Dec. 26, 1922. 1,439,770

R. A. SMITH.
SELF FITTING KEY DEVICE.
FILED JULY 12, 1921.

Fig. 1,

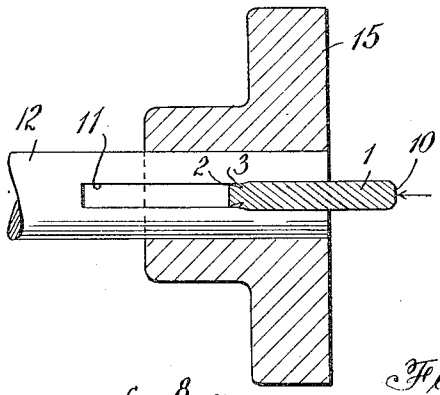


Fig. 2,

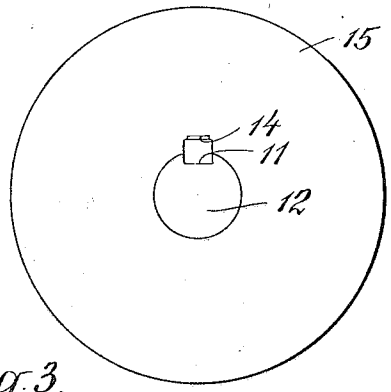


Fig. 3,

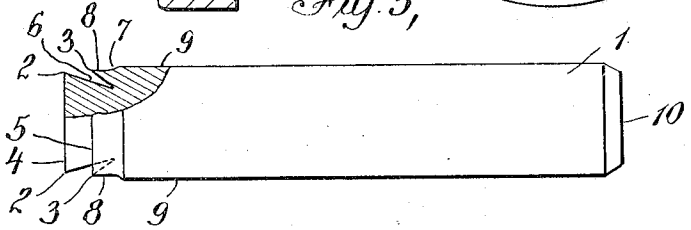
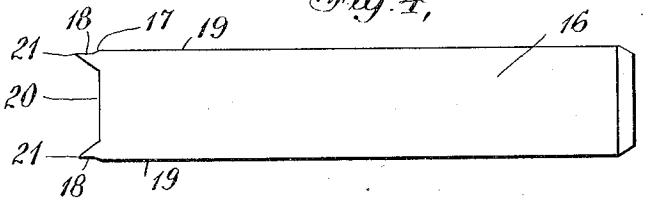


Fig. 4,



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UNITED STATES PATENT OFFICE.

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SELF-FITTING KEY DEVICE.

Application filed July 12, 1921, Serial No. 484,094. Renewed July 26, 1922. Serial No. 577,737.

To all whom it may concern:

Be it known that I, ROBERT A. SMITH, a citizen of the United States, and resident of Mahwah, Bergen County, State of New Jersey, have made a certain new and useful Invention Relating to Self-Fitting Key Devices, of which the following is a specification, taken in connection with the accompanying drawing, which forms part of the same.

Some of the broad subject matter has been transferred from this case to applicant's copending case Serial No. 573,195, filed July 6, 1922.

This invention relates especially to self-fitting or cutting keys of the usual square or rectangular section and provided with cutting edges or portions on at least one or more of the driving faces of the key, so that it may cut or finish its own keyway when forcibly inserted or driven into the usual rough cut keyways in the shaft and other cooperating parts. Such keys are preferably formed of hardened and tempered steel which may be advantageously ground to size after such heat treatment or otherwise accurately shaped, and on one or more faces of the key, cutting edges or portions are formed preferably in connection with chip retaining recesses, especially where several cutting edges are formed on the same face of the key. In some cases also the cutting edges may be slightly smaller or narrower than the adjacent body of the key, so that the finished cut thus produced is a rather snug or force fit into which the key may then be driven to secure still tighter and firmer engagement between the parts. It is of course of special advantage to have such self-fitting or cutting edges arranged on one or both of the driving faces of the connecting or driving key, so that an accurate fit is thus automatically secured at these driving faces, the inner and outer faces of the key not being of so much importance in driving rotating parts from shafts for example.

In the accompanying drawing showing in a somewhat diagrammatic way several illustrative embodiments of the invention,

Fig. 1 is a section showing the use of such a key; and

Fig. 2 is an end view thereof.

Fig. 3 is an enlarged view partly in section showing the key construction in greater detail; and

Figs. 4 to 6 show other illustrative forms of keys.

As indicated in Figs. 1 and 2, the ordinary rough slotted or milled keyways 11, 14 may be formed in any desired way in the cooperating parts such as the shaft 12 and the flange and coupling member 15 for example. The self-fitting or cutting key 1 which may have one or more cutting edges such as 2, 3 on at least one of the driving faces of the key such as its upper or lower notched edge as indicated in Fig. 1, becomes active in resisting the torque between these two rotating members under service conditions and if desired, both of these opposite driving faces may be formed with one or more of such cutting edges 2, 3 so that when the key is forced into this slightly undersized keyway, these edges automatically cut their own slot of such size as to accurately accommodate or fit the body 9 of the key. Of course the end 10 of the key may be beveled if desired so as to be driven home by a hammer or other means. It is also desirable to form such self-fitting cutting keys of tool steel or still better of special tough strong steel, which is heat treated to harden and toughen the body of the key and leave the cutting edges in most effective condition. In many cases it is desirable to preliminarily or roughly form these cutting edges and then after hardening and tempering the key, to grind or otherwise finish or straighten the key body, and in some cases to grind the cutting edges in proper relation thereto to get best results.

As is indicated in Fig. 3 one or more cutting edges such as 2, 3 may in many cases be advantageously formed on both of the opposing driving faces of the key, and each of these successively acting cutting edges may be slightly larger, so that each of them may remove a few thousandths of an inch from the corresponding face or edge of the keyway as the key is driven home. It is sometimes advantageous to have the final cutting edge such as 3 so formed as to take only a light cut, this material being ac-

commodated in a chip retainer recess such as 6 formed adjacent this cutting edge and extending inward, so as to give ample room to produce the desired cutting angle for this edge. In some cases also one or more cutting edges such as 5 may be formed on one or both of the other faces of the key besides the driving faces thereof, although it is usually better to have at least one of these inner and outer key faces flat so as to act somewhat more efficiently as a guide and aligning surface when the key is inserted. In some cases also the key body may have a wedging action if the final cutting edge is slightly smaller than the adjacent driving face of the key, and as shown on an exaggerated scale in Fig. 3 the width of the portions 8 of the key adjacent the cutting edges 3 may be slightly smaller than the corresponding driving faces 9; and the inclined or curved portion 7 joining these two faces may have a few thousandths of an inch or less difference in outward projection at its two ends so as to secure the desired tightness of drive fit depending of course on the size of key employed.

Fig. 4 shows another illustrative key 16 which may have the opposing driving faces 19 and cutting edges 21 on both sides of the key, which may if desired be slightly narrower than the driving faces, the adjacent portions 18 being not more than several thousandths of an inch smaller than the driving faces and joined therewith by the inclined or wedging surfaces 17, so that after the driving faces of the keyway have been cut or finished, the key is tightly wedged or forced into the same to more securely connect the parts, which is desirable in many cases.

This invention has been described in connection with a number of illustrative embodiments, forms, shapes, proportions, sizes, materials, and arrangements, to the details of which disclosure the invention is not of course to be limited since what is claimed as new and what is desired to be secured by Letters Patent is set forth in the appended claims:

1. In self-fitting driving keys, a rectangular sectioned key of hardened steel having on each of its opposite driving faces a plurality of cutting edges of progressively increasing width, the final cutting edges being of slightly less width than the distance between the driving faces and being joined therewith by an inclined wedging surface to give a drive fit as the key is driven or forced into a rough finished keyway.

2. In self-fitting driving keys, a rectangular sectioned key having on one of its driving faces a plurality of cutting edges at progressively increasing distances from the opposing driving face, the final cutting edge being of slightly less width than the distance between the driving faces to give a drive fit as the key is forced into an undersized keyway.

3. In self-fitting driving keys, a rectangular sectioned key having on each of its opposite driving faces a cutting edge of slightly less distance from the opposing driving face than the width between the driving faces and being joined therewith by a wedging surface to give a drive fit as the key is driven into an undersized keyway.

4. In self-fitting driving keys, a key having on each of its opposite driving faces a cutting edge of slightly less distance from the opposing driving face than the width between the driving faces to give a drive fit as the key is driven into an undersized keyway.

5. In self-fitting driving keys, a rectangular sectioned steel key having on one of its opposite key faces a cutting edge at slightly less distance from the opposing key face than the width between the key faces to give a drive fit as the key is forced into a rough finished keyway.

6. In self-fitting driving keys, a rectangular sectioned key having on its opposite driving faces cutting edges of several thousandths of an inch less width than the driving faces and being joined therewith by an inclined wedging surface to give a drive fit as the key is driven or forced into a rough finished keyway.

7. In self-fitting keys, a key having on one of its opposite faces, a cutting edge at a few thousandths of an inch less distance from the opposing driving face than the distance between the rear portions of said faces, said cutting edge being joined to the cooperating face by an inclined surface to give a close fit as the key is driven into an undersized keyway.

8. In self-fitting keys, a key having on one of its opposite faces, a hardened cutting edge at slightly less distance from the opposing driving face than the distance between the rear portions of said faces to give a drive fit as the key is driven into an undersized keyway.

9. In self-fitting keys, a key having on one of its opposite faces, a cutting edge at slightly less distance from the opposing driving face than the distance between rear portions of said faces.

ROBERT A. SMITH.