

June 14, 1932.

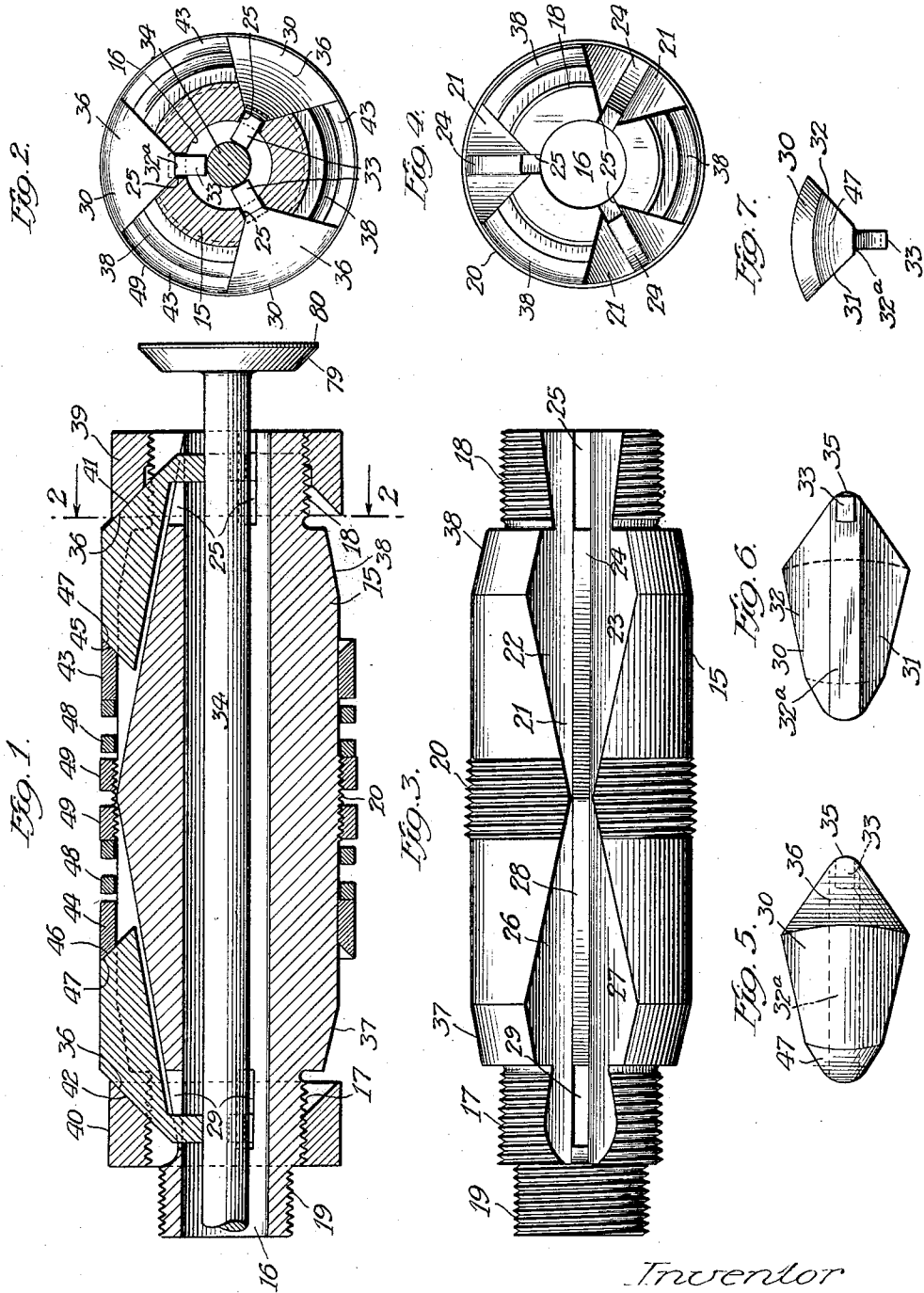
L. W. JOHNSON

1,862,856

CHUCK

Filed Dec. 9, 1929

3 Sheets-Sheet 1



Witness
R. B. Davison

Inventor
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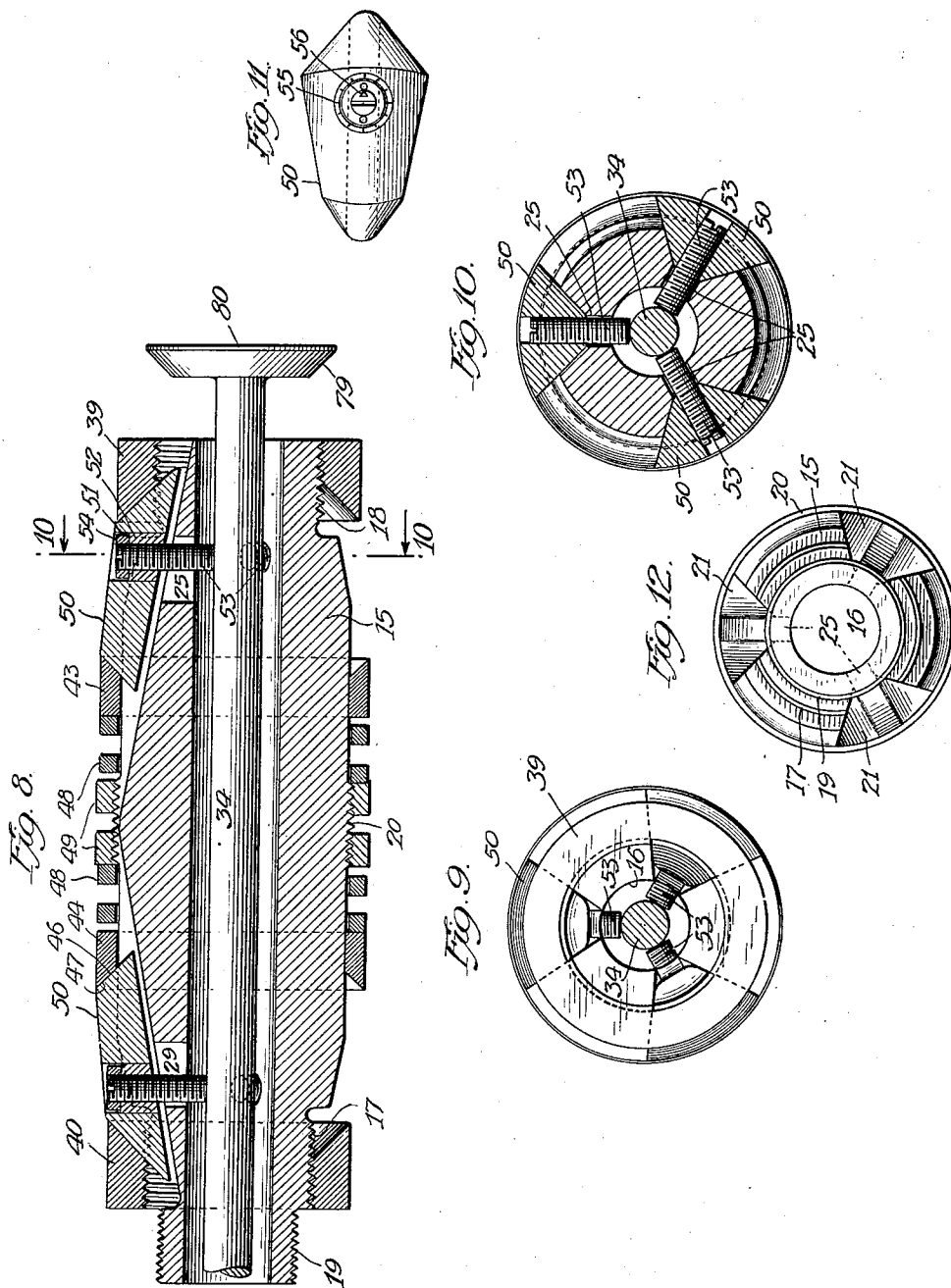
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CHUCK

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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

Fig. 13.

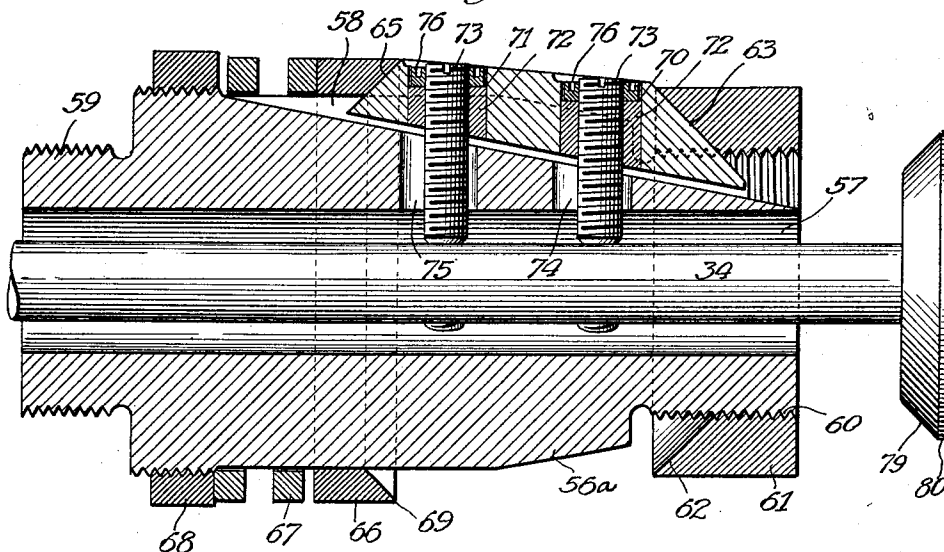
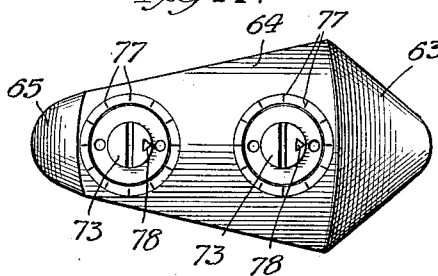


Fig. 14.



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UNITED STATES PATENT OFFICE

LEONARD W. JOHNSON, OF BATAVIA, ILLINOIS

CHUCK

Application filed December 9, 1929. Serial No. 412,691.

My invention relates to a chuck, and has particular reference to a chuck for use in holding valves during the grinding thereof.

The primary object of my invention is the provision of a chuck which will hold a valve accurately during the grinding operation and which possesses sufficient strength and gripping power to resist the turning of the valve stem during the grinding operation.

Another and further object of my invention is the provision of a chuck which grips the valve stem with sufficient force to prevent turning of the valve stem during the grinding operation and yet does not distort or bend the valve stem, thus rendering it inaccurate or unfit for use.

Another and further object of my invention is the provision of a chuck which has a capacity for a wide range of sizes of valve stems, rendering it unnecessary for the operator of a repair garage to use a large number of chucks for different sizes of valves.

Another and further object of my invention is the provision of a chuck which holds a valve in proper aligned relation for the grinding operation and which holds the valve stem securely during the grinding operation and prevents a swinging or moving of the stem, thereby rendering the grinding of the valve inaccurate.

These and other objects will be more fully and better understood by reference to the accompanying sheets of drawings, in which—

Figure 1 is a longitudinal sectional view of my improved invention;

Figure 2 is a transverse sectional view on lines 2—2 of Figure 1;

Figure 3 is a side elevational view of the shell member forming a component part of my invention;

Figure 4 is an end elevational view of the member shown in Figure 3;

Figure 5 is a top plan view of one of the gripping members used in connection with the device;

Figure 6 is a bottom plan view of the gripping member illustrated in Figure 5;

Figure 7 is an end view of the gripping member illustrated in Figures 5 and 6;

Figure 8 is a longitudinal sectional view of a modified form of my invention;

Figure 9 is an end elevational view of the device shown in Figure 8 with the valve removed;

Figure 10 is a cross sectional view on lines 10—10 of Figure 8;

Figure 11 is a top plan view of one of the gripping members shown in Figure 8;

Figure 12 is an end elevational view of the device shown in Figure 8, with the gripping members removed;

Figure 13 is a longitudinal sectional view of a modified form of the device; and

Figure 14 is a top view of one of the gripping members illustrated in Figure 13.

Referring now specifically to the drawings, and in which like reference characters refer to like parts throughout, a member 15 is shown having a central bore 16 extending longitudinally thereof and having threaded portions 17 and 18 at each end thereof of less external diameter than the body portion of the member 15, with a threaded portion 19 adjacent the portion 17 of lesser diameter than the portion 17, by means of which the device is attached to a mandrel, or the like, of a grinding machine.

The member 15 has a threaded portion 20 intermediate the ends thereof for purposes hereinafter described. Formed in the member 15 at one end thereof and in spaced relation with each other, is a plurality of longitudinal extending guideways designated as a whole as 21, 21. Each of these guideways has inclined sides 22 and 23 which extend outward from a bottom portion 24, the said bottom portion 24 being inclined from the central portion of the threaded part 20 of the device toward the threaded end 18 and terminates adjacent the inner end of the threaded portion 18 so that a plurality of channels 25, 25 are formed in the end portion 18 of the member 15, for purposes hereinafter described. At the opposite end of the member 15 a plurality of guideways similar to 21 is formed which have inclined sides 26 and 27 with a portion 28 therebetween, these guideways and the portions 28 being inclined towards the outer end 17 of the

member 15, and has a plurality of slots 29 formed through the member 17.

Gripping members, designated as a whole as 30, 30, are provided, illustrated specifically in Figures 5, 6 and 7, which have sloping under sides 31 and 32 adapted to engage on the sloping sides 22 and 23 of the guideways 21, or the sides 26 and 27 of the said guideways, merely by reversing the members 30. A flat portion 32^a is provided which extends longitudinally of the members 30, the members 30 having a gripping lug 33 formed thereon adapted to extend through the slots 25 and 29, depending upon the position of the members 30, which are adapted to engage the stem 34 of the valve when placed in position in the member 15. The members 30 have nose portions 35 and an inclined surface 36, with inclined surfaces 37 and 38 being formed in the ends of the member 15, these members 30 in effect being wedge-shaped so that the distances between the points of the members 33 on the members 30 when assembled in the member 15, may vary, depending upon the position of the members 30 in the guideways 21.

End rings 39 and 40 respectively are adapted to engage the threaded portions 17 and 18 on each end of the member 15, these members having undercut surfaces 41 and 42 respectively which are adapted to fit over the inclined surfaces 36 on the members 30 for the purpose of holding these members in assembled relation with the member 15 and also to assist in their proper adjustment. Inner rings 43 and 44 are provided which are slidably mounted upon the member 15 and have undercut surfaces 45 and 46 respectively adapted to engage sloping surfaces 47 formed on the rear ends of the members 30.

Springs 48, 48 are provided which are positioned around the outer surface of the member 15 with a pair of threaded rings 49, 49 adapted to abut against each of the springs 48 so that if the rings 49 are turned towards the ends of the member 15 the members 30 are pushed towards the outer end of the member 15 for the purpose of causing the members 33 to grip the valve stem 34 when the valve is positioned in the member 15, and are loosened therefrom by being turned in the opposite direction.

In Figure 8 a device of substantially the same form as that heretofore described is illustrated, with the exception that the sliding members 50 are provided which have gripping devices of different form than the members 30. The members 50 have holes 51 drilled therethrough within which a plug member 52 is seated, this member being internally threaded and adapted to engage pins 53, 53 which pass through the slots 25 and 29 formed in the bottom of the guideways 21 and are adapted to engage the stem 34 of the valve during the grinding operation in

the same manner as the members 33 engage the rod heretofore described.

Members 54 are shown having graduations 55, 55 thereon which are adapted to coact with a marking 56 upon the outer end of the members 53, so that these members serve as guides for the adjustment of the members 53 during the operation of the device.

In Figure 13 a modified form of the device is illustrated and in which a body member 56^a is shown having an opening 57 there-through adapted to receive the stem 34 of a valve, the member 56^a having a plurality of guideways 58 formed therein and having a threaded portion 59 adapted to be engaged by a mandrel or the like, at its rear end, with a threaded portion 60 at its forward end which is adapted to be engaged by a nut 61, the nut having an undercut portion 62 adapted to overlie the forward end 63 of a wedge member 64. The member 64 is formed in the same outer contour as the members 30 and 50, heretofore described, and has a rear sloping end portion 65 which is adapted to be engaged by a ring 66, with a spring 67 interposed between the rear end of the ring 66 and the ring 68 in threaded engagement with the member 56^a. The forward side of the ring 66 has an undercut portion 69 adapted to override the surface 65 on the member 64.

The member 64 has a pair of openings 70 and 71 therein within which plugs 72, 72 are inserted, these plugs being internally threaded and having a pair of threaded studs 73, 73 positioned therein which extend through slots 74 and 75 formed in the body of the member 56^a at the bottom of each of the guideways 58. Preferably the member 56^a has three of the guideways 58 formed there-around extending in a longitudinal direction in the same manner as the guideways which are formed in the member 15 heretofore described, except that they slope towards one end only of the member 56^a.

A pair of members 76, 76 having markings 77, 77 thereon are placed in the openings 70 and 71 at the outer sides thereof, the markings 77 serving as guides for cooperating markings 78, 78 formed on the outer ends of the members 73, 73. The purpose of the markings 77 and 78 is to allow the operator to make the proper adjustment of the members 73 so that only a limited movement of the operating parts, as will be hereinafter described is necessary in order to cause the stem 34 to be tightly gripped in the mechanism, and also because the slots 74 and 75 are comparatively short so that the travel of the member 64 in the guideways 58 is of necessity limited. The stems 34 for valves even of the same approximate sizes vary slightly in diameter so that it is necessary to make the proper adjustment of each of the screws 73 in order that the force as applied to the

stems 34 is properly equalized among the members 73, thus preventing any bending or distortion of the stems 34, and also that the members 73, 73 be at the same relative position in order that the valve rod 34 be in proper longitudinal position in the member 56.

In operation of the device, the rings 49 are placed in position upon the member 15, and the springs 48 and rings 43 and 44 also placed in position. The members 30, one for each of the guideways at each end of the member 15, are thereupon placed in position and the member 39 placed in threaded engagement with the end of the members. The members 30 in reverse position are thereupon placed in guideways at the opposite end of the device and the ring 40 placed in threaded engagement with the portion 17 at the rear end of the member 15. The device may thereupon be placed on a mandrel and the parts, by turning nuts 39, 40 and the rings 49, be properly adjusted so that there is sufficient clearance to allow the insertion of a valve rod 34, as shown in Figure 1. After the rod is inserted in position the rings 49 are turned so as to travel towards the outer ends of the device 15 or until the members 33 exert a tight grip upon the rod 34. The springs 48 are contracted, thus exerting a uniform pressure against the members 44 which may be tightened with a wrench if desired, so that sufficient pressure is exerted in an outward direction upon the members 30 and the rod 34 held tightly between the members 33. The springs 48 enable an equal pressure to be exerted on all three of the members 30 at one end of the device, so that there is no chance of bending or distorting the valve rod 34.

In the form of device shown in Figure 8, substantially the same operation is followed, with the exception that the bolts 53 are placed in substantially the proper adjustment to receive the valve rod 34 so that only a limited movement of the members 50 is required in order to tightly grip the rod 34. The advantage of this form of device over the form of device shown in Figure 1, is that it can be more readily adjusted to a variety of sizes, in that the members 53 can be backed out until their ends project only a short distance into the longitudinal opening 16 through the member 15. Because of this adjustment the device will receive larger sizes of stems than the device as illustrated in Figure 1.

In Figure 13 the assembling of the device is substantially the same as described heretofore, and the adjustment is made by positioning the members 73, 73 in proper relative adjustment with each other by comparing the position of the members 78 with relation to the markings 77, so that in each instance the members 73, 73 project into the internal opening of the member 56 an equal distance. The valve rod 34 is thereupon

placed in position in the device and the nut 68 turned so that it travels towards the outer end of the device, thereby exerting a sufficient gripping pressure upon the stem 34 to prevent the valve from rotating during the grinding operation.

It will be understood that the angular surface 79 on the valve head 80 is the surface on which it is desired to grind in order to remove any channelings or unequal portions of the sloping surface in the valve head. Therefore, the valve must be held very tightly against rotation and also against vibration or chattering, which is common in operations of this character so that the surface 79 when finally ground will be true and accurate in order to properly seat against the cooperating surface formed in the manifold of the engine or the head of the internal combustion engine as the case may be.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form and the proportion of parts and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit or scope of my invention.

I claim:

1. A chuck, comprising a body member having a central opening therein and a plurality of V-shaped inclined guideways in its outer wall and having openings from said guideways into said central opening, the said guideways being inclined towards the ends of the said body member, slidably mounted V-shaped members in said guideways having sloping surfaces at each of their ends, movably mounted retaining members having undercut portions adapted to overlap said slidably mounted members, and means carried by said slidably mounted members extending through the said slots into the central bore to engage a workpiece at right angles thereto.

2. A chuck, comprising in combination, a body member having a central bore and having a plurality of longitudinally extending V-shaped inclined seats therein with openings therein to said central bore, and being centrally threaded intermediate its ends and having threaded portions at each of its ends, movably mounted V-shaped gripping members in said seats having inclined ends, internally threaded undercut members in each end of the body member, a pair of centrally positioned internally threaded rings on said body member, a pair of slidably mounted undercut retaining members, and springs between the internally threaded rings and said undercut members.

3. A chuck, comprising in combination, a body member having a central bore and having a plurality of longitudinally extending V-shaped inclined seats therein with openings therein to said central bore and being

centrally threaded intermediate its ends and
having threaded portions at each of its ends,
movably mounted V-shaped gripping mem-
bers in said seats having inclined ends, in-
ternally threaded undercut members in each
end of the body member, a pair of centrally
positioned internally threaded rings on said
body member, a pair of slidably mounted
undercut retaining members, and springs be-
tween the internally threaded rings and said
undercut members, the said V-shaped mem-
bers being of less thickness at one end than
the other.

Signed at Chicago, Illinois, this 5th day
of December, 1929.

LEONARD W. JOHNSON.

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