T. OTSUKA.

VALVE LIFTER.

APPLICATION FILED DEC. 1, 1919.

1,384,969. Patented July 19, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

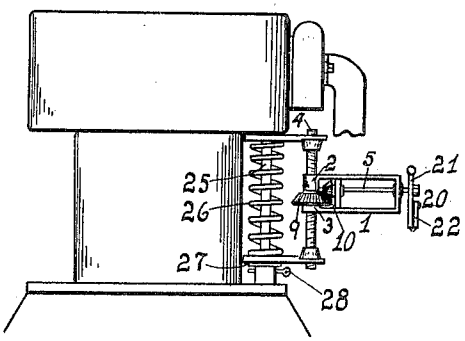



Fig. 2.

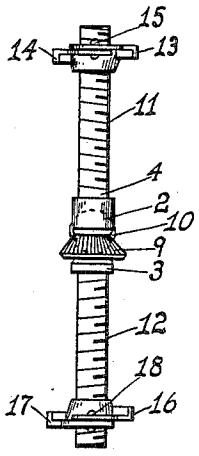



Fig. 3.

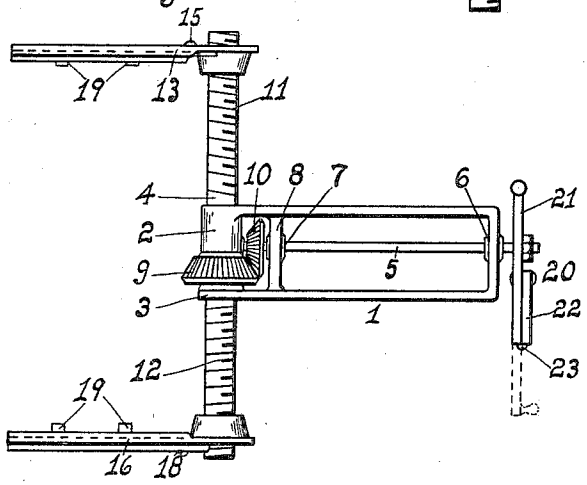
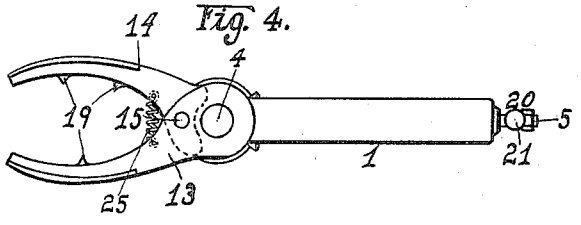



Fig. 4.




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2 SHEETS—SHEET 2.

Fig. 5.

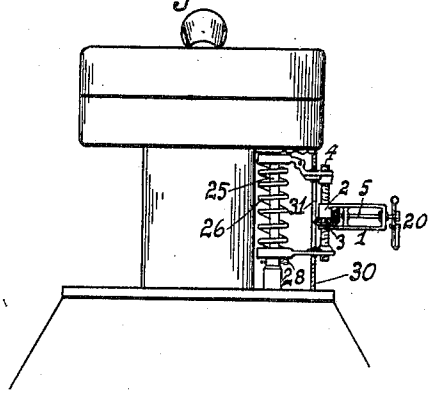



Fig. 6.

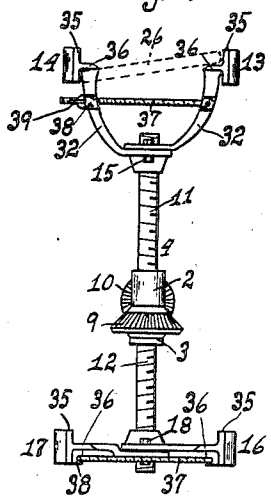



Fig. 7.

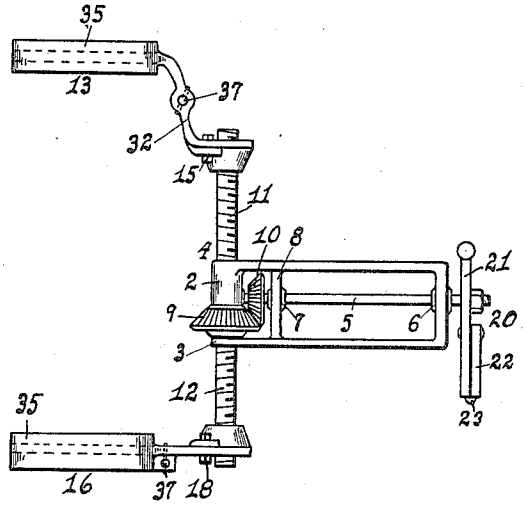
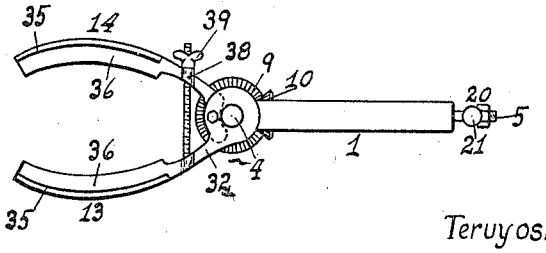



Fig. 8.




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# UNITED STATES PATENT OFFICE.

TERUYOSHI OTSUKA, OF OAKLAND, CALIFORNIA.

## VALVE-LIFTER.

1,384,969. Specification of Letters Patent. Patented July 19, 1921.

Application filed December 1, 1919. Serial No. 341,744.

*To all whom it may concern:*

Be it known that I, TERUYOSHI OTSUKA, a subject of the Emperor of Japan, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Valve-Lifters, of which the following is a specification.

My invention is an improved valve lifter which is compact, and efficient in operation.

Referring to the annexed drawing.

Figure 1 is a side view of my valve lifter in the act of lifting a valve.

Fig. 2 is an enlarged end view of my valve lifter.

Fig. 3 is an enlarged side elevation of my valve lifter.

Fig. 4 is a plan view of my valve lifter.

Fig. 5 is a side view of a modified form of my valve lifter applied to a valve to lift it.

Fig. 6 is an enlarged front elevation of my modified valve lifter.

Fig. 7 is an enlarged side elevation of my modified valve lifter.

Fig. 8 is an enlarged plan of my modified valve lifter.

In the drawing 1 indicates a frame. On one end of said frame are bearings 2 and 3 in which is journaled a shaft 4 extending transversely of the frame. A shaft 5 extending longitudinally of the frame is journaled in a bearing 6 and at the other end of said frame in a bearing 7 in transverse frame member 8. A beveled pinion 9 is secured on shaft 4 between bearings 2 and 3 and prevents longitudinally movement of said shaft in said bearings. A beveled pinion 10 is secured on the inner end of shaft 5 and meshes with pinion 9. On the shaft 4 beyond the bearing 2 is a left hand thread 11 and on said shaft beyond bearing 3 is a right hand thread 12. On the thread 11 screws a jaw 13 of a pair of jaws 13 and 14, the jaw 14 being pivoted by pivots 15 to jaw 13. On the thread 12 screws a jaw 16 of a pair of jaws 16 and 17, the jaw 17 being pivoted to jaw 16 by pivot 18. On the inner edge of all of said jaws are inturned lugs 19. On the outer end of shaft 5 is secured a crank 20 formed in two sections 21 and 22 hinged together by hinge 23 so that the section 22 may fold upon section 21 or straight out therefrom. A spring 25 normally holds the jaws 13 and 14, and 16 and 17 closed.

The operation of my invention is as follows:

The jaws 13 and 14 and 16 and 17 are slipped over the valve stem 25 between the head of the cylinder and the top of the spring 26 and between the lower end of the spring and the valve collar 27 respectively, the lugs 19 engaging the inside of the spring and holding the jaws closed. The shaft 5 and screw 4 through the medium of beveled gears 10 and 9 are then rotated by means of crank 20, which causes the jaws 13 and 14 and the jaws 16 and 17 to move toward each other and compress the valve spring 26. The cotterpin 28 is then removed from the valve stem. The valve is then lifted and the spring removed and held between the jaws 13 and 14 and the jaws 16 and 17 until the valve is again ready to be seated.

To seat the valve, the spring 26 held between said jaws is placed in position under the valve seat. The valve stem is inserted through the spring and seated. The collar 27 is slipped on the end of the valve stem and the pin 28 inserted through the lower end of the valve stem. The crank 20 is then turned backward and the jaws 13 and 14 and the jaws 16 and 17 are moved apart. The jaws are then withdrawn from the spring and valve stem leaving the valve in position.

In Fig. 5 is shown an engine of the closed valve type, the valves being closed by the usual wall 30 which is provided with an opening 31 the upper edge of which opening is somewhat below the top of the spring 26.

In the form of my invention shown in Figs. 5 to 8 the jaws 13 and 14 are bent upwardly at 32 so that they may be projected through the opening 31 to grip the top of the spring 26 above the upper edge of said opening.

The jaws of said form of my invention have vertical flanges 35 and horizontal flanges 36 extending inwardly from said vertical flanges midway between the lower and upper edges thereof, so that the coils of the spring 26 may be gripped between the vertical flanges above or below said horizontal flanges in accordance with the position of the coil. Screws 37 are respectively connected at one end to jaws 13 and 16 and extend through eyes 38 respectively in jaws 14 and 17.

Thumb nuts 39 on said screws bear against

the jaws 14 and 17 whereby the jaws are drawn toward each other to grip the valve spring.

Having described my invention I claim:

1. A valve lifter including a frame, a shaft journaled in said frame, a right thread and a left thread on said shaft, two pairs of jaws, one jaw of each pair engaging a thread on said shaft, the other jaws being each pivoted to one of said thread engaging jaws, and means for rotating said screw.

2. A valve lifter including a frame, bearings on said frame, a shaft journaled in said bearings, a beveled gear secured on said shaft between said bearings, a right thread and a left thread on said shaft, a pair of jaws actuated by each of said threads, a second shaft, a bevel gear secured to the second shaft and meshing with the beveled gear on said first shaft, and a crank on the other end of said second shaft.

3. A valve lifter including a frame, a shaft journaled in said frame, a right thread and a left thread on said shaft, a pair of jaws actuated by each of said threads, the upper jaws being bent upwardly to enable them to project through the valve closure opening and grip the top of the valve spring above the upper edge of said openings, and means for rotating said screw.

4. A valve lifter including a frame, a shaft journaled in said frame, a right thread and a left thread on said shaft, a pair of jaws actuated by each of said threads, said jaws being formed with vertical flanges and with inturned horizontal flanges extending from said vertical flanges intermediate the upper and lower edges thereof, and means for rotating said shaft.

5. A valve lifter including a frame, a shaft journaled in said frame, a right thread and a left thread on said shaft, a pair of jaws actuated by each of said threads, the upper jaws being bent upwardly to enable them to project through the valve closure opening and grip the top of the valve spring above the upper edge of said openings, a screw connected to one jaw of each pair and standing through the other jaw of each pair, a thumb nut on each screw engaging said other jaw for holding the jaws in gripping position.

In testimony whereof I affix my signature.

TERUYOSHI OTSUKA.