

(Model.)

W. N. WOODRUFF.

SHAFT KEY.

No. 368,744.

Patented Aug. 23, 1887.

Fig. 1.

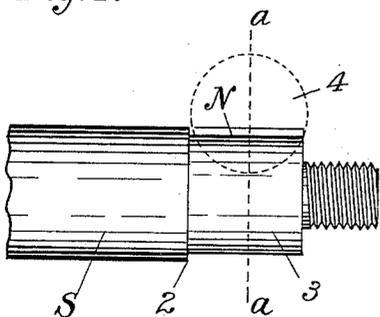


Fig. 2.

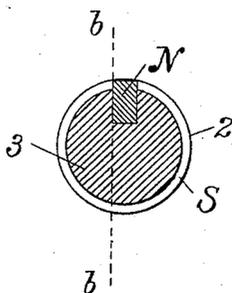


Fig. 3.

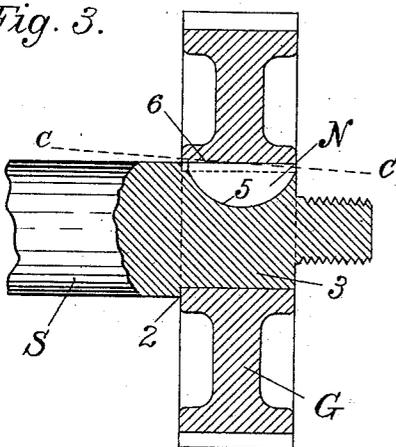


Fig. 4.

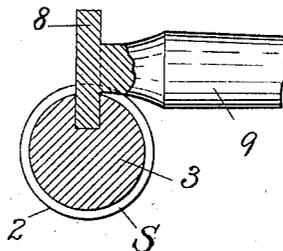


Fig. 5.

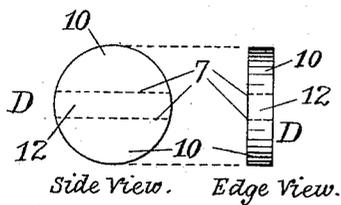
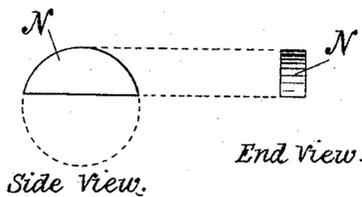


Fig. 6.



Witnesses:

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# UNITED STATES PATENT OFFICE.

WILLIAM N. WOODRUFF, OF HARTFORD, CONNECTICUT.

## SHAFT-KEY.

SPECIFICATION forming part of Letters Patent No. 368,744, dated August 23, 1887.

Application filed May 31, 1887. Serial No. 239,884. (Model.)

*To all whom it may concern:*

Be it known that I, WILLIAM N. WOODRUFF, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Shaft-Keys, of which the following is a specification.

This invention relates to those parts of machines usually denominated "keys," and which are employed for holding gears, wheels, or other details of machines in fixed circumferential position on their supporting-shafts.

The object of the invention is to furnish a key of that class which shall be efficient in operation and more convenient and economical to manufacture and use. To this end my invention consists in the improvements and combinations hereinafter set forth.

In the drawings accompanying and forming a part of this specification, Figure 1 is a side elevation of a shaft and key embodying my improvements. Fig. 2 is a cross-sectional view of the same in line *a a*, Fig. 1. Fig. 3 is a view similar to Fig. 1, showing the shaft broken away to line *b b*, Fig. 2, and showing a gear fitted on the shaft over the key. Fig. 4 illustrates the preferable mode of forming the rest for the key. Fig. 5 shows in side and edge view a blank from which to make the keys. Fig. 6 shows in side and end view a key made from said blank.

Similar characters designate like parts in all the figures.

For illustrating the practical application of my improvements, I have shown in the drawings one end of a shaft, S, which is similar to the shafts commonly used in a variety of machines—as, for instance, in lathes and other metal-working machines, and in weaving and other textile machinery. Said shaft is to have fitted thereto some part of machinery—as, for instance, the gear or other wheel G—which may or may not be set against a shoulder, 2, formed on the shaft. The wheel-carrying portion 3 of shaft S has formed therein and longitudinally thereof a key-seat which is concave throughout its length and deepest in the center of its length, as well shown by the

lower part of the dotted circle 4 in Fig. 1 and by the solid line 5 in Fig. 3. Into this key-seat the key N is inserted, its two opposite sides being parallel planes, its lower edge being formed convex to conform to the concavity of the key-seat, and its straight upper edge projecting above the shaft a proper distance to fit an ordinary keyway formed in the wheel or like part fitted on the shaft. The parts being thus constructed, when the wheel G is put on, as in Fig. 3, and forcibly, if necessary, the key N readily slides on its concave seat 5 until the upper edge of said key conforms in its position to the upper edge, 6, of the keyway in said wheel, and thus whether said upper edge is parallel to said shaft or is inclined thereto, as shown by dotted line *c c*. Thus is my improvement specially adapted for holding change-wheels, which, while at first sliding on freely, should be driven firmly on the key as they come against the shoulder 2.

For forming the key-seat in the shaft I employ a milling-cutter, 8, Fig. 4, corresponding in its thickness to that of the key N and in its diameter to that of the circle 4, Fig. 1. This cutter being carried by a suitable revolving stem or spindle, as 9, it is fed into the shaft to the required depth, thereby finishing the key-seat by a single operation of a very inexpensive character. By the old mode of making key-seats several distinct operations are necessary, involving much greater expense than by my method. The saving thus effected will amount in the aggregate to a large sum where machines of the classes specified are produced in large numbers.

The manufacture of the keys of proper size and shape may be accomplished as follows: A disk or blank, D, Fig. 5, is first prepared, of the diameter and thickness of the cutter 8, which is used for cutting out the key-seat. This blank is next divided on lines 7 7, thereby making two keys of those parts, 10 10, which lie outside of said lines. By cutting out the central space, 12, of the proper width, the keys are made of the required height, and appear as shown in Fig. 6. When longer

keys of less height are required, larger blanks D are used, and in some cases three or more keys may be cut from the same blank.

Having thus described my invention, I  
5 claim—

The combination herein described, the same consisting in a shaft having longitudinally thereof a key-seat, concaved substantially as described, a part fitting said shaft and hav-

ing a keyway, and a key lying in said key- 10 seat, one edge of said key being formed convex to fit the concavity of the key-seat, and the other edge thereof being fitted to the keyway in said part, substantially as described.

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Witnesses:

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