June 23, 1925. 1,543,006

A. V. HANNIFIN

BORING BAR AND THE LIKE

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Fig. 1.

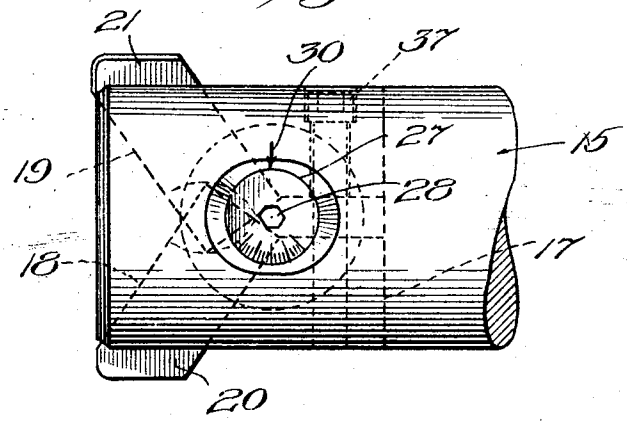


Fig. 2.

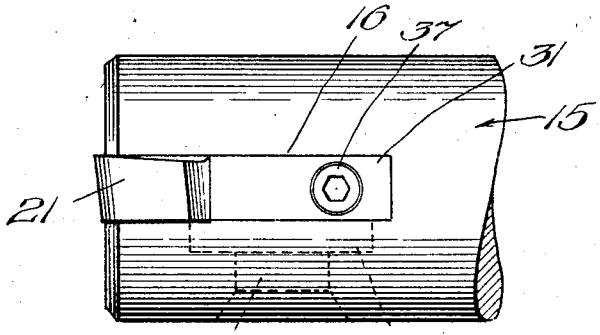


Fig. 3.

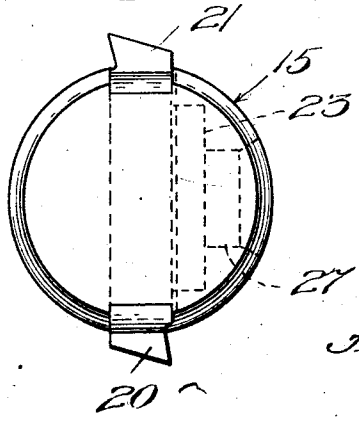
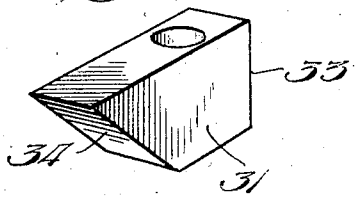


Fig. 4.



Inventor:
Arthur V. Hannifin
by Lonny & Lonny
Attys.

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A. V. HANNIFIN

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Fig. 5.

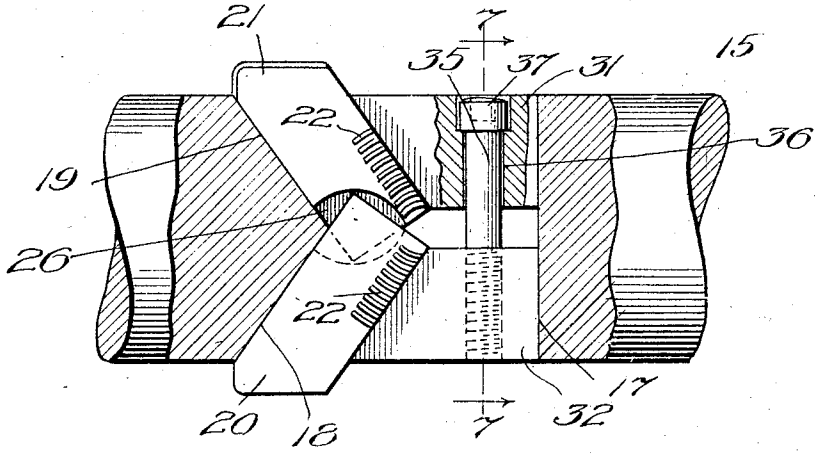


Fig. 6.

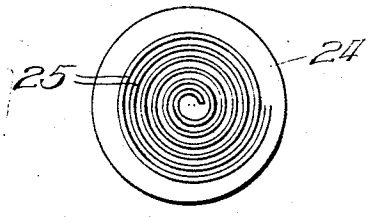


Fig. 7.

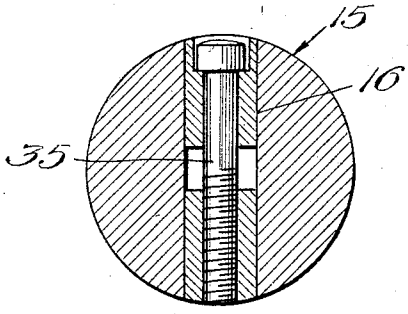
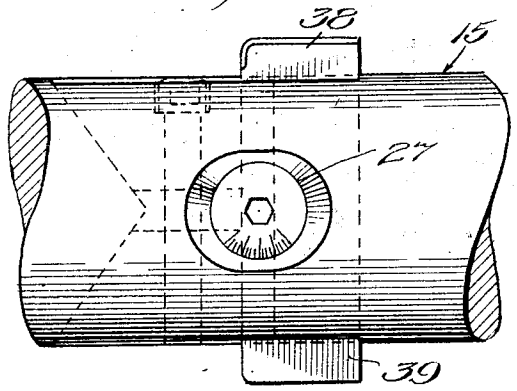


Fig. 8.



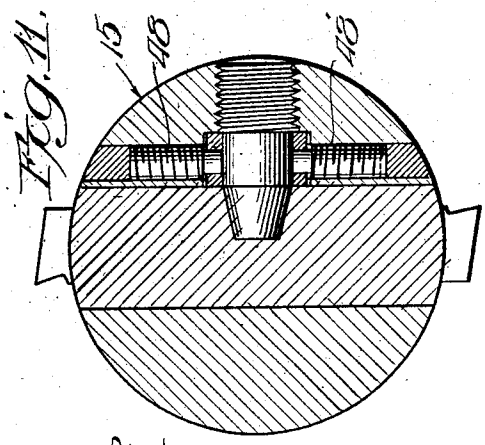
Inventor.
Arthur V. Hannifin
by Lamb & Lamb
Attys.

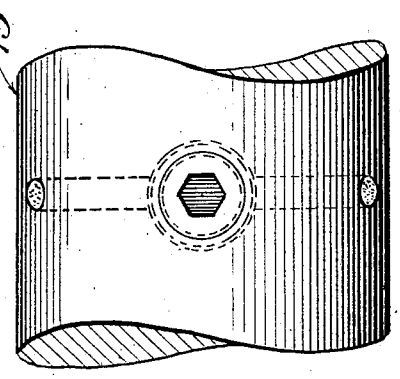
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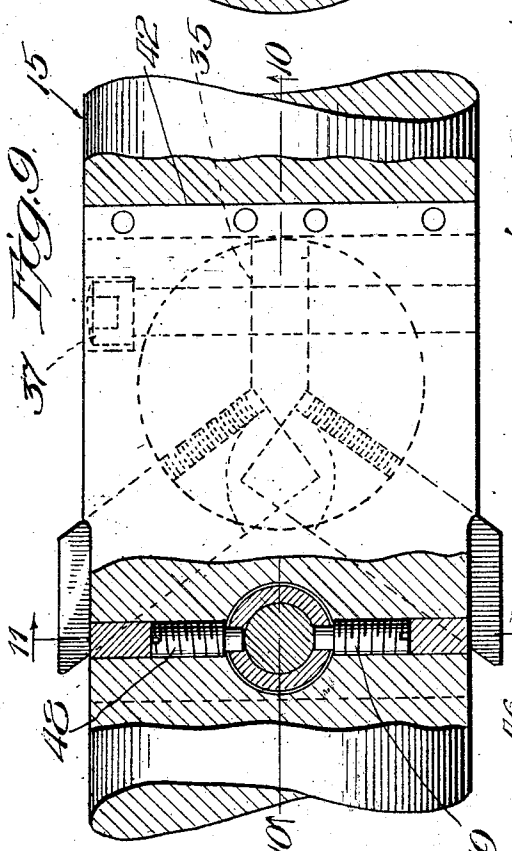
A. V. HANNIFIN

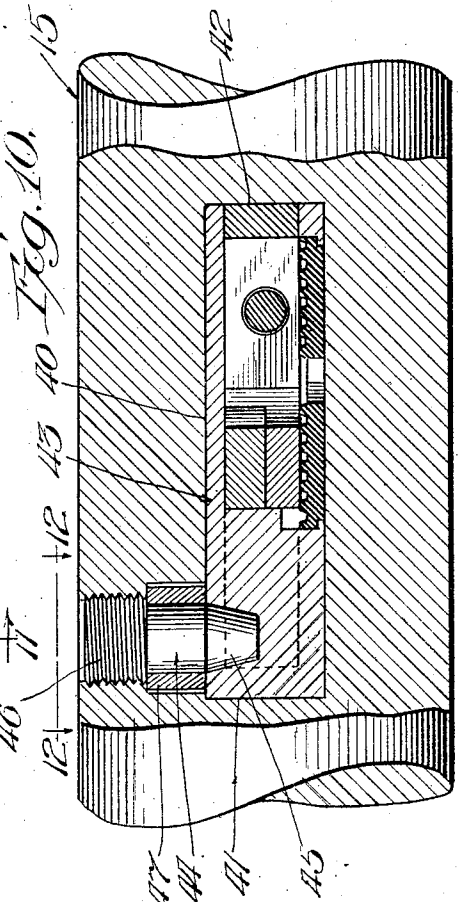
BORING BAR AND THE LIKE

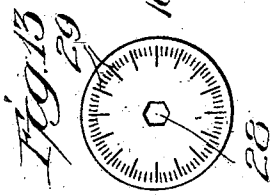
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Inventor:
Arthur V. Hannifin
by Lamy & Lamy
Attys

Patented June 23, 1925. 1,543,006

UNITED STATES PATENT OFFICE.

ARTHUR V. HANNIFIN, OF CHICAGO, ILLINOIS.

BORING BAR AND THE LIKE.

Application filed April 23, 1923. Serial No. 633,911.

To all whom it may concern:

Be it known that I, ARTHUR V. HANNIFIN, a citizen of the United States, residing at Chicago, in the county of Cook, and State of Illinois, have invented certain new and useful Improvements in Boring Bars and the like, of which the following is a specification.

This invention has to do with certain improvements in boring bars for machine tools. The invention relates particularly to improvements in the construction of the means for adjusting and locking the tools in place within the boring bar. In this connection, the main object of the invention is to provide an improved locking device of very simple form and arrangement, and which is very effective for the purpose of securely locking the tools after they have been adjusted.

Another object of the invention is to provide a construction embodying the features previously referred to, and which construction is such that the boring bar can be used either with tools extending at an angle with respect to the radius of the boring bar, or tools extending in a truly radial fashion.

A further object of the invention is to provide a locking device which can be used either in connection with that form of boring bar in which the tools and locking and adjusting elements are located directly within a slot or opening of the boring bar itself, or in conjunction with that type in which these elements are in the first place located within a carrier block, which block is then seated in the slot or recess of the boring bar.

Other objects and uses of the invention will appear from a detailed description of the same, which consists in the features of construction and combinations of parts hereinafter described and claimed.

In the drawings:

Figure 1 shows a side view of the end portion of a boring bar provided with a locking device embodying the features of the present invention, the same being provided with tools lying at an angle with respect to the radius of the boring bar;

Fig. 2 is a view at right angles to that of Fig. 1;

Fig. 3 is an end view corresponding to Figs. 1 and 2;

Fig. 4 is a perspective view of one of the locking blocks;

Fig. 5 is a view similar to that of Fig. 1, with the exception that the boring bar is shown partly in section, and one of the locking blocks is also shown partly in section in order to better reveal the construction of the parts;

Fig. 6 is a face view of the scroll plate;

Fig. 7 is a cross section taken on the line 7—7 of Fig. 5, looking in the direction of the arrows;

Fig. 8 is a view similar to that of Fig. 1, with the exception that the features of the present invention are in this case illustrated in connection with radial tools;

Fig. 9 is a view similar to that of Fig. 5, with the exception that it illustrates a construction in which the features of the present invention are incorporated within a boring bar which is provided with a tool carrying block into which the tools and adjustment and locking devices are directly placed;

Fig. 10 is a section taken on the line 10—10 of Fig. 7, looking in the direction of the arrows;

Fig. 11 is a cross section taken on the line 11—11 of Fig. 9, looking in the direction of the arrows;

Fig. 12 is a fragmentary face view of the boring bar taken on the line 12—12 of Fig. 10, looking in the direction of the arrows; and

Fig. 13 is a detail view of the exposed face of the scroll plate.

Referring first to the construction shown in Figs. 1 to 8 inclusive, the same includes the boring bar 15 which is provided with a transverse slot 16. This slot is provided with a radially extending straight back face 17 and with the angularly extending front end faces 18 and 19 respectively. The faces 18 and 19 preferably lie at equal angles with respect to the axis of rotation of the boring bar.

In Figs. 1 to 5, I have illustrated the cutting tools 20 and 21 as being set into the slot 16 and against the angularly extending walls 18 and 19 thereof. These tools, therefore, lie at an angle with respect to the radius of the boring bar.

On one face each tool is provided with a series of teeth 22, and the slot 16 is provided in one face with a circular recess 23 which accommodates a circular scroll plate 24. This scroll plate is provided with spirally formed threads 25 which receive the

teeth 22 of the tools, so that upon rotating the scroll plate the tools are either drawn towards each other or separated for the purpose of adjusting their cutting diameter. If desired, the adjoining corners of the tools may be cut away as shown in Fig. 5 at 26, so that the tools can overlap a slight amount, if necessary, in order to allow them to be drawn closely together.

An opening 27 reaches through the side of the boring bar to the position of the socket 23, so that a tool can be introduced therethrough to engage a recess 28 in the exposed face of the scroll plate in order to turn the same for adjustment. This exposed face of the scroll plate may be provided with graduations 29 which may be compared with a definite mark 30 on the boring bar adjacent to the position of the opening 27, so that the amount of the adjustment can be readily read.

In order to lock the tools after they have been adjusted, I have provided a pair of companion locking blocks 31 and 32 of the general form shown in Figs. 4 and 5. These blocks are of thickness substantially equal to the thickness of the slot 16. Each block has a straight back face 33 and an angularly formed front face 34, and the angle between these two faces is the same as the angle between the back face 17 of the slot 16 and the corresponding front face 18 or 19 as the case may be. Consequently, when the locking blocks 31 and 32 are set into place within the slot 16 they exert a perfectly flat and equal pressure on the cutting tools so as to lock the same solidly in place. This is on the assumption that the cutting tools are provided with parallel edges.

In order to draw the blocks 31 and 32 towards each other so as to clamp them solidly in place, I have provided a tap screw 35 which extends through an opening 36 in one of the blocks and is threaded into the other block. This tap screw has an enlarged head 37 which can be turned either by the use of a socket wrench or screw driver, according to its design.

Owing to the fact that the angle between the faces 33 and 34 of the locking blocks is equal to the angle between the corresponding edges of the slot 16, it is possible to use these same locking blocks in connection with radially extending cutting tools 38 and 39, as shown in Fig. 8. In this case the cutting tools are set against the radial back face 17 of the slot and the locking blocks are set against the angular front faces 18 and 19.

In the construction shown in Figs. 9, 10, 11 and 12, there is provided a slot 40 which extends through the boring bar and is preferably provided with radial front and back faces 41 and 42. Within the slot 40 is placed a tool block 43. This tool block 43 is in turn provided with a slot of the general form and characteristics of the slot 16, previously explained. The cutting tools and locking blocks are in this case set into the slot of the tool block 43. The tool block itself is centered and locked within the slot 40 by means of a pin 44 having a tapered lower end 45, the upper end 46 of which pin is threaded into the boring bar, and the central portion of which pin passes through a collar 47. The position of this collar is subject to slight adjustment transversely of the boring bar by means of a pair of opposite set screws 48 and 49, so that the position of the pin 44 can be exactly centered in the boring bar. I do not in this case particularly claim the construction and arrangement of this tool block, except as the same may be used in combination with the other features of the present invention, inasmuch as the general arrangement and method of locking and adjusting of the tool block constitutes the subject matter of a co-pending application for Letters Patent of the United States.

While I have herein shown and described only certain embodiments of the features of the present invention, still I do not intend to limit myself to the same, except as I may do so in the claims.

I claim:

A boring bar having a transversery extending through slot, one end face of said slot extending in a radial direction with respect to the axis of rotation of the boring bar, the other end face of the slot being of V-shape with the two arms of the V lying at equal angles with respect to the axis of rotation of the boring bar, a pair of companion clamping blocks adapted to seat into said slot for the purpose of clamping tools therein, each of said clamping blocks having a width less than one-half the diameter of the boring bar and having two of its opposite faces lying at an angle to each other equal to the angle between the two end walls of the slot of the boring bar, suitable tools in the slot between one end wall and the clamping blocks aforesaid, said tools having parallel edges, and means for drawing the clamping blocks towards each other to clamp the tools in place within the boring bar comprising a single tension screw reaching between the clamping blocks, substantially as described.

ARTHUR V. HANNIFIN.