

H. J. HJORTH.
SELF FITTING KEY.
APPLICATION FILED JUNE 26, 1907.

921,401.

Patented May 11, 1909.

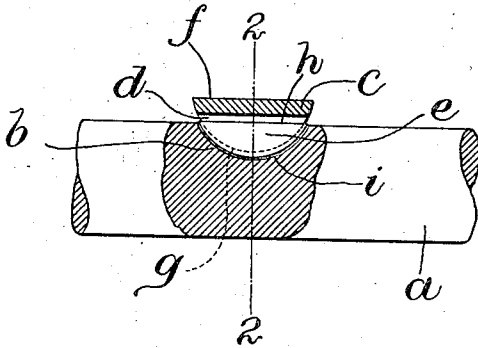


Fig. 1.

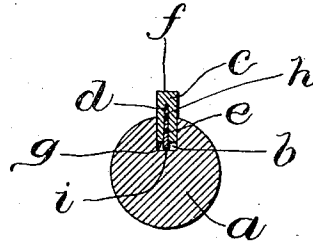


Fig. 2.

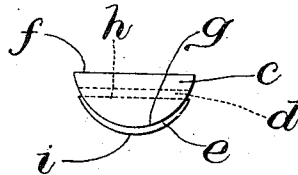


Fig. 3.

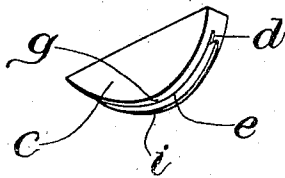


Fig. 4.

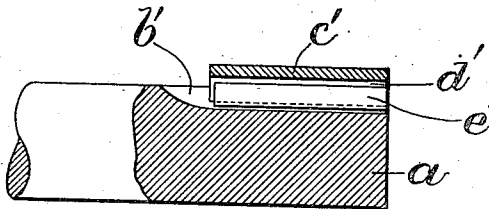


Fig. 5.

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UNITED STATES PATENT OFFICE.

HENRY J. HJORTH, OF CAMBRIDGE, MASSACHUSETTS.

SELF-FITTING KEY.

No. 921,401.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HENRY J. HJORTH, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Self-Fitting Keys, of which the following is a specification.

This invention relates to keys for connecting together rotating machine elements, such as pulleys, gears, clutches and the like, and shafting. Its object is to furnish a key for this purpose which may be made tight in its keyway beyond any possibility of working loose (so that it cannot bend or chafe, and so that liability of shearing may be minimized), and which is also capable of some range of adjustment, whereby standard keys may be fitted in keyways of varying widths with equal tightness; and slight inaccuracies in width of both key and keyway may be converted into details of no importance.

To this end, I have devised a key having a longitudinal slot or groove intermediate its side faces, whereby its width may by compression be made less, with which is associated a wedge strip adapted to be forced into the slot to expand the key, and have so arranged the slot and wedge with respect to the key as a whole that the mere act of forcing the key into its keyway in a shaft, or other machine element, will cause the key to be sufficiently expanded to fill the keyway and bear against the sides thereof with the necessary pressure.

Of the accompanying drawings,—Figure 1 represents a sectional elevation of a fragment of shafting showing a key embodying the preferred type of my invention. Fig. 2 represents a cross-section on line 2—2 of Fig. 1. Figs. 3 and 4 represent respectively, an elevation and a perspective view in detail of the key and wedge separate from the shaft. Fig. 5 represents a view similar to Fig. 1, showing a somewhat different embodiment of the invention.

The same reference characters indicate the same parts in all the figures.

In the above-noted drawings, the reference letter *a* designates a shaft, which may be taken as typifying any machine element whatever in which a key may be set to hold any other element against rotation relatively thereto, while *b* designates the keyway, slot, or groove into which the key *c* may be set. In that portion of the key which is con-

tained in the groove *b*, that is, extending inward from the edge or face which first enters the groove when the key is being set, is a slot or groove *d* which lies in the direction of the greatest dimension of the key between the side faces thereof, and so divides the key in its least dimension into two parts. The slot *d* does not, however, pass quite through from one edge to the other of the key, and so the two parts into which it is divided are integrally united by a connecting web which is narrow enough to allow the sides to be sprung toward or from one another. In the slot *d* is inserted an expander consisting of a wedge *e*.

Preferably the key embodying my invention is a segmental one, being a semi-circular disk with a straight edge or side *f*, parallel plane side faces, and a circular edge or side *g*. As the curved edge of the key is the one which enters the keyway, it is from this edge that the slot *d* extends. The wedge *e* is similarly shaped, being straight at its thin or entering edge *h*, and curved on its outer edge *i* with a radius substantially equal to that of the key. The sides of the wedge are plane, converging at the edge *h*. Consequently the curved edge *i* constitutes the base and is thickest at that point which is most remote from the edge *h*, and at this point the thickness is greater than the width of slot *d*. Accordingly when the wedge is inserted into the slot without force enough to expand the sides of the key, its curved base projects beyond the curved side *g* of the key.

The key and wedge having been assembled in the condition above described and as shown in the drawings, are inserted in the keyway *b*. The base of the wedge, being thus in advance, comes first into contact with the bottom of the keyway, by which it is arrested. Then as the key is forced down, the wedge is simultaneously caused to penetrate farther into the slot *d*, thus expanding the key laterally into frictional engagement with the walls of the keyway. Thus the expansion of the key takes place simultaneously with its insertion into the keyway and is wholly automatic. This expansion will continue until the edge reaches the bottom of the keyway, when the base of the wedge is flush with this edge and the key is given its maximum thickness. Thereby all looseness is taken up and the key is held so it cannot slip out or move sidewise,

and thus its resistance to bending and shearing is increased to the maximum.

The keyway when first cut should be greater in width than the key alone and slightly less than the key and wedge together, so that they may be partially inserted with ease and then expanded to the necessary degree of tightness. Slight inaccuracies in the thickness of keys and width of keyways, however, may be compensated for by the distance of insertion of the key, and by the use of wedges of varying thicknesses. It is possible also to set such a key into a groove of less width than its own thickness by omitting the wedge and pressing the separated sides together, diminishing the width of the slot d . Then the elasticity of the sides and connecting web will produce the requisite frictional pressure.

It is to be understood that, although my invention is preferably embodied in a segmental key, it is not limited in its application to one of that type, but may equally be embodied in one of any other form. Accordingly, in Fig. 5, I have shown it as applied to a bar key. In this figure the keyway is a longitudinal groove b' , instead of

a circular recess, the key is a prismatic bar c' , having a slot d' , and the wedge is a long parallelogram-shaped strip e' . In other respects (as to the relation of the slot and wedge to the key and manner of assembling them) this form of the invention is precisely like that first described.

I claim:—

1. A flat key having parallel sides and longitudinally slotted from end to end in its inner side or edge whereby its sides may be brought nearer together, and a wedge adapted to be inserted in said slot to expand the key laterally.

2. The combination with a machine element having a keyway with parallel sides, of a key also having parallel sides and longitudinally slotted from end to end in the side or edge thereof which enters said keyway, and a wedge in said slot to expand the key laterally into frictional engagement with the said parallel sides of the keyway.

In testimony whereof I have affixed my signature, in the presence of two witnesses.

HENRY J. HJORTH.

Witnesses:

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