

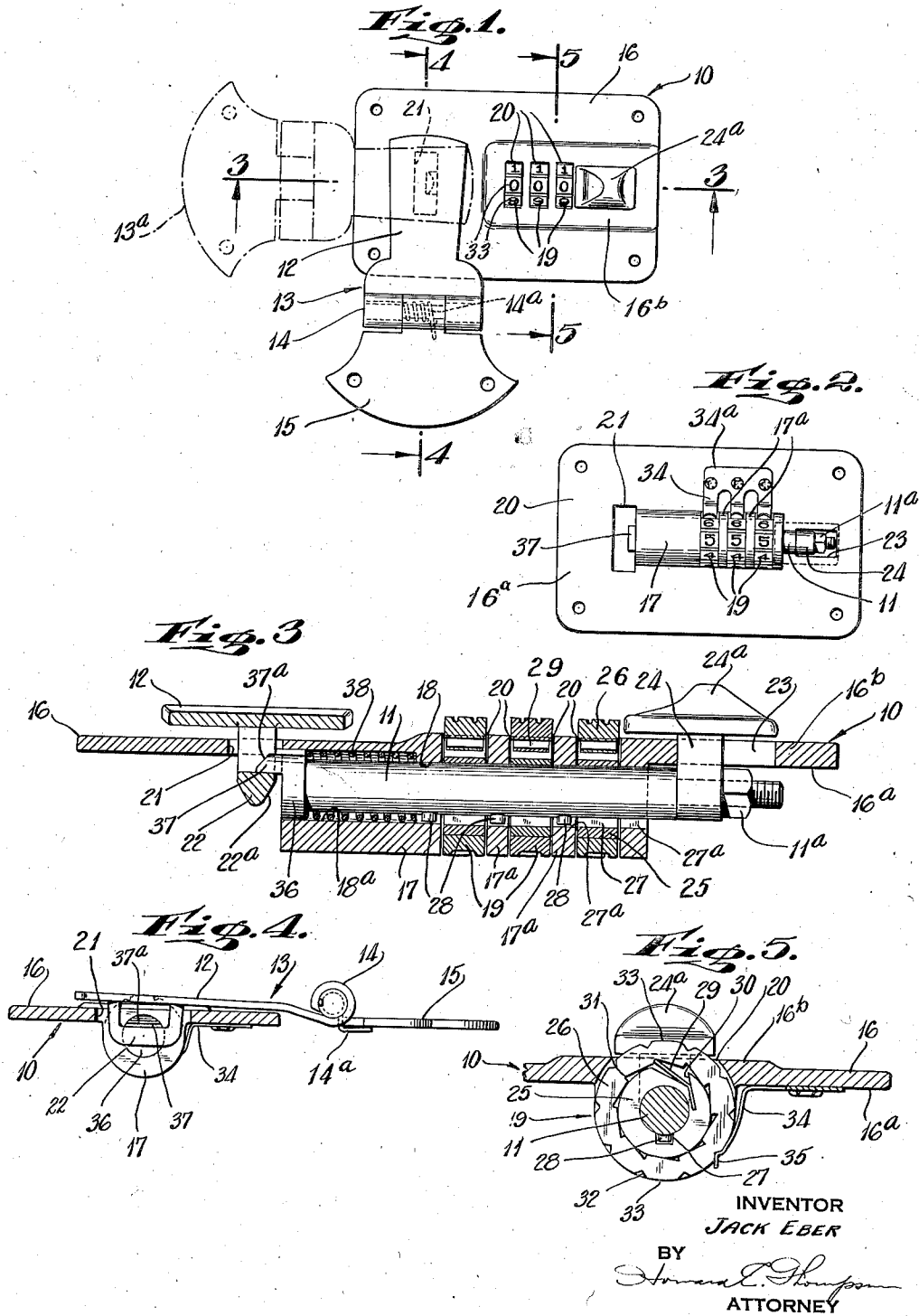
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COMBINATION LOCK

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COMBINATION LOCK

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This invention relates to combination locks and particularly to locks having a casing part supporting the combination mechanism thereof, and a movable part adapted to be engaged with and disengaged from said casing part in the proper setting and movement of said combination mechanism, and the object of the invention is to provide a lock of the class described wherein a single element movable longitudinally of the casing forms both the means for engaging the movable lock member and the means for supporting and operatively engaging a plurality of combination control devices, a further object being to provide combination control devices in the form of closely fitting concentric rings rotatably engaging said element with means on the inner ring of each device adapted in predetermined positions of rotation thereof to provide for sliding movement of said element into unlocked or inoperative position, a still further object being to provide means for rotatably adjusting the concentric rings of the control devices one with respect to the other when the lock element is in said inoperative position, and with these and other objects in view, the invention consists in an article of the class and for the purpose specified which is constructed in accordance with the method more fully hereinafter described and claimed.

The invention is fully disclosed in the following specification of which the accompanying drawing forms a part, in which the separate parts of my invention are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a plan view of one form of my improved lock with an alternative arrangement of the movable member thereof indicated in dot and dash lines.

Fig. 2 is a bottom plan view of part of the construction as shown in Fig. 1.

Fig. 3 is a sectional view substantially on the line 3-3 of Fig. 1.

Fig. 4 is a view substantially on the line 4-4 of Fig. 1, and,

Fig. 5 is a view on the line 5-5 of Fig. 1 with part of the structure broken away.

To illustrate one form of my improved lock, I have shown in the drawing a lock construction of a type and kind particularly suited for use on articles of luggage and the like. The construction includes what might be termed a fixed part of the lock comprising a casing 10 which supports the combination control mechanism and is adapted to be permanently secured to one part

of an article of luggage or other suitable support. The lock mechanism includes a slidable lock element 11 for detachably engaging a movable member 12. The member 12 has been shown as comprising the free end portion of a hasp 13, and is pivotally coupled as at 14 to an attaching plate 15 adapted to be secured to a suitable support, such for example, as an adjacent movable part of an article of luggage. The pivotal coupling between the member 12 and the plate 15 includes a spring 14a which forces the member 12 away from the casing 10 when released by the lock member 11.

It will of course be apparent that the hasp 13 may be oriented in any desired manner with respect to the casing 10 and for purposes of illustration an alternative position of the hasp 13 has been illustrated in dot and dash lines. It will further be apparent that the formation of the movable member 12 as part of a hasp as shown in the drawing, is merely one adaptation of the invention, and it will be understood that the particular disclosure in this respect is not intended in any way to limit the improved lock construction to an assemblage including a hasp.

The casing part 10 comprises an enlarged attaching plate 16 and is provided centrally thereof with an elongated bearing portion 17 protruding from the inner surface 16a thereof. The bearing portion 17 is provided with an elongated passage 18 for slidably supporting the lock element 11 in connection with the casing part 10. The bearing portion 17 is also cut out to receive a plurality of control devices or wheels 19 rotatably mounted on the lock element 11. The wheels 19 protrude through apertures 20 in the outer surface of the casing part 10 and preferably conform closely to the contour of the bearing portion 17 as seen in Figs. 2 and 3.

The casing part 10 is provided adjacent one end of the bearing 17 with an aperture 21 adapted to receive a protruding coupling part 22 of the movable lock member or hasp 12. The casing 10 is further provided adjacent the other end of the bearing 17 with an aperture 23 adapted to receive a transversely extending arm 24 on the lock element 11. The arm 24 preferably comprises a separate member detachably secured to the element 11 as seen at 11a, and the end of the arm 24 protruding through the casing 10 includes an enlarged finger engaging portion 24a suitably fashioned in a manner to facilitate easy movement of the lock element in the intended operation thereof.

The casing part 10 may be formed in any de-

sired manner, but is preferably fashioned as a unitary body with the attaching plate and bearing portions forming integral parts of said body. The body may, for example, be substantially formed in a single casting operation, and thereafter machined to size wherever necessary. The cuts or apertures in the bearing or cylinder 17 are spaced apart in the manner indicated by relatively thin portions 17a of the bearing or cylinder.

The control devices or wheels 19 each comprise inner and outer concentric rings 25 and 26 respectively as clearly seen in Figs. 3 and 5 of the drawing. The inner ring is provided with a transverse groove 27 adapted to register in one position of rotation of the ring 25 with a corresponding protruding member or key 28 on the lock element 11. It will be noted in this connection that a plurality of protruding members or keys 28 are arranged in common alinement at intervals longitudinally of the lock element 11 controlled by the number and size of the control devices 19. The passage 18 for receiving the lock element, is provided with an offset groove 27a similar to the groove 27 formed in the inner ring of each control device. Thus it will be apparent that when the groove 27 of each control device is adjusted to the proper position of alinement with the groove 27a, this provides free movement of the lock element 11 longitudinally of the bearing 17. In Fig. 3 of the drawing the grooves have been indicated as thus alined and it will be apparent that slight rotary movement of any one or more of the control devices 19 from the position shown in Fig. 3, would operate to lock the element 11 against longitudinal movement. It will further be noted that when the control devices are adjusted to the position shown in Fig. 3, and the lock element is moved to the right to disengage the movable lock member 12, the protruding members or keys 28 will be moved into the grooves 27 of the control devices, thereby retaining said devices or at least the inner rings 25 thereof against rotary movement.

The inner ring 25 of each control device 19 is also provided with a spring 29 embedded in a notch 30 in said ring and normally protruding from the periphery thereof. The outer ring 26 is provided with a plurality of ratchet grooves 31 on the inner surface thereof, providing means for rotating the outer ring 26 in one direction with respect to the inner ring 25 when the inner ring is supported against rotation by the key 28 in the groove 27 thereof. The tension in the spring 29 is sufficient to retain the rings 25 and 26 against relative rotation except when the inner ring 25 is keyed against rotation as above described.

The outer surface of the ring 26 is provided with a plurality of notches 32 corresponding with the notches 31 in the inner surface thereof. The notches divide the periphery of the wheel 25 into a plurality of panels 33 which are differently characterized by numbers, letters, or other suitable symbols, and it will be apparent that the notches 31 and 32 are so disposed with respect to each other that when the groove 27 is in the position shown in Fig. 5, one of the panels 33 will be disposed centrally of the aperture 20 in the casing part 10. To facilitate accurate alining of the control devices, I preferably employ a spring member 34 secured to the inner surface 16a of the casing part 10 and having a hook end 35 adapted to tensionally engage the notches 32 of the ring 26. A separate spring 34 may be em-

ployed for each control device 19 or as shown in Fig. 2 of the drawing, the springs 34 may be joined in a single attaching plate 34a. The tension in the spring 34 will be sufficient to support the control devices against accidental rotation thereby facilitating easy and accurate setting of the control devices in any predetermined combination in the normal operation of the lock. Likewise, the combined tension of the springs 29 and 34 are sufficient to prevent accidental rotation of the outer ring 26 when the lock element 11 is in the unlocked position. When it is desired to change or alter the combination of the lock, however, it will be apparent that the outer ring 26 of each control device may be rotated against the combined action of the springs 29 and 34 by turning the ring 26 in the proper direction with respect to the spring 29. For example, as seen in Fig. 5 of the drawing, adjustment to change the combination would be made by rotating the ring 26 in a counterclockwise direction.

In the construction as shown in the drawing, the lock element 11 is provided with an enlarged end 36 having a protruding tongue 37 adapted to engage the coupling part 22 of the movable lock member 12. The enlarged end 36 of the lock element slidably engages an enlarged portion 18a of the passage 18 and the space between the element 11 and the walls of the passage 18a forms an annular chamber to receive a suitable spring 38 which normally urges the lock element 11 into operative or locked position. When the grooves 27 of the control devices are alined with the grooves 27a as seen in Fig. 3, it will be apparent that the lock will operate in much the same manner as conventional catch devices on articles of luggage and the like. The surfaces of the interengaging portions 22 and 37 are beveled as seen at 22a and 37a, to provide automatic engagement of the lock element with the lock member 12 when the protruding coupling part of the latter is forced downwardly through the aperture 21. Furthermore, movement of the lock element into inoperative position by the finger piece 24a will provide instantaneous release of the member 12 through the action of the spring 14a. In so using the lock, the combination wheels may be left undisturbed. When it is desired to permanently lock the device, however, combination wheels may merely be rotated to other positions retaining the same setting or combination thereof, or on the other hand the combination may first be reset in the manner previously described and the wheels then moved to inoperative positions. In resetting the combination the lock element 11 may be supported in the inoperative position or with the keys 28 thereof in the grooves 27 of the combination wheels by means of the finger piece 24a. On the other hand, if desired, suitable means may be provided for positively supporting the lock element in the inoperative position against the action of the spring 38 during the operation of resetting or readjusting the combination wheels.

The attaching plate 16 has been indicated in the drawing as including a thicker or heavier section 16b surrounding the apertures 20 and 23 therein. The thicker portion 16b serves to enhance the appearance of the lock by forming a panel around the exposed portions of the lock mechanism, and also serves to more completely conceal the control devices 19 while maintaining a minimum inward extension of the bearing 17. It is important that only a small portion of the wheels or control devices 19 be exposed through

the apertures 20 in order that the engagement between the inner and outer rings of the control devices cannot be seen from the top or outer surface of the lock. This will clearly be apparent from a consideration of Fig. 5 of the drawing.

It should again be noted that while for purposes of illustration the lock construction has been shown as adapted to locks of the type generally used on articles of luggage and the like, the movable lock member 12 may in reality constitute any desired part independent of the lock casing 10 having a suitable coupling portion for detachable engagement with the lock element 11. The element 11 may properly be referred to as a combined bolt and lock element since as previously pointed out it performs the dual functions in the operation of the lock. The particular shape and contour of the attaching plate 16 of the casing may of course be varied in any desired manner to adapt the lock to different uses, and if desired, a suitable hood may be secured to the attaching plate 16 to conceal and protect the portions of the lock mechanism protruding from the inner surface 16a thereof. In many uses of the lock, however, such a protective hood would be unnecessary, and the hood has therefore been omitted from the drawing.

It will be noted that the lock element 11 forms the sole means for supporting the various members of the lock mechanism with the exception of the springs 34 in connection with the casing part 10. Thus the lock is very readily assembled and dismantled without the use of any special tools, when the control devices are in the proper position of setting, as previously described.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A combination lock of the character described comprising a casing part and a movable lock member independent of said casing part, said casing part comprising an enlarged attaching plate portion having an elongated bearing extending from the inner surface thereof, a lock element arranged in and slidable longitudinally of said bearing, a plurality of combination control devices arranged at spaced intervals longitudinally of said lock element and protruding through apertures in the outer surface of said attaching plate, cooperating means on said control devices and lock element providing longitudinal movement of said element only in predetermined positions of setting of said devices, said attaching plate having other apertures adjacent the ends of said elongated bearing, means on said lock element and extending through one of said apertures for manually moving the same, and other means registering with the other of said apertures on said lock element for detachably engaging cooperating means on said lock member when inserted in said aperture.

2. A combination lock of the character described comprising a casing part and a movable lock member independent of said casing part, said casing part comprising an enlarged attaching plate portion having an elongated bearing extending from the inner surface thereof, a lock element arranged in and slidable longitudinally of said bearing, a plurality of combination control devices arranged at spaced intervals longitudinally of said lock element and protruding through apertures in the outer surface of said attaching plate, cooperating means on said control devices and lock element providing longitudinal movement of said element only in pre-

determined positions of setting of said devices, cooperating means on said lock element and movable lock member providing detachable engagement therebetween, resilient means within said bearing and operating on said lock element to normally support said last-named means in engagement, and a finger engaging portion of said lock element protruding through said attaching plate for manually moving the lock element against the action of said resilient means.

3. A unitary bolt and lock element for a combination lock of the character described, said element comprising an elongated rod-like member adapted for slidable engagement with said lock, said member having enlarged bolt forming means at one end thereof for detachably engaging an independent part adapted to be retained by said lock, the outer surface of said bolt forming means having a beveled portion and the inner surface thereof forming an annular shoulder for engaging a spring thereby adapting said element for automatic latching movement, a plurality of protruding lugs on said member forming the lock means of said element, said lugs being arranged in common alinement and at longitudinally spaced intervals on said member, and means at the end of said member for detachably engaging an actuating finger piece for said element.

4. A combination lock of the class described, comprising interengaging lock parts adapted to be secured to relatively movable supports, one of said parts comprising a spring actuated hasp, and the other of said parts comprising an attaching plate, an elongated bearing portion or cylinder integral with said plate and protruding from the inner surface thereof, said bearing portion having a passage extending longitudinally thereof slidably engaging a combined bolt and lock element, a plurality of control devices rotatably supported on said lock element and seating within spaced cut out portions of said bearing, said control devices protruding through apertures on the outer surface of said attaching plate to facilitate manual rotation thereof, cooperating means on said devices and lock element providing for longitudinal movement of said lock element in predetermined positions of setting of said devices, said attaching plate having an aperture therethrough adjacent each end of said bearing portion, means on one end of said lock element and registering with one of said apertures for detachably engaging cooperating means on said hasp, and other means on said lock element protruding through the other of said last named apertures for manually moving the same into operative and inoperative positions when the control devices are in said position of setting.

5. A combination lock of the class described comprising interengaging lock parts adapted to be secured to relatively movable supports, one of said parts comprising a spring actuated hasp, and the other of said parts comprising an attaching plate, an elongated bearing portion or cylinder integral with said plate and protruding from the inner surface thereof, said bearing portion having a passage extending longitudinally thereof slidably engaging a combined bolt and lock element, a plurality of control devices rotatably supported on said lock element and seating within spaced cut out portions of said bearing, said control devices protruding through apertures on the outer surface of said attaching plate to facilitate manual rotation thereof, cooperating means on said devices and lock element providing for

longitudinal movement of said lock element in predetermined positions of setting of said devices, said lock element having an enlarged end cooperating with an enlarged portion of the passage through said bearing, means on said enlarged end detachably engaging cooperating means on said hasp, a spring arranged within the enlarged portion of said passage and bearing against the enlarged end of said element to normally support said element in position for operative engagement with said last-named means, and means for moving said element longitudinally into inoperative position against the action of said spring.

6. A combination lock of the class described comprising interengaging lock parts adapted to be secured to relatively movable supports, one of said parts comprising a spring actuated hasp, and the other of said parts comprising an attaching plate, an elongated bearing portion, or cylinder integral with said plate and protruding from the inner surface thereof, said bearing portion having a passage extending longitudinally thereof slidably engaging a combined bolt and lock element, a plurality of control devices rotatably supported on said lock element and seat-

5 ing within spaced cut out portions of said bearing, said control devices protruding through apertures on the outer surface of said attaching plate to facilitate manual rotation thereof, cooperating means on said devices and lock element providing for longitudinal movement of said lock element in predetermined positions of setting of said devices, said lock element having an enlarged end cooperating with an enlarged portion of the passage through said bearing, means on said enlarged end detachably engaging cooperating means on said hasp, a spring arranged within the enlarged portion of said passage and bearing against the enlarged end of said element to normally support said element in position for operative engagement with said last-named means, means for moving said element longitudinally into inoperative position against the action of said spring, said last-named means comprising beveled surfaces on the enlarged end of said element and the cooperating portion of said hasp providing automatic movement of the lock element against the action of said spring when the hasp is forcibly moved into engagement therewith.

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