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P. G. CAILLOIS

SAFETY SPRING BARREL APPLICABLE TO LOCKS OR ANY KEY LOCKING SYSTEM

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Fig.1

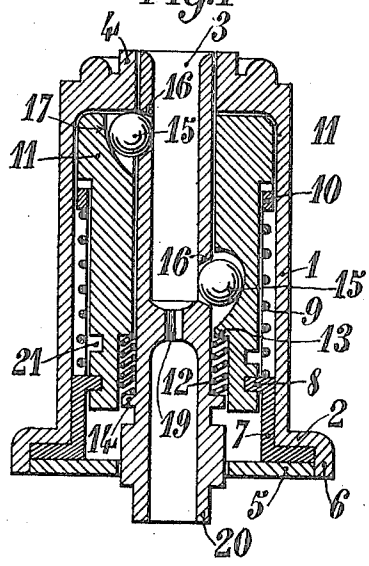
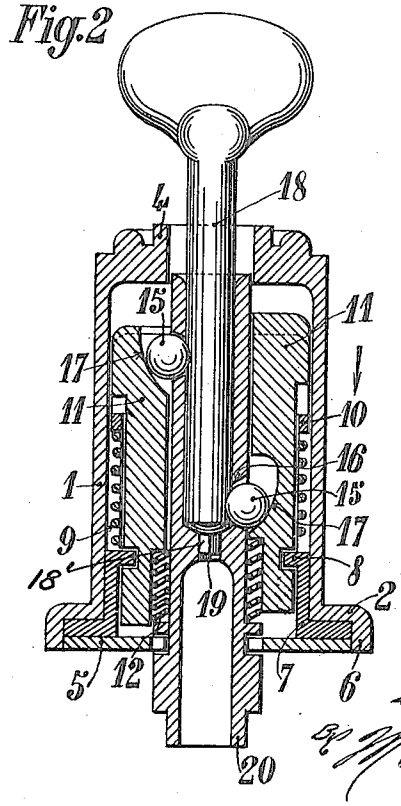


Fig.2



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SAFETY SPRING BARREL APPLICABLE TO LOCKS OR ANY KEY-LOCKING SYSTEM.

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To all whom it may concern:

Be it known that I, PIERRE GUSTAVE CAILLOIS, a citizen of the French Republic, residing at 12 Avenue Victor Hugo, Paris, France, have invented certain new and useful Improvements in a Safety Spring Barrel Applicable to Locks or Any Key-Locking System, of which the following is a specification.

The present invention relates to a safety spring barrel, applicable to locks or key-locking systems of any type.

This device is characterized by the freedom of the parts when the spring is at rest and the complete locking of these parts as soon as the inserted key pushes the central member arranged in the axis of the barrel and one of the ends of which engages with the mechanism of the locks. This central member is connected to bolt-bars radially arranged and longitudinally guided in the grooves of a rotating ring, by means of balls which combine, on the one hand, with inclines of suitable profile provided in the bolt-bars and, on the other hand, with grooves or recesses provided in the shank of the key the translation of which with the central member it actuates according to the axis of the barrel, determines, owing to the respective profiles of the inclines, to the depth of the grooves or recesses and to the diameter of the balls, unequal movements, of the balls, for each of the bolt-bars brought simultaneously in a final position for which the central member which engages with the mechanism of the lock can be angularly displaced.

The unequal movements of the balls displaced for one and the same longitudinal translation of the central member of the barrel, are determined by the respective profiles of the inclines provided in the bolt-bars, the diameter of the balls and the depth of the grooves. The relative positions of these various elements and their respective shapes or dimensions constituting a number of variables permitting the putting on the market an unlimited number of safety barrels without any one key being able to operate two combinations.

The accompanying drawing illustrates, by way of example, a form of construction of a safety barrel made in accordance with the present invention.

Fig. 1 is a horizontal section of the barrel according to a plane containing its longitudinal axis; all the safety members being in locking position.

Fig. 2 is a view similar to the preceding one, but in the case where the safety members are in unlocking position.

All the parts of the safety mechanism are enclosed within the hollow body 1 which is secured by its base 2 on the case of the lock, in any suitable manner. The key pipe 3 is formed of a cylindrical member guided at its upper end in a central bearing in the top 4 and at its other end in a bearing provided at the center of a cover-plate 5 centered in the inner bearing of the flange 6 and secured as well as the crown 7 on the base 2 by means of screws or preferably of rivets. The crown 7 is provided at its inner end with a seat 8 on which bears a compression spring 9 the other end of which acts on the upper seat of a ring 10. In the radial grooves of this ring are arranged bolt-bars 11. In the example illustrated, the ring 10 and the central member 3 form a single part and the safety device has only two diametrically opposed bolt-bars. The compression springs 12 act between the lower face of notches 13 provided in the bars 11 and the seat 14 on the member 3 which forms the hub of the ring. The bars 11 are, in locking position, engaged in notches formed in the seat 8 of the crown 7.

The connection between the ring and the bars is ensured by means of steel balls 15 fitted in orifices 16 formed in the walls of the member 3 and which bear on the inclines 17 provided at various points of the bars 11. The operating key 18 engages in the central bore of the member 3 and a square part 18′ of its end entering in the mortice 19 causes the key and ring to rotate together.

The depth of the grooves formed on the shank of the key opposite the balls 15 determines the extreme position of the balls relatively to the longitudinal axis of the barrel. If the key 18 is acted upon for displacing the ring in translation in the direction of the arrow (Fig. 2), the balls 15 slide on the inclines 17 until the position of their point of contact with these latter is such that these balls are wedged between the incline and the groove provided in the key; in this position, the bar and the ring are integral as far as the translation is concerned. It will be understood that according to the profile of the inclines, the diameter of the

balls, the depth of the grooves of the key, and the distance separating the balls on the length of this key, the bars have for one and the same translation of the ring, their own translations which are different, not only in value, but the origins of which are displaced in the time. These respective translations of the bars are determined so that, the end 20 being at the end of its stroke and engaging with the mechanism of the lock, the notches 21 of the bars are opposite the seat 8, as shown in Fig. 2. The entire block constituted by the parts within the body 1 can then be subjected to the angular displacement which actuates the mechanism of the lock. When the ring moves back to its initial position, the springs 9 and 12 act for bringing back the mechanism of the spring device in the position shown in Fig. 1.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a safety spring barrel for locks, the arrangement in the barrel of a key pipe capable of receiving longitudinal and angular displacements about its axis and having a central bore for receiving a key therein to permit of the pushing of the key pipe into the barrel, means on the key for angularly displacing said key pipe, a plurality of balls, the walls of the key pipe having orifices therein serving as housings for the balls, and means for independently pushing the balls toward the axis of the key pipe when the latter is longitudinally displaced.

2. In a safety spring barrel for locks, a key pipe rotatably and slidably mounted in the barrel and having a central bore and a rectangular recess for receiving a notched key therein to permit of the pushing back of the key pipe into the barrel, a rectangular extension on the key fitting in the recess for effecting rotation of the key pipe, the walls of the key pipe having orifices therein, a plurality of balls housed in the orifices in the key pipe and cooperating with the notched key, a plurality of longitudinal bars, inclined portions on the longitudinal bars for cooperating with the balls, and means for causing the bars to rotate together.

3. In a safety spring valve for locks, a key pipe rotatably and longitudinally slidable in the valve and having a central bore and a recess therein for receiving a key to permit of the pushing back of the key pipe into the barrel, a rectangular extension on the key engageable in the recess for facilitating the rotation of the key pipe, the walls of the key pipe having orifices therein, a plurality of balls housed in the orifices of said key pipe, a plurality of longitudinal bars provided with inclined portions for cooperating with the balls, a ring capable of sliding in the barrel and provided with a series of longitudinal grooves for guiding the bars, the bars being movable independently of each other, a flange on the key pipe, resilient means interposed between the bars and the flange on the key pipe, and means for disengaging the bars in order to rotate the key pipe and the ring.

4. In a safety spring barrel for locks, the arrangement in the barrel of a key pipe capable of receiving longitudinal and angular displacements about its axis and provided with a recess for receiving a notched key to permit of the pushing back of the key pipe into the barrel, a rectangular extension on the key engaged in the recess for effecting rotation of the key pipe, the wall of the key pipe being provided with orifices, a plurality of balls housed in the orifices and cooperating with the notched key, a plurality of longitudinal bars provided with inclined portions for cooperating with the balls, a ring capable of sliding in the barrel and provided with longitudinal grooves for guiding the bars, the bars being movable independently of each other, a flange on the key pipe, springs interposed between the lower ends of the bars and the flange on the key pipe, an annular ledge on the barrel provided with grooves to permit of the longitudinal displacement of the bars, and the bars being provided with openings for cooperating with said ledge, substantially as and for the purposes set forth.

5. In a safety spring barrel for locks, the arrangement in the barrel of a key pipe capable of receiving longitudinal displacements and angular displacements about its axis provided with a central bore and a recess, a notched key having a rectangular extension fitting in the bore and engaging the recess for sliding the key pipe inwardly and for rotating the same, the walls of the key pipe being provided with orifices, balls housed in said orifices for cooperating with the notched key, a plurality of longitudinal bars provided with inclined portions for cooperating with the balls, a ring capable of sliding in the barrel and provided with longitudinal grooves for ensuring of the guiding of the bars, the bars being movable independently of each other, a flange on the key pipe, springs interposed between the lower ends of the bars and said flange, an annular ledge fixed in the barrel and provided with grooves for guiding the bars, the bars being provided with notches for straddling said ledge so as to determine the longitudinal displacement of the bars depending on the depth of the notches of the key and of the relative positions of the notches and resilient means interposed between the ring and the annular ledge.

6. In a safety spring barrel for locks, the arrangement of the barrel of a key pipe capable of receiving longitudinal displace-

ments and angular displacements about its axis and provided with a central bore and a recess, a notched key insertable in the bore of the key pipe and having a rectangular extension engaging the recess to facilitate the inward sliding and rotation of the key pipe, the walls of the key pipe being provided with orifices, a plurality of balls housed by said orifices, a ring capable of sliding in the barrel and provided with a plurality of longitudinal grooves, a plurality of independently movable longitudinal bars guided by the grooves in the ring and provided with inclined portions for cooperating with the balls, a flange on the key pipe, springs interposed between the lower ends of the bars and the flange, an annular ledge fixed in the barrel and provided with grooves for guiding the bars, the bars being also provided with notches for straddling the ledge for determining the longitudinal displacements of the bars depending on the depth of the notches of the key and on the relative positions of said notches so that the engagement of any notches of the bars with the said annular ledge permits the turning of the ring and key pipe about their common axis for actuating the lock.

In testimony whereof I have signed my name to this specification.

PIERRE GUSTAVE CAILLOIS.