No. 685,697. Patented Oct. 29, 1901.

F. L. SMITH.

GATE VALVE RESEATING MACHINE.

(Application filed Nov. 28, 1900.)

(No Model.)

Fig. 2.

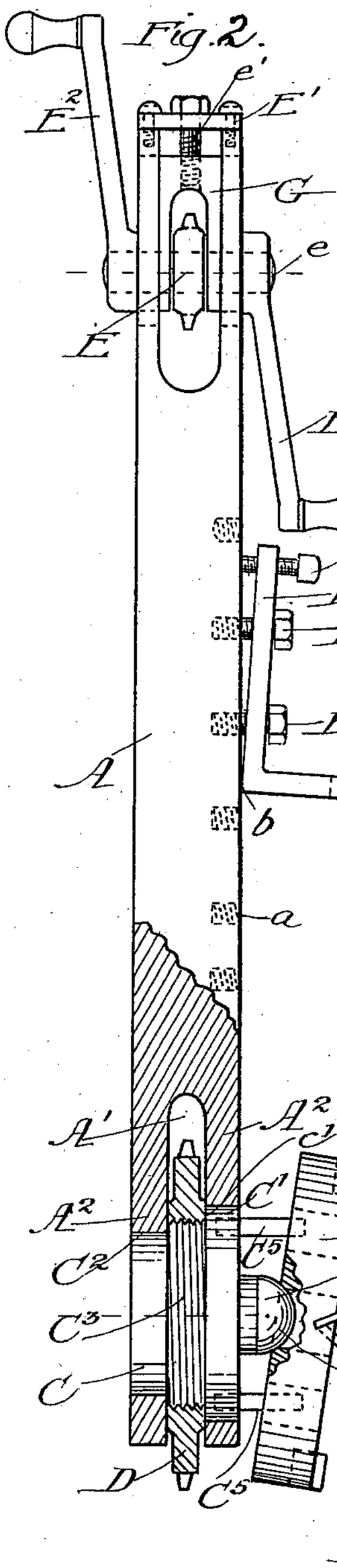


Fig. 1.

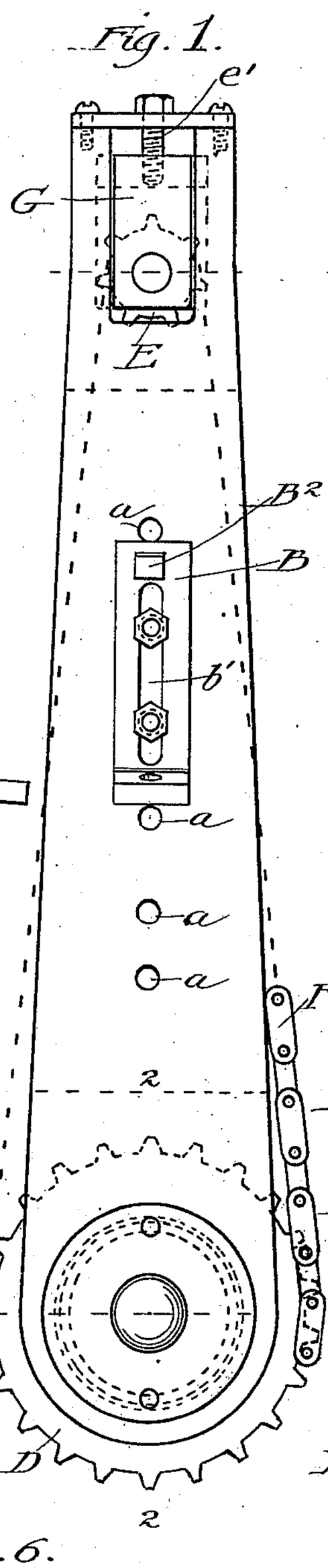


Fig. 4.

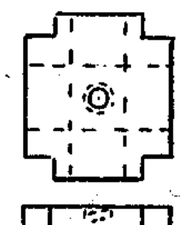


Fig. 5.

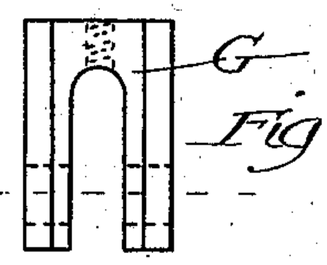


Fig. 7.

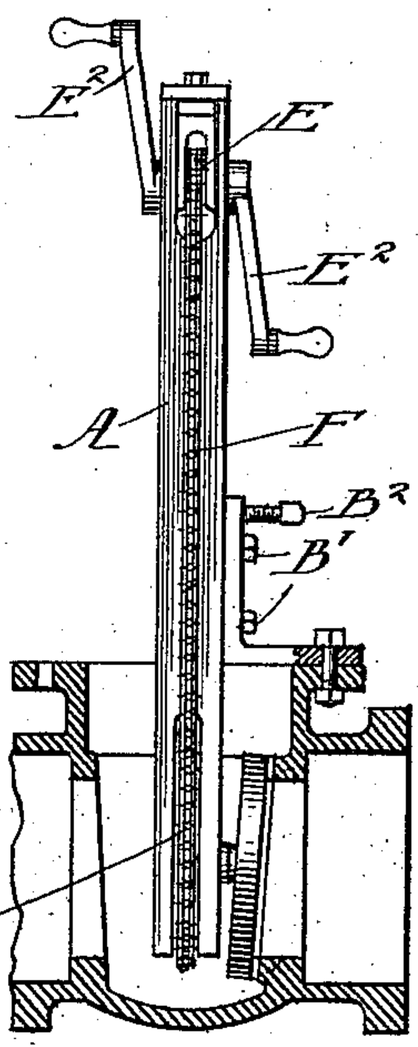


Fig. 3.

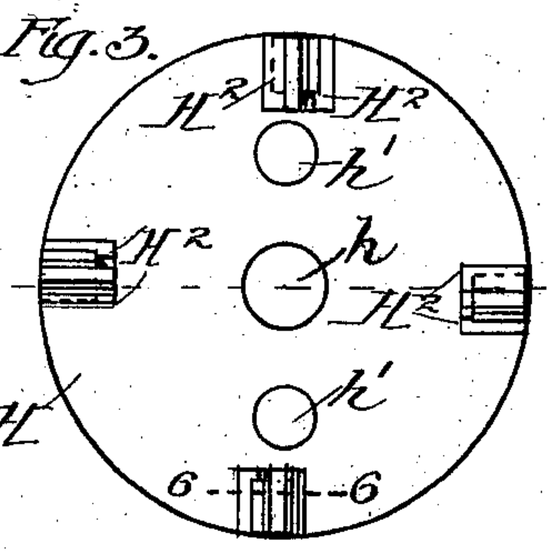
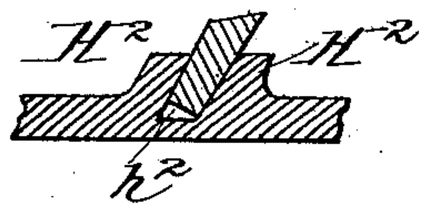


Fig. 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANK L. SMITH, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO ALVA C. RICKSECKER, OF CHICAGO, ILLINOIS.

GATE-VALVE-RESEATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 685,697, dated October 29, 1901.

Application filed November 28, 1900. Serial No. 37,953. (No model.)

To all whom it may concern:

Be it known that I, FRANK L. SMITH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain 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.

The purpose of this invention is to provide an improved device for the purpose of reseating gate-valves adapted to be used for that purpose without removing the valves from the line of pipe with which they are connected, but suited also for use in the shop.

It consists of features of construction which are specified in the claims.

In the drawings, Figure 1 is a side elevation of my improved device. Fig. 2 is an edge elevation of the same cut away at the lower part and shown in section at the line 2 2 on Fig. 1, disclosing the cutter-head shaft in its bearings. Fig. 3 is a face elevation of the cutter-head with the cutters therein. Fig. 4 is a top plan or end view, and Fig. 5 a side elevation, of the take-up bearing-block for the driving-shaft. Fig. 6 is a detail section at the line 6 6 on Fig. 3. Fig. 7 is a view showing in section a gate-valve body with my improved device in edge elevation mounted thereon in position for dressing the valve-seat.

A is a flat plate which constitutes a frame for the machine adapted to be entered through the gateway of a gate-valve. It is bifurcated at the lower end in the plane of its greater transverse dimension, the bifurcating-slot A′ being of suitable width to admit a sprocket-wheel D and having bearings for the cutter-head shaft C, extending through the fork-arms A^2 A^2 transversely to the bifurcating-slot. The shaft C has a greater diameter at its journal C′ in one of the fork-arms and a less diameter at the journal C^2 in the other fork-arm, and the intermediate portion is of intermediate diameter and threaded, as shown at C^3, the width of said threaded portion being substantially the width of the bifurcating-slot A′ of the frame. The sprocket-wheel D is provided with a suitably large interiorly-threaded central aperture to permit the threaded portion C^3 of the shaft to be screwed into it. The order of assembling, it will be understood, is to place the sprocket-wheel D in the bifurcating-slot A′ and enter the shaft from the side having the larger bearing through the same, screwing the threaded portions C^3 into the sprocket-wheel until the larger journal C′ is seated in its bearing in the fork-arm A^2, the sprocket-wheel being by that time brought tightly up against the shoulder *c*′, the direction of the thread being such that the operation of the tool for cutting tends to tighten and not to loosen it. It will be understood that the end of the frame carrying the sprocket-wheel D is designed to be inserted into the gateway of a gate-valve. The opposite or outer end of the frame is bifurcated in the planes of both its transverse directions and adapted to admit a take-up and journal bearing-block G, rabbeted at the four corners longitudinally to receive the four fork-arms left by the double bifurcation of this end of the frame. The journal bearing-block is bifurcated in the plane of the slot A′ to receive the driving sprocket-wheel E and is pierced in the other transverse direction to afford bearings for the shaft *e* of said sprocket-wheel, which is provided with the crank-arms E^2 E^2, secured on the protruding ends of the shaft outside the bearing-block and frame.

E′ is a plate fastened by screws to the ends of the four fork-arms which result from the double bifurcation of the outer frame A. It is apertured at the center, and a take-up bolt *e*′ is set through it and screwed in the end of the take-up journal bearing-block G, and thereby it is adapted to draw the journal bearing-block outward and take up any slack in the driven chain F, which encompasses the sprocket-wheels D and E and communicates motion from the latter to the former.

B is a bracket adapted to be secured to the gate-valve body by the same screws which secure the cap-plate, the latter being removed for the purpose. This bracket is designed to be adjusted over the open end of the valve-gateway, so that its lower corner *b* may serve as a fulcrum for the frame A in the adjustment of the latter, as will now be explained. Said frame is attached to the bracket by means

of one or more bolts B' B', said bolts taking through a slot b' in the upstanding limb of the bracket, the slot being of sufficient length to allow a range of adjustment of the frame at such connection, and for the purpose of a greater range of adjustment the frame-plate A is provided with a plurality of holes a a, &c.—that is, more than the number of the bolts, and at a distance apart not greater than the range of adjustment provided by the length of the slot b', so that by shifting the bolts from hole to hole adjustment can be obtained at any point between the extreme holes and a distance beyond them, respectively, equal to the range of adjustment provided by the slot. The bracket has an additional bolt B^2 screwed through it at the upper end of said upstanding arm, adapted to impinge against the face of the frame A, so that by adjusting the fastening-bolts B' and relatively to the bolt B^2, which I term the "adjusting-bolt," the frame may be tilted more or less away from the face of the upstanding arm of the bracket, being rocked over the lower corner b, tending thus to move its lower inner end toward or from the face which is to be dressed in the valve-body.

H is the cutter-head, which is a short cylindrical block which is adapted to be seated at its center on an axial projection C^4 of the shaft C, its seat being such as to adapt it to oscillate freely in all directions about a central point. The most desirable construction for a seat for this purpose is obtained by making the terminal C^4 hemispherical. Such hemispherical terminal of the shaft is seated in the central circular aperture h in the cutter-head, the margin of said aperture being spherically beveled to afford seating-surface on the spherical terminal C^4. In order that the shaft may drive the cutter-head, the latter has two eccentrically-situated apertures h' h', and from the shaft two driving projections C^5 C^5 extend into said apertures, which are much larger than the projections, so that the latter are admitted freely and engage the cutter-head throughout any range of oscillation about the spherical terminal for which provision may be made in the proportions of the parts. The purpose of this construction is to adapt the cutter-head to accommodate itself to the surface to be dressed and to set itself upon the same automatically, so as to avoid unnecessary dressing and preserve the valve-seat in its plane substantially as originally constructed. This also makes it practicable to advance the cutter-head to its work by merely tilting the frame, A as illustrated, the change of angle of the frame being compensated by corresponding oscillation of the cutter-head at its fulcrum on the terminal of the shaft.

In order that the total dimension of the device, with the cutter-head thereon, in the direction of the axis of the shaft C may be the least consistent with proper strength of the parts, so that a given tool may be adapted for work in the smallest possible gateway of the valve to be reseated, it is necessary to secure the cutters H' to the cutter-head with the simplest possible means which will give them perfectly secure and rigid seating. For this purpose I prefer to employ the construction which is illustrated in Fig. 6. This construction consists of bosses H^2 H^2, &c., projecting from the face of the cutter-head at positions to be occupied by the cutters, respectively, such bosses having apertures h^2 for the cutters, which are very slightly tapered, narrowing from the outer end inward. The cutters are correspondingly tapered, so that they are adapted to be driven into such apertures and to be tightly seated by the wedging which results from the taper of the apertures and the cutters. This causes the cutters to be more tightly seated the more severely they are resisted by the work. The apertures h^2 extending to the periphery of the cutter-head, opportunity is afforded for dislodging the cutters, when desired, by entering a suitable wedging-tool behind the latter and forcing them outward.

I claim—

1. 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 in such inserted end of the frame; means mounted on the frame at the outer end thereof for driving such shaft; and a cutter-head having a centering-seat on said shaft, and having a range of oscillation of its axis in all directions about the center of said seat; and projections from the shaft loosely engaging the cutter-head at points aside from the center of both the cutter-head and the shaft to rotate such cutter-head with the shaft.

2. A gate-valve-reseating machine, comprising a frame adapted to enter the gateway of the body; transversely-journaled driving and driven shafts at the opposite ends respectively of the said frame; driving and driven sprocket-wheels on said shafts respectively; means for rotating the driving-shaft; and a cutter-head having a centering-seat on said driven shaft and having a range of oscillation of its axis in all directions about the center of such seat, such driven shaft having projections loosely engaging the cutter-head at points aside from the center of both the cutter-head and the shaft, to rotate such cutter-head with the shaft.

3. A gate-valve-reseating machine, comprising a frame adapted to enter the gateway of the body and having mechanism mounted on its inner end adapted to dress the valve-seat, a bracket adapted to be secured to the valve-body adjacent to the gateway, having a limb extending off from the valve-body in the general direction of the gate-valve's opening and closing movement and longitudinally slotted; bolts taking through such gate, the frame having a plurality of threaded holes to receive the bolts at intervals in its length,

whereby the frame may be adjustably secured at suitable positions to bring the dressing devices in proper relation to the seat.

4. A gate-valve-reseating machine, comprising a frame adapted to enter the gateway of the valve-body and having seat-dressing devices at its inner end; a bracket adapted to be mounted on the valve-body adjacent to the gateway, having a corner which may overhang said gateway to form a fulcrum for the frame; a bolt taking loosely through the bracket and screwed into the frame; a second bolt screwed into the bracket and bearing against the frame; whereby the frame may be rocked over the bearing provided for it on the bracket to advance or retract the dressing devices in respect to the face to be operated upon, and held rigid at all positions throughout such range of adjustment.

5. In a valve-reseating machine, the frame made bifurcated at the inner end and having two members of such bifurcation provided with coaxial apertures; one of said apertures of greater diameter than the other; a shaft having its opposite end portions of different diameters corresponding to the diameters of said two apertures, and its intermediate portion of intermediate diameter and threaded and a sprocket-wheel adapted to enter between said two members, and having a central aperture interiorly threaded to receive the threaded portion of such shaft; the cutter-head connected to said shaft at one end outside the frame; a drive-chain extending around the sprocket-wheel, and means on the exterior portion of the frame for actuating same.

6. A gate-valve-reseating machine, comprising a frame adapted to be entered through the gateway of the valve-body; driving and driven shafts journaled in its opposite end portions respectively, and sprocket-wheels on said shafts, and a drive-chain connecting them; means for actuating the driving-shaft; the cutter-head having a centering-seat on the end of the driven shaft outside the frame, and having range of oscillation in all directions about the center of such seat, and suitable means by which the shaft engages the cutter-head to rotate it throughout its entire range of oscillation; in combination with a bracket adapted to be secured to the valve-body, and means for securing the frame to such bracket and adjusting it over a fulcrum thereon to advance and retract the cutter-head with respect to the surface to be operated upon.

In testimony whereof I have hereunto set my hand, at Chicago, Illinois, in the presence of two witnesses, this 19th day of November, A. D. 1900.

FRANK L. SMITH.

In presence of—
CHAS. S. BURTON,
ADNA H. BOWEN, Jr.