May 14, 1946. J. M. BENNETT 2,400,221

KEY CASE

Original Filed July 31, 1942 2 Sheets-Sheet 1

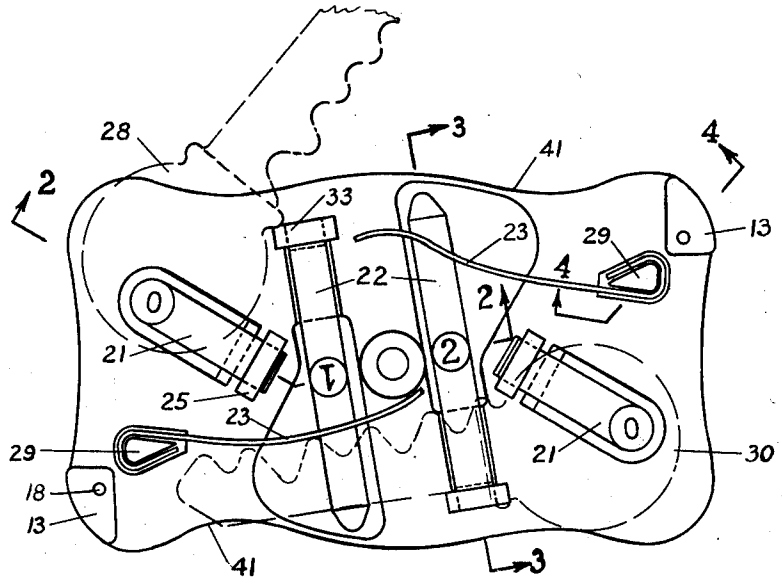


FIG. 1

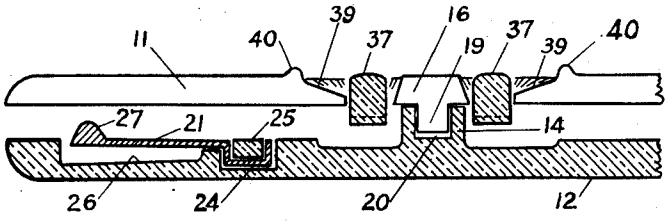


FIG. 2

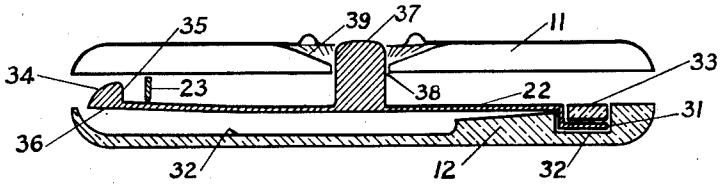


FIG. 3

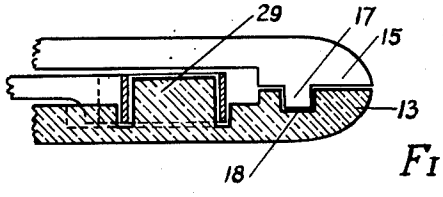


FIG. 4

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KEY CASE

Original Filed July 31, 1942 2 Sheets-Sheet 2

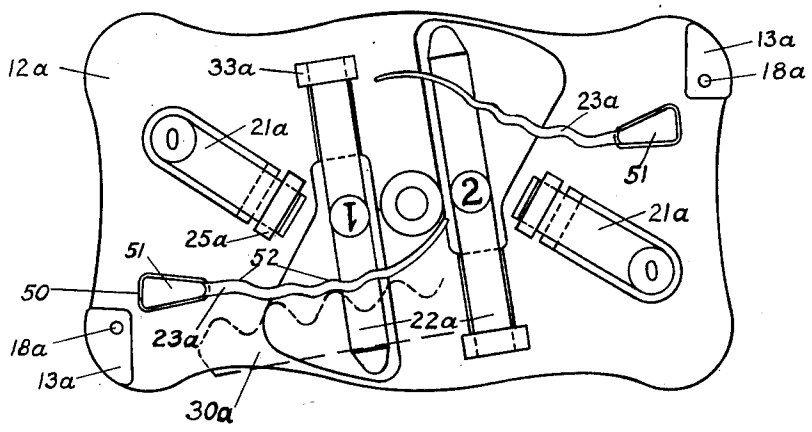


FIG. 5

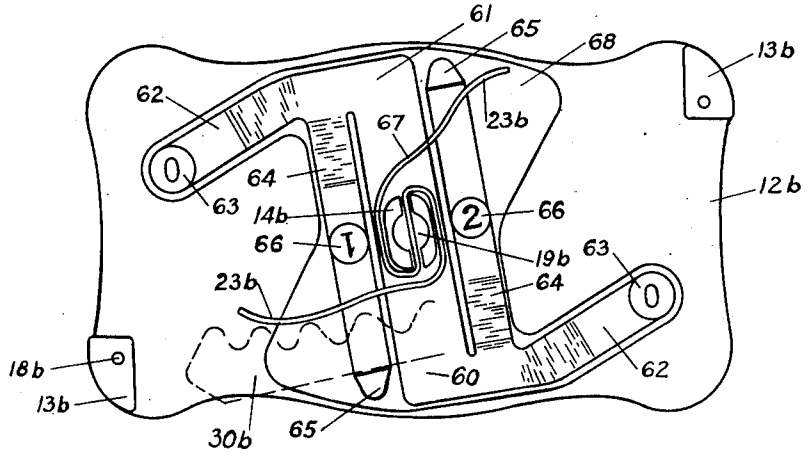


FIG. 6

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Patented May 14, 1946 2,400,221

UNITED STATES PATENT OFFICE

2,400,221

KEY CASE

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Original application July 31, 1942, Serial No. 453,012, now Patent No. 2,376,026, dated May 15, 1945. Divided and this application December 9, 1944, Serial No. 567,497

11 Claims. (Cl. 70—456)

This invention relates to key cases of the kind in which a plurality of keys are mounted on pivots, are normally individually confined within the case by latch springs which may be selectively released by the user, and are individually snapped outward by ejector springs upon the release of their respective latch springs.

It is an object of the present invention to provide a flat, generally rectangular, key case for a pair of keys comprising upper and lower casing members disposed in confronting, parallel relation, each provided with spacing bosses at diagonally opposite corners and in a central region, through which the casing members are united to one another.

It is a further object of the invention to provide a key case which can be economically and permanently assembled and which will not deteriorate in use through corrosion or the working loose of attaching parts.

To this end it is a feature of the invention that the casing is desirably made of plastic material, and that the casing members are directly and integrally bonded to one another through the spacing bosses.

It is a further feature that the spacing bosses are provided with interfitting jig formations which assure immediate and exact positioning of the casing members in relation to one another, and which also serve in the finished assembly to relieve the bond joints of strains tending to turn or shift the casing members relative to one another.

It is a further feature in accordance with certain embodiments of the invention that the springs are anchored to the casing by anchoring blocks of plastic material which are set in recesses of the casing to overlie the anchored spring ends, and which are integrally bonded to the casing.

It is a further important and highly advantageous feature of the invention in accordance with certain embodiments of the invention that the springs as well as the casing are made of plastic material, the springs being formed of the same material as the casing or of a plastic material capable of being integrally bonded to the casing material. This feature provides for extreme simplicity and economy of manufacture, enables any of the parts desired to be directly and dependably bonded to one another, reduces wear because the parts are all of equal hardness and have a low coefficient of friction, and avoids deformation of the keys through wear because the plastic material is softer than the material of which the keys are made. The plastic material employed is desirably Celluloid or one of the cellulose acetates.

Other objects and advantages will hereinafter appear.

In the drawings forming part of this specification

Fig. 1 is a plan view of an illustrative key case embodying features of the invention, the upper casing member being removed to reveal the lower assembly, and a pair of keys being shown, one in latched position and the other in a released or ejected position;

Fig. 2 is a fragmentary view in elevation of the key case of Fig. 1 with the lower assembly shown in section, the section being taken upon the line 2—2 of Fig. 1 looking in the direction of the arrows;

Fig. 3 is a view in end elevation of the key case of Fig. 1 with the lower assembly shown in section, the section being taken upon the line 3—3 of Fig. 1 looking in the direction of the arrows;

Fig. 4 is another fragmentary view in elevation of the key case of Fig. 1 with the lower assembly shown in section, the section being taken upon the line 4—4 of Fig. 1, looking in the direction of the arrows;

Fig. 5 is a view similar to Fig. 1 showing another form of the invention in which the springs are of plastic material; and

Fig. 6 is a further view similar to Fig. 1, but showing still another form of the invention.

In the illustrative key case of Figs. 1 to 4, the case comprises upper and lower casing members 11 and 12 which are desirably formed of a plastic material such as Celluloid or one of the cellulose acetates. The casing members 11 and 12 are in general in the form of elongated, rectangular, flat plates. At diagonally opposite corners, the lower casing member 12 is formed with spacing bosses 13, and it is formed with a further central spacing boss 14. Corresponding spacing bosses 15 are formed at diagonally opposite corners of the upper casing member 11 and a spacing boss 16 is formed at the center.

The spacing bosses of the upper and lower casing members 11 and 12 have interfitting jig formations through which the correct relative positioning of the members 11 and 12 may be immediately and mechanically assured. As illustrated, the jig formations take the form of jig pins 17 on the bosses 15 which fit into jig openings 18 in the bosses 13, and a jig pin 19 on the boss 16 which fits into a jig opening 20 in the boss 14.

After the other elements to be described have been assembled with the lower casing member 12,

the casing members are directly and integrally bonded to one another through the spacing bosses. This bonding is desirable effected by applying to the bosses a bonding material composed of the same material as the casing members dissolved in a suitable solvent. The casing members are held pressed together until the bonding material has had an opportunity to become set.

In the illustrative form of the invention of Figs. 1 to 4, pivot springs 21, latch springs 22 and ejector springs 23 are anchored to the lower casing member 12 prior to the assembly of the lower casing member 12 with the upper casing member 11. The springs as here illustrated may be of any suitable metal or alloy but are desirably of non-rusting metal such as copper, or a suitable alloy of copper, and are all in the form of leaf springs. Each pivot spring 21 has a U-shaped formation at its fixed or anchored end which is set in a recess 24 of the lower casing member 12. An anchoring block 25, desirably of the same plastic material as the casing, is placed over the anchored end of the spring 21 in the hollow or U-shaped portion and extends beyond the lateral bounds of the spring 21 within the recess 24. The anchoring block 25 is bonded integrally to the lower casing member 12 in the same way in which the casing members are integrally bonded to one another, as already described.

The free portion of the spring 21 extends over a clearance recess 26 formed in the lower casing member 12. The spring is formed at the free end thereof with a dome shaped boss 27 which normally extends into proximity with, or may even extend into contact with, the lower face of the upper casing member 11.

When the handle portion of a key 28 is thrust into a corner of the key case and against the boss 27, it cams the boss downward, flexing the spring 21, until a clearance is provided between the boss 27 and the lower face of the upper casing member 11 sufficient to accommodate the thickness of the key. When the circular opening in the handle portion of the key 28 comes over the boss 27, the pressure on the spring 21 is relieved, and the boss snaps into the opening of the key and forms a pivot upon which the key may be rotated.

The pivot spring 21, with its boss 27, serves pivotally to support the key in the case with capacity for removal if desired. The key may be completely detached at any time by pulling it out with sufficient force to cam the boss 27 downward, but normally the key is retained by the boss with sufficient force to prevent accidental dislodgement. The inner face of the boss is more abrupt than the outer face, so that a key may be inserted against little opposition but requires a greater force for its retraction.

Each ejector spring 23 is formed with a loop at its fixed or anchored end which surrounds an upwardly projecting boss 29 formed on the lower casing member 12. The spring 23 is desirably bonded to the boss or post 29 by the same material through which the plastic parts are bonded to one another, but such bonding may be dispensed with, if desired. The spring 23 overlies the corresponding latch spring 22 and stands in the path of the key upon which it is intended to operate. Turning of a key to the position in which the key 30 is shown in Fig. 1 stresses the spring 23 and stores up energy for snapping the key sharply outward when it is unlatched.

Each latch spring 22 is formed at its fixed or anchored end with an offset portion 31 which is seated in a recess 32 of the lower casing member 12. An anchoring block 33 of plastic material extends over the offset portion 31 of the spring and beyond the lateral bounds thereof, being integrally bonded with the lower casing member in the same manner as the blocks 25 which anchor the pivot springs 21.

Each latch spring 22 is formed at the free end thereof with a latching nose portion 34. This nose portion has an abrupt inner vertical wall 35 for engaging and detaining the key in latched position, and an outer sloping wall 36 against which the key may operate to cam the spring downward as the key is thrust inward toward latched position. As soon as the key has been thrust inward far enough to clear the nose 34, the spring 22 snaps upward placing the nose at the outer side of the key to latch it in place.

The spring 22, between the ends thereof, has a generally cylindrical boss 37 of substantial height displaced upwardly from it to extend through an opening 38 of the upper casing member 11. The upper end of the boss 37 normally stands substantially flush with the outer face of the casing member 11, but it is surrounded by a recess 39 of sufficient area and depth to enable the operator to thrust the boss downward with his thumb far enough to cause the nose 34 of the spring 22 to be moved clear of the key. When the key is thus released by its latch spring, the ejector spring 23 acts to snap the key outward to or toward a position suitable for convenient use.

Means are desirably provided for enabling the user to distinguish between the keys either by sight or touch. For the former purpose the bosses are numbered "1" and "2"; for the latter one small tit or boss 40 is provided on the outer face of the casing member 11 adjacent the boss 37 marked "1," and two small tits or bosses 40 are provided on the outer face of the casing member 11 adjacent the boss 37 marked "2."

While the casing members 11 and 12 are generally rectangular in form, they are provided with edge recesses 41 to enable the user to press the key inward to a latched position in which the key is entirely contained within normal bounds of the key case, and hence does not project outward so as to rub against the pocket of the user or against objects carried in the pocket along with the key case.

The form of the invention illustrated in Fig. 5 is generally the same as that illustrated in Figs. 1 to 4, the only exceptions being that all the springs are formed of plastic material, desirably the same as the casing material, and that the ejector springs are formed and mounted differently. Corresponding reference characters with the subscript *a* added in each instance have accordingly been applied to corresponding parts, and the detailed description will be confined to a description of the mounting and construction of the ejector springs.

Instead of posts 29, the lower casing member 12*a* is provided with recesses 50. Each ejector spring 23*a*, as already noted, is made of plastic material desirably the same material as that of which the upper and lower casing members is formed. Each ejector spring comprises an anchoring base portion 51, the lower portion of which is adapted substantially to fit snugly into the recess 50. This base portion is integrally bonded to the lower casing member 12*a* in the manner already described. The flexible portion of the spring is of tapering thickness from the anchoring block 51 to the remote end of the

spring, and it is cross-corrugated. The cross-corrugations 62 are of progressively diminishing height or amplitude from the anchoring block 61 toward the remote end of the spring. The tapering thickness of the spring, together with the corrugations, gives to the various portions of the spring desired characteristics of rigidity and resiliency for enabling it to perform its intended function in a thoroughly satisfactory manner.

In the form of the invention disclosed in Fig. 6 every part of the key case including the springs as well as the casing members may be of plastic material, although the spring members may, if desired, be made of metal.

The casing members are, with one exception, the same as in the forms already described, and as to these like parts corresponding reference characters have been applied with the subscript *b* added in each instance. The detailed description will be confined to pointing out the structure which is different from the forms already described.

The center boss 14*b* of the lower casing member 12*b* is made non-circular in form, and both the center boss 14*b* and the jig pin 19*b* of the upper casing member are formed with coinciding cross slots. A spring block 60, which is desirably composed of the same plastic material as the casing sections, but which may be composed of any suitable material, either plastic or metal, comprises a central relatively thick and rigid body portion 61 which is impaled upon and fits the non-circular central boss 14*b*. A recess 68 formed in the lower casing member 12*b* is shaped to receive the plastic block 60. The block 60 includes integrally a pair of arms 62 having pivot bosses 63 at the outer ends thereof, the arms 62 serving as pivot springs for the respective keys.

The block 60 also includes integrally a pair of arms 64 which serve as latch springs. Each arm 64 includes a latch nose 65 of the same shape and for the same purpose as the nose 34 of spring 22. Each arm 64 also includes a boss 66 of the same shape and for the same purpose as the boss 37 of the spring 22. Since the block 60 can be molded or stamped, the bosses 65 and 66 may conveniently be made either hollow or solid as desired, preferably the latter.

The central body portion 61 of the block 60 may be integrally bonded to the lower casing member 12*b* throughout any portion of its area desired, or it may be simply impaled upon the boss 14*b* and left unattached to the casing member 12*b*.

The two ejector springs 23*b* in this instance form arms of a single leaf spring 67. This leaf spring comprises a central portion which is received in the lots of the boss 14*b* and the jig 19*b*, and resilient arms which extend part way around the boss 14*b*, and thence in opposite directions from the boss into positions for acting upon the respective keys. The ejector spring 67 may be of metal, or it may be formed of the same plastic material of which the casing members and the other spring members are formed. In the latter case the central portion of the spring may be integrally bonded to the boss 14*b* and to the jig pin 19*b*, if desired.

The present application is a division of my pending application Serial No. 453,012, filed July 31, 1942, for Key case, now Patent No. 2,376,026, dated May 15, 1945. No claim is made herein to a plastic spring per se, the plastic spring being claimed in Serial No. 453,012.

I have described what I believe to be the best embodiments of my invention. I do not wish, however, to be confined to the embodiments shown, but what I desire to cover by Letters Patent is set forth in the appended claims.

1. A flat, elongated, generally rectangular key case for a pair of keys comprising, in combination, upper and lower outer casing members of plastic material disposed in continuously confronting, parallel relation, said casing members each having spacing bosses formed at diagonally opposite corners and at a central point which include cooperating and interfitting jig formations, and the corresponding spacer bosses of the respective casing members being integrally bonded one with the other in permanently fixed relation.

2. A flat, elongated, generally rectangular key case for a pair of keys comprising, in combination, upper and lower outer casing members of plastic material disposed in permanently fixed, continuously confronting, parallel relation, said casing members each having spacing bosses formed at diagonally opposite corners and at a central point which include cooperating and interfitting jig formations, and the corresponding spacer bosses of the respective casing members being integrally bonded one with the other, and said casing including within it means for pivotally supporting the respective keys, and means for latching, releasing and ejecting the respective keys selectively at the will of the user.

3. A flat, elongated, generally rectangular key case for a pair of keys comprising, in combination, upper and lower outer plastic casing members directly and rigidly bonded to one another at diagonally opposite corners and at a central point, but generally disposed in fixed, directly confronting, spaced relation to one another to provide clearance for the insertion and ejection of the keys, pivot, latch, and ejector springs for the respective keys and plastic means integrally bonded with the inner side of one of the casing members and anchoring the pivot, latch and ejector springs.

4. A flat, elongated, generally rectangular key case for a pair of keys comprising, in combination, upper and lower casing members of plastic material disposed in confronting, parallel relation, said casing members each having spacing bosses formed at diagonally opposite corners and at a central point which include cooperating and interfitting jig formations, pivot springs and latch springs for the respective keys, said lower casing member formed with recesses for the reception of said springs, and anchor blocks for the respective springs each overlying the anchored end of the associated spring and bonded to the lower casing member.

5. A flat elongated, generally rectangular key case for a pair of keys comprising, in combination, upper and lower casing members of plastic material disposed in confronting, parallel relation, said casing members each having spacing bosses formed at diagonally opposite corners and at a central point which include cooperating and interfitting jig formations, pivot springs, latch springs and ejector springs within the casing for the respective keys, said lower casing member having the inner surface thereof embossed to provide anchorage for the ejector springs.

6. A flat, elongated, generally rectangular key case for a pair of keys comprising, in combination, upper and lower casing members of plastic material disposed in confronting, parallel relation, said casing members each having spacer

bosses formed at diagonally opposite corners and at a central region, the bosses including cooperating and interfitting jig formations, pivot springs and latch springs for the respective keys housed and anchored in the casing, and a two-armed ejector spring anchored in the central bosses and having the arms thereof extending in opposite directions to act independently upon the respective keys.

7. A flat, elongated, generally rectangular key case for a pair of keys comprising, in combination, upper and lower outer casing members of plastic material disposed in permanently fixed continuously confronting, parallel relation and united at localized points with one another, pivot springs, latch springs, and ejector springs within the casing for acting upon the respective keys, a portion at least of said springs being formed of plastic material capable of integral bonding with the casing and integrally bonded thereto.

8. A flat, elongated, generally rectangular key case formed throughout of a single plastic material, said key case comprising directly confronting upper and lower outer casing members disposed in permanently fixed, spaced, parallel relation and integrally bonded one with the other, and pivot springs, latch springs and ejector springs for the respective keys also formed of the same plastic material and each anchored within the casing by bonding to at least one of said casing members.

9. A flat, elongated, generally rectangular key case for a pair of keys comprising, in combination, upper and lower casing members united one with the other in spaced parallel relation, said casing members formed with inwardly extending, central bosses which are joined to one another, a block of resilient material impaled upon the central boss of the lower casing member, the lower casing member being formed with a recess in which the block is lodged, said block being formed with four distinct, flexible arms disposed to serve, respectively, as pivot springs and latch springs for the respective keys, and ejector springs in the casing for the respective keys.

10. A flat, elongated, generally rectangular key case for a plurality of keys comprising, in combination, a plurality of casing members of plastic material disposed in superposed relation, said casing members including spacing bosses, formed at diagonally opposite corners and at a central point, and including cooperating and interfitting jig formations, each of the spacer bosses being integrally bonded with an opposed casing member.

11. In a key case, the combination with a pair of casing members, of a spring plate mounted between the casing members in fixed relation to them, said spring plate including tongue portions integral with the plate and formed respectively to provide individual pivot springs for a plurality of keys, and individual latch springs for a plurality of keys.

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