Oct. 10, 1939. C. E. JOHNSON 2,175,465

TAPPET

Filed May 2, 1938

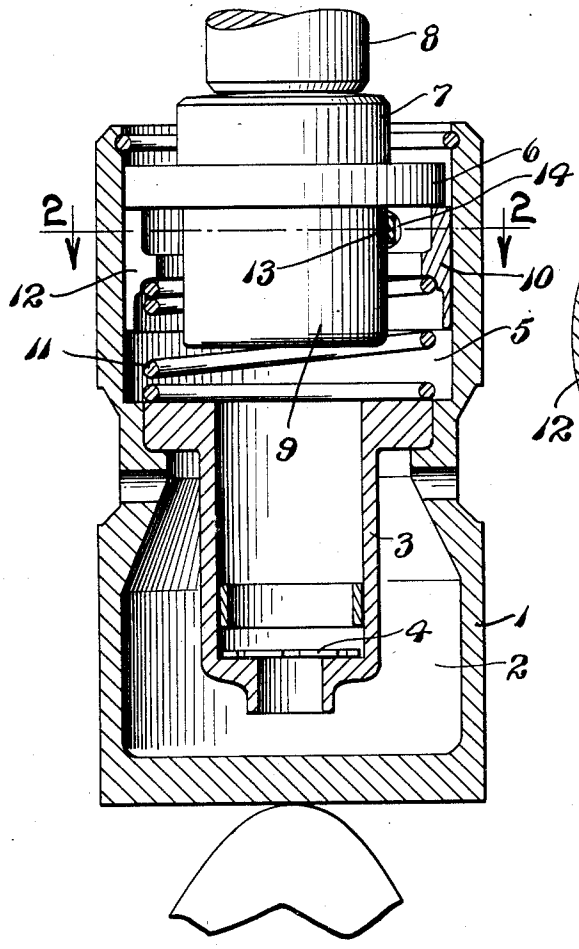



Fig. 1.

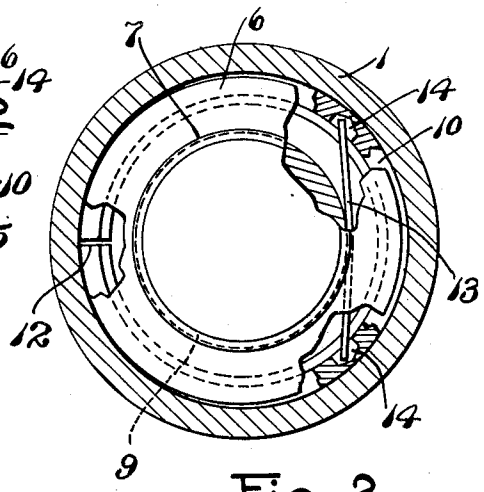



Fig. 2.

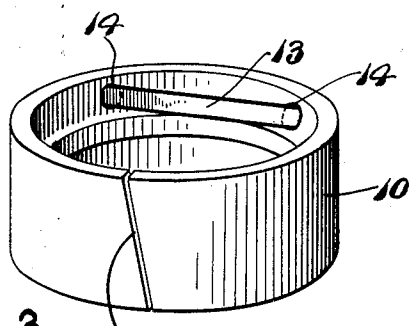



Fig. 3.

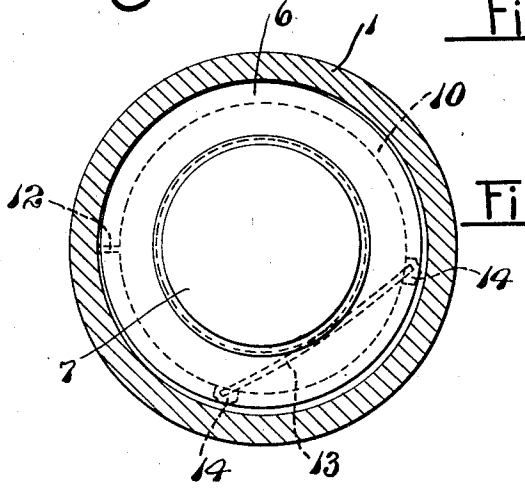



Fig. 4.

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# UNITED STATES PATENT OFFICE

2,175,465

## TAPPET

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Application May 2, 1938, Serial No. 205,525

3 Claims. (Cl. 309—41)

This invention relates to valve tappets of the hydraulic type and, generally, of the character shown in my Patent No. 2,090,795 issued August 24, 1937. The present invention is directed to an improvement in connection with the slot in the piston ring to keep the same from any excess leakage, which ring, as shown in the patent above noted, is underneath and is pressed upwardly by a spring against a vertically movable piston which is mounted within the tappet body. The gap or parting in said ring, while of narrow width, permits some passage of oil which is under pressure in the tappet. The piston in order to be freely movable vertically in the tappet body must be of a slightly smaller exterior diameter than the interior diameter of the body. Should the piston be moved over in the tappet body to one side as far as it can go, thus making a relatively large clearance between the opposite side of the piston and the body, and if the parting in the ring is in substantial alinement with said relatively wide clearance, there may be too great a passage of oil.

The present invention is concerned with a very simple yet practical means for insuring that the parting in said split ring sealing member shall never be in alinement or anywhere near alinement with any relatively large clearance between the piston and the tappet body, but on the other hand that such parting in the piston ring shall always be at a side of the piston close to the wall of the tappet body and where there is but little or no clearance between said piston and body.

An understanding of the invention may be had from the following description taken in connection with the accompanying drawing, in which:

Fig. 1 is a longitudinal central vertical section through a tappet made in accordance with my invention.

Fig. 2 is a partial horizontal section and plan, the parts in section being on the plane of line 2—2 of Fig. 1, looking downwardly as indicated.

Fig. 3 is a perspective view of the split sealing ring which is used, modified in accordance with my invention, and

Fig. 4 is a plan and horizontal section of a slightly different construction embodying the invention.

Like reference characters refer to like parts in the different figures of the drawing.

The hollow tappet body 1 is of cylindrical form closed at its lower end, and its lower portion has an oil chamber or reservoir 2 into which oil passes through the lateral openings shown near the upper portion of the chamber. A tubular member 3 extends downwardly into the oil chamber 2 and is provided with a valve 4 at its lower part permitting upward passage of oil but closing against any return downward passage. The tubular member 3 forms a part of a hydraulic oil compression chamber 5 located between the valve 4 and the piston 6, which piston is mounted in the upper portion of the body 1 and has a limited movement. The piston 6 is provided with an integral upper cylindrical projection 7, the upper end of which is directly at the lower end of the valve stem 8. The piston is also provided with a downward cylindrical projection 9 which extends into the oil compression chamber 5.

Within the chamber 5 and directly underneath the piston 6 is a split sealing ring 10 between which and the upper end of the tubular member 3 is a coiled compression spring 11 which acts to move the ring 10 upwardly against the under side of the piston 6, and thus move the projection 7 into engagement with the lower end of the valve stem 8. The ring 10 is very similar to piston rings which are used in internal combustion engines though of small diameter and greater height.

In the inner side of the split ring 10 and, in the form shown in Figs. 1, 2 and 3, directly opposite the parting slot at 12 therein a member 13 of thin flat spring steel stock is carried, the ends of the member 13 being received in suitably drilled sockets or openings 14 which are made at spaced points at the inner side of the split ring 10. The middle point of the spring member 13, in Figs. 1, 2 and 3, is diametrically opposite the parting slot 12 in the ring.

When the parts are assembled as in Fig. 1, the downwardly extending cylindrical projection 9 comes at the inner side of the spring member 13 which is slightly pressed outwardly thereby so that the effect is to move the piston 6, in Fig. 1, over as far to the left as it will go, while the clearance between the piston and the body 1 is greatest at the right hand side of the piston as shown in Fig. 1. As the spring member 13 is directly opposite the parting slot at 12, it is evident that at said parting through which oil might pass upwardly, there is no appreciable clearance between the piston and the tappet body at the upper end of the slot. This structure insures that the parting slot 12 in the split sealing ring 10 shall never be in conjunction with any appreciable clearance between any part of the piston and inner wall of the tappet body, but that such parting 12 will always be as far away from the

widest clearance space between the piston and body as is possible.

In Fig. 4 the spring member 13 is not located directly opposite the parting 12 as in Figs. 1, 2 and 3, but, as shown, it is located at a different position whereby there is left a relatively small clearance between the piston 6 and the walls of the cylinder directly over the parting of the ring at 12. By locating the bar 13 at a predetermined position with respect to the ring parting 12, it is thus made possible to provide a predetermined metering opening between the hydraulic chamber 5 and the outside of the tappet through the parting 12 and the small clearance such as shown in Fig. 4 at the outer portions of the parting 12, said clearance being between the piston 6 and the walls of the cylinder.

Such communication will permit the escape of air which may collect in the upper portion of the hydraulic chamber 5 and also permit the escape of a relatively small amount of oil but not in any excess quantity. It is thus possible to insure against any excess leakage of oil from the hydraulic chamber 5, yet at the same time provide a means of air escape and control the passage of oil to such a degree that any limited escape permitted will not be in any way detrimental to the operation of the tappet.

This structure while simple and easily produced, is particularly effective in service.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. A device of the class described comprising, a cylinder, a piston therein having a depending portion, a piston ring located below said piston having a parting at one side thereof, means to urge said ring upwardly against the bottom of said piston, and resilient means within said ring adjacent said depending portion to maintain said piston against the wall of the cylinder at substantially the same point where the parting in the ring is located.

2. A device of the class described comprising, a cylinder, a piston therein having a depending portion thereon, a piston ring adjacent said piston and surrounding said depending portion having a parting at one side thereof, means to urge said ring upwardly against said piston, and resilient means within said ring and considerably spaced from the parting therein to contact said depending portion thereby forcing said piston against the wall of the cylinder at the same side where the parting of the ring is located.

3. A device of the class described comprising, a cylinder, a piston therein having a depending portion thereon, a piston ring having a parting at one side thereof and surrounding said depending portion, means to maintain said ring against the underside of said piston, and a strip of spring steel secured within said ring a considerable distance from said parting therein adapted to contact said depending portion to force said piston against the wall of the cylinder at a point opposite said strip and adjacent the parting in the ring.

CHARLES E. JOHNSON.