Sept. 23, 1941. W. H. ODLUM 2,256,624

WRENCH JOINT

Filed Dec. 14, 1940

Fig. 1

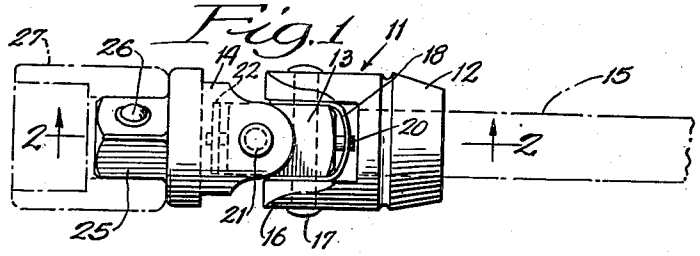


Fig. 2

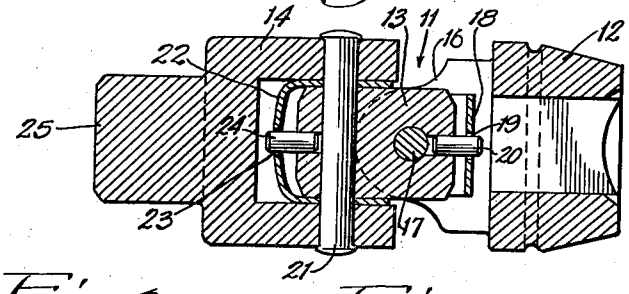


Fig. 3

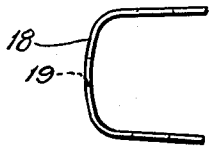


Fig. 4

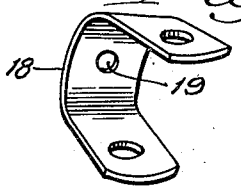


Fig. 5

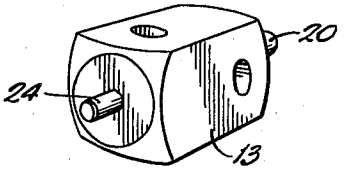


Fig. 6

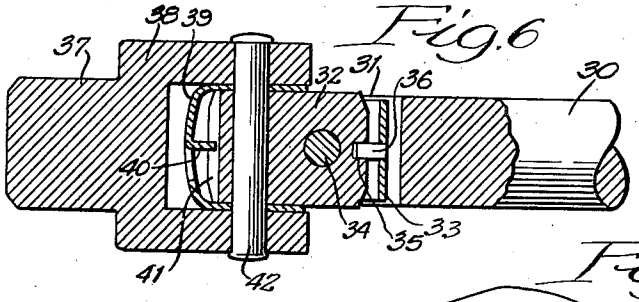


Fig. 7

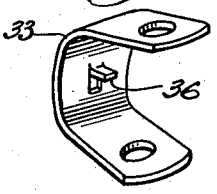
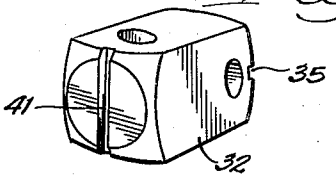


Fig. 8



Inventor:
William H. Odlum,
By McCaleb & Kendall
Attorneys.

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2,256,624

WRENCH JOINT

William H. Odlum, Chicago, Ill., assignor to Duro Metal Products Company, Chicago, Ill., a corporation of Illinois

Application December 14, 1940, Serial No. 370,095

11 Claims. (Cl. 64—17)

The present invention relates to wrench joints, and is particularly concerned with a universal joint of the type commonly used in conjunction with wrenches, such as socket wrenches and similarly operated tools.

In using a tool of this type, it is frequently necessary to work in close or cramped quarters. In such cases, it is desirable that the jointed parts of the tool remain in preadjusted relationship until the wrench or other tool is brought into engagement with the nut or part to be serviced. The engagement between the parts, however, should not be so strong as to interfere with the normal universal movement of the parts in performing a working operation.

One method of frictionally engaging the various parts of a universal joint of this general type is shown in Patent No. 1,978,590, issued October 30, 1934, and assigned to the assignee of the present application. Such a frictional engagement of the parts, while satisfactory for universal joints of approximately half-inch size or larger, has not been found suitable for universal joints smaller than the half-inch size, due to the fact that in such construction it is necessary to counterbore the pivot holes in the articulating joint member, which is positioned between the two principal members of the universal joint. Such counterboring removes an amount of metal which has been found unduly to weaken universal joints of a size smaller than one-half inch.

One of the objects of the invention is to provide an improved universal joint for wrenches and the like.

Another object is frictionally to engage pivotally connected portions of a universal wrench joint.

Another object is to engage pivotally connected parts of a universal wrench joint with a frictional force sufficient to support the parts thereof in adjusted relationship, but not sufficient to interfere with a normal working operation of such parts.

Another object is to provide a simple frictional connection between pivoted portions of a universal wrench joint.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawing, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the drawing of which there is one sheet:

Fig. 1 is a view in side elevation showing a universal wrench joint constructed according to the invention, a handle portion and a socket wrench associated therewith being indicated in dotted lines;

Fig. 2 is an enlarged sectional view taken on the plane of the line 2—2 of Fig. 1;

Fig. 3 is a plan view of a frictional spring member employed in the construction of Fig. 2;

Fig. 4 is a view in perspective of the frictional spring member shown in Fig. 3;

Fig. 5 is a view in perspective of a double pivotally mounted connecting block employed in the construction of Fig. 2;

Fig. 6 is a longitudinal sectional view taken on a plane similar to that of Fig. 2, and showing a modified type of tool and embodying a modified type of frictional spring member;

Fig. 7 is a view in perspective of a modified type of frictional spring member employed in the construction of Fig. 6; and

Fig. 8 is a view in perspective similar to Fig. 5, showing a double pivoted connecting block of the type employed in the structure of Fig. 6.

Referring to Fig. 1, the numeral 11 indicates in its entirety a universal wrench joint which is composed mainly of three principal portions, namely, a forked handle portion 12, an intermediate pivoted joint member 13, and a forked tool-engaging portion 14. The handle portion 12, as illustrated in Fig. 1, is provided with a rectangular socket in which to receive a rectangular handle 15. The forked handle member 12 is generally cylindrical in shape, the end 16 thereof being bifurcated and having aligned openings in opposite sides of the bifurcated portion to receive a pivot pin 17. The joint member 13 is here illustrated as being rectangular in section, but the exact conformation thereof is subject to variation as will be apparent to those versed in the art, and is slightly smaller in width than the separation of the bifurcated arms 16 of the member 12, so as to receive the sides of a U-shaped spring member 18 between the sides of the joint member 13 and the inner faces of the arms 16 when the parts are assembled as shown in Figs. 1 and 2. The member 13 and each side of the U-shaped spring member 18 are provided with openings to receive the pivot pin 17 therein. An opening 19 is provided centrally of the U-shaped spring member 18 to receive a pin 20, which is secured in a hole drilled centrally of the end of the joint member 13. The connection between the pivoted joint member 13 and the U-shaped spring 18 provided by this

construction causes the spring to move pivotally with the joint member 13.

The pin 20 can be optionally formed by turning integrally with the body of the member 13, as will be apparent to those versed in the art. Such procedure might be preferred in turning the member 13 from square bar stock on some types of automatic or semi-automatic machines.

The sides of the U-shaped spring member 18 are preferably formed to be normally somewhat divergent from each other, as indicated in Figs. 3 and 4, so that in inserting the joint member 13, with the spring 18 assembled therewith, between the arms 16 of the forked member 12, the sides of the U-shaped spring member 18 will be displaced inwardly against the resilient action of the spring. When inserted in this manner between the sides of the bifurcated member 12, the sides of the spring will be forced outwardly by the resilient action of the spring into frictional engagement with the inner faces of the arms 16.

The bifurcated tool-engaging portion 14 is pivotally connected by means of a pivot pin 21 to the opposite end of the articulating joint member 13, in a manner similar to that of connecting the handle member 12 to the joint member 13. A U-shaped spring 22, similar to the spring 18, is mounted over the opposite end of the member 13 and is provided with an opening 23 which is engaged by a second positioning pin 24 in a manner similar to that described for the first pivotal connection.

The tool-engaging portion 14 is here illustrated as having a rectangular tool-engaging stud 25 formed integrally therewith, the stud 25 being provided with a conventional type of spring-pressed ball catch 26 embodied therein to engage a tool or other element, such as the wrench socket 27 indicated as in operative position thereon.

In the modified structure illustrated in Fig. 6, a handle portion 30 of the type generally referred to by the industry as a "speeder" handle is provided with a bifurcated end portion 31, adapted to receive an articulating joint member 37 and U shaped spring member 33 therein, in a manner similar to that described for the construction illustrated in Figs. 1 to 5, inclusive, the parts being similarly secured in assembled position by means of a pivot pin 34.

In the structure illustrated in Fig. 6, the joint member 32 is formed with a groove 35 in each end thereof, and the U-shaped spring members 33 are each formed with an inwardly projecting tab 36, preferably cut from the metal of the spring itself before tempering, as best illustrated in Fig. 7. The tab 36 is of a size and extension to fit within the recess 35 in the end of the member 32 to anchor the U-shaped spring 33 to the joint member 32, to prevent independent rotative movement of the spring and the joint member on their common pivot pin 34.

A square tool-engaging stud 37 is formed on a bifurcated tool-engaging portion 38 in a manner similar to that illustrated and described for the construction of the member 14 of Figs. 1 and 2. A second U-shaped spring member 39 is assembled over the end of the member 32 with a tab 40 inserted in a groove 41 in the member 32. This assembly is pivotally mounted between the arms of the tool-engaging portion 38 by means of a pivot pin 42 in a manner similar to the assembly of the handle member 30, the joint member 32, and the spring 33.

I have found in the practice of my present invention that by varying the thickness and spring tension of my frictionally engaging spring members I am able to attain any reasonable desired degree of frictional engagement between the articulated parts of a wrench joint and with no appreciable decrease in strength thereof. It is also possible to attain a material variation in the frictional engagement between the parts without changing the thickness of the springs, but merely by varying the degree of divergence between the sides of the spring members before assembling them with the other parts of the structure.

I have found further that the use of the present frictional spring connection is suitable for use in all sizes of universal wrench joints from the smallest to the largest now being manufactured, and that the use of the frictional spring connection does not complicate the manufacture of the universal joint since the spring has a tendency to hold the parts in assembled position even before the pivot pins are inserted. Since there is no appreciable flexing of the spring during use, and since the sides of the spring have a tendency to separate to compensate for any wear which may occur between the sides of the spring and the inner faces of the bifurcated co-operation portion, the connection will remain operative and without appreciable change in frictional engagement throughout the life of the universal joint.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

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

1. A wrench joint comprising a forked element having parallel inner faces, a co-operating pivoted joint element having parallel sides mounted between said parallel inner faces to be spaced inwardly therefrom, and a spring embracing an end and said parallel sides of said joint element, the sides of said spring being held in compression between the inner faces of said forked element, said spring being connected to said joint element to move pivotally therewith.

2. In a wrench joint having a forked element and a co-operative pivoted joint element, a frictional spring traversing an end of said joint element and extending longitudinally of the sides of said joint element, said spring engaging said joint element to move pivotally therewith, and said spring being held in compression between the sides of said forked element.

3. In a wrench joint having a forked element and a co-operating pivoted joint element, a frictional leaf spring traversing an end of said joint element and interposed between a side of said joint element and said forked element, the pivotal connection between said forked element and said joint element penetrating said spring.

4. In a wrench universal joint having a forked element and a co-operating pivoted joint element, a center stud protruding from an end of said joint element, a U shaped leaf frictional spring traversing an end of said joint element with said stud penetrating the web of said spring, said spring extending longitudinally of the sides of said joint element, said spring frictionally engaging said forked element.

5. In a wrench universal joint having a forked element and a co-operating pivoted joint element, a center stud protruding from an end of said joint element, a U shaped leaf frictional spring traversing an end of said joint element with said stud penetrating the web of said spring, said spring extending longitudinally of the sides of said joint element, said spring being pivoted concentrically with said joint element, said spring frictionally engaging said forked element.

6. In a wrench universal joint having a forked element and a co-operating pivoted joint element, said joint element having a recess in an end thereof, a U shaped leaf frictional spring traversing an end of said joint element, a portion of the web of said spring being offset and positioned in said recess, said spring extending longitudinally of the side of said joint element, said spring frictionally engaging said forked element.

7. In a wrench joint having a pair of forked elements and a co-operating pivoted joint element, said forked elements being pivoted to said joint element in planes substantially at right angles to each other, a frictional spring traversing an end of said joint element and extending longitudinally of the sides of said joint element, said spring engaging said joint element to move pivotally therewith.

8. In a wrench joint having a pair of forked elements and a co-operating pivoted joint element, said forked elements being pivoted to said joint element in planes substantially at right angles to each other, a frictional spring traversing an end of said joint element and extending longitudinally of the sides of said joint element, said spring having anchoring engagement with one of said elements, and being pivotally mounted to move pivotally with another of said elements.

9. In a wrench joint having a pair of forked elements and a co-operating pivoted joint element, said forked elements being pivoted to said joint element in planes substantially at right angles to each other, a frictional spring of U shape, positioned within each of said forked elements, and pivoted concentrically therein with said joint element, said spring having interlocking connection with one of said elements, and frictional engagement with another of said elements.

10. In a wrench joint having a forked element and a co-operating pivoted joint element, a frictional spring traversing an end of said joint element and extending longitudinally of the sides of said joint element, said spring having interlocking engagement with one of said elements, and having frictional engagement with the other of said elements, said spring being penetrated by a pivotal connection between said elements.

11. A wrench joint comprising a forked element, a co-operating pivoted joint element, and a spring overlying an end and embracing two opposite sides of said joint element, said spring being interposed between the joint element and the forked element, and connected to one of said elements to move pivotally therewith.

WILLIAM H. ODLUM.