

(No Model.)

H. V. CLYNICK.  
SLIDING GATE.

No. 465,776.

Patented Dec. 22, 1891.

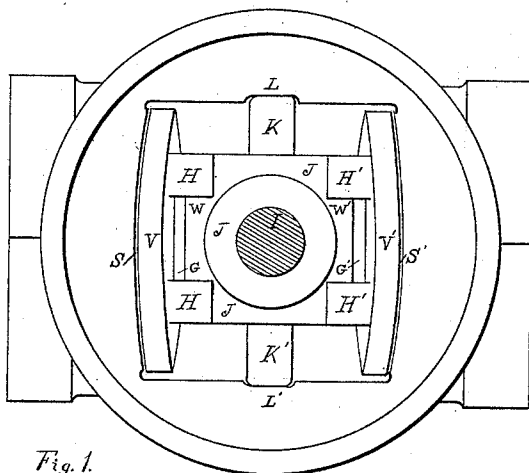


Fig. 1.

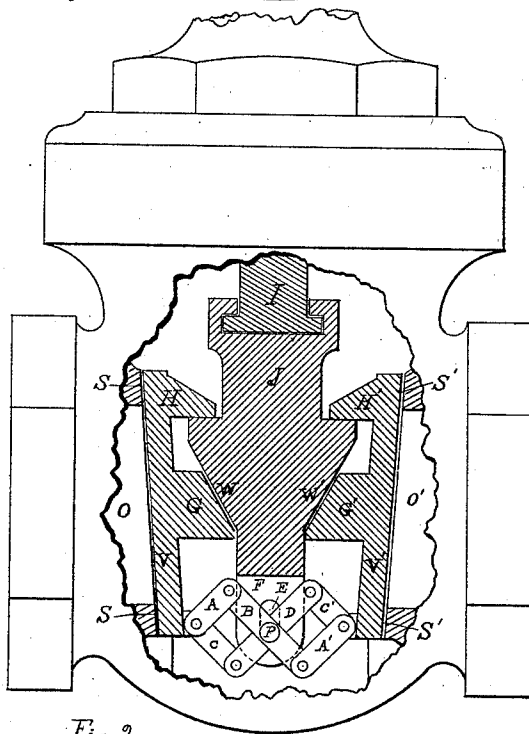


Fig. 2.

Witnesses:

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# UNITED STATES PATENT OFFICE.

HORACE V. CLYNICK, OF NEW YORK, N. Y.

## SLIDING GATE.

SPECIFICATION forming part of Letters Patent No. 465,776, dated December 22, 1891.

Application filed June 22, 1891. Serial No. 397,172. (No model.)

*To all whom it may concern:*

Be it known that I, HORACE V. CLYNICK, a subject of the Queen of Great Britain, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Attachments for Gate-Valves, of which the following is a specification.

This invention relates to an attachment for facilitating the lifting of the valve-plates in large gate-valves; and it consists, essentially, of toggle-jointed levers attached to the valve-plates and adapted to draw both plates inward upon external pressure exerted against either plate.

Heretofore it has been the custom usually to apply side gears and a worm-screw to the valve-plates on large gate-valves, so that the necessary leverage could be had to force them open when located, for instance, in a large main water-pipe line with the pressure of a body of water on one side of the valve and only atmospheric pressure on the other. It is very evident that in such cases, where a large valve is to be opened, with the great pressure on the one side only, considerable power is required to move the valve-plates, and, moreover, when they are moved, bearing as they do with considerable force on the valve-seat, sand and other grit gets in between the seat and the valve and the friction between the two when the valve-plate is sliding, as in opening and closing, makes the two surfaces wear unevenly, thus soon causing a leak and necessitating refitting of the valve-plates to their seats.

The objects of this invention are to avoid all of the above objections inherent in the ordinary form of gate-valve, and also to provide novel and effective means whereby the effect of the pressure on one side of the valve counteracts and relieves the pressure from the other side, thereby rendering it easy and possible for the valves to be lifted by means of the ordinary central screw as now used for small valves.

In practice the objects of this invention are obtained in the following manner, references being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a plan view through the valve, showing a channel or groove on both sides of the wall or chamber of the valve in which slide extensions on the spreader or moving portion. Fig. 2 shows a side elevation through an ordinary form of gate-valve, illustrating the manner of attaching the toggle-joints to the parts of the valve.

In Fig. 2, I is the lifting-screw. J is the valve-stem on which is formed the spreader W of wedge shape, the said spreader being elongated and forming an extension F, which is provided with a slot E, in which the pin P may be free to move vertically, but not sideways. V V' are the valve-plates, and the points S S' S' S' are the seats. O O' are the passages of the valve. P is a pin acting as a fulcrum on which toggle-joints are pivoted. The said toggles are composed of the joints A B A' and C D C'. G G' are wedge extensions on the valve-plates V V', which serve to close the valve by means of the spreader W when forced downward by the screw I. The top extensions on the spreader W engage with the shoulders H H' on the valve-plates and serve the purpose of lifting the said plates. The lifting-screw I fits in a stationary nut at the top of the valve shown in perspective.

In Fig. 1 extensions K K' on the spreader W fit and slide in the grooves L L', located in the sides or body of the valve. This prevents any side motion to the nut W when raised or lowered.

The action of the valve may be described as follows: When the valve-plates V V' are closed, the toggle-joints are in a normal position; but as soon as the valves are lifted or the pressure taken off of the extensions G G' by lifting the spreader W (for illustration it will be assumed that the passage O is under pressure of water and that the other side is empty) the force of water against the valve-plate V pushes it in and at the same instant pushes forward the joints A and C of the toggles, and the joints A' C', being connected to the said joints A C by the center levers B D and to the valve-plate V', operate to draw it inward, thus allowing a small quantity of water to flow through the valve-passages O O' and quickly allowing the pressure to be equalized. It is thus seen that as both valve-

plates are drawn away from their seats they may be readily lifted (without rubbing against the seats) to full opening.

The toggles are shown with six links, although three links may be effective for the smaller-sized valves; but where much strength is required the six links are better. It is obvious that the toggles will operate in any position the valve may be placed. It is also obvious that the attachment of the toggles offers a great advantage over valves not having them—especially, for instance, without the toggles the valve-plate V, as soon as loosened by raising the spreader W, would be pushed from its seat by the outside pressure of water, and the body of the valve in becoming filled at once would act to press the valve-plate V' tightly to its seat, thus requiring considerable force to overcome the friction between the valve and seat, and the grit almost sure to be present in many valves getting between the surfaces cuts them and soon causes a leak. Besides, when the valves are raised enough to let some water through they are apt to open suddenly, letting in a rush of water, which causes hammering and otherwise straining the pipes in connection therewith.

With the toggle-joints attached to the valve-plates, as hereinbefore described, the effects of the pressure when on one side only of the valve is counteracted by means of the said toggles. Hence the valves lift easily and gradually without forcibly rubbing against the seats and allow a small quantity of water through—just sufficient to equalize the pressure gradually.

I do not limit myself to the use of but one set of toggles in any one valve. I have shown but one set for the purpose of obtaining clearness in the drawings, and parts have been exaggerated in order to clearly illustrate the detail of the various portions of the valve mechanism and the relation of the toggles to such portions. In very large valves, or even in the smaller ones, as many as four sets of toggles may be employed, distributed at the top and bottom of the valve-plates on both sides. An additional pin and slot could be provided in the portion J of the valve-stem for fulcruming the additional toggles.

It is obvious that the position of the joints of the toggles may be altered to some extent from that shown in the drawings and serve the purpose sought. Hence I do not limit myself to the exact position shown nor to the

relative lengths of the joints in the toggles shown, as they may also vary and yet serve the purpose.

What I claim as my invention is as follows:

1. An attachment for gate-valves, consisting of one or more sets of toggle-joints attached to the valve-stem spreader and to the valve-plates and so disposed that one of the said plates draws the other inward when subjected to external pressure, substantially as shown and described.

2. An attachment for gate-valves, consisting of two sets of jointed levers, each set having a fulcrum-point on the valve-stem, and the extreme ends thereof hinged directly to the valve-plates and adapted to draw the said plates toward each other by external pressure against either plate, substantially as and for the purpose shown and described.

3. An attachment for gate-valves, consisting of two or more systems of jointed levers, a single set being composed of two jointed levers, each having three joints usually of unequal lengths, and the ends of the said jointed levers being pivoted to opposite valve-plates and adapted upon external pressure against either plate to cause both of them to be drawn together and away from their seats, substantially as shown and described.

4. An attachment for gate-valves, consisting of a jointed lever A B A' and a jointed lever C D C', both attached centrally and pivoted to a pin P, the extreme ends of said levers being pivoted to the valve-plates V V', in the manner substantially as shown and described.

5. The combination of a valve-body with vertical grooves in its sides, an elongated valve-stem having extension on opposite sides adapted to slide in said grooves in valve-body, and pins forming fulcrum-points, upon which are pivoted two or more systems of jointed levers, said jointed levers being also pivoted to two valve-plates, which are adapted to be raised and lowered together with the valve-stem by means of a lifting-screw, all being adapted to operate substantially as and for the purpose shown and described.

Signed at Hoosick, in the county of Rensselaer and State of New York, this 10th day of June, A. D. 1891.

HORACE V. CLYNICK.

Witnesses:

A. H. HAWKS,  
DURNER D. BOTTOME.