

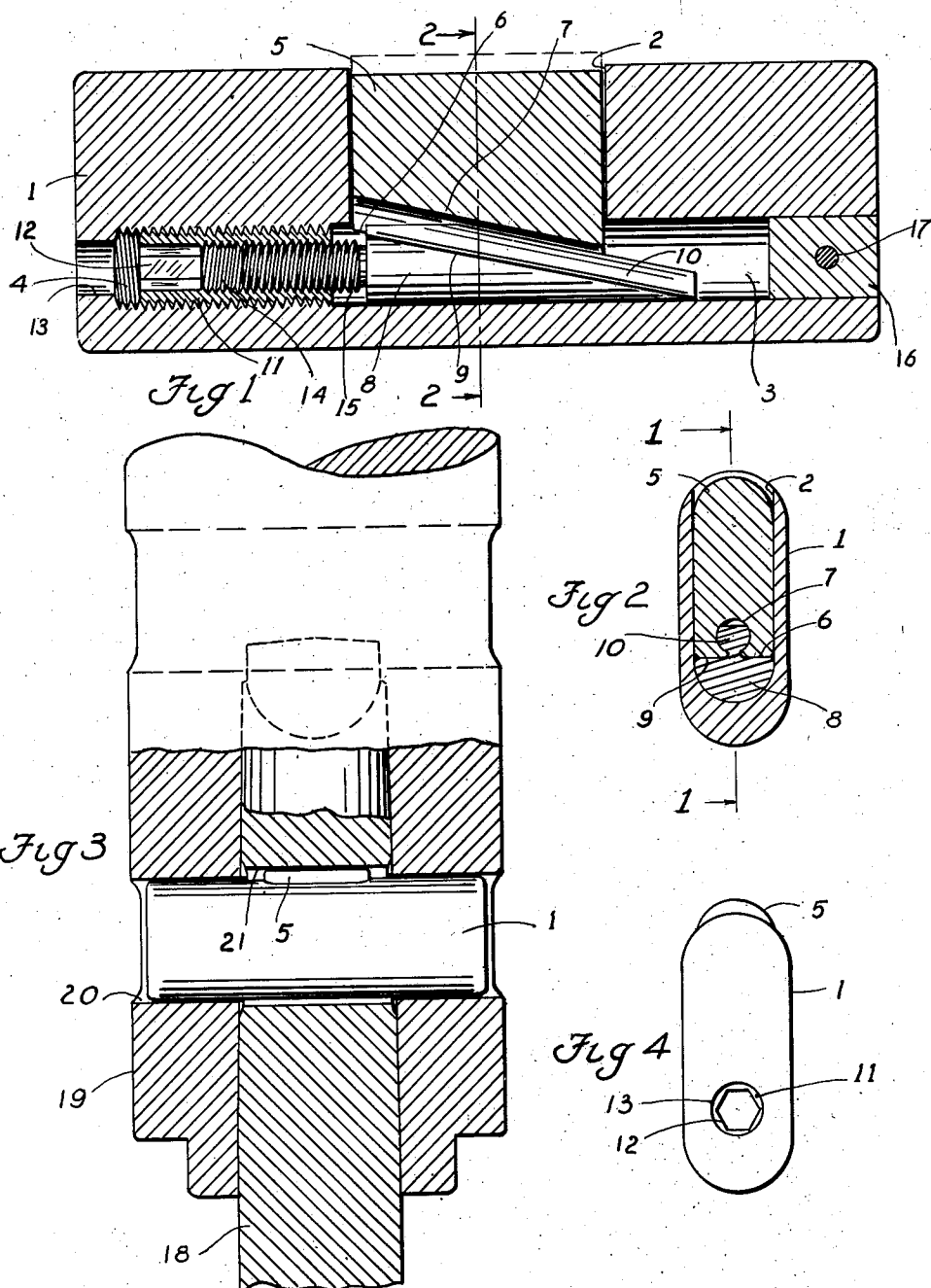
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ADJUSTABLE DRAW KEY

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ADJUSTABLE DRAW KEY

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1 Claim. (Cl. 254-104)

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This invention relates to expandable draw keys and resides specifically in an improved form of the same in which a transversely slidable draw tongue is mounted within a draw key body in inclined plane relationship to a longitudinally positionable actuator within the key body, the actuator being controllable as to its position by a screw positioner preferably of the differential type accessible from the exterior of the key body.

Heretofore expandable draw keys have been constructed in various forms and have been employed for various purposes. In the case of keys intended to hold tapered shank tools in place in machine tool spindles expandable draw keys have not heretofore found favor. The common practice has heretofore been to hold such tapered shank tools in place with tapered keys driven into place. The hammering which this entails is damaging to the spindle, its bearings, the tool and the key itself.

It is an object of this invention to provide an expandable draw key of such simplicity, reliability and convenience in its use as to encourage operators of machine tools to abandon the tapered key and its need for harmful hammering.

This invention is herein described by reference to the accompanying drawing in which there is set forth by way of illustration and not of limitation one form in which the apparatus of this invention may be embodied.

In the drawing:

Fig. 1 is a side view in elevation and in section of a draw key constructed in accordance with this invention said section being viewed through the plane 1-1 indicated in Fig. 2;

Fig. 2 is an end view in elevation and in section of the key shown in Fig. 1 the same being viewed through the plane 2-2 there indicated;

Fig. 3 is a side view in elevation on a reduced scale of the key shown in Fig. 1 shown in place in a spindle the latter being shown partly broken away and in section; and

Fig. 4 is an end view in elevation of the key shown in Fig. 1.

Referring now to the drawing the form of the key of this invention there shown comprises a key body 1 of elongated, flattened form with rounded upper and lower edges. The key body 1 has formed in it a transverse slot or recess 2 extending from one edge downwardly beyond the center of the key body 1 until it intercepts a longitudinal channel 3 also formed within the key body 1 as shown. The longitudinal channel 3 is in the form of a cylindrical bore the left hand

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end of which is provided with an internal thread 4.

Mounted to freely slide transversely in the recess 2 is a draw tongue 5 the lower or inner face of which is inclined as shown at 6. As more clearly appears in Fig. 2 there is formed in the tongue 5 along its inclined face 6 a circular dovetail opening 7 running parallel with the face 6 and emerging therefrom.

Mounted to slide longitudinally in the channel 3 is an actuator 8 of cylindrical form closely fitting the bore of the channel 3. The actuator 8 is shaped so as to present an inclined face 9 in sliding inclined plane relationship to the inclined face 6 of the tongue 5. Projecting upwardly from the inclined face 9 and formed integrally therewith is a dovetail 10 shaped for interfitting engagement with the dovetail slot 7. By reason of this construction longitudinal movement of the actuator 8 compels not only expansion of the tongue 5, if the actuator moves to the right, but positive retraction of the same as well, when the actuator 8 moves toward the left.

In order to provide for convenient positioning of the actuator 8 a screw 11 is mounted in threaded engagement with thread 4. The screw 11 is provided with a hexagonal end socket 12 which may be engaged by a wrench introduced through the reduced end opening 13 in the channel 3. The screw 11 itself is provided with a central bore internally threaded as indicated at 14. The thread 14 is formed as shown to be of opposite hand to the thread 4 and of different pitch therefrom. Threadedly received within the thread 14 is a threaded shank 15 formed as a part of the actuator 8.

By reason of the arrangement of the threads above described a differential action takes place upon rotation of the screw 11.

For example, if the screw 11 be turned so as to cause it to advance toward the right, its rate of advance per turn will be equal to the pitch of its thread. At the same time the screw 15 will move relatively with respect to the screw 11 toward the left an amount equal to the pitch of the thread of screw 15. Since this is a smaller amount than the advance toward the right of the screw 11 a net motion toward the right of the actuator 8 takes place and the tongue 5 is caused to move outwardly from the key body 1. Rotation of the screw 11 in the opposite direction produces an opposite motion of the tongue 5. In this way a very powerful mechanical advantage is made available for expansion of the key and a natural

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and normal expansion on right hand rotation is produced.

After the parts are assembled it is preferred that a plug 16 held in place by a pin 17 be inserted as shown.

As appears in Fig. 3 one convenient intended use of the key of this invention is to hold the tapered shank 18 of a boring or milling tool in the tapered socket provided therefor in a spindle nose 19. Under these circumstances the transverse slot 20 of the nose 19 is engaged by the key body 1 while the transverse slot 21 of the tool shank 18 is engaged by the tongue 5. It may be readily observed that the key body 1 can be quickly inserted and a wrench applied to the screw 11 to bring the parts to the position shown. In this way the tool shank 18 is quickly locked in place without any damaging hammering being necessary and when it is necessary to remove the tool, the tongue 5 can be retracted quickly also without hammering.

I claim:

In an expandable draw key a key body having a transversely extending draw tongue recess and a longitudinally extending actuator channel intersecting said recess, a transversely slidable draw tongue received within and closely fitting said recess confined to transverse sliding movement thereby and having an inner inclined face, an actuator longitudinally movable in said chan-

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nel having an inclined face complementary to the inclined face of said tongue and adapted to cooperate therewith to cause transverse movement of said tongue upon longitudinal movement of said actuator, an internal thread of one hand in one end of said channel, a positioning screw in threaded engagement with said internal thread, a concentric longitudinal recess in said positioning screw having an internal thread of opposite hand and different pitch from the internal thread in said channel, and a threaded follower in threaded engagement with said internal thread in said positioning screw secured to said actuator.

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