

Sept. 25, 1928.

M. SKLOVSKY

1,685,098

DRIVING KEY

Filed March 7, 1927

Fig. 1.

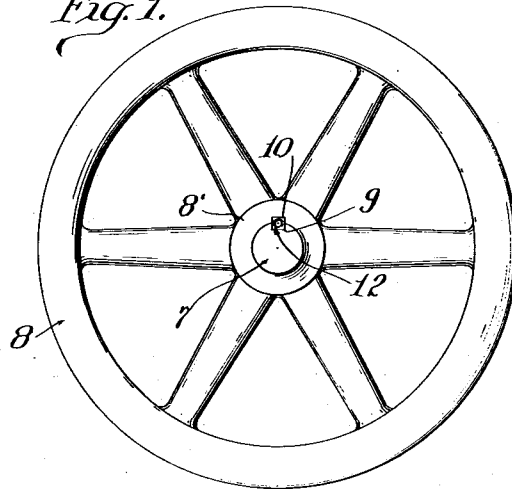


Fig. 2.

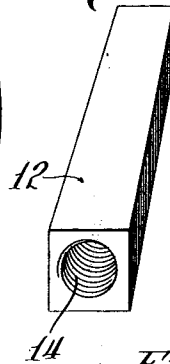


Fig. 3.

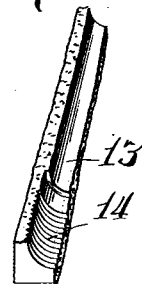


Fig. 4.

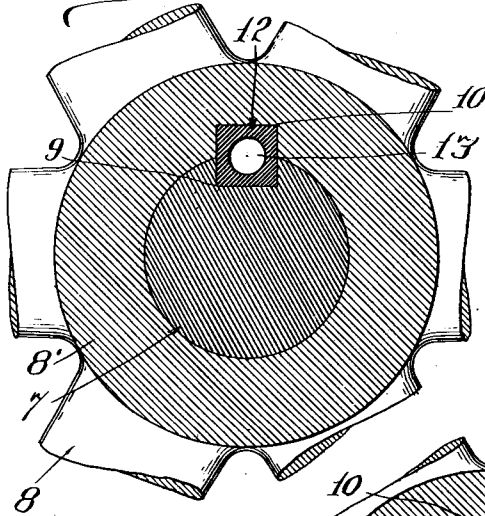


Fig. 5.

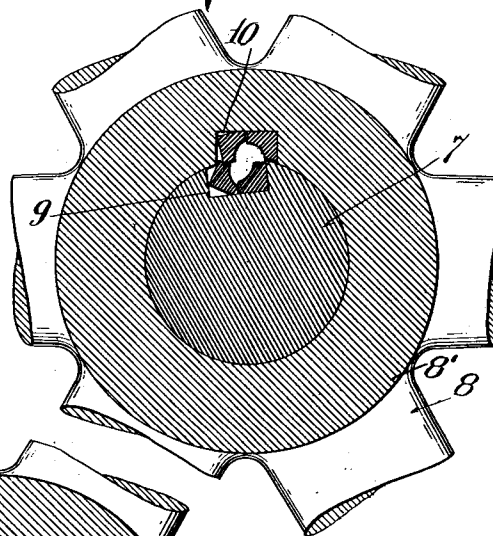
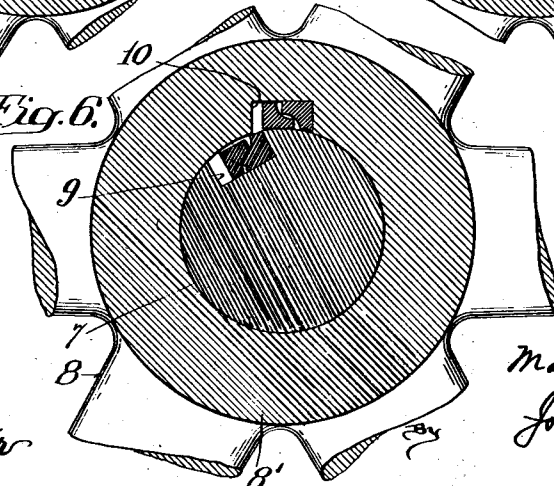


Fig. 6.



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UNITED STATES PATENT OFFICE.

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DRIVING KEY.

Application filed March 7, 1927. Serial No. 173,278.

The present invention relates to driving keys, such as are used for coupling together a shaft and fly-wheel, a shaft and belt pulley, and other like rotating elements.

5 The primary object of the invention is to provide an improved construction of safety driving key designed to fracture at a predetermined stress and thus prevent injury to either the driving or driven element, such as might result through the creation of an
10 abnormal momentum, inertia shock, overload, etc. This type of key has general utility in practically all classes of machinery where such safety feature is desired, represented for example by shop machinery, hay
15 presses, bull-dozers, internal combustion engines etc. The present improvements have been devised to the end of providing a key which will have more certainty in its release
20 function viz: a key wherein the point of failure for effecting the safety release can be predetermined within very close limits with maximum certainty.

Referring to the accompanying drawing
25 illustrating my invention:

Figure 1 is an elevational view illustrating a typical use of my invention for keying a shaft and fly-wheel together.

Figure 2 is a perspective view of the key.

30 Figure 3 is a similar view of one of the quarter sections of the key after fracture has occurred.

Figure 4 is a sectional view on a larger scale, illustrating the seating of the key in the key ways of the shaft and fly-wheel hub.
35

Figure 5 is a similar view illustrating the planes of fracture and the initial movement of the key sections in the failure of the key, and

40 Figure 6 is a similar view illustrating the nesting of the key sections after failure.

The shaft 7 and fly-wheel 8, chosen merely for exemplifying typical driving and driven elements, have rectangular key seats
45 or key ways 9 and 10 formed therein, extending longitudinally of the shaft. The present key consists of a bar 12 of square cross section having a bore 13 extending entirely through its length. At the outer
50 end of the key, or if desired, at both ends thereof a threaded socket 14 is formed in the bore for receiving any correspondingly threaded member serving temporarily as a tool for inserting or removing the key. This
55 threaded socket is of particular advantage

for removing the key, as by screwing a bolt or other threaded member into the socket 14, a secure grip may be had on the key for pulling the same. Where the key is to be held in the key ways 9 and 10 by a drive
60 fit, it is formed with a slight taper. Where the hub 8' of the outer rotating element is split for clamping the key, or where other means is provided for holding the key in place, the latter can be constructed of uni-
65 form thickness throughout. The provision of the bore 13 forms relatively thin side walls, which side walls are the points at which failure of the key occurs. Thus, by varying the diameter of this bore the break-
70 ing stress of the particular key can be predetermined as desired. It will be noted that the bore extends longitudinally through the key so that the axis of the bore is substantially in the peripheral plane of the shaft 7.
75

In the construction of the key it is given a brittle tempering so that its failure will be more in the nature of a fracture or collapse of these side walls rather than a shearing of the key. The key may have any desired metallic composition and may be given any desired heat treatment to obtain this brittle characteristic. For the purpose of teaching the art one method of constructing these keys I may remark that for one particular
85 duty, for which I have successfully used the keys, I have constructed them of 20'-30' carbon steel which is carbonized to the brittle point so that the key will crush quickly when the maximum resistance is
90 passed. This failure of the key by fracture enables the collapsing point to be predetermined within very close limits with maximum certainty, which is a desideratum not possible in the case of a key failing solely
95 by shear.

By making the key hollow and of substantially symmetrical cross section with the axis of the bore positioned approximately in the peripheral plane of the shaft 7, the
100 fracture is made to occur in two planes substantially at right angles to each other, so that upon failure the key breaks into four quarter sections. By collapsing in this manner the key sections are caused to nest
105 with each other whereby the release between the two rotating elements is complete so that the element having the high inertia or momentum has free rotation instantly relative to the other element. Such nesting of the
110

key sections avoids any tendency of these sections chewing off the corners of the key ways in the resulting independent rotation of the driving and driven elements.

5 Figure 5 illustrates the failure of the key in its two transverse planes and the initial movement of the broken key sections upon such failure. The two sections at one side of the key are tipped inwardly by the breaking stresses and by the initial independent movement between the driving and driven elements, so that the inner tipped section is caused to rock over the nest with the adjacent inner section and the outer tipped section is similarly rocked over and caused to nest with its adjacent outer section. The tipped sections thus assume the positions illustrated in Figure 6, nesting with their adjacent sections, and permitting independent rotation of the driving and driven elements with minimum possibility of these key sections striking and chewing off the corners of the key ways in such independent rotation.

25 What I claim as my invention and desire to secure by Letters Patent, is—

1. A safety driving key of the class described consisting of a hollow bar of substantially symmetrical, uniform cross-sectional area from end to end and composed of a metal which will fracture in its failure under excessive stress.

30 2. A safety driving key of the class described consisting of a hollow bar of rectangular cross section.

35 3. A safety driving key for the use described consisting of a heat treated hollow bar designed to fracture at a predetermined stress.

40 4. A safety driving key for the use described consisting of a bar having a longitudinal bore therethrough leaving relatively thin wall sections designed to fracture in two planes upon the subjection of said key to a predetermined stress.

45 5. A safety driving key for reception in longitudinally extending key ways of two rotating elements, consisting of a bar of

substantially square cross section having a bore extending longitudinally thereof from end to end, said bar being heat treated to have a brittle characteristic for fracture upon the subjection of said key to a given stress.

6. A safety driving key for reception in longitudinally extending key ways of two rotating elements, consisting of a bar of substantially square cross section having a central bore extending longitudinally of the same from end to end thereof, said bar being composed of carbon steel carbonized to the brittle point, whereby said bar will be caused to collapse in two planes upon the subjection thereof to a predetermined stress.

7. The combination with two concentric rotating elements having longitudinally extending key ways in their engaging surfaces, of a safety driving key engaging in said key ways for releasably coupling said elements together, said key consisting of a hollow metallic bar, of substantially rectangular cross section, having a relatively brittle temper for fracture under predetermined stress.

8. The combination with two concentric rotating elements having longitudinally extending key ways in their engaging surfaces, of a driving key engaging in said key ways and comprising a threaded socket at one end for the reception of a threaded member utilized for drawing the same.

9. The combination with two concentric rotating elements having longitudinally extending key ways in their engaging surfaces, of a safety driving key engaging in said key ways for coupling said elements together, said key consisting of a bar of substantially square cross section having a bore extending longitudinally through the same, said bar having a relatively brittle temper for fracture upon the subjection thereof to a predetermined stress, and a threaded socket in one end of said bore for the reception of a threaded member utilized for drawing the key.

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