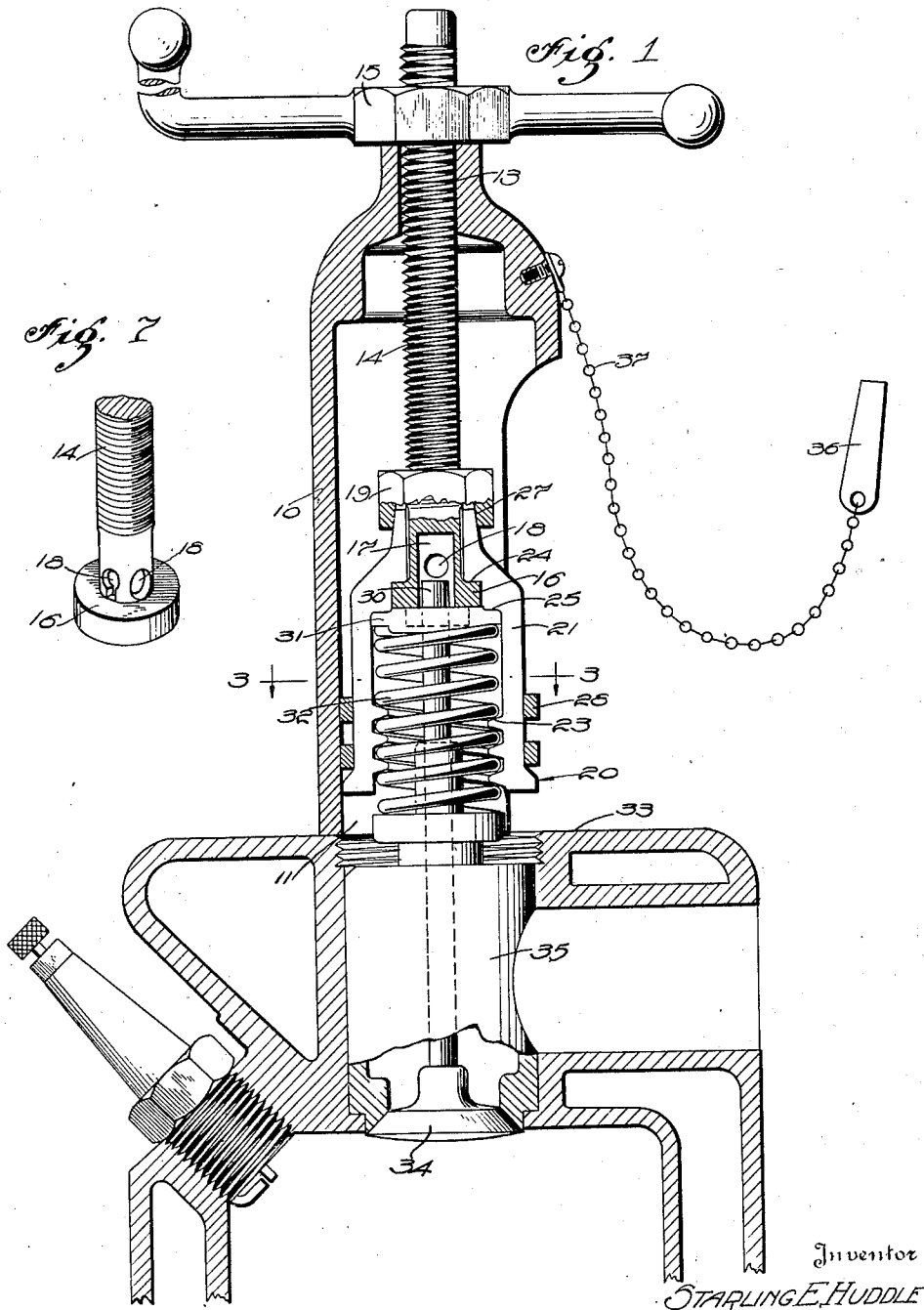


S. E. HUDDLE.
VALVE ASSEMBLY REMOVER.
APPLICATION FILED APR. 12, 1920.

1,368,501.

Patented Feb. 15, 1921.

2 SHEETS—SHEET 1.



By

Ch. Parker Attorney

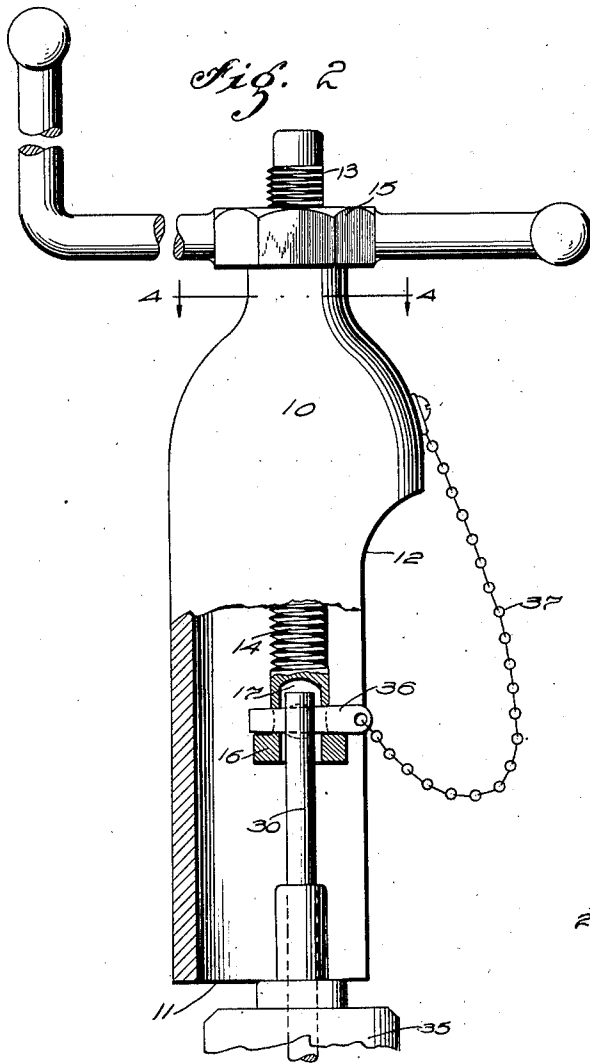
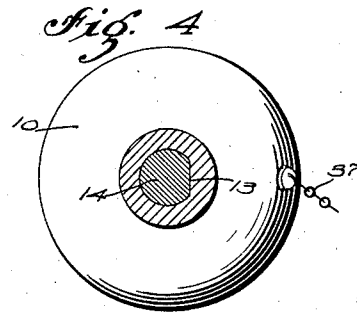
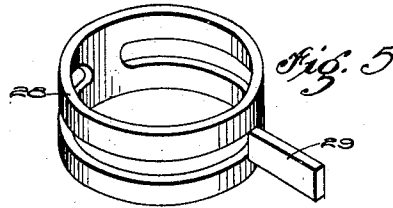
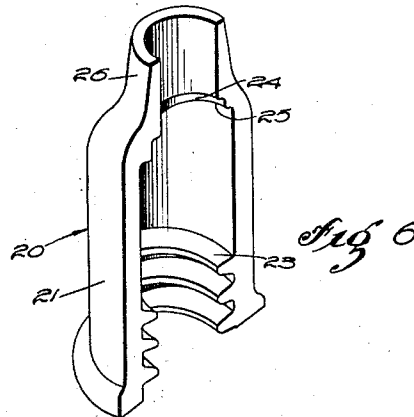
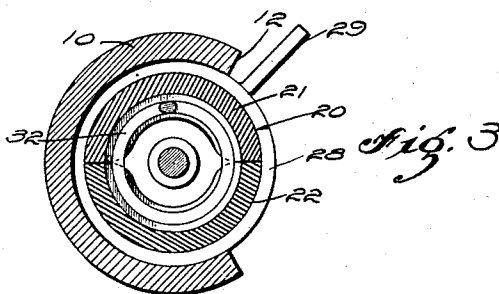
Inventor

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UNITED STATES PATENT OFFICE.

STARLING E. HUDDLE, OF LANCASTER, OHIO.

VALVE-ASSEMBLY REMOVER.

1,368,501.

Specification of Letters Patent. Patented Feb. 15, 1921.

Application filed April 12, 1920. Serial No. 373,288.

To all whom it may concern:

Be it known that I, STARLING E. HUDDLE, a citizen of the United States, residing at Lancaster, in the county of Fairfield and State of Ohio, have invented certain new and useful Improvements in Valve-Assembly Removers, of which the following is a specification.

This invention relates to improvements in valve assembly jacks, and more particularly to a mechanism adapted to the removal of valve assemblies of the type wherein the valve is used in connection with a valve cage, such as at present in common use in internal combustion engines of the valve-in-head type.

In this type of assembly a cage is provided having a valve seat on its inner end, or the end which is disposed adjacent the cylinder proper, and adapted to receive a valve of the type in common use in internal combustion engines. This cage is seated in a bore prepared therefor in the cylinder block and has a very close fit in this bore. The removal of the valve assembly and cage in these motors is very difficult owing to the fact that due to heat conditions, rust, and carbon, the cage has a tendency to stick. At present the most common method of removing these assemblies is to use a lever of some sort attaching it to the valve and pulling the valve or cage out. Where the cages stick, the cages themselves, and often the valves and valve springs are destroyed.

I have devised a jack for removing these assemblies whereby the outwardly extending end of the valve stem is very firmly grasped in some convenient manner, and the entire assembly removed by the simple rotation of a lever nut or similar appliances without danger of destroying the springs or the valves.

In the accompanying drawings wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein like numerals designate like parts.

Figure 1 is a vertical section taken through apparatus embodying my invention showing the same in use.

Fig. 2 is a side elevation partly in section of my apparatus showing a second method of withdrawing the assembly.

Fig. 3 is a section taken on the line 3—3 of Fig. 1.

Fig. 4 is the section taken on the line 4—4 of Fig. 2.

Fig. 5 is a perspective view of the locking ring.

Fig. 6 is a perspective of one of the pulling jaws, and.

Fig. 7 is a fragmentary perspective of the lower end of the jack screw.

Referring more particularly to the drawings, the numeral 10 indicates a substantially bottle shaped standard which is hollow and has an open bottom 11, and one side thereof cut away as at 12, to form an inspection aperture.

The restricted upper end of the standard 10 is provided with a vertical guide aperture having one side thereof flattened as at 13. This aperture slidably receives a jack screw or lift bar 14 which is externally screw threaded and provided upon one side with a flattened face adapted to co-act with the flat side 13 with the aperture. Mounted upon the upper end of the jack screw 14 is a lever nut 15 having threaded engagement with the jack, and abutting the upper end of the standard 10.

The lower end of the jack screw 14 is flanged as at 16. An axial bore 17 is formed in the lower end of the jack screw and transverse bores 18 are formed therein above the flanges 16 thereof and communicating with the bore 17 for a purpose hereinafter to appear. A threaded nut 19 is mounted upon the jack screw 14 interiorly of the standard 10.

A clamping member 20 is provided comprising a pair of co-acting clamping jaws 21 and 22 similar in construction. These jaws are provided with internal inclined outstanding ridges 23 which co-act when the jaws are assembled to form a helix of the same pattern as that of the spring of the assembly being removed. Adjacent their upper ends the jaws are provided with recesses forming shoulders 24 which are adapted to receive the flange 16 of the jack screw 14 and shoulders 25 for a purpose hereinafter to appear. The outer surface of the upper ends of the clamping jaws are tapered as at 26. The nut 19 is provided with a tapered counter bore 27 corresponding to and adapted to receive and co-act with the tapered upper end 26 of the jaws 21 and 22. It will be seen that by placing these jaws in position about the lower end of the jack and tightening the nut 19 downwardly upon the upper end of the jaws 21 the jaws are clamped about the lower end of the jack

screw and, as the lever nut 15 is rotated the jack screw 14 and the clamping jaws will be raised. A clamping ring 28 is provided which is adapted to fit over the lower end of the jaws when they are in assembled position, the clamping ring 28 being provided with an integral extension 29 for the purpose of convenience in handling.

In applying the tool to use the jack screw 14 is placed upon the top of the valve stem 30 with the stem projecting unto the bore 17 thereof. The clamping jaws 21 and 22 are now placed in position about the lower end of the jack screw. When in this position the helix formed by the ridges 23 of the jaws extends intermediate the coils of the spring 32 and the shoulder 25 of the jaws abuts the upper end of the spring retaining flange 31 thereof. It will thus be seen that the spring 32 and flange 31 are inclosed by the jaws 21 and 22. The clamping ring 28 is then placed in position holding the jaws in firm engagement. The standard 10 is now placed over the jack screw and the lever nut 15 placed in a position and rotated until the valve 34 and cage 35 are withdrawn.

In some instances the cage 35 adheres to the wall sufficiently that the pin, which holds the flange 31, in position shears through the flange. In event of such happening I have provided a pin 36 preferably secured by a chain 37 to the standard 10. The clamping jaws 21 and 22 are removed as is likewise the pin which holds the flange 31 in position upon the valve stem and the spring 32 is removed. The jack screw 14 is then placed over the end of the valve stem 30 until one pair of the apertures 18 aligns with the openings formed in the valve stem for the reception of the flange retaining pin. Pin 36 is then inserted through these aligned openings and the jack screw elevated.

What I claim is:

1. In a device for removing valve assemblies, the combination with a standard, and a lift bar slidably mounted in said standard, said lift bar having its lower end flanged, of a pair of co-acting jaws provided internally with inclined ridges, said ridges combining to form a helix when the jaws are in assembled position, said jaws being provided with a recess receiving the flanged lower end of said lift bar, and means for clamping said jaws about the flanged end of said lift bar.

2. In a device for removing valve assemblies, the combination with a standard, and lift bar slidably mounted in said standard

said lift bar having its lower end flanged and provided with an axial bore, of a pair of co-acting jaws provided internally with inclined ridges, said ridges combining to form a helix when the jaws are in assembled position, said jaws being provided with a recess receiving the flanged lower end of said lift bar, means engaging the upper ends of said jaws for clamping said jaws about the flanged end of said lift bar, and a ring arranged about the lower ends of said jaws.

3. In a device for removing valve assemblies, the combination with a standard, of a lift bar slidably mounted therein, said lift bar being provided in its end with an axial bore and with aligned transverse bores communicating with said axial bore, and a pin adapted for insertion in said transverse bores.

4. In a device for removing valve assemblies, the combination with a standard, of a lift bar slidably mounted therein, and provided with a flanged lower end, said lift bar being provided in its flanged end with an axial bore and with aligned transverse bores, communicating with said axial bore and arranged above said flange, and a pin adapted for insertion in said transverse bores.

5. In a device for removing valve assemblies, the combination with a standard and a lift bar slidably mounted therein, of a pair of coacting jaws provided internally with inclined ridges, said ridges being adapted to form a helix when the jaws are in assembled position, means for securing said jaws to the lower end of said lift bar, and means for clamping the lower ends of said jaws to each other.

6. In a device for removing valve assemblies, the combination with a standard and a lift bar slidably mounted therein, of a pair of coacting jaws provided internally with inclined ridges, said ridges being adapted to form a helix when the jaws are in an assembled position, the upper end of said jaws being shaped to fit about the lower end of said lift bar, means for securing said jaws to said lift bar, and a clamping ring adapted to be arranged about the lower end of said jaws to retain them in position.

In testimony whereof I affix my signature in presence of witnesses.

STARLING E. HUDDLE.

Witnesses:

C. H. DRINKLE,

F. R. RISING,

E. F. SHALLENBERGER.