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F. JERDONE, JR

AUTOMATIC TAKE-UP DEVICE

Filed Feb. 24, 1919

2 Sheets-Sheet 1

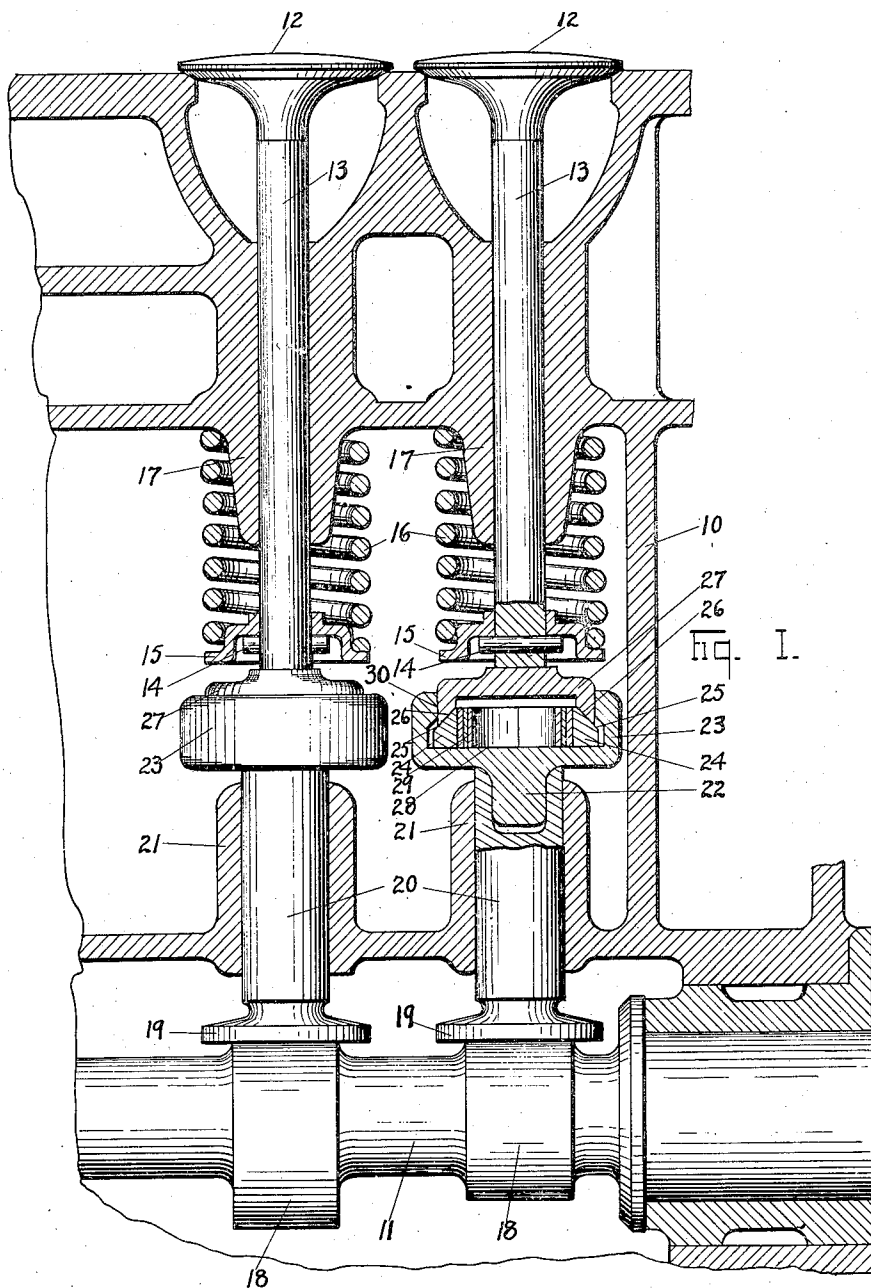
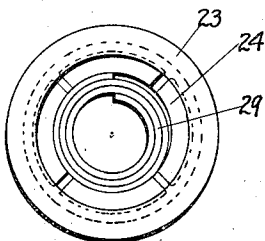


Fig. II.



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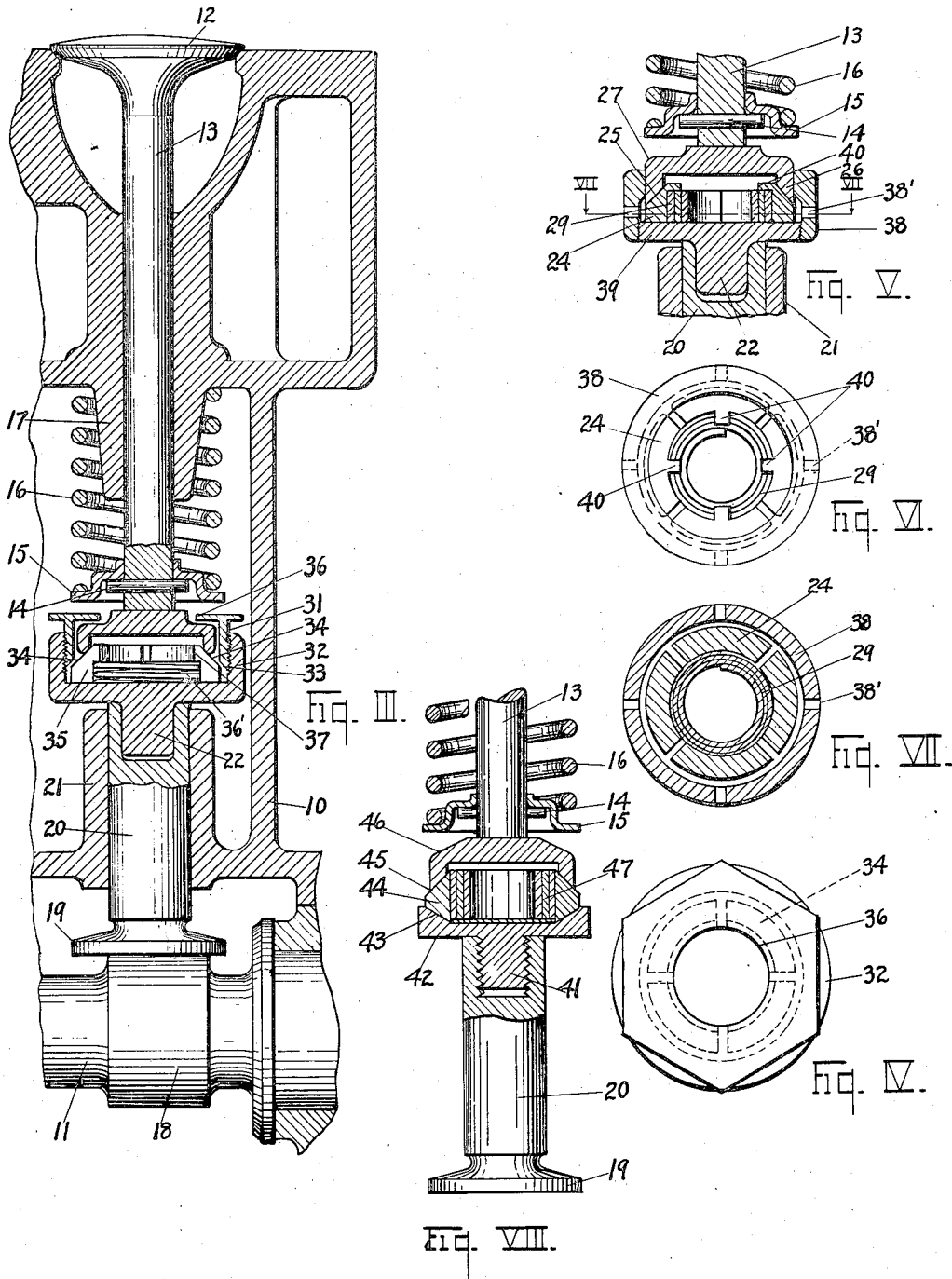
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UNITED STATES PATENT OFFICE.

FRANCIS JERDONE, JR., OF TOLEDO, OHIO, ASSIGNOR TO THE WILLYS-OVERLAND COMPANY, OF TOLEDO, OHIO, A CORPORATION OF OHIO.

AUTOMATIC TAKE-UP DEVICE.

Application filed February 24, 1919. Serial No. 273,768.

To all whom it may concern:

Be it known that I, FRANCIS JERDONE, Jr., residing at Toledo, Lucas County, and State of Ohio, have invented certain new and useful Improvements in Automatic Take-Up Devices, of which I declare the following to be a full, clear, and exact description.

My invention relates to an automatic take-up device and has for its object to provide improved means adapted to compensate for lost motion between two or more co-operating mechanisms or devices.

Another object of the invention is to provide, in an automatic take-up device, a plurality of spring actuated wedge-shaped members adapted to compensate for lost motion between two or more moving parts.

Still another object of the invention is to provide a simple and inexpensive automatic take-up device which is particularly adapted to compensate for lost motion between the valves and cam shafts of internal combustion engines such as are used on motor driven vehicles.

To these and other ends the invention comprises certain novel features of construction and arrangement of parts as will be hereinafter more fully described and claimed, it being understood that the invention is susceptible to certain modifications not shown in the drawings which will be comprehended by the claims forming a part of this specification.

A structure constituting one embodiment of my invention is illustrated in the accompanying drawings forming a part of this specification, in which:

Figure I is a fragmentary sectional elevation showing the application of my invention as applied between the valves and push rods of an internal combustion engine.

Figure II is a top plan of one of the take-up devices shown in Figure I with the cap removed.

Figure III is a fragmentary sectional elevation of an internal combustion engine showing the application of a modified form of the invention to the valves.

Figure IV is a top plan view of the take-up device shown in Figure III with the cap removed.

Figure V is a fragmentary sectional elevation of a slightly modified form of take-up device.

Figure VI is a top plan view of the same with the cap removed.

Figure VII is a sectional plan taken on the line VII—VII of Figure V.

Figure VIII is a fragmentary sectional elevation illustrating another modification of the invention.

Similar reference numerals refer to similar parts throughout the several views of the drawings.

The automatic take-up device shown and described in the present application as a compensating means for lost motion between the valves and cam shaft of an internal combustion engine may readily be applied to other mechanisms where it is desired to provide compensating means for lost motion between an operating and operated member or members, it being understood that the present application is merely illustrative of one of the uses to which the invention may be put.

Referring to the drawings 10 represents a portion of the cylinder block of an internal combustion engine and 11 the cam shaft of the engine. The valves 12 are provided with the usual valve stems 13 through the lower ends of which are extended the pins 14 for supporting the spring seats 15 carrying the lower ends of the valve closing springs 16, the upper ends of said springs being held by the valve stem guides 17 which are preferably cast integral with the cylinder block. Seated upon the cams 18 of the cam shaft 11 are the heads 19 of the push rods 20 which are reciprocally mounted in the guides 21 of the engine frame or block 10. The upper ends of the push rods 20 are preferably bored or otherwise recessed to receive the projection 22 on the bottom of the recessed holder 23, which is removable from the push rod and which forms a support for the circular segments 24 having the inclined or wedge-shaped faces 25 adapted to receive the correspondingly inclined faces 26 of the cap or follower 27 upon which is seated the lower end of the valve stem 13 as shown in Figure I. The wedge-shaped segments 24 are supported on the horizontal wall 28 of the recessed holder 23, said wall forming the seat upon which said segments are slidably mounted, one relatively to another. Coiled within the segments and seated upon the wall 28 is a tensioned leaf spring

29 which is constantly tending to expand or push outwardly the several wedge-shaped segments 24, which serve to automatically raise the cap or follower 27, said cap being at all times resisted by the valve stem 13 under the tension of the spring 16, whereby any lost motion between the cam 18 and valve stem 13 and the parts therebetween is automatically taken up or compensated for by the outward movement of the wedge-shaped segments under the action of the spring 29. The cap 27 is preferably held centralized on the segments by the annular and inwardly extending flange 30 of the recessed holder 23 as shown at the right of Figure I. That portion of the cap 27 which rests upon the inclined faces of the segments 24 is correspondingly inclined, although it may be rounded as shown in Figure III if desired. If preferred the cap 27 and valve stem 13 may be united or rigidly connected together, although I consider it best to construct these parts as shown in the drawing. The same applies also to the push rod 20 and the seat or holder 23 thereon. These last two members may be termed the operating or actuating mechanism and the valve and cap the means to be actuated, while the spring-pressed segments may be said to constitute the automatic take-up portion of the mechanism.

In the modification shown in Figures III and IV, I have provided a ring 31 which is threaded into the recessed holder 32 and provided at its lower end with a tapered or inclined portion 33 which is adapted to be adjusted into engagement with the inclined faces 34 of the segments 35 for the purpose of temporarily contracting or moving said segments together to afford a more ready application of the device between the member to be actuated and the members for actuating the same, by reason of the fact that the cap may in this way be lowered within the recessed holder sufficiently to clear the valve stem, thereby permitting the latter with the valve to be more easily applied or removed from the valve seat. A further advantage in the adjustable ring lies in the fact that it serves to prevent accidental displacement of the parts of the device and permits the handling of these parts as a unit. In this instance the cap is also held against accidental displacement by the inwardly projecting annular flange 36 on said ring as shown in Figure III. In this modification, I have used a coiled spring 36' formed of round wire rather than the leaf spring, said spring being held against accidental displacement by the inwardly extending annular flanges 37 on the segments 35.

In the modification shown in Figures V to VII inclusive, the recessed holder is formed in two parts comprising a ring 38 into the bottom end of which is screwed the base or

seat 39 upon which the wedge-shaped segments are mounted. The ring 38 is provided with apertures 38' adapted to receive a suitable tool for temporarily contracting the segments 24 to lower the cap thereon. The inwardly extending spring retaining projections 40 on these segments are relatively narrow and are preferably centrally located upon the segments.

In Figure VIII, I have shown a modification in which the projection 41 on the holder 42 is threaded into the push rod, while the holder is also provided with a tapered or inclined annular face 43 for receiving the lower inclined faces of the circular segments 44, said segments having at their upper ends the reversely inclined faces 45 upon which the cap 46 is mounted. Coiled within the segments 44 is a leaf spring 47 for expanding said segments to automatically compensate for lost motion between the several moving parts, whether caused by wear or otherwise.

The present device is so constructed that in case of elongation caused by expansion of the valve stem, push rod and other parts of the mechanism, the valves will not be lifted from their seats as the wedge-shaped segments will be automatically forced inwardly sufficiently to compensate for such action and at the same time, of course, the spring for expanding said segments will yield and be slightly compressed, it being understood that the main valve spring is of a capacity sufficient to prevent the raising of the valves by expansion of the stem.

While in the present application I have shown the spring in position to expand or move the segments outwardly, it will be understood that by reversing the inclined portions of said segments and placing the spring exteriorly of these members, they may be actuated inwardly to produce the same result.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an automatic take-up device, the combination with a member to be actuated, operating mechanism therefor, a recessed member mounted upon said operating mechanism having an inwardly disposed inclined face, a plurality of wedge-shaped members seated upon the inclined face of the last mentioned member and co-operating with the member to be actuated to compensate for lost motion between said member and the operating mechanism.

2. The combination with the valves and cam shaft of an internal combustion engine, a push rod for each of the valves adapted to be actuated by the cam shaft, a seat upon said push rod, a plurality of circumferentially arranged members mounted upon said seat having outwardly disposed inclined faces, a spring tending to move said

members relatively to each other, and a cap having an annular flange disposed upon said inclined faces and forming a seat for the stem of the valve.

3. The combination with the valves and cam shaft of an internal combustion engine, a push rod for each of the valves adapted to be actuated by said cam shaft, a removable seat upon said push rod, a plurality of segments carried by the seat having outwardly disposed inclined faces, a spring within said segments tending to move them outwardly upon the seat, a cap positioned upon the inclined faces of said segments and co-operating with the stem of the valve to lift the same, and a spring for returning said valve to closed position.

4. The combination with the valves and cam shaft of an internal combustion engine, a push rod for each of the valves adapted to be actuated by said cam shaft, a seat upon each of said push rods having inclined faces thereon, a plurality of relatively movable members having correspondingly inclined faces resting upon the inclined faces of said seat, said members being provided at their opposite ends with reversely inclined faces, a cap mounted upon the last mentioned faces and co-operating with the stem of the valve to lift the latter, a spring acting upon said members to move them relatively to each other, and a second spring for closing said valve.

5. An automatic take-up device comprising a recessed holder provided with an annular inclined face, a plurality of spring-pressed segments having correspondingly inclined faces seated upon the inclined faces of said holder, said segments being also provided with reversely inclined faces and a cap seated upon said last mentioned faces.

6. An automatic take-up device adapted for insertion between two movable members, one of which is adapted to be actuated by the other, said device comprising a holder, a plurality of segments upon said holder provided with outwardly disposed inclined faces, a follower disposed upon said inclined faces and means tending to force said segments apart.

7. An automatic take-up device adapted for insertion between two movable members, one of which is adapted to be actuated by the other, said device comprising a holder provided with a stem adapted for insertion

in a recess formed in one of said movable members, a plurality of segments upon said holder provided with outwardly disposed inclined faces, a follower mounted upon said inclined faces and forming a seat for the other of said movable members and a spring coiled within said segments.

8. An automatic take-up device adapted for insertion between two movable members, said device comprising a recessed holder, a plurality of segments within the holder provided with outwardly disposed inclined faces, a follower having a flanged portion seated upon the inclined faces of said segments and a spring within said recessed holder tending to force said segments apart.

9. An automatic take-up device adapted for insertion between two movable members, said device comprising a holder having an inclined annular face, a plurality of segments seated upon the inclined face of the holder, a follower disposed upon said segments and a spring coiled within said segments.

10. An automatic take-up device adapted for insertion between two movable parts, said device comprising a holder provided with an inclined face, a plurality of segments mounted upon the inclined face of the holder and provided with reversely inclined faces, a follower disposed upon said reversely inclined faces and a spring coiled within said segments.

11. An automatic take-up device adapted for insertion between two movable members, said device comprising an integral holder adapted for adjustment upon one of said members and having an inclined face, a plurality of segments mounted upon the inclined face of the holder, a spring coiled within the segments and a follower mounted upon said segments.

12. The combination with the valve stem and push rod of an internal combustion engine, a holder upon the push rod, a plurality of segments upon the holder having outwardly disposed inclined faces, a follower having an annular flange engaging the inclined faces of said segments, said follower forming a seat for said valve stem and a spring coiled within said segments.

In testimony whereof I affix my signature.

FRANCIS JERDONE, JR.