Feb. 25, 1964 L. S. WARNER 3,122,048

ADJUSTABLE BACKING KEY

Filed Feb. 1, 1962

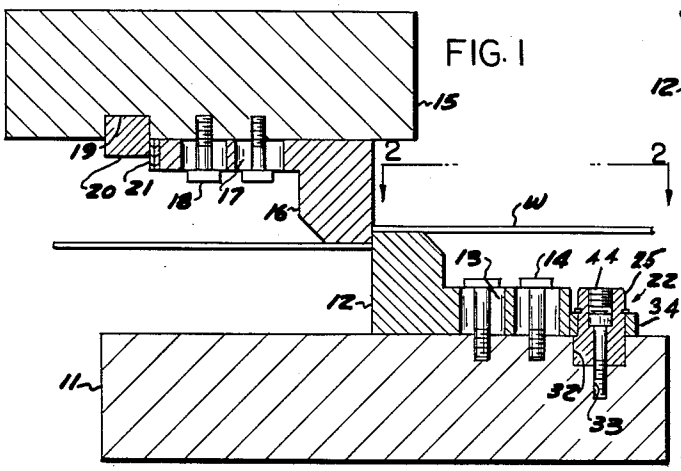


FIG. 1

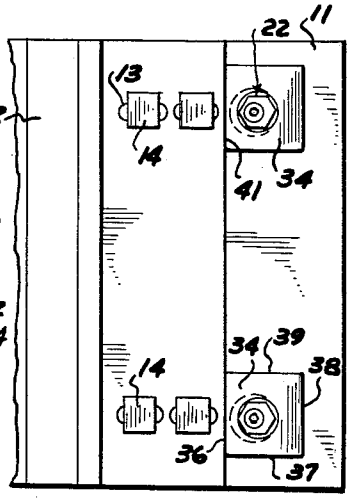


FIG. 2

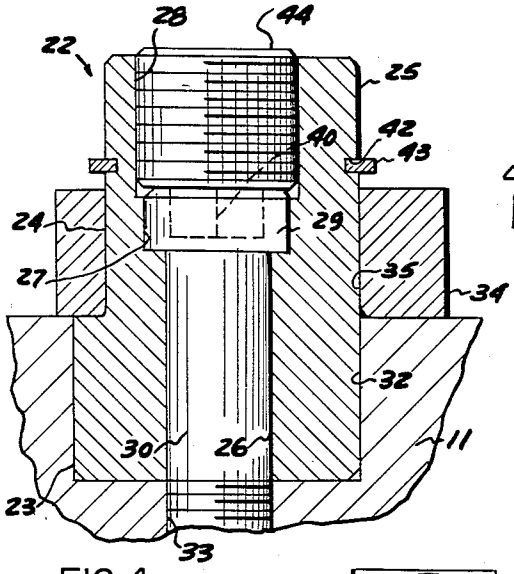


FIG. 4

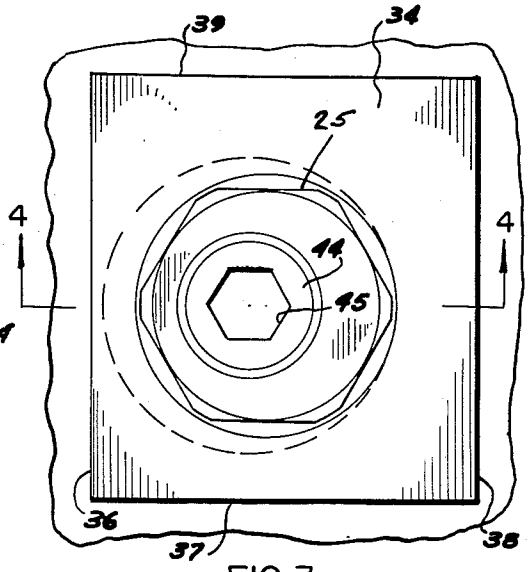


FIG. 3

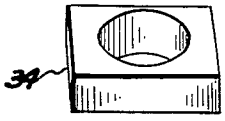


FIG. 5

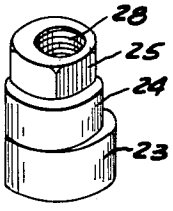


FIG. 6

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United States Patent Office 3,122,048
Patented Feb. 25, 1964

3,122,048

ADJUSTABLE BACKING KEY

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Filed Feb. 1, 1962, Ser. No. 170,411
1 Claim. (Cl. 85—1)

This invention relates to an adjustable backing key.

Heretofore where it had been desired to secure parts of tools in predetermined positions, and where due to the wear of the tool, incremental adjustments were required, the device employed for that purpose was a shim.

Furthermore, in the past a milled slot was often required in the base of the tool within which was inserted a stop block.

It is the object of the present invention to provide an adjustable backing key which not only eliminates the use of shims but also eliminates the time consuming milling operation.

It is the further object of the present invention to provide an adjustable backing key which may be rotatively positioned within a machine tool.

It is a further object of the present invention to provide a backing key including an eccentrically located cam surface and a backing collar thereon, together with a wrench engaging portion whereby the cam element may be rotatively adjusted within the backing collar for adjusting said collar with respect to a tool or other member to be backed up and retained against displacement.

It is the further object of the present invention to employ in conjunction with said cam a backing collar or pressure plate whereby the thrust of the same is transmitted by the pressure plate to the tool.

It is the further object of the present invention to provide a novel structure for locking the adjustable backing key and collar in any desired position of rotated adjustment.

These and other objects will be seen from the following specification and claim in conjunction with the appended drawing in which:

FIG. 1 is a fragmentary elevational view illustrating one use for the present adjustable backing key.

FIG. 2 is a fragmentary plan view taken on line 2—2 of FIG. 1.

FIG. 3 is a plan view of the assembled backing key and collar as assembled in FIG. 1 and on an increased scale.

FIG. 4 is a section taken on line 4—4 of FIG. 3.

FIG. 5 is a perspective view of the backing collar.

FIG. 6 is a perspective view of the backing key.

It will be understood that the above drawing illustrates merely a preferred embodiment of the invention, and that other embodiments are contemplated within the scope of the claim hereafter set forth.

Referring to the drawing, the present adjustable backing key is shown as it would be used in FIG. 1 in connection with a punch, which includes punch holder 11 having mounted on its top surface die 12, which has elongated slots 13 and secured to said holder by the bolts 14 which extend through said slots and threadedly engage said holder.

There is a complemental vertically movable die shoe 15 from which depends the punch 16 of the desired form and which is longitudinally slotted at 17 to receive the punch securing bolts 18, which threadedly engage said die shoe.

There is a conventional type of adjustable backing mechanism for holding punch 16 against relative longitudinal displacement. This device includes the positioning within milled slot 19 of an elongated block 20, held therein in any suitable fashion.

The elongated stock blank is designated at W. During the course of punching operations or blanking operations employing the die and punch 12 and 16, the registering edges thereof wear from time to time and must be refinished. This usually means that there must be a longitudinal adjustment of at least one of the elements towards the other to take up for the change in dimension of the die on such refinishing. Heretofore, upon readjustment of the punch 16 for illustration, one or more shims 21 were introduced between the end of the punch and retaining block 20 in order to firmly retain said punch against relative longitudinal movement with respect to shoe 15.

In addition to the impractical use of shims, the initial milling of slot 19 is a long and time consuming operation, which is eliminated by the use of the present adjustable backing key, and wherein it is merely necessary to bore the opening 32 within punch holder 11.

The present adjustable backing key and collar generally indicated at 22, FIGS. 1 and 4, cooperatively engage one end of die 12 for effecting longitudinal adjustments of die 12 and for securing said die in the adjusted position.

Referring to FIGS. 3 and 4, the adjustable backing key 22 of FIG. 1 is shown on an enlarged scale and includes cylindrical base 23, and upon one side thereof the cam 24 of substantially circular construction but which is eccentric to the longitudinal axis of base 23.

The cam element 24 terminates in the wrench-engaging nut 25, which in the preferred embodiment is of hexagonal shape for illustration, and provides a means for effecting rotary adjustments of cam 24 and its base 23, within bore 32.

Base 23, cam or eccentric body 24, and nut 25 are all formed in one piece, and there is formed therethrough a longitudinal bore 26, which terminates in counterbore 27 and enlarged threaded bore 28. Bore 27 is adapted to receive the enlarged head 29 of bolt 30 which extends down through bore 26 and in use is threaded down into threaded opening 33 in the supporting member, such as punch holder 11. Bolt 30 effectively secures the backing key in any position of rotated adjustment.

As constructed the cam or eccentric body 24 is so formed that if used alone to operatively engage the end face of die 12, it would be in the nature of a "line" contact. To improve upon this contact and to provide an extended surface contact between the cam and die 12, there is provided a pressure plate in the form of a collar 34, which has an eccentrically displaced circular bore 35 to receive the eccentric body 24 loosely, so as to provide a slip fit therebetween.

The exterior bearing surface 36, 37, 38, and 39 of collar 34 are flat as shown in FIGS. 2 and 3 for operatively engaging the end face of die 12. With bolt 30 loosened, on application of a wrench to its socket 40 by turning key 22 through nut 25, the cam body or eccentric 24 acting through collar 34 will transmit longitudinal pressure to the end face of die 12 for effecting the desired longitudinal adjustment thereof towards punch 16. When the key has been rotated sufficiently so as to properly in-feed die 12 to the correct position, bolt 30 is tightened.

In use cylindrical body 23 is snugly yet rotatively journaled and supported within bore 32 in member 11. As shown in FIG. 2, one of the flat surfaces 36, 37, 38 and 39 operatively engages the end wall of die 12 as at 41.

In use, there are normally employed more than one backing key, such as the backing keys illustrated in FIG. 2.

In FIGS. 2 and 3, the sides 36, 37, 38 and 39 of collar 34 are arranged as in a square, and its bore 35 is eccentric to its center. Here also, there is a variable radial distance between the center of bore 35 and said flat sides to provide a greater range of adjustment. For example, surface 36 is at a center distance of .69 inch with respect to the

center of collar opening 35. Surface 35 is .75 inch; surface 38 is .81 inch and surface 39 is at a set center distance of .87 inch.

The collar 34 thus provides for the maximum range of adjustment of the backing key. There is thus provided the selective use of any of the tool engaging surfaces 36, 37, 38 and 39 to provide for external adjustments or for an external backing up operation. In addition thereto, there is the eccentricity of the cam body 24 with respect to the axis of rotation of key body 23.

There is thus provided in the present key a maximum adjustment, for illustration, of .290 inch.

It is contemplated that the effectiveness of the key may be modified by modifying the dimensions of the collar. The key has formed therein outwardly of cam element 24, an annular groove 42 which receives the locking ring 43 for the purpose of retaining collar 34 on key 22 limiting relative longitudinal adjustment thereof. At the same time the collar is free to be rotatively adjusted as required.

Plug 44 with Allen wrench aperture 45 is threaded down into bore 28 at the outer end of key 22 to retainingly engage bolt 29—30 to prevent loosening or accidental removal thereof.

Having described my invention, reference should now be had to the following claim.

I claim:

For use with a horizontal support having a vertical axis tapped hole and a coaxial counterbore;

an assembly comprising a stop block collar, an adjustable key therefor; a headed key-retaining screw bolt; and a retaining ring;

the stop collar being of polygonal shape having a central hole and flat vertical stop sides, these sides being at varying distances from the axis of the collar hole and serving as stops;

the key comprising a cylindrical base portion at its lower end, a central cylindrical cam body portion, and a nut portion at its upper end having flat vertical sides;

all three portions being integral;

the key having a central longitudinal bore having a vertical axis coincident with the axes of the support tapped hole and the support counterbore and the stop collar;

the base portion being of the approximate diameter of the support counterbore to fit snugly and be journalled therein;

the height of the base portion being no greater than the counterbore depth so that at no time can the upper end of the base portion be above the support; the base portion being concentric with the key axis;

the cam body portion being of the approximate diameter of the collar hole so as to fit snugly therein; the cam body portion being eccentric to the axis of the key;

the cam body portion being smaller in diameter than the base portion, providing an arcuate stop shoulder on the upper end of the base portion at its juncture with the cam portion;

the nut portion being of lesser maximum diameter than the cam portion and formed with vertical flat sides to receive a wrench enabling the key to be adjusted by being rotated on its axis while its base portion journals the key in the support counterbore, and while the collar hole receives the cam portion;

the key having a horizontal stop shoulder in the central bore for the bolt head;

such rotation of the key by a wrench applied to the nut portion acting to shift the collar laterally of the key axis on the support on which the collar rests, due to the coaction of the eccentric cylindrical cam portion of the key and the collar whose hole fits snugly around the cam portion;

the key retaining bolt having a head engaging the key stop shoulder to hold the key down in the support counterbore in adjusted position with the bolt thread shank adapted to be threaded into the support tapped hole;

a collar retaining ring on the key spaced above said arcuate stop shoulder a distance greater than the height of the collar for loosely retaining the collar assembled in its place around the cam portion and between the nut portion and the base portion of the key;

said retaining ring being so formed that it can be applied to the key after the collar is loosely assembled on the key by being slipped over the nut portion end of the key and dropped along the key towards said arcuate stop shoulder, which with the ring, retains the collar loosely in assembly with the key.

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