(No Model.)

O. SMITH.

SPRING KEY.

No. 362,548. Patented May 10. 1887.

Fig. 1.

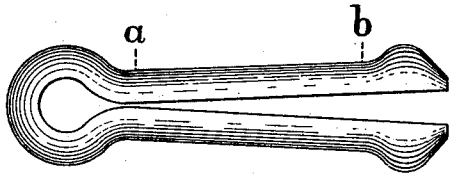


Fig. 2.



Fig. 3.



Fig. 4.

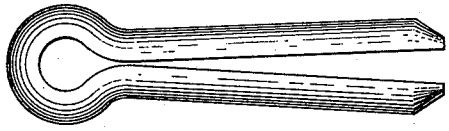


Fig. 5.

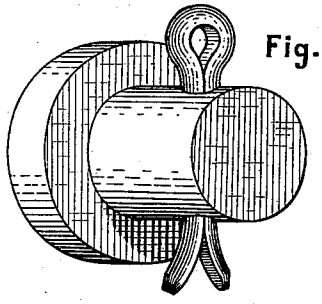


Fig. 6.

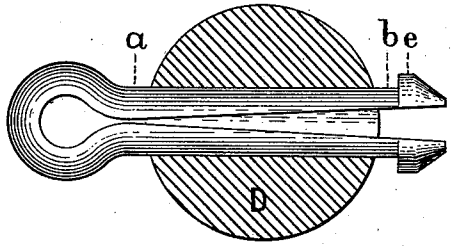


Fig. 7.



Fig. 8.



Fig. 9.

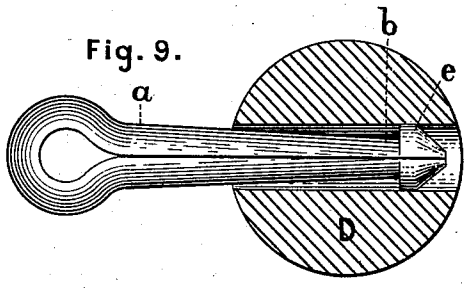


Fig. 10.



Fig. 11.



Fig. 12.

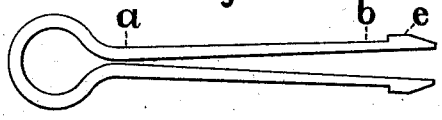


Fig. 13.



Fig. 14.



WITNESSES:

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INVENTOR

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UNITED STATES PATENT OFFICE.

OBERLIN SMITH, OF BRIDGETON, NEW JERSEY.

SPRING-KEY.

SPECIFICATION forming part of Letters Patent No. 362,548, dated May 10, 1887.

Application filed August 11, 1886. Serial No. 210,659. (No model.)

To all whom it may concern:

Be it known that I, OBERLIN SMITH, a citizen of the United States, residing at Bridgeton, in the county of Cumberland and State of New Jersey, have invented a new and useful Form of Spring Key or Cotter, of which the following is a specification.

My invention consists in making a spring-key with shoulders near the point to prevent its being easily withdrawn from the hole in which it is inserted, and at the same time to retain a normal strength and normal fitting of the hole, which has been heretofore secured only by making the key smooth without such shoulders. I attain this object by the construction and design shown in the accompanying drawings, in which I will first illustrate, in Figures 1 to 5, how such a result has not heretofore been attained by the keys and cotters which are now in the market.

In Fig. 1 is shown a side view of the old-fashioned spring-key, Fig. 2 being a cross-section of the same at *a*, Fig. 1, and Fig. 3 a cross section at *b*, Fig. 1, both views being looked at from the head end, or from the direction of *a* toward *b*. Fig. 2 shows the key open, and Fig. 3 shows it closed together at the point, so that it may be inserted in the hole, which is represented by the dotted circle *c*. It will be noticed that this hole is much larger than the body or the cylindrical part of the key between *a* and *b*, and therefore the key must be a very loose fit, thus making it unsuitable for many purposes where shaking about is to be avoided, and where a maximum diameter, and consequent strength of key, must be combined with a minimum diameter of hole in the bolt, shaft, or other rod through which the key is inserted, in order that said rod may not be too much weakened thereby. Fig. 4 shows the side view of what is commercially termed a "spring-cotter," made with no enlargement at its point to prevent its sliding out of its hole. This is a useful device when it can remain permanently in the hole, and can have its points spread apart or opened outward, as shown in perspective in Fig. 5. When, however, it is desired to have it removable, so that the machinery in which it is used can be taken apart and put together, such a cotter, although possessing the advantage of fitting the hole properly, is of very little use, because it is not sure to stay in the hole by the action of friction alone, even though its elasticity causes it to spring apart with considerable force.

In Fig. 6 is shown a side view of my new spring-key, which is the subject of this invention, as it appears when inserted entirely into its hole, with its points opened by its own elasticity as far as the sides of the hole will allow.

In Figs. 7 and 8 are shown cross-sections at *a* and *b*, represented looking in the same direction as above mentioned for Figs. 2 and 3.

Fig. 9 shows a side view of the same key inserted part way into its hole, with its points sprung together, so as to reduce it to its proper diameter.

Figs. 10 and 11 show the respective cross-sections at *a* and *b*, as before, the section-lined circle marked D in Figs. 6 and 9 being of course a cross-section (through the axis of the key-hole) of the rod through which the key is inserted.

In Figs. 12, 13, and 14 are shown similar views to the above of a rectangular key made upon the same principle; but the cylindrical one is more particularly the subject of this invention.

It will be seen from the foregoing that the main idea involved in my invention consists in making a spring-key whose body is cylindrical and fits its hole, while its point is furnished with approximately right-angled shoulders of a larger diameter than the hole, to prevent its being withdrawn unless it is forcibly sprung together. It consists, furthermore, in making the wedge-shaped slit between the two arms of the key of such proportions that when it is entirely closed by the points being sprung together the total diameter of such points will be equal to or less than the size of the body at *a*, so that it can be put through the hole.

As shown in Fig. 9, it will be noticed that the desired result is here obtained without weakening the key, because the full diameter is retained at *a*, and the less amount of cross-section at *b* only makes each arm of the key a tapering lever or projecting beam, which, it is well known, is within certain limits just as strong as if the said lever or beam were parallel or of equal cross-section throughout. Any such lever may be of less than half the thickness at its outer end that it is at its inner

end without being weakened by such taper, and it is also of the proper shape to bend uniformly without bringing the stresses mostly at one place, as is the case when the lever is parallel.

There are various methods by which this form of key can be easily manufactured, either by machine-forging or by making it first in the form of Fig. 4, and then milling or turning the body to a cylindrical form while the points are held the proper distance apart by a specially-adapted chuck, preferably furnished with a projecting wedge to enter and fit the slot between the arms. The latter is the method which I have used with perfect success in my own practice.

Being aware, as above mentioned, that spring-keys have been made with enlarged points to prevent their slipping out of their holes, I do not claim such as my invention; but

What I do claim, and for which I desire to secure Letters Patent, is—

A barbed spring key or cotter having when closed similar and approximately equal cross-sections at *a* and *e*, and a smaller cross-section at *b* than at *a* and *e*, substantially as shown and described.

OBERLIN SMITH.

Witnesses:
HARRY C. WARE,
FRANK L. HEWITT.