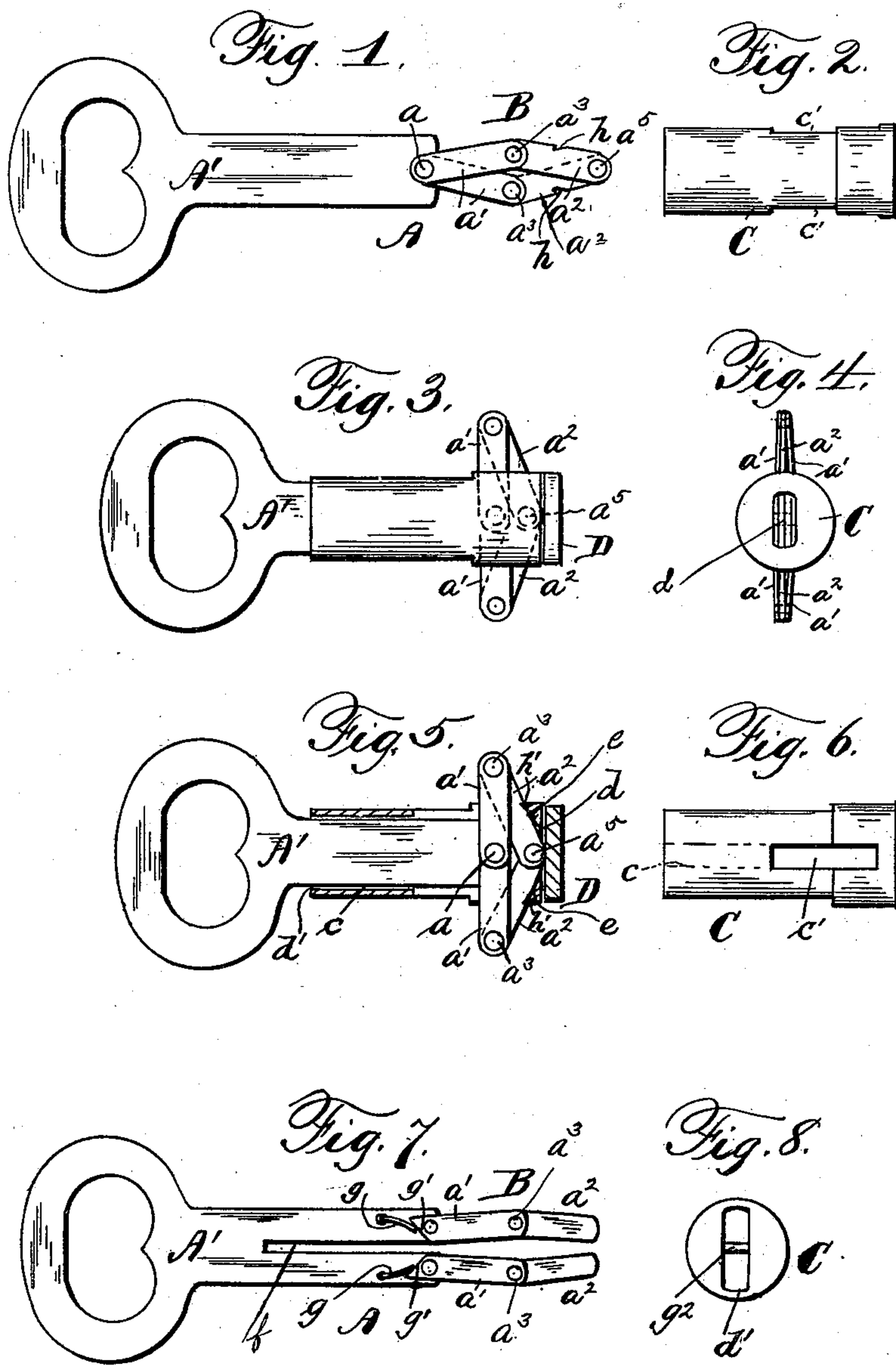


(No Model.)

S. C. BOLE.  
KEY.

No. 507,408.

Patented Oct. 24, 1893.



Witnesses:-  
Wm. H. Boulter  
C. A. Michener

Inventor  
Samuel C. Cole,  
by his attorney,  
H. B. Wilson

# UNITED STATES PATENT OFFICE.

SAMUEL C. BOLE, OF LEECHBURG, PENNSYLVANIA.

## KEY.

SPECIFICATION forming part of Letters Patent No. 507,408, dated October 24, 1893.

Application filed April 11, 1893. Serial No. 469,938. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL C. BOLE, a citizen of the United States, residing at Leechburg, in the county of Armstrong and State of Pennsylvania, have invented certain new and useful Improvements in Keys; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to improvements in keys and it relates more particularly to that class of keys which are adapted to turn or revolve a barrel or sleeve fitted in the lock casing, which sleeve in turn serves through suitable means to operate the tumblers to release the lock-bolt, and among the objects in view is to provide an extremely simple and inexpensive key, which is efficient in operation, and which owing to its peculiar construction renders it extremely difficult to substitute therefor a false key for the required purpose, and the invention consists in the peculiar construction, arrangement and combination of parts; all as will hereinafter be fully described, illustrated in the accompanying drawings and pointed out in the appended claims.

In the drawings:—Figure 1 is a side view of the improved key; Fig. 2 a side view of the revoluble barrel or sleeve; Fig. 3 a side view of the key within the barrel, and showing the key in a position to turn said barrel. Fig. 4 is a face view of the parts shown in Fig. 3. Fig. 5 is a side view of the key showing it in place in the barrel or sleeve, the latter being shown in section. Fig. 6 is a top view of the barrel or sleeve. Fig. 7 is a side view of a modified form of key, and Fig. 8 is a face view of the barrel adapted for use with the key shown in Fig. 7.

Referring to the drawings and more particularly to Figs. 1 to 6 thereof, A indicates my improved key which is provided with the flat portion A' adapted to be operated by the person, in the usual manner.

B represents a series of toggle-levers which are pivoted to the portion A' upon a pin or stud or rivet  $a$ , said toggle-levers comprising the levers  $a'$  of which there are four—two upon each side of the portion A' of the key,

and the levers  $a^2$  of which there are but two. The rivet  $a$  serves to pivotally connect the inner ends of the levers  $a'$  together and to the portion A'; the rivets  $a^3$  serve to pivotally connect the outer ends of the levers  $a'$  to the inner ends of the levers  $a^2$ , while the rivet  $a^5$  serves to pivotally connect the outer ends of the levers  $a^2$  together.

C indicates the usual revoluble barrel, cylinder or sleeve usually found in the well-known Yale locks, said barrel or sleeve being here provided with the longitudinal bore  $c$ , and the vertical longitudinal slots  $c'$ ,  $c'$ . In practice I prefer to make the widths of the said bore  $c$ , and slots  $c'$  of such extent that the key may be inserted in the barrel and confined therein closely and thus avoid lost motion of the key when it is turned.

D indicates an abutment-plate which in practice is to be secured within the lock-case in rear of the cylinder.

When it is desired to insert the key within the cylinder, the toggle-levers or arms of said key are placed in the position shown in Fig. 1, and then inserted through the inner end of the bore of the cylinder until the outer end of the arms  $a^2$  strike against the abutment-plate D and the key being still pushed inward the arms  $a'$ ,  $a^2$ , spread apart into the position shown in Figs. 3 and 5 after which the key is turned in the proper direction which causes the cylinder D to turn also and effect the release of the lock-bolt.

It will be seen that the length of the key when extended as in Fig. 1 should be sufficient to permit the ends of the arms  $a^2$  to project slightly beyond the outer end of the bore of the cylinder so that said ends may strike the abutment-plate and thus be operated to cause the toggle levers or arms to spread into the proper operative position shown in Figs. 3 and 5. It will also be seen that by making the outer end  $d$ , of the bore of the cylinder of less height than the inner end  $d'$  of said bore, the outer end of the arms  $a^2$  would when projected somewhat beyond the said end  $d$ , not be operated as herein above described, such operation being prevented by the binding action exerted upon the edges of the arms  $a$  by the bearing surfaces  $e$ . Thus by making the plate D of less thickness than that shown,



so as to bring its abutting surface somewhat away from the outer end  $d$ , of the cylinder, would necessitate varying the inclination of the bearing surfaces  $e$ , to permit the arms to spread apart. Thus it will be obvious that in fitting up the locks the thicknesses of the plates D may be varied and the inclinations of the surfaces  $e$  of the bores of the cylinders correspondingly varied, so that only the keys made of certain lengths for their respective locks will be adapted to turn the cylinders thereof.

Owing to the peculiar construction and operation of the parts of my device, the slightest change in the thickness of the plate D will necessitate a different length of key or different inclination of the surfaces  $d$ , and in this manner the substitution of a false key for operating the lock will be rendered almost futile. The same result might be attained by varying the length of the slots  $c'$ ,  $c'$  of the cylinder, to permit only the proper key to be used.

In Fig. 7 I show a slightly modified form of the key wherein the toggle-levers or arms  $a'$  are pivoted upon opposite sides of a longitudinal slot  $f$ , formed in the key, the outer ends of the arms  $a^2$  being left free as shown. The several arms are adapted to be held normally in the position shown in Fig. 7 for insertion into the cylinder, by means of leaf-springs  $g$ , which are secured to the key at one end and bear at their opposite end upon the bearing surface  $g'$  on the rear end of the arms  $a'$ . This form of key is adapted to be used with a cylinder having a dividing wall or partition  $g^2$  horizontally arranged across the opening or bore of said cylinder, seen in Fig. 8. For simplicity and cheapness I however prefer to use the form of key shown in Figs. 1, 3, 4, and 5. One or more notches  $h$ , may be provided in each of the edges of the arms  $a^2$  which when said arms are in the position represented in Figs. 3 and 5 engage with the edges  $h'$  of the cylinder.

In practice, the length of the revoluble cylinder may be varied to suit different widths of doors to which the said cylinder may be applied.

What I claim, and desire to secure by Letters Patent, is—

1. The herein described key consisting essentially of the portion A' and toggle levers or arms  $a'$ , and  $a^2$  pivoted to one end of the portion A', as described, and adapted to be extended so as to project beyond both the lateral edges of the said portion, for the purpose specified.

2. The herein described key consisting essentially of the portion A' and a series of toggle-levers or arms pivotally connected thereto, in combination with a revoluble cylinder provided with a longitudinal bore and slots in opposite walls thereof, and an abutment-plate arranged at the rear end of the cylinder in the manner described, for the purpose specified.

3. The herein described key consisting essentially of the portion A', and a series of toggle levers or arms  $a'$  and  $a^2$  pivotally connected thereto and adapted to be extended so as to project beyond the upper and lower edges of the said portion, in combination with a revoluble cylinder provided with a longitudinal bore and slots in opposite walls thereof, bearing surfaces  $e$ , on said cylinder near the rear end of the bore, and an abutment plate arranged adjacent to the rear end of the cylinder, for the purpose specified.

4. The herein described key consisting essentially of the portion A' and a series of toggle levers or arms pivotally connected thereto and adapted to be extended so as to project beyond the upper and lower edges of said portion, in combination with a revoluble cylinder provided with a longitudinal bore and slots in opposite walls thereof, the outer end of the bore being of less height than the inner end thereof, bearing surfaces  $e$ , on the cylinder near the outer end of the bore, and an abutment plate arranged adjacent to the rear end of the cylinder, for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL C. BOLE.

Witnesses:

L. A. KEPPEL,  
M. R. HUNTER.