Jan. 17, 1939. J. A. EDEN 2,144,047

PERMUTATION LOCK

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Fig. 1

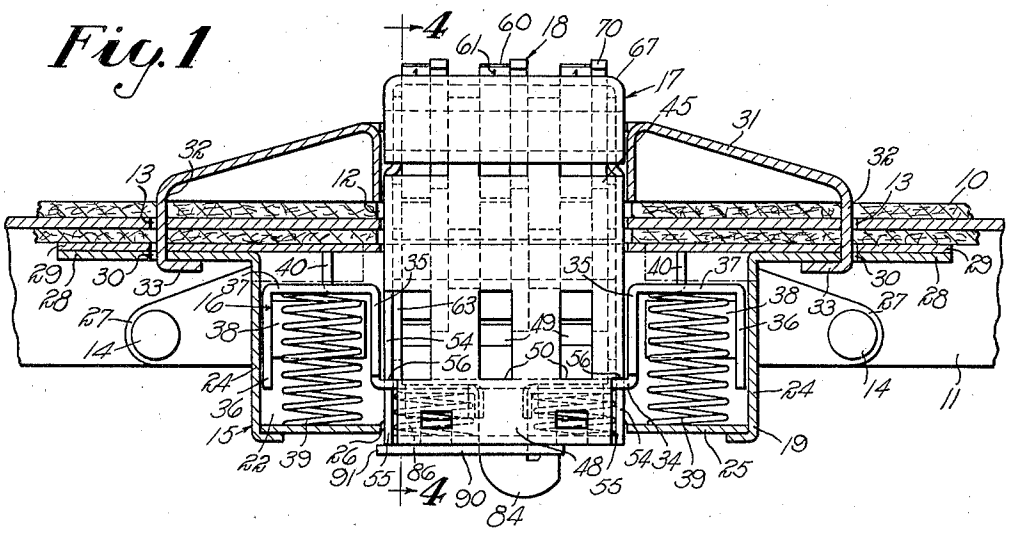
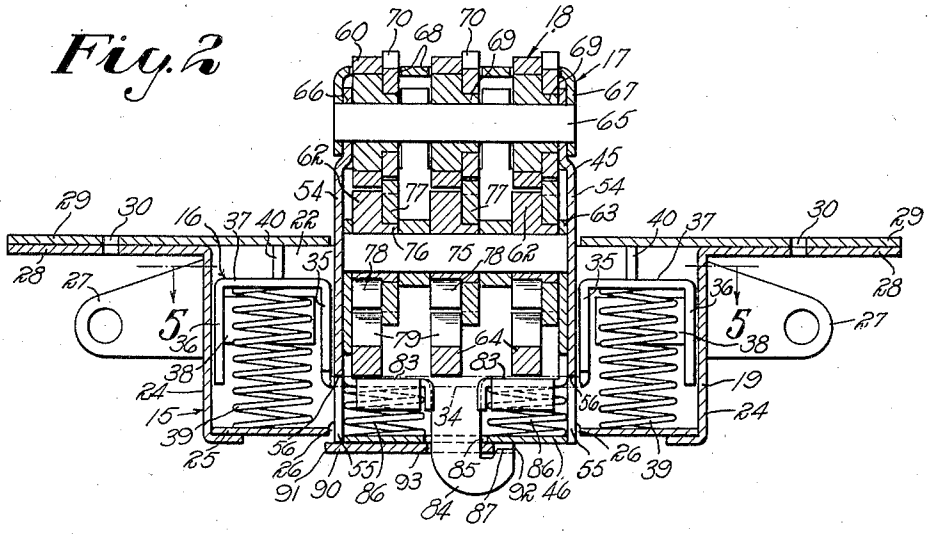


Fig. 2



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Fig. 3

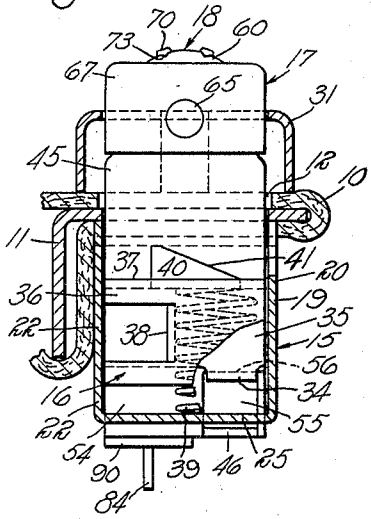


Fig. 4

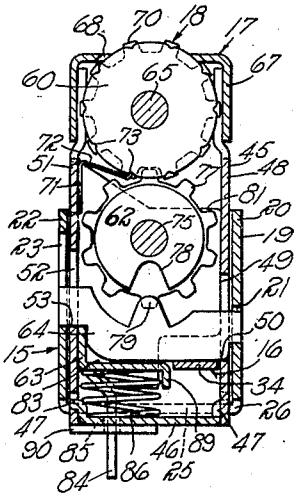


Fig. 5

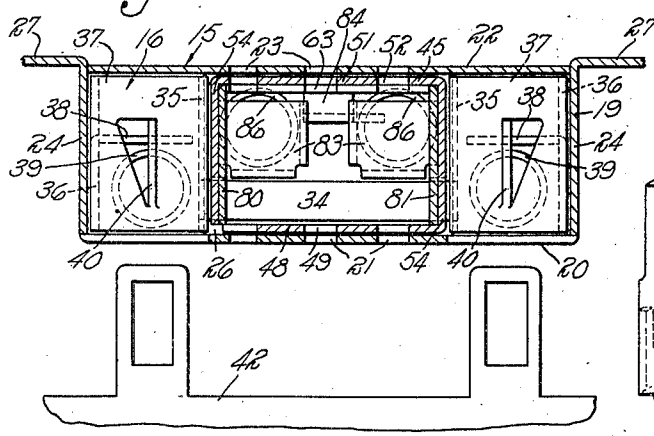
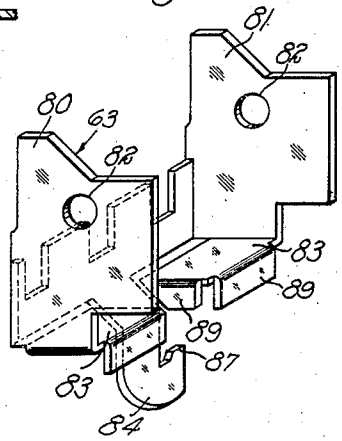


Fig. 6



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PERMUTATION LOCK

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Application October 20, 1937, Serial No. 169,932

6 Claims. (Cl. 70—66)

The present invention relates to a bag frame lock of the keyless type in which there is provided a plurality of settable or permutation wheels bearing suitable indicia thereon, each of said wheels being associated with a locking element. Although particularly adapted for use in travelling bags and the like wherein a small lock is required and is secured to one frame of the bag, and a keeper plate is secured to the other frame of the bag and adapted to be moved into and out of locking engagement by relative movements of the frames of the bag, it is apparent that the lock may be utilized for other purposes.

An object of the present invention is a lock wherein the casing, locking bolt, locking bolt operating means, and the permutation supporting means are all stamped from single sheets of metal and then bent to the desired shapes.

A further object is a lock of this type wherein the various members are all assembled without any fastening means other than the interlocking engagement of the various members which go to make up the lock.

A still further object is a lock of this type having improved means for enabling the resetting of the permutation devices to a new combination.

A still further object is a lock wherein the bolt is movable with the bolt operating means and also movable independently of the bolt operating means, thereby enabling the bolt to be depressed when the keeper plate is brought into engagement upon the locking of the bag even though the prevailing combination has been disturbed.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the accompanying drawings which illustrate one embodiment which the present invention may take:

Figure 1 is a cross sectional view of the lock casing showing the bolt and bolt operating means in locking position as assembled on a bag;

Fig. 2 is a cross sectional view of the lock and bolt operating means with the bolt partially broken away;

Fig. 3 is a side elevation of the lock as assembled in the bag;

Fig. 4 is a view substantially on the line 4—4 of Fig. 1 with certain parts thereof omitted;

Fig. 5 is a plan view substantially on the line 5—5 of Fig. 2; and

Fig. 6 is a perspective view of the locking element shifting frame.

Referring to the drawings, the lock shown is adapted to be secured in a conventional bag of any suitable material 10 having a metal frame 11 provided with a rectangular aperture 12 and a pair of transverse rectangular apertures 13. The lock is secured to the frame of the bag in any suitable way, such, for example, as by rivets 14. The lock comprises generally a casing 15, a bolt 16 slidably mounted in the casing, bolt operating means 17 also slidably mounted in the casing, and enclosing permutation locking means 18.

The lock casing 15 comprises a body part 19 stamped from a single piece of metal and bent to form a front wall 20 having rectangular openings 21 (see Fig. 4), a rear wall 22 having elongated openings 23 therein oppositely disposed to openings 21, end walls 24, and a bottom wall 25 having a centrally located rectangular aperture 26 therein. Bent outwardly at right angles from the side walls 24 are a pair of ears 27 adapted to lie flush with the frame 11 and receive the rivets 14 for securing the casing to the frame, and bent downwardly at right angles are a pair of cover supporting members 28. The top of the body part is closed by a pair of plates 29 which partially overlie supporting members 28 and extend inwardly towards the center, being spaced to form a centrally disposed aperture in alignment with the aperture 26 in the bottom wall 25. The cover could be made of a single piece, but is preferably made of two plates for ease in assembly. The members 28 and plates 29 are also provided with transverse aligned rectangular openings 30 adapted to be aligned with the opening 13 in the frame 11 of the bag. There is further provided an escutcheon plate 31 having downwardly projecting tongues 32 which may be passed through the aligned transversely rectangular openings in material 10 of frame 11 and casing 15 and then bent inwardly, as at 33, to secure the parts in place.

The locking bolt 16 is also stamped and folded from a single blank and comprises a narrow cross bar 34 interconnecting two substantially inverted U-shaped portions having inner legs 35, outer legs 36, and a base 37, each outer leg having bent inwardly therefrom a tab 38 for positioning spring members 39 which normally tends to bias bolt 16 to its uppermost position. Bent

upwardly from the base 37 is a triangularly shaped keeper 40 having a cammed surface 41 over which a keeper plate 42 (see Fig. 5) may ride into locked position. When in locked position, the keepers 40 abut the closure plates 29 of the casing. The substantially rectangular U-shaped ends of the bolt tend to guide it and keep it in vertical alignment within the casing 15.

The bolt operating means 17 comprises a housing 45 which is stamped from a single piece of metal and then bent to form an elongated rectangular box of such size as to permit positioning of the housing in the aligned apertures of the casing and frame; the housing extending above the escutcheon plate 31 and the bottom below the bottom wall 25. The lower end of the housing is closed by a plate 46 held in the side walls by a tongue and groove connection 47. The front wall 48 of the housing is provided with a rectangular opening 49 having an upwardly facing shoulder 50, and the rear wall 51 is provided with an oppositely disposed elongated rectangular opening 52 having an upwardly facing shoulder 53. Forwardly and oppositely disposed near the bottom of the housing end walls 54 are a pair of vertical rectangular openings 55 having downwardly facing shoulders 56. These openings are adapted to receive the cross bar 34 of the bolt 16; it being apparent that the locking bolt normally tends to move the housing 17 outwardly, and when the housing 17 is depressed the downwardly facing shoulders 56 of the openings 55 will force the cross member 34 of the bolt downwardly to move the keeper 40 out of locking engagement with the top plates 29.

Enclosed in housing 45 is a permutation device for locking the housing in its projected position except when a prevailing combination is set. The permutation device includes a plurality of wheels 60 having indicia 61 on the periphery thereof, locking elements 62 carried on a shifting frame 63, and stop members 64 which limit movement of housing 45. The permutation wheels 60 are supported on a shaft 65, which shaft is supported in oppositely disposed apertures 66 in the housing 45. There may be provided a suitable cover plate 67 having a plurality of openings 68 in the top thereof through which the permutation wheels 60 may project so that only one number on each wheel may be seen at any one time. Each permutation wheel 60 has a transversely extending hub 69 on which is fitted a toothed gear 70. In order to prevent the permutation wheels from rotating freely, there is provided a bar 71 carried by the housing 45 and having spring fingers 72 which are bent to fit in cammed grooves 73 in the permutation wheels 60. The locking elements 62 are supported on a transverse shaft 75 carried by the frame 63; the shaft 75 being parallel to the shaft 65 to dispose the locking elements 62 in vertical alignment with the permutation wheels 60. The locking elements 62 are also provided with projecting hubs 76 on which are carried gears 77 having teeth adapted to mesh with the teeth of the gears 70. Each locking element is further provided with a recess 78 in the wall thereof. The stop member 64 is arranged at right angles to the shaft and supported in the openings 21 and 23 of the front and rear walls of the casing and also passes through the rectangular openings 49 and 51 in the front and rear walls of the housing. The upwardly facing shoulders 50 and 52 of said openings are adapted to abut said stop members 64 and limit the outward movement of the housing 45. The stop member 64 is further provided with a raised central portion 79 adapted to fit into the recess 78 of the locking elements 62. It will be apparent that when the prevailing combination is set (see Fig. 4) the recesses 78 of the locking elements 62 will be disposed above the raised central portions 79 of the stop members 64, whereupon the housing may be moved inwardly, causing the downwardly facing shoulders 56 of housing 45 to abut the cross bar 34 of the bolt 16 and move it to unlocked position. However, if the prevailing combination is disturbed, the recesses 78 of the locking elements will be out of alignment with the elevated portions 79 of the stop members 64 and the peripheries of the locking elements will abut same and prevent the housing from being depressed to operate the bolt 16. However, as bolt 16 is movable independently of the housing 17 in openings 55, the bag may be closed regardless of whether or not the prevailing combination is set, as the keeper plate (see Fig. 5) will ride up and over keeper 40, depressing the bolt to unlocked position.

Means are also provided for enabling a new prevailing combination to be set when desired. To accomplish this, the frame 63 supporting the locking elements is formed with a pair of wing members 80 and 81 provided with aligned apertures 82 which support the shaft 75. The frame is further formed with a bottom member 83 which is disposed rearwardly of the bolt cross bar 34 and is positioned in place by a depending hook member 84 which passes through a slot 85 in the bottom plate 46 of the housing. The shifting frame 63 is normally retained in its uppermost position by springs 86 which are disposed between the lower plate 46 of the housing and bottom plate 83 of the frame. The point 87 of the hook member 84 tends to limit the upward movement of frame 63 so that there is sufficient clearance between the permutation wheels 60 and the locking elements 62 to enable them to be readily turned. If it is desired to set a new combination, the permutation wheels are set to the prevailing combination, and, by pulling hook member 84 downwardly against the bias of spring 86, the stops 79 will enter the recesses 78, whereupon the permutation wheels 60 may be set to a new combination, and, upon releasing member 84, the springs 86 will again urge the frame upwardly to cause the locking elements and permutation wheels to intermesh. In order to keep the spring 86 correctly positioned, the bottom member 83 of the frame 63 has downwardly depending tabs 89 which prevent the spring from moving out from under the bottom member. It will be seen that with the bottom member 83 of the frame 63 disposed rearwardly in the housing the frame may be shifted up and down relative to the housing without disturbing the locking bolt, and when it is in its uppermost position it moves as a unit with the housing 45 to operate the bolt 16.

There is also provided a shifting lever 90 which normally lies flat against the bottom plate 46 of the housing, and one end 91 projects slightly beyond one side wall so that it may be conveniently gripped. The lever is provided near the opposite end 92 with a longitudinal slot 93 adapted to fit over the hook member 84. When so arranged, if the handle end 91 of the lever is moved downwardly, the lever will fulcrum about the crook in hook member, causing end 92 to pivot and slide on the bottom of the housing and exert a downward force on the hook to move it and the frame downwardly relative to the housing, thus sepa-

rating the permutation wheels and locking elements. When the new combination is set, it is only necessary to return the lever to its normally flat position, whereupon the permutation wheels and locking elements will again intermesh.

It will be seen that with the lock so constructed it lends itself to ready assembly. Bolt biasing springs 39 are first inserted in the casing and then positioned by the bolt 16. The permutation wheels may next be assembled in the housing 45 and the cover plate placed thereon. The locking elements may next be assembled on the shifting frame 63 and the frame placed in the housing 45. With these members assembled, the housing may be placed through the aligned apertures in the casing and positioned by having the cross member of the bolt enter openings 55. The frame biasing springs 66 may next be positioned below the frame 63 and the bottom plate 46 of the housing secured in place. With the parts so assembled, the locking elements may be turned at an angle of about 45°, whereupon the stop members 64 may be inserted through and positioned in the aligned openings in the front and rear wall of the housing and casing. The entire structure may then be secured in place by riveting the ears 25 to the frame 11 and inserting the escutcheon plate and bending over the inwardly projecting ends parallel to the bottom face of the cover supporting projections. It is apparent that all of the body parts of the structure may be readily stamped from sheet metal and that the entire structure is held together without the use of any securing means other than interlocking of the various members of the lock.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim as my invention:

1. In a lock of the character described, a casing, a housing movable in said casing, a plurality of permutation wheels carried by said housing, a frame slidably mounted in said housing, a plurality of locking elements carried by said frame, means normally urging said frame to bring the locking elements and wheels into engagement whereby the housing and frame will move as a unit, and stop means carried by said casing and cooperating with said locking elements to permit movement of the frame only when the prevailing combination is set, and means exterior of the housing for moving said frame and locking elements out of engagement with the permutation wheels, whereby said prevailing combination may be altered.

2. In a lock of the character described, a casing, a housing movable in said casing, a bolt forwardly disposed in said housing and adapted to be moved thereby, a plurality of permutation wheels carried by said housing, a frame slidably mounted in said housing, a plurality of locking elements carried by said frame, said frame being disposed rearwardly of said bolt whereby the locking elements may be moved into and out of engagement with the permutation wheels, means normally urging said frame to bring the locking elements and wheels into engagement whereby the housing and frame will move as a unit, and stop means carried by said casing and cooperating with said locking elements to permit movement of the frame only when the prevailing combination is set, and means exterior of the housing for moving said frame and locking elements out of engagement with the permutation wheels, whereby said prevailing combination may be altered.

3. In a lock of the character described, a casing, a housing movable in said casing, a bolt forwardly disposed in said housing and adapted to be actuated thereby, a plurality of permutation wheels carried by said housing, a frame slidably mounted in said housing, a plurality of locking elements carried by said frame, said frame being disposed rearwardly of said bolt whereby the locking elements may be moved into and out of engagement with the permutation wheels, spring means disposed between the base of the frame and the bottom of the housing for normally urging said frame to bring the locking elements and wheels into engagement whereby the housing and frame will move as a unit, stop means carried by said casing and cooperating with said locking elements to permit movement of the frame only when the prevailing combination is set, and a member connected to said frame and projecting through the base of said housing for moving said frame against the bias of said springs to separate the locking elements and permutation wheels.

4. In a lock of the character described, a casing, a housing movable in the casing, a bolt forwardly disposed in said housing and adapted to be moved thereby, a plurality of permutation wheels carried by said housing, a frame slidably mounted in said housing, a plurality of locking elements carried by said frame, said frame being disposed rearwardly of said bolt whereby the locking elements may be moved into and out of engagement with the permutation wheels, means normally urging said frame to bring the locking elements and wheels into engagement whereby the housing and frame will move as a unit, stop means carried by said casing and cooperating with said locking elements to permit movement of the frame only when the prevailing combination is set, a member connected to said frame and projecting through the base of said housing for moving said frame to separate the locking elements and permutation wheels, and a pivotally mounted lever normally disposed against the bottom plate of the housing and cooperating with said member to shift said frame upon pivoting of the lever.

5. In a lock of the character described, a casing, a housing mounted in said casing, a plurality of geared permutation wheels carried by said housing, a frame slidably mounted in said housing, a plurality of geared locking elements supported by said frame, said wheels and locking elements being adapted to intermesh, a stop member transversely supported by said casing and cooperating with the locking elements to permit movement thereof when the prevailing combination is set, spring means normally urging said frame and locking elements into engagement with said permutation wheels, and means for moving said frame relative to said housing whereby said locking elements will be moved out of engagement with said permutation wheels and said permu-

tation wheels may be freely rotated to a new position.

6. In a bag of the character described, a casing, a housing supported in the casing, a plurality of toothed permutation wheels supported in the housing, a frame slidably mounted in the housing, a plurality of toothed locking elements carried by said frame, each of said locking elements having a recess in the side wall thereof, a stop member transversely supported in said casing and cooperating with said recesses to permit movement of the locking elements when the prevailing combination is set, spring means normally urging said frame to bring said locking elements and permutation wheels into intermeshing engagement, and means exterior of the housing operable when the prevailing combination is set for moving said frame relative to the housing to separate said permutation wheels and locking elements.

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