April 3, 1951 H. K. DEARBORN 2,547,858

CENTER

Filed Nov. 17, 1945

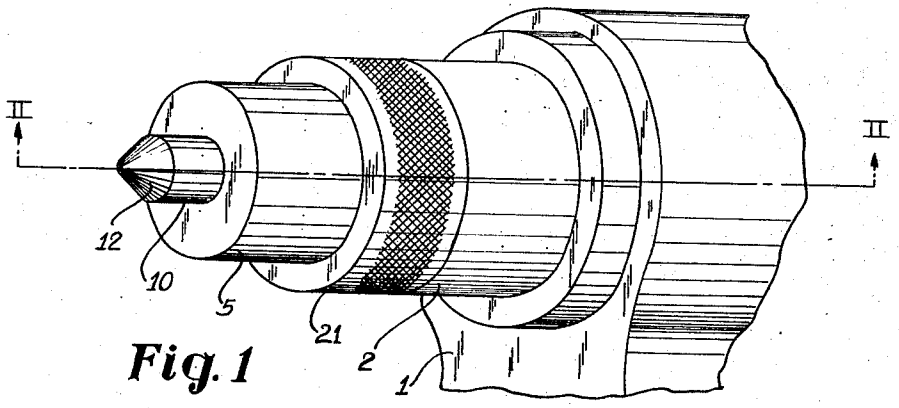


Fig. 1

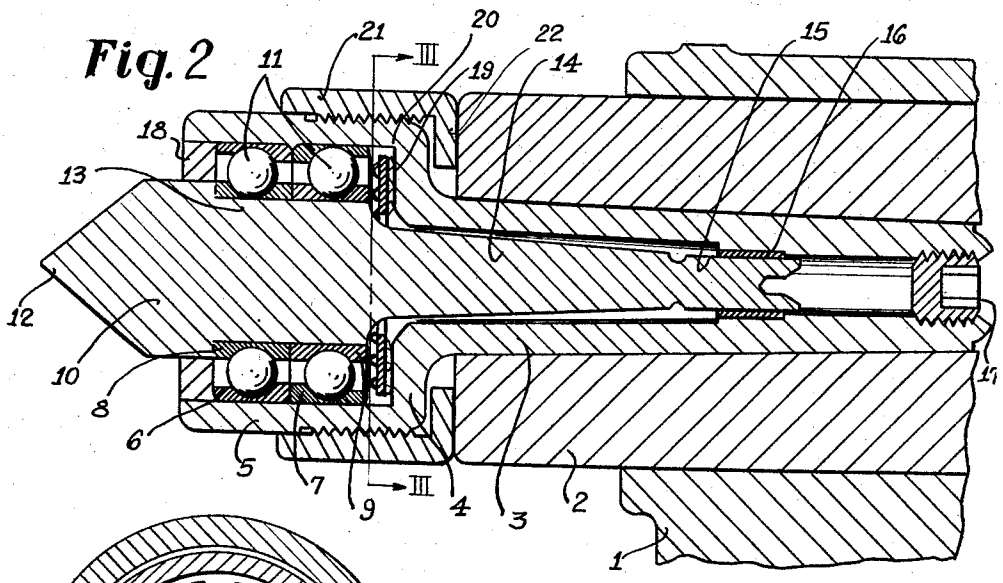


Fig. 2

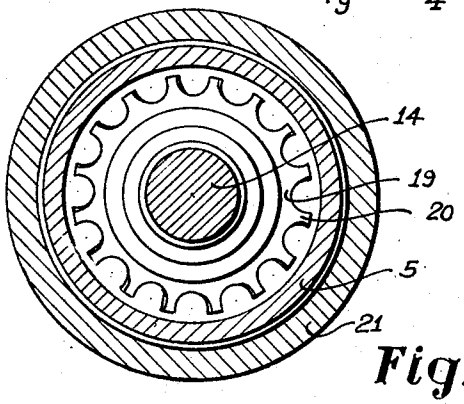


Fig. 3

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Patented Apr. 3, 1951

2,547,858

UNITED STATES PATENT OFFICE

2,547,858

CENTER

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Application November 17, 1945, Serial No. 629,287

2 Claims. (Cl. 82—33)

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This invention relates to a center, such, for instance, as is used for supporting work in various types of machine tools.

An object of the invention is to provide an improved center which will freely rotate with the work supported thereby.

Another object is to provide an improved center which will firmly support a work piece, and at the same time will eliminate friction between the center and piece.

Another object is to provide an improved center which will be extremely rugged in construction and capable of standing severe use and abuse.

Another object is to provide an improved center composed of few and strong parts.

Another object is to provide an improved center in which moving parts will be protected against dirt and the like.

Another object is to provide an improved center which may be easily and economically manufactured.

Another object is to provide an improved center which may be accurately manufactured by simple machine operations.

Another object is to provide an improved center which will be accurately and firmly positioned when in use.

Another object is to provide an improved center which may be easily installed and removed from current machine tools.

Other objects will hereinafter appear.

The invention will be better understood from the description of one practical embodiment thereof, illustrated in the accompanying drawing, in which:

Figure 1 is a fragmentary perspective view of a portion of a machine tool, the portion chosen for the purpose of illustration being the tail stock of a lathe.

Figure 2 is a central sectional view of the parts appearing in Figure 1 taken on line II—II thereof; and,

Figure 3 is a transverse sectional view taken on the line III—III of Figure 2.

In such operations as turning metal in a lathe, it is customary to support the work between two conical centers, one of which is fixed to the main spindle and rotates therewith, and the other of which is mounted in the tail stock and which remains stationary, the work turning upon the center. This type of center is commonly known as a "dead" center.

To eliminate friction between the recessed end of the work piece and the center, attempts have

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been made to support the latter so that it might rotate in the tail stock spindle, and such centers are commonly called "live" centers. It is to the latter type of center that the present invention is directed.

The greatest advantage of the dead center over former types of live centers has been in the accuracy with which it held the work. Being rigidly wedged into the tail stock, it was to all intents and purposes a unitary part thereof and no looseness or backlash occurred between the center and the stock.

Former live centers, however, have not only introduced a certain amount of looseness due to the tolerances necessary in the bearings which support them, but have added to this source of inaccuracy an increased tendency for bending of the center under pressure of the cutting tool.

This tendency has been aggravated by the fact that such centers generally had relatively slender shanks which entered the spindle and, consequently, when anti-friction bearings or the like which supported the center proper were mounted on the end of this shank adjacent the work and at the end remote from the tail stock, they introduced an overhung and poorly supported additional weight, the slender shank forming the only support between this weight and the head stock.

According to the present invention, I support the center-carrying bearings in a much firmer manner than has been done heretofore, and, in effect, render these bearings a unitary part of the stock.

In the drawings, the main casting of the tail stock is indicated at 1, and in this, mounted for axial movement for purposes of adjustment and to clear the work in loading and unloading the machine, is the tail stock spindle 2, provided with a central tapered bore for the reception of the center or other element to be used by the machine.

The tail stock and its spindle are of conventional design and per se constitute no part of the present invention, it being understood that the tail stock is adjustably mounted on the bed of the machine and that suitable means for adjusting the spindle in the stock and locking it in adjusted position are provided, as well understood by all machine tool operators.

The center disclosed is supported by a hollow tapered shank 3 having a taper conjugate to that within the tail stock spindle and inserted tightly within this tapered bore when in use. The outer end of the shank carries a hollow cylindrical or

cup-shaped supporting hub defined by a head 4 and cylindrical peripheral flange 5, in which the center-supporting bearings are positioned.

These bearings are shown as two ball bearings having outer races 6 and 7 having a tight or pressed fit within the hub, and inner races 8 and 9 tightly fitting upon the periphery of the center proper 10, there being balls 11 between the races.

The center itself includes a conical end 12 for engagement with the work, a reduced cylindrical portion 13 fitting within the inner races of the bearings, and terminates in a reduced shank 14 with a cylindrical end 15 fitting within a bearing 16 in the bore in the shank 3.

This last mentioned bearing may be conveniently a self-lubricating bushing. The end of the bore which extends throughout the shank 3 is closed by a plug 17 threaded therein.

The front of the hub is closed by a ring 18 which may be secured to the hub as by being pressed therein, threaded thereto, or in any other desired manner and closely fits about the center.

Positioned between the innermost bearing race 9 and the inner surface of the flange 4 of the hub is a resilient member consisting of a disc having a notched or cassilated periphery producing a central ring 19 and radially extending lugs 20 and made of spring metal.

The ends of the lugs are twisted out of the plane of the central ring 19 into a plurality of generally helically arranged surfaces, so that one corner of each lug bears upon the head 4 of the hub and the opposite corner bears upon the bearing race 9, the lugs acting as a series of peripherally arranged springs to urge the center to its outermost position while allowing it to be moved slightly axially if any heavy impact upon it occurs.

Threaded upon the exterior of the hub is a sleeve 21 having a relatively narrow inwardly extending bearing flange 22 which may be brought firmly into contact with the end of the spindle 2 and which supports the hub against any tendency to be displaced by the bending of shank 3.

This sleeve is shown as knurled on its exterior, and may be provided with means for attaching a wrench, as flattened surfaces or holes to receive the pin of a spanner, but in ordinary use adjustment by hand applied to the knurled surface is generally found sufficient, as the sleeve

may be adjusted against the spindle after the shank has been inserted by hand therein and both will be pressed more tightly in engagement when work is inserted in the machine.

It has been found in practice with this center that work may be held to tolerances and accuracies which heretofore have been possible only with "dead" centers, while at the same time the friction losses, liability of burning the center by friction with the work, and the like, are eliminated.

While I have described the illustrated embodiment of my invention in some particularity, obviously many other embodiments, modifications, and variations will readily occur to those skilled in this art, and I do not, therefore, limit myself to the precise details described herein, but claim as my invention all embodiments, modifications and variations coming within the scope of the appended claims.

I claim:

1. A center for a machine tool having a spindle, comprising a shank and a head, an adjustable sleeve connected with the head having an end engageable with the peripheral portion of the spindle carrying the center and spaced from the spindle between said peripheral portion and said shank.

2. A center for a machine tool having a spindle, comprising a shank and a head, an adjustable threaded sleeve connected with the head having an end engageable with the peripheral portion of the spindle carrying the center and spaced from the spindle between said peripheral portion and said shank.

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