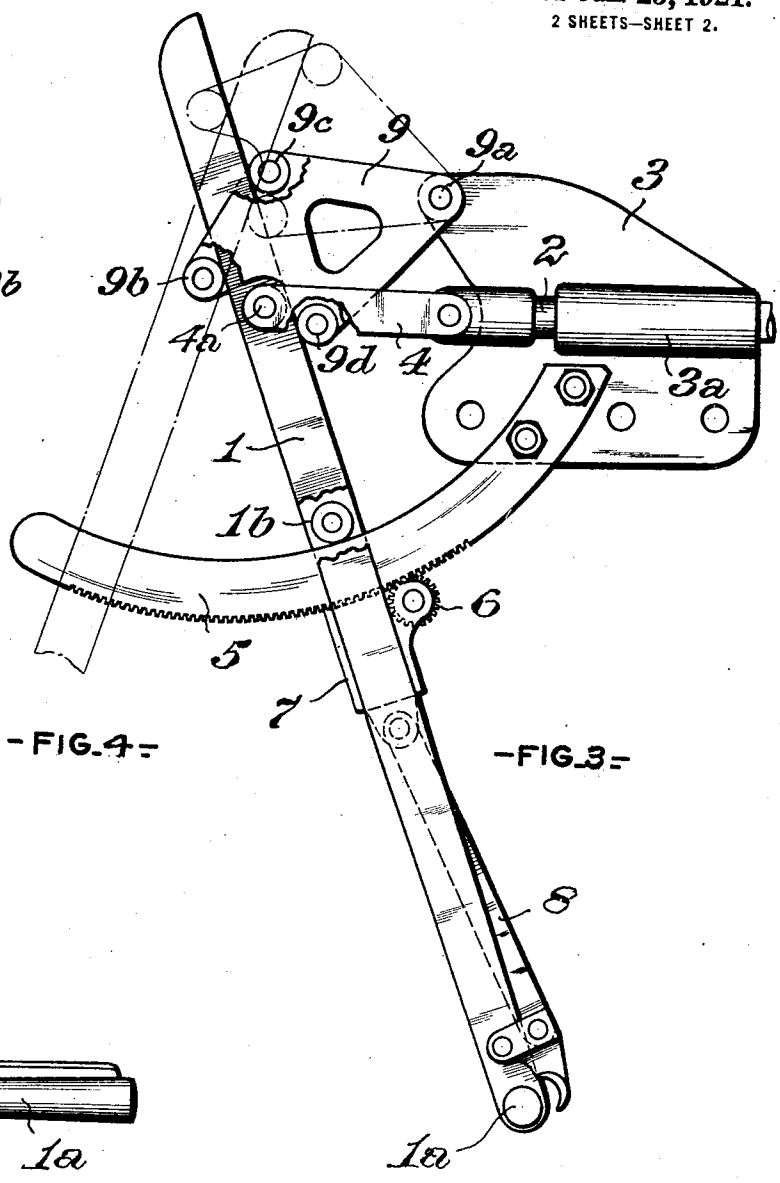
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2 SHEETS—SHEET 2.



-FIG. 4-



-FIG. 3-

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VALVE-OPERATING LEVER.

1,366,502. Specification of Letters Patent. Patented Jan. 25, 1921.

Application filed November 1, 1919. Serial No. 335,132.

To all whom it may concern:

Be it known that I, FRANK F. SCOVILLE, of Schenectady, in the county of Schenectady and State of New York, have invented a certain new and useful Improvement in Valve-Operating Levers, of which improvement the following is a specification.

My invention relates to levers for manually operating throttle or other valves controlling the flow of fluid, and its object is to provide a lever of such character, in the operation of which maximum leverage may be afforded at the commencement of the traverse of the lever, and be progressively decreased toward the end thereof, or vice versa, this result being attained without the use of the toggle connections heretofore employed for the purpose, in which slackness of the joints is substantially objectionable. The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a side view, in elevation, of a valve operating lever, illustrating an embodiment of my invention; Fig. 2, a view, taken at right angles thereto; Figs. 3 and 4, similar views, respectively, showing a structural modification; and, Figs. 5 and 6, plan and side views, respectively, showing another structural modification.

In the practice of my invention, referring descriptively to the specific embodiment thereof which is herein exemplified, and first to the form shown in Figs. 1 and 2, I provide a valve operating lever, 1, having a handle, 1^a, at one end, which may either stand at an angle to the body of the lever, as shown, or be in line therewith, as preferred. A longitudinally movable valve stem, 2, which is shown as passing through a guide, 3^a, formed on a fixed support, 3, is connected to the lever by a pair of parallel links, 4, which are pivotally coupled to the lever, by a pin, 4^a, at a point in its length nearer to its end which is farthest from its handle. The opposite end of the valve stem, 2, is connected to a valve of any known and desired construction, which, as it does not, in and of itself, form part of my present invention, is not herein shown. The lever 1, is fitted to swing over a toothed segment, 5, upon which it may be guided, in its traverse, by a block, 7, fixed upon the lever, on the outer face of the segment, and a roller, 1^b, journaled on the lever, and bearing on the inner face of the segment, said block and roller maintaining the lever, throughout its swinging traverse, in true radial relation to the segment. A suitable latch, guided in the block, is actuated by a latch lever, 8.

The lever, 1, is fulcrumed on a swiveling arm, 9, which, in the instance exemplified, is of T form, and its upper member is forked, at its outer end, to embrace the lever. The arm, 9, is pivotally connected to the fixed support, 3, by a pin, 9^a, and, at its opposite end, bears on the farther and the nearer sides of the lever, 1, rollers, 9^b and 9^c, being journaled on it, which bear, respectively, on said sides, in order to reduce friction and insure the prevention of cramping in operation. The downwardly projecting member of the arm, 9, is pivotally connected to a jaw, 9^f, which extends outwardly, substantially parallel with the upper member, and carries rollers, 9^e and 9^d, bearing on the farther and the nearer sides of the lever, 1, similarly to the rollers, 9^b and 9^c.

In the operation of the construction above described, at the commencement of the movement of the lever, 1, to the left, for the purpose of opening the valve, the lever bears on the rollers, 9^e and 9^c, thereof, through which rollers, and the swiveling arm, 9, on which they are mounted, the power applied to the lever handle is applied to the fixed fulcrum pin, 9^a, overcoming the resistance exerted to the movement of the lever, by its connection, through the links, 4, to the valve stem, 2. The power arm of the lever is, consequently, the distance, measured on its middle line, between the axis of the lever handle, 1^a, and a line intersecting the axes of the fulcrum arm pins, 9^b and 9^a, and the resistance arm of the lever is the materially lesser distance between the axis of the pin, 4^a, by which the lever is coupled, to the valve stem links, 4, and a line intersecting the axes of the fulcrum arm pins, 9^b and 9^a. Under these conditions, the leverage of the operating lever is at its maximum, and as, in the continued traverse of the lever to the left, the fulcrum arm, 9, is swung upwardly on its pivot pin, 9^a, by the lever, as indicated in broken lines in Fig. 1, the length of the resistance arm of the lever above indicated is continuously increased, with a corresponding decrease in the leverage of the lever, which reaches its minimum at the left hand extremity of the traverse of the lever.

Various modifications of the specific form of my invention above described, may be made, in the discretion of the constructor, without departure from its operative principle or essential structural features. Thus, for example, in the structure illustrated in Figs. 3 and 4, the swiveling arm, 9, on which the operating lever is fulcrumed, comprises two parallel connected plates, between which the lever passes, and is pivotally connected to the fixed support, 3, by a pin, 9^a. The lever bears on the fulcrum arm through rollers, 9^b, 9^c and 9^d, journaled in the fulcrum arm on the sides of the lever farther from, and nearer to, respectively, the pivot pin, 9^a, of the arm. The valve stem, 2, is, as in the prior instance, coupled to a pin, 4^a, on the operating lever, and the latter is maintained in proper relation to its segment, 5, by a pinion, 6, journaled in a block, 7, which is fixed on the operating lever and carries a suitable latch, which is movable toward and from the segment, by a latch lever, 8, and is adapted to engage teeth on the segment, and by a roller, 1^b, journaled on the lever, and bearing on the inner face of the segment.

It will be seen that, in operation, movement of the lever, 1, to the left, swings the fulcrum arm, 9, upwardly on its pivot pin, 9^a, and thereby progressively increases the length of the resistance arm of the lever, correspondingly reducing the leverage thereof in its traverse, as in the instance first described.

In the modification shown in Figs. 5 and 6, the fulcrum arm, 9, carries, on its outer end, a slotted head, 9^e, which fits around the operating lever, the fulcrum arm being, by this connection, moved upwardly upon the lever by the traverse thereof from right to left, as in the constructions of Figs. 1 to 4 inclusive, the friction rollers of the latter being dispensed with, in order to simplify the structure.

I claim as my invention and desire to secure by Letters Patent:

1. The combination of a valve operating lever; a valve stem; a link, coupling the lever to the valve stem; a fixed support for the operating lever; a fulcrum arm, pivoted to said support, independently of the valve stem, and adapted to bear, in opposite directions, on the sides of the operating lever; a segment, over which the operating lever is fitted to traverse; and means for maintaining said lever in normal relation to the segment.

2. The combination of a valve operating lever; a valve stem; a link, coupling the lever to the valve stem; a fixed support for the operating lever; a fulcrum arm, pivoted to said support, independently of the valve stem; bearing rollers, journaled on said arm, and adapted to bear against opposite sides of the operating lever; a segment, over which the operating lever is fitted to traverse; and means for maintaining said lever in normal relation to the segment.

3. The combination of a valve operating lever; a valve stem; a link, coupling the lever to the valve stem; a fixed support for the operating lever; a fulcrum arm, pivoted to said support, independently of the valve stem, and fitted to slide longitudinally on the operating lever, with its bearings on opposite sides thereof; a segment, over which the operating lever is fitted to traverse; and means for maintaining said lever in normal relation to the segment.

4. The combination of a valve operating lever; a valve stem; a link, coupling the lever to the valve stem; a fixed support for the operating lever; a fulcrum arm, of T form, pivoted, at one end of its cross bar, to said support; bearings on the cross bar of the fulcrum arm, abutting on opposite sides of the operating lever; and similarly abutting bearings at the lower end of the central bar of the fulcrum arm; a segment over which the operating lever is fitted to traverse; and means for maintaining said lever in normal relation to the segment.

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Witnesses:
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