July 15, 1930. R. C. WILLIS 1,770,721

UNIVERSAL MOUNTING

Filed March 11, 1929

Fig. 1.

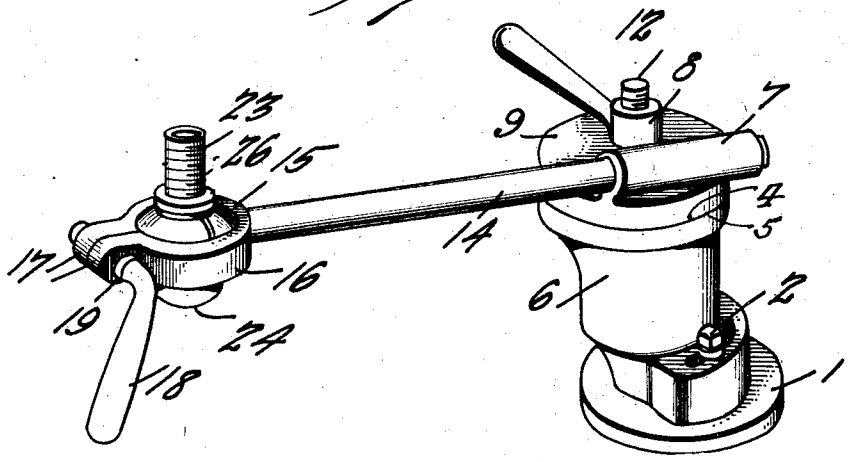


Fig. 3.

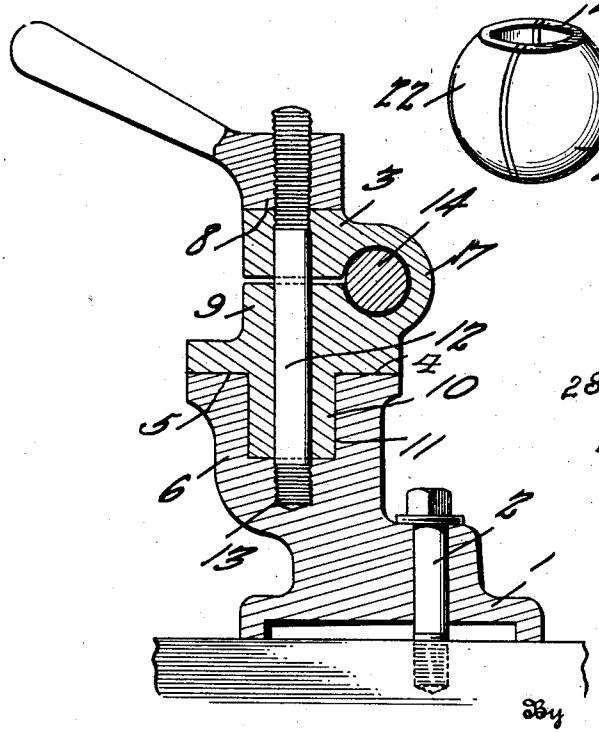
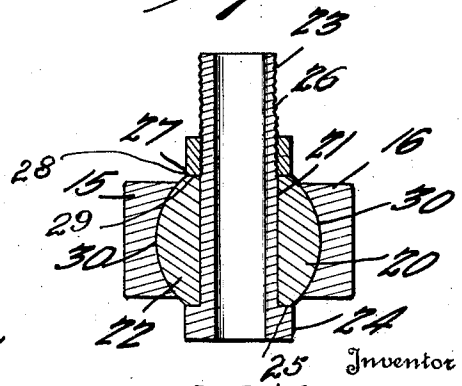


Fig. 4.

Fig. 2.



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UNITED STATES PATENT OFFICE

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UNIVERSAL MOUNTING

Application filed March 11, 1929. Serial No. 346,231.

This invention is directed to an improvement in universal mountings for valve-seat cutters and reseaters of the type described and claimed in Patent No. 1,667,918, issued May 1, 1928.

In the type of mounting disclosed in the patent referred to, the cutter-arbor guide was terminally formed with a ball seating in a correspondingly shaped receiver provided in the respective faces of arms arranged for clamping to hold the ball and therefore the guide in any set position. The wall of the receiver was of babbitt or like metal to insure proper and non-slipping cooperation with the ball. This particular construction has proven to have some commercial disadvantages in that the babbitt bearing in the continued use of the tool is gradually worn away and at the same time becomes more or less deformed under the pressure with a resultant uneven pressure on the ball and a tendency to deflect under such uneven pressure.

Furthermore, the required accuracy of the tool necessitates a very close, free, sliding fit between the cutting arbor and arbor guide and in the continued use of the tool, particularly under the liability of imperfect lubrication, the bore of the arbor guide becomes worn to an extent to materially interfere with the desired accuracy of the tool. Under these circumstances, the arbor guide must of course be renewed and this requires a new ball terminal, as such ball terminal is integral with the guide, and the new ball terminal necessitates a new babbitt metal bearing in the arm and the refinishing of the arm as the heat of the metal destroys the finish. Thus, even the normal wear in the arbor guide results in the necessity for a renewing of a number of parts which should not ordinarily require renewal and has proven a matter of more or less serious economic consideration from a commercial standpoint.

It is the primary object of the present invention to so construct the several parts as to insure their effective service and yet render the part naturally subjected to most wear and therefore sooner requiring renewal to be independently separable to permit its immediate renewal by a stock part and thereby avoid the necessity for replacement of parts not necessarily affected by wear and avoiding the necessity for returning the parts to be renewed to the factory or other point having facilities for the renewal heretofore necessary.

In this particular, the invention comprises a gripping element having an external spherical form and an internal diametric opening to receive the tool arbor guide, the element thus provided having its wall divided on a diametric line to form separable sections, with means by which these sections may be removably interfitted with the tubular arbor guide in a rigid, non-yielding, non-compressible manner. Thus, the renewal of the normally wearing part, the arbor guide, is a small matter of replacing that guide, using the former gripping element and securing means, the separability of the gripping element from the arbor guide facilitating this replacement.

The invention also contemplates the provision of a base to be removably fixed on the engine block, with means carried by the base whereby the arbor guide and its cooperating elements may be readily and conveniently adjusted for the initial centering of the arbor guide with respect to the valve seat being operated upon.

The invention is illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of the mounting.

Figure 2 is an enlarged sectional view of the clamping members, gripping member, and guide in cooperative relation.

Figure 3 is an enlarged sectional view through the parts providing for the rotative movement of the mounting as a whole.

Figure 4 is a perspective view of the gripping member.

The improved mounting comprises a base adapted to be removably fixed on the engine block, a supporting member mounted for rotative adjustment on the base, a clamping means adjustable to and from the supporting member, and a gripping member and cutter-

arbor guide cooperating with the clamping means.

In the preferred embodiment illustrated, the mounting comprises a base 1, formed with a slot 2 to receive one of the usual removable head clamping bolts of the engine. By this means, after removing the engine head, the base may be secured in a convenient position on the block with a rotative adjustment in such position limited only by the extent of the slot 2.

To secure the supporting member in proper relation to the base while insuring the absolute accuracy of its relation to the base, said supporting member comprises a divided body 3 having a flat face 4 bearing squarely on the flat face 5 of an upstanding part 6 of the base. The supporting member is formed with an offset sleeve portion 7 integral with the respective upper and lower portions 8 and 9 of the divided body 3, to provide for contracting movement of the wall of sleeve 7 when the body parts 8 and 9 are forced together.

The lower body part 9 is formed with a circular guide lug 10 extending below its face 4 and seating with a sliding fit, when the parts are assembled, in a correspondingly shaped recess 11 in the upstanding part 6 of the base. A rod 12 passes through both parts of the body and through the lug 10, being threaded into a threaded hole 13 in the bottom of the recess 11. The upper end of rod 12 has its threaded upper end projected above the body 3 to receive a clamping handle which, when appropriately turned, will secure the supporting member rigidly on the base and at the same time contract the sleeve 7, or loosen such parts in an obvious manner.

The clamping parts for the cutter-arbor guide include a rod 14 fitting the sleeve 7 and obviously adjustable therein both rotatively and longitudinally, and clamping arms 15 and 16 carried by or integral with the rod. The arms 15 and 16 are of semicircular form in plan and have a substantial vertical dimension. The terminals of the arms have cooperating outstanding radial ears 17, one of which is formed with a threaded opening to receive the threaded end of a handle 18, which passes loosely through the other ear and is provided with a collar 19 to bear against such ear. By operation of the handle, the ears and therefore the arms 15 and 16 may be moved toward each other for clamping cooperation, or from each other for unclamping.

A gripping member 20 is provided to cooperate with the clamping arms. This member comprises a metallic body externally of spherical form and having an axial bore 21. The body is divided on its diametric line, providing two spherical segments 22. A cutting arbor guide 23 in the form of an elongated sleevelike member and designed to slidably and rotatably receive the arbor on which the cutter is mounted (not shown), has an external diameter throughout its lower portion for a sliding fit in the bore 21 of the gripping member 20.

The lower end of the guide has an annular offset 24 to receive the lower edges of the spherical segments 22, such spherical segments throughout the area cooperating with the offset 24 being flattened, as at 25, to accurately and snugly bear on said offsets. The arbor guide above the gripping member receiving portion is exteriorly threaded, as at 26, to receive a clamping nut 27, the lower surface of which presents the square abutment 28 to bear upon a flattened portion 29 at the upper extremity of the spherical segment sections 22.

Thus, with the sections in applied position on the arbor guide and the nut 27 tightened, it is apparent that the sections are secured in a substantially rigid manner to the arbor guide and form in effect a spherical or ball-like enlargement at the lower end of the guide.

It is important that under the clamping pressure of the arms 15 and 16 on the gripping member, as will later appear, no appreciable clamping pressure of such gripping sections be had on the arbor guide. To insure this it may be found necessary to provide ordinary shims between the meeting edges of the segment sections 22 to insure absolute accuracy of the internal bores of such sections with the external diameter of the arbor guide to prevent any possibility of clamping action of the sections 22 on the guide. The sole connecting relation between the spherical segment sections 22 and the arbor guide is through the clamping of such sections on the guide between the offset 24 on the guide and the nut 27, it being understood that the bearing surfaces between the segment sections 22 and the offsets 24 and between such sections and the nut 27 are carefully formed to insure uniformity of contact throughout to thereby hold the sections 22 in rigid relation to the arbor guide under the clamping action of the nut 27.

The inner surface of the clamping arms 15 and 16 are recessed on spherical lines at 30 to accurately receive the gripping member and exert binding pressure thereon under clamping action of the arms to rigidly hold the gripping member and arbor guide.

In operation, the arbor guide is to be aligned with the valve guide of the particular valve seat, as described in the patent above referred to. The base is adjusted on the block and secured; the supporting member is adjusted and secured; and the arbor guide is aligned with the valve guide of the valve seat to be recut or reseated. After placement of

the arbor guide, the clamping arms are to be tightened by handle 18 to hold the gripping member in its then position and also to bind said member and the guide.

It will be apparent from the above construction that in the natural wear to which the tool is subjected and the necessity following such natural wear for the renewal of the arbor guide, the replacement of such guide is a simple and easy matter. The removal of the clamping nut instantly frees the sections 22 of the gripping member and these may be readily replaced and clamped onto a new arbor guide, available ordinarily from stock, by the simple expedient of positioning the sections 22 and applying the clamping nut 27.

Of course, in the new application, the use of appropriate shims to prevent clamping action of the segments on the arbor guide is of importance and as it may well be that the exterior diameter of the replaced guide differs slightly from that of the worn guide, care should be taken to use the proper shims to insure the accuracy of fit required. This, of course, is a detail of assembly well understood by any mechanic and the provision of several shims of different thicknesses as a part of the original tool equipment may readily take care of these renewals. Therefore, in the absence of breakage, the renewal of the part most subjected to wear is a simple mechanical operation and one requiring but a few moments time, so that the tool is practically not out of service at all by the requirement of replacement of the worn part.

The spherical form gripping member is constructed in two parts which, in addition to other advantages, permits the assemblage of the parts in unit form within the clamping parts, as it is apparent that if the gripping member was in the form of a single unit, it could not be placed in and removed from position in the clamping parts. Where the gripping member is divided into two parts as shown, the sawing element which divides the material will, of course, take out a certain portion of that material in the cutting operation, that is at least to the thickness of the saw. Shims of appropriate thickness, if used between the parts, will replace the metal cut out by the saw and thus the gripping member will, in use, be in true spherical form.

What is claimed to be new is:

1. A universal mounting for valve reseaters and the like, including a tool-arbor guide, a spherical member made up in sections and surrounding the guide, and means including an offset and a nut on the guide for simultaneously clamping the sections of the spherical member onto the guide.

2. A universal mounting for valve reseaters and the like, including a cutter-arbor guide, a gripping member loosely encircling the guide and made up of a plurality of sections together presenting an exterior spherical face, means carried by the cutter arbor-guide for simultaneously clamping the sections onto the guide, and clamping arms formed to fit the spherical face of the gripping member and adapted in clamping cooperation to bind the sections of the gripping member to hold the guide.

3. A universal mounting for valve reseaters and the like, including a cutter-arbor guide, a gripping member loosely encircling the guide and made up of a plurality of sections together presenting an exterior spherical face, means carried by the cutter arbor-guide for simultaneously clamping the sections onto the guide, clamping arms formed to fit the spherical face of the gripping member and adapted in clamping cooperation to bind the sections of the gripping member to hold the guide, said sections being free of clamping action on the guide at all times.

4. A universal mounting for valve reseaters and the like, including a cutter-arbor guide, a gripping member encircling the guide and comprising a plurality of independent sections together presenting an exterior spherical surface, clamping arms recessed on their inner surfaces to accurately receive the spherical surface of the gripping member, means to operate the clamping arms to exert a clamping pressure on the sections of the gripping member to thereby bind the guide in any position in which it may be set, and manually operable means carried by the guide to removably secure the sections of the gripping member on the guide.

5. A universal mounting for valve reseaters and the like, including a cutter-arbor guide, a gripping member encircling the guide and comprising a plurality of independent sections together presenting an exterior spherical surface, clamping arms recessed on their inner surfaces to accurately receive the spherical surface of the gripping member, means to operate the clamping arms to exert a clamping pressure on the sections of the gripping member to thereby bind the guide in any position in which it may be set, an offset on the guide to receive the lower ends of the gripping sections, and a clamping nut cooperating with the guide to engage the upper ends of the sections and clamp the sections between said nut and offset to fix the gripping member with respect to the guide.

6. A universal mounting for valve reseating tools and the like, including a base to be removably secured to the engine block, a supporting member rotatably adjustable on the base means cooperating with the supporting member and the base to secure the supporting member in adjusted position, a rod slidable in the supporting member, clamping arms carried by the rod, a cutter-arbor guide arranged between the clamping arms, and a spherical gripping member interposed be-

tween the guide and arms and serving to fix the guide in any desired position following clamping movement of the arms.

7. A universal mounting for valve reseating tools, including a cutter-arbor guide, a sectional gripping member loosely encircling the guide, clamping arms for exerting a clamping pressure on the sections of the gripping member, a rod projecting from said arms, a supporting member in which the rod is longitudinally and rotatably adjustable, a base on which the supporting member is rotatable, and means for simultaneously clamping the supporting member in fixed relation to the base and securing said rod against movement.

8. A universal mounting for valve reseating tools, including a cutter-arbor guide, a sectional gripping member loosely encircling the guide, clamping arms for exerting a clamping pressure on the sections of the gripping member, a rod projecting from said arms, a base to be removably secured to the engine block, said base having a plain upper bearing face with a central depression, a supporting member having a bearing face to cooperate with the bearing face of the base and having a lug to seat in the depression of the base, said supporting member being formed in upper and lower parts together with an offset sleeve to receive said rod, a pin passing loosely through the parts of the supporting member and the lug thereon and threaded into the bottom of the recess in the base, and a handle having a threaded cooperation with the pin beyond the upper part of the supporting member, whereby through operation of the handle the supporting member is fixed with relation to the base and the sleeve is clamped on said rod to prevent movement of the latter.

9. A universal mounting for valve reseating tools, including a cutter arbor guide, a spherical gripping member on the guide clamping arms for exerting a clamping pressure on the gripping member, a rod projecting from said arms, a supporting member in which the rod is longitudinally and rotatably adjustable, a base on which the supporting member is rotatable, and means for simultaneously clamping the supporting member in fixed relation to the base and securing said rod against movement.

10. A universal mounting for valve reseating tools, including a cutter arbor guide, a spherical gripping member on the guide, clamping arms for exerting a clamping pressure on the gripping member, a rod projecting from said arms, a base to be removably secured to the engine block, said base having a plain upper bearing face with a central depression, a supporting member having a bearing face to cooperate with the bearing face of the base and having a lug to seat in the depression of the base, said supporting member being formed in upper and lower parts together with an offset sleeve to receive said rod, a pin passing loosely through the parts of the supporting member and the lug thereon and seated in the bottom of the recess in the base, and a hand operated element having a threaded cooperation with the pin beyond the upper part of the supporting member, whereby through operation of the hand operated element the supporting member is fixed with relation to the base and the sleeve is clamped on said rod to prevent movement of the latter.

In testimony whereof I affix my signature.

REX C. WILLIS. [L. S.]