

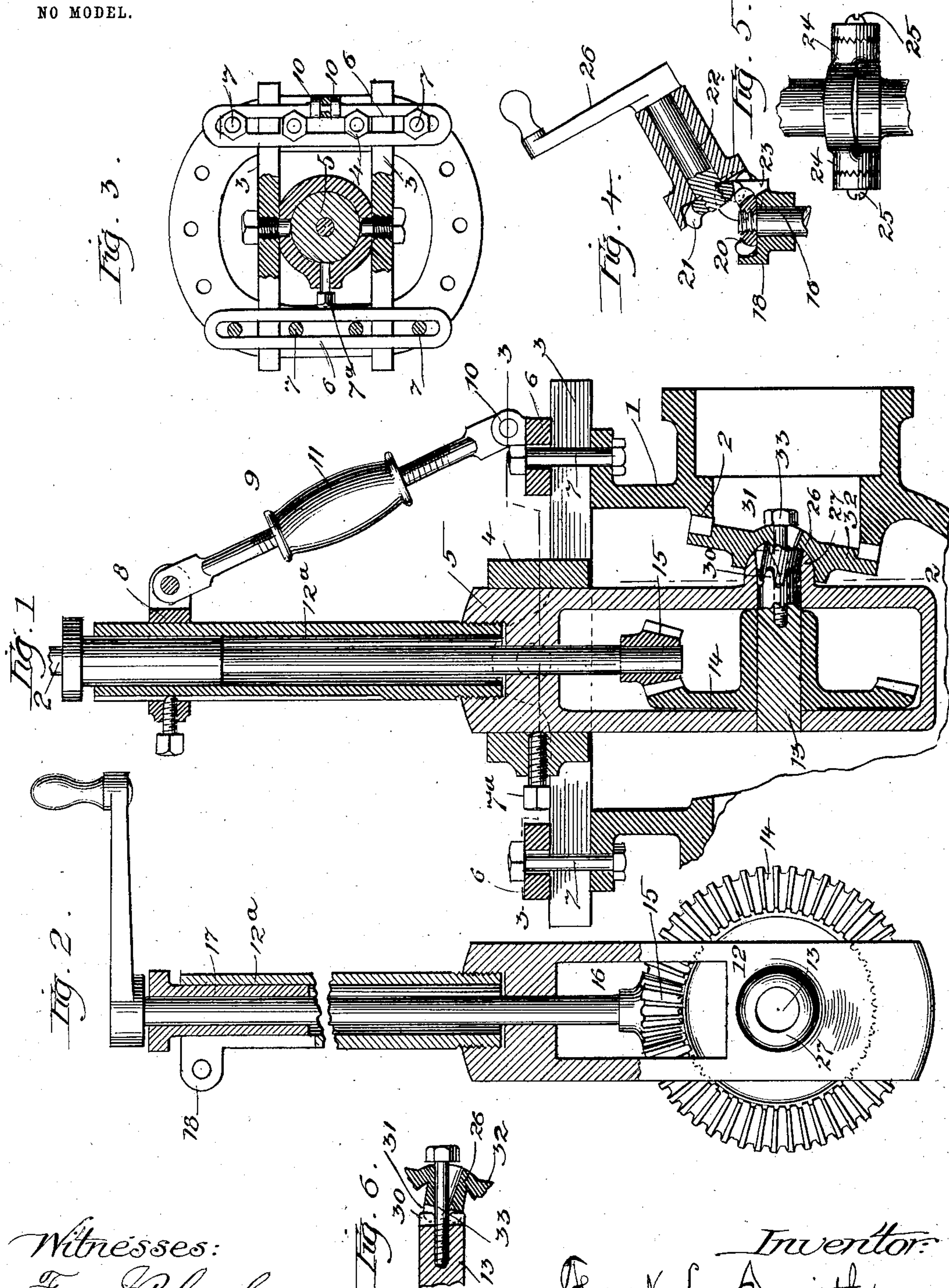
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PATENTED MAR. 1, 1904.

F. L. SMITH.  
GATE VALVE RESEATING MACHINE.

APPLICATION FILED APR. 13, 1903.

NO MODEL.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## GATE-VALVE-RESEATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 753,747, dated March 1, 1904.

Application filed April 13, 1903. Serial No. 152,345. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK L. SMITH, a citizen of the United States, residing at No. 5733 Union avenue, Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Gate-Valve-Reseating Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

10 The purpose of this invention is to provide an improved device for reseating gate-valves, particularly adapted to be mounted upon the valve-body while the same is in place on the pipe-line to which it pertains.

15 It consists in the features of construction set out in the claims.

In the drawings, Figure 1 is an axial section through the operating-shaft of my improved machine and body of a valve on which it is mounted for the purpose of reseating the same. Fig. 2 is a section at the line 2 2 on Fig. 1. Fig. 3 is a section at the line 3 3 on Fig. 1. Fig. 4 is a detail section axial with respect to the shafts, showing a modification of the means for driving the operating-shaft adapted for varying the position of the operating-crank. Fig. 5 is a side elevation of the pivoted bearing pertaining to the device shown in Fig. 4. Fig. 6 is a detail section axial with respect to the cutter-head shaft, showing an accommodating joint between said cutter-head and shaft.

On the valve-body 1 whose seat 2 is to be dressed my improved machine is mounted and secured by means of the parallel bars 3 3, between which there is pivoted the collar 4, which is adapted to be secured to the barrel or trunk 5, in which the operating-shaft of the machine is mounted, the machine hereinafter described having been introduced into the valve-body after the removal therefrom of the customary cap in which the valve is journaled, (said cap and valves not being shown in the drawings.) The parallel bars 3 3 are lodged across the upper mouth of the body on the flanges from which the cap has been removed, and they are clamped rigidly to the valve-body by means of the slotted clamp-bars 6 6, through whose slots necessary bolts 7 may be inserted to enter such of the bolt-

holes in the valve-body flanges as may be in convenient position. The trunk 5 is adjusted vertically through the collar 4 to bring the cutter hereinafter described in proper relation to the valve-seat to be dressed and is secured in such position by tightening the set-screw 7<sup>a</sup>. For the purpose of forcing the cutters against the valve-seat as their work is done I provide a collar 8, which is adjustable on the trunk above the collar 4. This collar 60 being left loose on the trunk while the latter is being adjusted through the collar 4 to the proper position is secured fast in the position at which it stands when the proper adjustment is effected. This collar 8 is connected by a 65 two-part link 9 to one of the clamps 6, which is provided with suitable lugs 10 10, between which the lower end of the link 9 is pivoted. The link 9 comprises a turnbuckle or right and left threaded sleeve 11, connecting its two 70 end portions, and by rotating this turnbuckle the link may be lengthened or shortened, and thereby the trunk tilted over the fulcrum afforded by the pivotal connection of the sleeve 4 to the bars 3 3, and thus the cutter is advanced toward and withdrawn from the seat on which it is to operate. The trunk comprises at its lower part which enters into the valve-body a bearing-frame 12 for the cutter-shaft 13, which is journaled transversely there- 80 in and has rigid with it a beveled gear 14, which rotates between the opposite sides of the frame in which the shaft-bearings are obtained and is actuated by a beveled pinion 15 on the inner end of the operating-shaft 16, 85 which extends up through the trunk, being journaled therein at the upper end of the frame 12 and also at the upper end of the sleeve or cylindrical portion of the trunk 12<sup>a</sup>, which is provided with a bushing 17, forming an adjustable bearing, which is telescoped into the upper end of the sleeve 12<sup>a</sup> and held securely by clamping the sleeve, which is split at one side between the lugs 18 18, through which a clamping-bolt (not shown) takes to close up 95 the sleeve at the split. The shaft 16 may be actuated by a crank attached at its upper end and rotating in a plane at right angles to said shaft; but for convenience of operating the device in positions where it may not be prac- 100



ticable to rotate the shaft in the plane required  
 by the construction shown in Fig. 1 I provide  
 a crown-gear 20 at the upper end of the shaft  
 16, (see Fig. 4,) having its teeth rounded, so  
 5 as to mesh with a similar crown-gear 21 at any  
 angle, said crown-gear 21 being mounted in a  
 bearing 22, which is pivotally connected to  
 the bearing 17 of the shaft 16, the pivotal  
 10 axis being in a line tangent to the pitch-circle  
 of the gears, so that their mesh is not mate-  
 rially affected by the change of angle between  
 the gears. The bearing 22 of the crown-gear  
 21 is pivoted to the bearing 18 of the shaft 16  
 by means of lugs 23 and 24 on said bearings,  
 15 respectively, said lugs having their faces in  
 contact serrated, so that they may be bound  
 together by the pivot-bolt 25 and held rigidly  
 in position to cause the shaft of the crown-  
 gear 21 to project at any desired angle, and  
 20 said shaft having the crank 26 applied to it  
 may be rotated to rotate the shaft 16 in what-  
 ever position is most convenient.

It is necessary that the cutter should be  
 adapted to accommodate itself to the seat on  
 25 which it is to operate, which is oblique to the  
 shaft by which the cutter is rotated, and it is  
 also necessary to be able to force the cutter  
 toward its seat while it operates, and it is de-  
 sirable that the thrusting action by which the  
 30 cutter is thus held to its work shall not be  
 performed by the shaft, which necessarily has  
 a universal-joint connection of some sort for  
 the purpose of rotating the cutter. I there-  
 fore provide on the outer side of the frame 12  
 35 at which the cutter is located a spherical boss  
 27, coaxial with the shaft-bearing and there-  
 by encompassing said bearing in annular form.  
 The cutter-shaft 13, which terminates within  
 the annular boss, is provided at the end with  
 40 teeth 30, intermeshing with corresponding  
 teeth 31 on the spindle of the cutter 32, and  
 the cutter has around said spindle a concave  
 annular seat by which it lodges and makes a  
 45 universal or ball-and-socket joint with the an-  
 nular boss 26 around the bearing of the cut-  
 ter-shaft. By this means the cutter is adapt-  
 ed to assume any angle to the shaft which is  
 necessary in order that it may correctly work  
 upon the valve-seat to be dressed, and at all  
 50 angles within the range of accommodation  
 necessary it is driven by the engagement of  
 its spindle with the pivoted end of the shaft.  
 In order to hold the cutter safely in connec-  
 tion with the shaft while introducing and  
 55 withdrawing the machine from the valve, a  
 bolt 33 is set through the center of the cut-  
 ter, which is apertured for that purpose, and  
 screws into the end of the shaft within the  
 circle of the teeth which engage the cutter-  
 60 spindle, the aperture in the cutter for said  
 bolt being sufficiently enlarged to accommo-  
 date the cutter in its necessary change of po-  
 sition and the bolt having a head sufficiently  
 65 the enlargement of the aperture.

I claim—

1. A gate-valve-reseating machine, compris-  
 ing a frame adapted at one end to be inserted  
 into the gateway of the valve-body; a shaft  
 journaled transversely in such inserted end of  
 70 the frame; means mounted on the frame at  
 the outer end thereof for driving such shaft,  
 the frame having an annular spherical boss  
 protruding from one side of the frame con-  
 centric about the axis of the shaft-bearing; a  
 75 cutter-head having a central socket adapted  
 to seat on said boss, the shaft having projec-  
 tions engaging recesses in the cutter-head for  
 driving the latter, adapted to remain engaged  
 throughout the entire range of oscillation of  
 80 the cutter-head about the spherical boss on  
 which it is seated.

2. A gate-valve-reseating machine compris-  
 ing a frame adapted at one end to be inserted  
 into the gateway of the valve-body and to  
 85 protrude therefrom; a shaft journaled trans-  
 versely in such inserted end of the frame, and  
 means mounted on the frame at the outer end  
 thereof for driving such shaft; the frame hav-  
 ing a spherical seat whose center is in the  
 90 axis of the transverse shaft, a cutter-head  
 seated on said spherical seat whereby such  
 cutter-head is adapted to oscillate about the  
 center of such seat and to be held to its work  
 directly by the pressure of the frame, and  
 95 loose driving connections between the shaft  
 and the cutter-head adapted to permit such  
 oscillation.

3. A gate-valve-reseating machine compris-  
 ing a frame adapted at one end to be inserted  
 100 into the gateway of a valve-body; a shaft  
 journaled transversely in said inserted end of  
 the frame; a shaft extending longitudinally  
 of the frame and journaled therein and gear  
 connections at the inner end by which it  
 105 drives the transverse shaft, the frame having  
 exteriorly a spherical seat whose center is in  
 the axis of the transverse shaft; a cutter-head  
 seated on said seat, whereby such cutter-head  
 is adapted to oscillate about the center of such  
 110 seat and to be held to its work directly by the  
 pressure of the frame, and loose driving con-  
 nections between the shaft and the cutter-  
 head adapted to permit such oscillation.

4. A valve-reseating machine comprising a  
 115 frame adapted at one end to be inserted into  
 the gateway of a valve-body; a shaft jour-  
 naled transversely in such inserted end of the  
 frame, and means mounted on the frame for  
 driving such shaft from the outer end of the  
 120 frame, the frame having an annular boss pro-  
 truding from one side, concentric about the  
 axis of the transverse shaft; a cutter-head  
 having a central socket adapted to seat on  
 such boss and loose driving connections be-  
 125 tween the transverse shaft and the cutter-  
 head engaging within the annular boss.

5. A valve-reseating machine comprising a  
 frame adapted to enter the gateway of a valve-  
 body; a shaft journaled transversely in such  
 130



inserted end of the frame; a beveled gear on such shaft; a driving-shaft journaled at right angles thereto in the portion of the frame exterior to the valve-body and a beveled pinion thereon meshing with the beveled gear on the first-mentioned shaft; means for rotating the driving-shaft at the outer end of the frame, the frame having an annular boss protruding from one side concentric about the axis of the transverse shaft; a cutter-head having a central socket adapted to seat on said boss, and driving connections between the transverse shaft and the cutter-head engaging within the annular boss.

6. In a gate-valve-reseating machine, in combination with a frame adapted to be intruded into the valve-body; the cutter-head and the shaft by which it is rotated; means for rotating the shaft from the exterior end of the frame; a spherical seat on the frame concentric with the cutter-head shaft, the cutter-head being centrally mounted on such seat with a range of oscillation in all directions; loose driving engagements between the shaft and the cutter-head, the latter having a central aperture within the circle of the driving engagements and a retaining-bolt passing through said aperture and secured in the shaft, and provided at its outer end with proper shoulder for retaining the cutter-head.

7. A gate-valve-reseating machine comprising a frame adapted at one end to be inserted into the gateway of the valve-body; a shaft journaled transversely at such inserted end of the frame; a cutter-head operatively connected with the shaft with freedom for oscillating in all directions about a point in the axis of the shaft whereby the cutter-head is adapted to accommodate itself to the seat; means for rotating said shaft to operate the cutter-head; means adapted to be secured to the valve-body for pivotally supporting the frame to swing toward and from the valve-seat at the inner end; a link and means for pivoting it at one end to said supporting means parallel to the frame-pivot and for pivoting it at the other end to the frame at a distance above the pivot of the latter, and means for lengthening and shortening the link at will to swing the frame about its pivot to carry the cutter-head toward and from the valve-seat.

8. A gate-valve-reseating machine comprising a frame adapted at one end to be inserted into the gateway of the valve-body, and having at that end a cutter-head and means for operating it in combination with a sleeve and means for pivotally mounting the same on the valve-body, the frame being adjustable through the sleeve, and means for securing it in adjustable position; an extensible link and means pivotally connecting it with the valve-body and with the frame above the pivotal connection of the latter.

9. A gate-valve-reseating machine comprising a frame adapted at one end to be inserted into the gateway of the valve-body, and carrying at that end a cutter-head for operating on the valve-seat and means for actuating it; means for securing such frame in relation to the valve-body, consisting of parallel bars adapted to span the gateway into the valve-body; a collar pivotally mounted between them and slotted clamps lodged across the parallel bars, and bolts passing through said slotted clamps into the bolt-apertures of the valve-body, the frame being inserted through such sleeve and adjustably secured thereto, and means for tilting the frame over the pivot of the sleeve and securing it as tilted.

10. A gate-valve-reseating machine comprising a frame adapted at one end to be inserted into the gateway of the valve-body, and carrying at that end a cutter-head for operating on the valve-seat and means for actuating it; means for securing such frame in relation to the valve-body, consisting of parallel bars adapted to span the gateway into the valve-body; a collar pivotally mounted between them and slotted clamps lodged across the parallel bars, and bolts passing through said slotted clamps into the bolt-apertures of the valve-body, the frame being inserted through such sleeve and adjustably secured thereto; a collar adjustably secured on the frame above said sleeve and an extensible link pivotally connected at one end with one of the clamps and at the other end with the collar.

11. A gate-valve-reseating machine comprising a frame adapted at one end to be inserted into the gateway of the valve-body, and carrying at that end a cutter-head for operating on the valve-seat and means for actuating it; means for securing such frame in relation to the valve-body consisting of parallel bars adapted to span the gateway into the valve-body; a collar pivotally mounted between them and slotted clamps lodged across the parallel bars, and bolts passing through said slotted clamps into the bolt-apertures of the valve-body, the frame being inserted through such sleeve and adjustably secured thereto; a collar adjustably secured on the frame above said sleeve; an adjustable link comprising two terminal portions pivotally connected, respectively, to the collar and to one of the clamps, and an intermediate sleeve having right and left thread connections with the two terminal portions, respectively.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 31st day of March, A. D. 1903.

FRANK L. SMITH.

In presence of—

CHAS. S. BURTON,  
FRED. G. FISCHER.