Dec. 14, 1954 J. S. APPLETON 2,696,765

FIXTURE KEY

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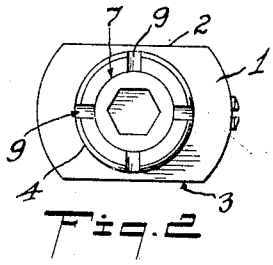


Fig. 2

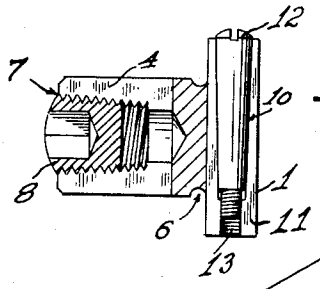


Fig. 1.

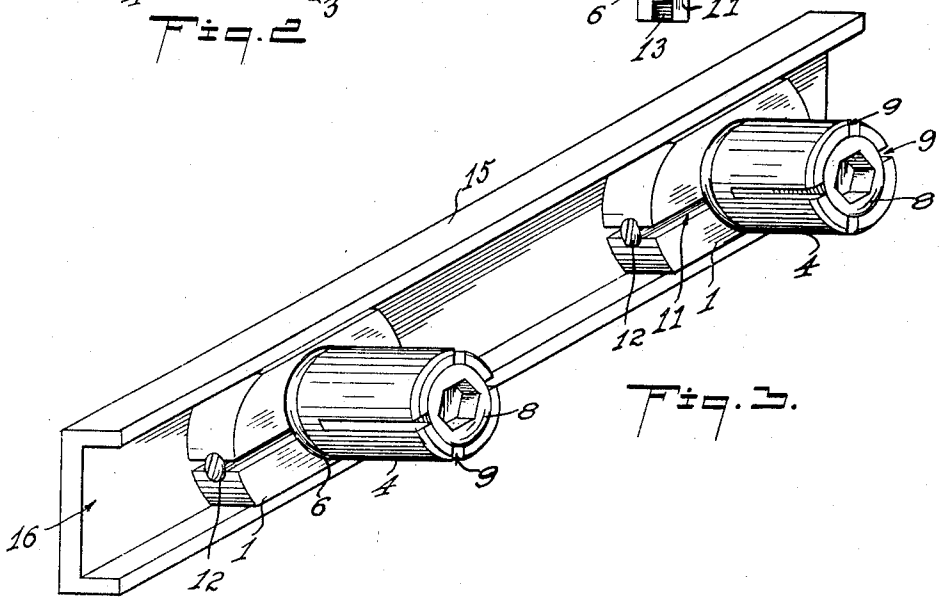


Fig. 3.

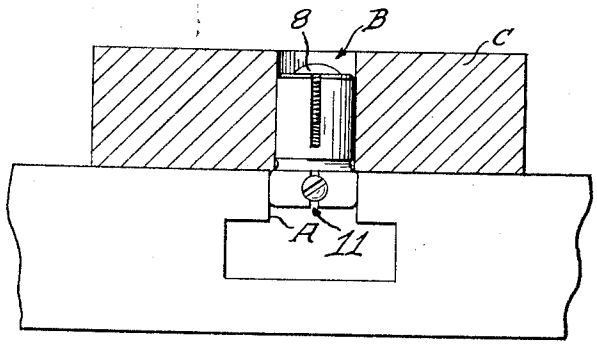


Fig. 4.

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FIXTURE KEY

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3 Claims. (Cl. 90—59)

This invention relates to keys for locating jigs and fixtures on the tables of machine tools.

Various types of locating devices, generally termed fixture keys, are now in use and will serve satisfactorily in cases where the seats for the keys in the bases of the jigs and fixtures and the grooves or slots of the machine tables are made and held to correct shapes and sizes. However, it is found that the wear due to recurrent seating of keys to mount such jigs and fixtures on machine tables tends to change the shape and size of the key and of the openings in which the keys are seatable. While the effect of such wear ordinarily might be considered negligible, it will be appreciated that, in precision manufacture, where the sizes of such fixture keys are held within limits of .0005 of an inch and the openings for receiving the keys are similarly held within close limits, even the effect of slight wear will be found of importance.

It is in view of the foregoing the object of the present invention to provide a fixture key which is designed and constructed to maintain its size and shape over a long period of time. A further object of the invention is to provide means within the key of my invention for adjusting the size and shape of the key to make up for such slight variations as may develop due to wear of the contacting surfaces to the end that the same close tolerances may be maintained over a long period of repeated use of the keys on the same machine. Another object is to provide means for seating the key in the base of the jig or fixture in correct parallel alinement with the grooves of the machines tables.

These and other objects of the invention together with the advantageous features thereof will be appreciated upon perusal of the following detailed description and by referring to the accompanying drawings in which a preferred form of the invention is illustrated.

In the drawing:

Fig. 1 is a side elevational view of a fixture key embodying the invention;

Fig. 2 is a substantially corresponding end view of the device;

Fig. 3 illustrates the method of alining keys for insertion into the base plate of a jig or fixture; and

Fig. 4 shows the key applied to locate such fixture base plate on the table or bed of a machine.

The key of the invention includes a relatively large base **1** having parallel side surfaces **2, 3**. The width of this base is calculated to seat the key snugly in a groove A of the machine table, substantially as indicated in Fig. 4 of the drawing. A cylindrical shank **4** rises from this base to engage a hole, or socket B of the tool C to be machined. The inner end of this shank is at **6** shown slightly recessed to insure clearance when the key is mounted in position for complete seating of the key.

As above explained, the diameter of the key shank **4** and width of the base **1** are held to very close tolerances in order that the key may be snugly seated to insure correct positioning of the tool on the machine table. But even when tightly fitted, it is found that repeated seating of the keys will result in wear on the contacting surfaces sufficient to affect the correctness of the position of the tool on the machine table. It has, for this reason, been suggested slightly to taper the sides of the key base and the cylindrical surface of the shank to facilitate seating of the key and to insure tight fit when fully seated. But because in this case only a small portion of each of the engaging surfaces of the key becomes tightly seated, it is found that these portions of the surfaces become worn so much faster that such tapering becomes detrimental rather than beneficial.

A better way of overcoming this difficulty is to provide means for spreading apart the surfaces of the key which engage the sockets and slots in which the key is placed. This may be accomplished by sinking a recess **7** axially into the end of the key shank. When this recess is threaded to receive a slightly tapered screw **8**, such as an ordinary pipe plug, and when the shank **4** is axially slotted as indicated at **9**, it is found that the key may be readily seated in the tool base. Should it then be found that the key is not held tightly in position therein, it is merely required to advance the pipe plug into the recess of the key until the proper fit is obtained. When it is time to remove the key from its socket, the pipe plug is retracted to relieve the pressure; the key may then be readily withdrawn and no wear on the key or key seat has occurred. While in the drawing only four slots **9** are provided, it is to be understood that the number of slots may be varied where it is found more advantageous to do so.

The base of the key should be similarly adjustable and this may be accomplished by boring a slightly tapered hole **10** through the middle of the base parallel with the side surfaces thereof. A narrow slot **11** is sunk into the base through the axis of this hole, substantially as indicated in the drawing. A tapered pin **12** is fitted into the hole of the base and this pin may be advanced therein after the key has been seated in the slot A of the machine table, as indicated in Fig. 4, to take up any slight clearance that may be found between the abutting surfaces. More delicate adjustment of the base may be obtained by threading one end of the pin, as indicated at **13** to engage screw threads of the base perforation and by slotting the other end of the pin to receive a screw driver.

When the base is equipped with such spreading means, it is seen that the key may be placed in and removed from the machine bed slot an indefinite number of times without danger of any wear occurring.

One difficulty generally found in mounting fixture keys in the base of a jig or fixture for seating in a slot of a machine table is the alining of the key bases with the slots of the machine. If the keys are so loosely seated in the tool base that they may be manually seated in the socket of the fixture base and rotated therein to aline with the slots, there is nothing to retain them in position while being held in storage and carried to and from the machine. It is, for this reason, found important to devise some means for alining the key bases when they are seated in the tool base and retaining the keys in alined position until mounted on the machine table. Such means may take the form of a guide member **15** having a straight groove **16** sunk into the surface thereof of a width to receive therein the key bases for correct alining after the key shanks have been inserted in the socket of the fixture. If the key bases do not fit tightly within the groove, it is merely required to apply a screwdriver to the slot of the element **12** and lightly to rotate the element to obtain a snug fit insuring correct alinement. The pipe plugs **8** are thereupon similarly adjusted, if found necessary, to fit the shanks of the keys snugly within the tool sockets. The guide member **15** is then withdrawn and the tool may be seated in the slot of the machine table. When the guide member **15** is hardened and ground to the exact size, it is found that the key bases will seat tightly in the groove of the machine table. But should this groove be found so badly worn that the keys do not fit tightly therein, it is merely required to turn the elements **12** to spread the bases of the keys until firm contact is obtained. It is seen from this description that the member **15** forms a gage for correctly seating of the keys which may be used in this manner indefinitely without showing signs of wear. Also that the key shanks and key bases may be adjusted and readjusted for correct seating over an extensive period of time without showing signs of wear. But while I have illustrated a preferred form of the invention, it is to be understood that modifications of arrangements, proportions and shapes, within the scope of the claims hereto appended, may be embodied therein without departing from the spirit of the invention.

I claim:

1. A key for locating a fixture on a machine bed, said key including a base having parallel side surfaces seatable in a groove of the machine bed and a cylindrical shank seatable in a socket of the fixture, means for spreading said base to move the parallel side surfaces thereof against the sides of said groove, and means for expanding said shank snugly to fit the shank within said socket.

2. A key for locating a fixture on a machine bed, said key including a base having parallel side surfaces seatable in a groove of the machine bed and a cylindrical shank rising perpendicularly from the base, the shank being axially recessed and slotted, means seatable in the recess of the shank to expand the shank tightly to engage the socket of the fixture, the base being lengthwise slotted, and means seatable in the slot thereof to expand the base to move the parallel surfaces thereof against the sides of the machine bed groove.

3. A key for locating a fixture on a machine bed, said key including a base having parallel side surfaces seatable in a groove of the machine bed and a cylindrical shank rising perpendicularly from the base, the shank having a tapered and threaded recess axially sunk therein and provided with axially directed slots, a tapered screw seatable in the threads of the recess to expand the shank tightly to fit within the socket of the fixture, the base having a tapered hole through the middle thereof parallel with its side surfaces and a narrow slot sunk into the bottom surface thereof through the axis of the hole, and a tapered element seatable in the hole to expand the base to move the parallel sides thereof against the sides of the machine bed groove.

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