

Title: Credit card ejector having break coupling.

The invention relates to a card holder provided with a device (further also called "ejector") to eject or dispense the cards, e.g. credit cards or bank cards, or different flat 5 or plate like objects, from the holder and wherein the card or cards tightly fit within the holder, for which the holder has a cavity similar to the shape and slightly bigger than the card or cards stack. The ejected cards are preferably presented as a staggered stack.

10 For the so called credit card format the main dimensions suffice ISO 7810 and the thickness and roundings suffice ISO 7813. This format is applied for many cards with a diversity of applications: bank cards, driving licenses, membership cards, entry tickets, reduction cards, savings cards, ID-cards, etc.

15 The cards preferably have a solid, not foldable shape and a smooth, slippery, low friction surface. The holder preferably has a rigid flat box or sleeve shape.

The prior art discloses in EP-A 0 287 532, CH702919 B1, WO2010137975 and WO2014098580 a pivoting ejector arm provided 20 with a stepped profile along its length such that each card engages with a different edge at the ejector arm, the cards are simultaneously dispensed to present a staggered stack of cards, partly projecting out the card holder. Different card holders are disclosed in US2002/074246, US4887739, US5718329 25 and JP S60-179484 U.

Above cited WO2014098580 addresses the problem of jamming of the ejector arm at the time of ejecting the stack of cards.

The above cited prior art provides background knowledge for the present invention. The disclosure of this prior art 30 is enclosed herein by reference.

The object of the invention is versatile. In one aspect the object is a further improvement of the prior art in avoiding or solving jamming of the card eject feature, or part of it, e.g. the ejector arm, or jamming of the cards at the time of 35 ejecting the stack of cards. Additional possible aspects are a comfortable, simple and accurate operation of the holder with long life. In yet another aspect the object is error free handling, low production costs, attractive appearance. Thus the invention is directed to a card holder according to the

claims. Other aspects can be learned from the specification, drawings or claims. Two or more aspects can be combined.

Preferably one or more of the following applies to the device: a rectangular shape, preferably elongated; fixed shape, 5 robust, of light weight material, e.g. metal or polymer material, polyester, PP; box or sleeve shaped; the card storage space receives a cards stack with tight fit; fixed length, width and depth; an ejector mechanism of the cards, preferably at the longitudinal end of the card holder opposite the card access 10 opening to the housing space in which the cards are stored.

Preferably the invention is directed to a card holder provided with an ejector mechanism dispensing the complete stack of cards, thus all cards of the stack are dispensed simultaneously, e.g. since the ejector mechanism simultane- 15 ously engages the complete cards stack at the time of ejecting the cards. Preferably the cards are urged from the housing in such a manner that a staggered stack of cards, partly projecting out the card holder, is presented. This is preferably provided by the design of the ejector device. More preferably the design 20 of the card holder or the ejector device is such that when the cards stack is completely contained within the card holder, the cards are mutually in register (in other words the cards are not staggered), and preferably is partly projected from the card holder, wherein the cards are presented in a staggered 25 fashion. By presenting the cards in staggered fashion, they can be easily individually identified and individually taken from the stack by two fingers of the hand of the user. The card holder is preferably rigid in relation to the typical loads to which the card holder is exposed during normal daily use.

30 In particular the holder is designed to receive and dispense credit cards (and different items with dimensions comparable to credit cards, further mentioned as "cards"), preferably wherein a stack of, e.g. at least three, four or five, cards can be housed in the holder, more preferably wherein 35 the cards in the stack are immediately mutually superposed or adjacent, in other words no further object, e.g. spacer, is or needs be present between adjacent cards. The holder

preferably has two pairs of substantially or completely closed and fixed opposite sides, one pair with length and width almost equal to the same card dimensions (also called the "main sides") and this pair spaced by the other (also called the "minor sides") pair (delimiting the stack thickness) such that the card stack tightly fits between these four sides. Preferably these sides are thin walled and/or provide a rigid, sleeve like casing. Of the remaining pair of two opposite sides (typically located at the longitudinal ends of the sleeve) preferably one (also called the "bottom") is permanently substantially or completely closed and the other (also called the "top") is open but could be temporary closed, e.g. by a lid, such that the holder preferably has merely a single open side through which the cards can enter and exit the holder. Thus the holder provides a rigid sleeve with closed bottom. Typically the cards enter and exit the holder by moving parallel to their main sides.

To avoid that the cards can spontaneously leave the card holder, the device is preferably provided with card retaining means, e.g. a (preferably pivoting) removable lid associated with the access opening to open and close it, or clamping or friction means designed to engage e.g. a main side (a side defining a card face) or a minor side (a side defining the card thickness, i.e. the thin side) of the card. E.g. WO2010137975 (above cited) addresses releasably retaining the cards within the housing by friction means and the relevant disclosures are incorporated in here by reference. Retaining means to keep the cards within the holder without closing the top side with a lid, are preferred.

The ejector comprises an ejector element (further also called "arm") moving between a first and second (preferably a retracted and an extended, respectively) position inside the holder and engaging the cards stack, preferably engaging an edge of the cards, to push the cards stack out of the holder while the cards move in a plane parallel to their main faces, preferably such that the cards (with the ejector element in its extended position) partly project from the holder in a stepped or staggered manner. For the purpose of presenting or

dispensing the cards in a stepped manner, the ejector arm is preferably provided with a relief profile, preferably having some relation with the thickness of the cards, such that the element has a plurality of spaced features, preferably located 5 along a straight line, e.g. lengthwise of the arm, a such feature designed to engage a single card from the stack, preferably such that by movement of the element within the holder, the one card is moving with the element for a further distance outward compared to another card from the same stack within 10 the holder. In an embodiment such features are projections at the arm each providing an engagement edge (also called "face" or "contact face"), wherein preferably the projections project a different distance from the element such that each engagement face is present at a different level. Preferably the arm is 15 designed such that, in its retracted position, the cards fit within the holder such that the cards are mutually in register, in other words, present a neat stack.

Preferably the height (meaning the dimension normal to the housing main sides and parallel to the thickness direction 20 of the cards or cards stack loaded into the housing) of the ejector arm stepwise increases longitudinally from the free end (in other words the distal end or the end remote from the pivot point or the end opposite the end to which the drive means engage or are mounted). This stepwise increase of height (also 25 named: thickness) provides step shaped features or contact faces for ejecting the cards stack in a staggered fashion.

The number of steps preferably at least equals the number of cards within the stack and/or is at least 4 or 5 or 6 or 7. The steps preferably have approximately equal longitudinal 30 spacing and/or height.

In its extended position, the ejector arm preferably extends diagonally within the holder or makes an angle between 20 and 90 degrees (90 degrees equals a right angle), preferably at least 45 or 55 or 60 degrees and/or less than 85 degrees, 35 compared to its retracted position. In its retracted position, the ejector arm preferably extends parallel to an external side(also called "bottom") or edge of the holder, preferably

opposite the side from which the cards are dispensed from within the holder. Preferably the ejector arm rotates or swivels or turns or hinges or pivots between its first and second position, for which it is preferably provided with a hinge or pivot feature, 5 such as a pin or hole, with which it is mounted to the holder. In the alternative a translating movement is feasible.

To provide the movement of the ejector arm, the ejector comprises a drive means associated with the ejector arm. This could be a motoric means however a manually operated drive means, 10 e.g. a finger operated button, is preferred, preferably projecting or located outside the housing. Preferably the ejector arm and the drive means are connected in a rigid manner such that the movement of the drive means is directly transferred to the ejector arm and both these members move as 15 one, e.g. since both these members are integrated in a single, preferably rigid piece. The ejector arm and/or drive means could be injection moulded parts, e.g. of polymeric or plastic or equivalent material.

Preferably the ejector arm provides or is part of, a base 20 or bottom of the holder, or part of it, preventing exit of the cards from the associated side of the holder.

The card ejector feature gives the user the opportunity to partly slide the card stack from the housing. This is a preferred operation before the user can select a card and remove 25 it from the housing.

By the time the eject arm is in its extended position, the cards are partly slid from the housing as a staggered or stepped stack such that each card presents an outside the housing projecting, exposed narrow strip of its upper main side 30 and by viewing these strips the user can see at a blink which cards are present in the holder. Also the user can easy and quick select within the cards stack the desired card and remove it by manually sliding the cards mutually in a direction equal to or opposite the direction in which the cards are slid from 35 the housing from their stored position

An embodiment of the card ejector feature of the invention comprises, among others, a step like element, which by the user

relative to the housing, e.g. by means of rotation or translation, can be moved against the cards stack, wherein the individual steps of the step like element exert at the individual cards in the stack in the direction of the card opening a force, resulting that the card stack slides outward in stepped shape. The steps have a thickness which is measured parallel to the card thickness and a spacing which is measured perpendicular to the thickness and which determines the degree wherein the cards slide mutually if they slide in stepped shape from the housing. Above cited WO2010137975 and WO2014098580, the contents of which is inserted in here by reference, provide further preferred details of the step like element.

An embodiment of the ejector, or part of it, e.g. the arm, as card remove feature of the card holder of the invention, is provided with or associated, e.g. coupled, with a reset means, e.g. a spring, with the effect that the ejector or the relevant part after operation will always immediately and automatically return to the initial position, e.g. move from the extended to the retracted position. Such by the reset means provided return offers the advantage such that without obstruction the user can slide cards back into the housing during making a selection from the partly exposed cards.

An embodiment of the card holder of the invention has a housing made of a galvanic material. The geometry of the housing of this invention lends itself for fabrication by means of metal extrusion, with which a proper Faraday cage is made.

Preferably the holder is provided with a card ejector means for normal duty use and a card ejector means for heavy duty or emergency use, which two card ejector means could be mutually separate mechanisms or integrated in a single mechanism. E.g. each card ejector means could be provided with its own dedicated driving or operating means, e.g. an operating button or key. A shared, single operating button is preferred, e.g. if both ejector means are integrated in a single mechanism. One or both ejector means can be of pivoting or turning or swivelling type.

Preferably the normal duty ejector is designed to eject the complete cards stack in staggered manner, and the heavy

duty neatly and/or only part of the stack. Preferably the heavy duty ejector provides a short lever arm engaging the cards and the normal duty ejector provides a long lever arm engaging the cards, preferably at least 10% or 20% or 50% longer compared to the heavy duty ejector. Preferably the distal end or end region of a lever arm engages the cards.

The ejector mechanism is preferably designed, e.g. comprises means, to switch between engagement of the normal and heavy duty ejector with the cards, preferably reversibly, e.g. by application of a friction or snap coupling which e.g. uncouples above an eject load threshold.

In an embodiment, during operation of the holder to eject the cards, the heavy duty ejector is always operative while the normal duty ejector is selectively operative or inoperative (e.g. if the eject load is below or above, respectively, a load threshold), e.g. in case both ejectors share the same actuator, e.g. operating button. Typically, in such case the heavy duty ejector is merely engaged with the cards if the normal duty ejector is inoperative.

If integrated the heavy duty part could be a projection at the normal duty part, preferably remote from the length area comprising the stepped or relief profile; or the normal duty part could be an extension of the heavy duty part, e.g. separated by a living hinge.

The heavy duty ejector is e.g. activated in case the cards stack has become jammed within the housing such that one is unable to eject the cards by using the normal duty ejector.

The provision of the heavy duty ejector by a projection along the length of the normal duty ejector is an example of providing the normal duty ejector with a first engagement area (e.g. the stepped or relief profile) and longitudinally remote from said area a second engagement area with the to be ejected stack. Typically, in such case the heavy duty ejector will always engage the cards stack first and eject it a slight distance and subsequently, with continued movement of the ejector to its fully extended position, the normal duty ejector will take over the engagement and eject the cards further.

Preferably the heavy duty ejector is designed to eject the cards for at least 10 millimeter and/or the stroke from retracted to extended state is equal for heavy duty and normal duty ejector.

5 Preferably the ejector arm comprises at least two separate parts (e.g. trigger and barrel), preferably mutually joined by coupling means. Preferably the one part (e.g. called barrel) provides an extension of the other part (e.g. called trigger). This offers the advantage that the parts can be tailored to
10 their function, e.g. shockproof and low friction on the one hand and shockproof and good haptics and appearance on the other hand. Further advantages are mutual disengagement during operation of the arm, e.g. to avoid or overcome jamming; play to allow the free end of the arm to elongate to avoid sticking
15 or wedging of the arm to the cards such that the arm more smoothly returns to its retracted position (tests with the prior art holder revealed that during ejecting the cards, the arm sometimes becomes wedged between two adjacent cards such that the reset means is unable to automatically return the arm to
20 the retracted position since the arm remains "sticked" to the cards that are retained by the retaining means of the holder. Briefly hitting the operating button of the ejector arm releases the arm from the cards, but this generates shocks and noise). Preferably the one part, e.g. barrel, is designed to engage
25 and eject the complete cards stack, e.g. covers the complete thickness of the cards stack, while the other part, e.g. trigger, is designed to engage and eject only a few, not all, cards of the stack, e.g. at least one, two or three cards less from the stack, which is beneficial to overcome jamming of the cards,
30 e.g. covers not more than 80% of the cards stack. Preferably, the trigger is located such that the card closest to each main side will remain disengaged from this part during ejecting the cards, e.g. keeps a gap of at least 0.8 millimeter with both these main sides while moving between the retracted and extended
35 position. In the alternative the trigger keeps a gap of at least 0.8 or 1.2 millimeter with at least one of the main sides while moving between the retracted and extended position.

In an embodiment both parts share a pivot or hinged fixture with the housing, wherein preferably for at least one of the parts, e.g. barrel, the pivot comprises an elongated pivot hole such that this barrel can travel lengthwise.

5 An alternative embodiment provides that the one part, e.g. barrel, has two pivots, one with the housing, the other with the other part, e.g. trigger.

Preferably the with the cards engaging end of the one part, e.g. barrel, ends further away from the with the housing
10 associated pivot compared to the other part, e.g. trigger, preferably at least 10% or 25% or 50% or 75% further away. By way of example, the barrel is longer, measured from the with the housing associated pivot to the with the card engaging end, preferably at least 10% or 25% or 50% or 75%. The trigger length
15 is preferably between 25% or 40% and 60% or 75%, e.g. approximately 50%, of ejector arm length.

Preferably the parts are mutually joined by a break coupling which uncouples damage free above a load threshold and can be re-coupled such that uncoupling can be repeated many
20 times during the service life of the product. The break coupling is e.g. provided by form fit or tight fit or force fit or friction fit. E.g. a friction coupling or a snap coupling is feasible. Preferably uncoupling requires a higher load compared to re-coupling, e.g. at least 5% or 10% or or 15% or 20% higher.

25 Preferably one or more of the following applies to the break coupling: location between 25% or 35% and 60% 75%, e.g. approximately 50% of the ejector arm length and/or adjacent the longitudinal free end of the trigger; allows a mutual longitudinal movement between barrel and trigger of at least
30 0.5 millimeter before uncoupling starts; provided by preferably one or both longitudinally extending, mutually longitudinally slidably engaging, edges at barrel and trigger which longitudinally overlap and/or engage for a longitudinal stroke of barrel relative to trigger for at least 0.5 millimeter.

35 In an embodiment the one part, e.g. trigger, transmits the driving force from the actuator, e.g. operating button, to the other part, e.g. barrel, via the mutual coupling.

An example of the inventive effect to avoid sticking or wedging of the eject arm (barrel) to the cards during eject is as follows: a distal edge (also called slide cam) of the trigger, e.g. at its longitudinal end, bears against a stop edge at the barrel in such manner that if the trigger is pivoted from its retracted position by operating the actuator, the barrel is forced to follow this movement. Due to the resistance of the cards against ejection (e.g. due to the friction means of the holder engaging a main or minor side of the cards), applying a force to the distal end of the barrel opposite the direction of rotating of the trigger and barrel to the extended position, and due to the mutual orientation and/or shape of the slide cam and the associated stop edge, the driving force from the trigger is partly split in longitudinal direction of the barrel, such that the barrel is slightly moved away longitudinally from the trigger (translating movement), as if the barrel longitudinally elongates. Thus, initially when starting from the retracted position of the ejector, the barrel longitudinally translates besides its pivoting or rotation with the trigger. This elongation of the barrel is against the action of a reset means, e.g. spring such that the elongation is limited. As long as the trigger urges the barrel to the extended position and simultaneously the barrel urges the cards to exit the holder, this elongation of the barrel is maintained. However, as soon as the driving force of the trigger is removed, the force component from the trigger acting longitudinally on the barrel disappears, resulting in the reset means withdrawing the barrel longitudinally as if it shrinks longitudinally, which movement demands less effort from the reset means compared to returning to the retracted position of the complete ejector arm (trigger plus barrel) in case the barrel is wedged between cards (in other words "sticks to the cards"), such that the barrel is reliably disengaged from the cards such that even when sticking happens, the complete ejector arm always automatically returns to the retracted position by action of the reset means as soon as the actuator (e.g. operating button) is released.

In an embodiment, the ejector arm is designed to elongate

by being provided with telescoping parts, e.g. barrel and trigger. Elongation is preferably at least 0.5 millimeter.

Preferably one or more of the following applies to the reset means, e.g. spring, preferably tension spring and/or
5 coiled spring, of the ejector arm: operates parallel to the extension of the arm or at a sharp angle of 10 or 15 or 20 degrees maximum both in the retracted and extended position and preferably one or more or all positions in between; is joined to the holder at a location between the location of the joint
10 of the reset means to the arm, when the ejector arm is in the completely retracted position, and the pivot of the arm or beyond this pivot as viewed from said joint; is joined to the holder at a location within 5 millimeters from the location where the eject arm is mounted to the holder (e.g. the holder
15 fixed ejector arm pivot). This allows the free end of the arm to elongate to avoid sticking of the arm to the cards such that the arm more smoothly returns to its retracted position.

The prior art reset means, e.g. known from above cited WO2010137975, is joined to the holder at a location beyond
20 the joint of the reset means to the arm, as viewed from the pivot of the arm, thus near the distal end of the eject arm if in its retracted position, and extends parallel to the eject arm only if in its retracted position, while in its extended position the reset means extends almost perpendicular to the
25 eject arm, thus the reset means covers a stroke of approximately 45 degrees while the eject arm moves from the retracted to the extended position.

Thus, according to the invention the reset means is oriented differently compared to the prior art.

30 The reset means preferably is present aside, preferably straight aside, one or more of the eject arm, trigger and barrel (or at least the stepped part of it), in different words is adjacent a side of the eject arm, trigger or barrel facing in the direction of movement between the extended and retracted
35 position. Prior art applies the spring straight above or below the eject arm. Preferably the reset means extends parallel to such side and/or covers such side at least partly. The reset

means preferably is fixed to the barrel means. The trigger means is preferably free from a reset means.

The element closing the holder opposite the cards access opening preferably has a aperture or window through which the barrel and trigger are visible and/or project into (e.g. illustrated in Fig. 30).

The invention also relates to each and any combination and permutation of the above individual inventions.

The invention will now be further explained by way of the drawing, showing presently preferred embodiments. The drawing shows in:

Fig. 1 - 2 a card holder, in perspective view;

Fig. 3 a cross section of the fig. 1 card holder;

Fig. 4 in perspective view a pivoted ejector arm engaging a staggered cards stack;

Fig. 5 - 12 in perspective view a first embodiment of the invented ejector arm during different stages of its operation;

Fig. 13 - 17 in perspective and side view the fig. 5 ejector arm in different positions;

Fig. 18 and 19 a perspective exploded view of the fig. 5 ejector arm from opposite sides;

Fig. 20 - 23 perspective views of two alternative embodiments of a double hinged ejector device of the invention in two operating states;

Fig. 24A-B in perspective side view an embodiment of mutually separate and independent normal duty and heavy duty ejector arms;

Fig. 25 in perspective side view an embodiment of normal duty and heavy duty operation provided by a unitary ejector arm;

Fig. 26A-B in perspective side view another embodiment of normal duty and heavy duty operation provided by a unitary ejector arm;

Fig. 27A-E elaborate the operation of the break coupling;

Fig. 28A-F elaborate the operation of another break coupling;

Fig. 29 a top view of the fig. 5 embodiment; and

Fig. 30 a bottom view of the fig. 5 embodiment.

Fig. 1 - 3 show a perspective view of the housing of the card holder which tightly fits around the shown stack of at least three cards (four are shown), wherein one of the two longitudinal ends of the housing is referred to as a card opening because it is opened to receive and remove cards. The tightly fit around the card stack implicates a main shape based on a right angled brick, but it can of course, for reasons of design or ergonomics, differ, e.g. by providing chamfers, roundings, ribs, etc.

Fig. 1 shows the holder 1 and a neat stack 2 of four cards in register, ready to be loaded into the holder through the cards opening 3. If completely located in the holder, the lower side of each card is in register with a relevant engagement face of the ejector arm in its first (retracted) position. Starting from this position of the ejector arm and moving (pivoting) it to its second position, the cards will be forced by the associated engagement face such that the cards stack is partly ejected. Since each engagement face has a different distance to the pivot point of the ejector arm, each card will travel a different distance such that a staggered ejected stack 2 is obtained (shown in fig. 2 in which the ejector arm (not shown) is in its second position), each card presenting an exposed narrow strip of a main side as shown.

Fig. 3 shows in sectional view a holder (without cards) with a card eject feature (in the first (retracted) position) provided by the stepped element 16 which can pivot around an axis 17 if the user exerts in the pivot direction (according to the arrow B) a force through the actuator 18 outside the housing. The stepped element is made from steps providing card contact faces 19 designed to exert force against the minor side of the cards to be ejected. The card contact faces 19 can be regarded as the thickness of the steps in the stepped shape and the height of these faces is equal to or smaller than the nominal card thickness (approx. 0.8 mm), whereby each step contacts a different card. A reset spring 20 ensures that the stepped element 16 after releasing the button 18 returns

immediately and automatically to the initial (first) position shown. Friction elements 4, e.g. pads of rough fibre like material, e.g. felt, are located mutually opposite within the housing at the housing minor sides to engage each individual 5 minor card side to retain the cards against gravity force.

In a possible variant of fig. 3, the stepped element 16 can translate in the direction in which the cards are slid through the card opening 3 and out the housing and which by means of a reset spring 20 after releasing the operation part 10 18 returns immediately and automatically to the initial position.

Fig. 3 shows the connection between the button 18 and the ejector arm 16 extending through a passage in the bottom edge, meaning the edge opposite the opening 3. Alternatively such 15 passage could be present in a side edge or even in a main side 31. The button 18 is shown adjacent the bottom edge, however could be located adjacent a side edge or even a main side 31. The bottom edge or side edge is a minor side, bridging the main sides 31. These locations of the passage and button 18 are known 20 from the prior art.

In fig. 4 the housing is removed such that the elements within the housing are visible. The eject arm 16 is pivoted to its second (extended) position, engaging the staggered cards stack 2 (only partly shown). Arm 16 is, by pivot 17, pivotably 25 mounted to a fixture 10 which is fixedly located in the housing opening opposite the card opening 3, thus providing a closure of the housing.

As is clear from all fig. 1-4, the thickness of the ejector arm stepwise decreases from the proximal (close to the pivot 30 point 17) to the distal (free or remote) end 5. The maximum ejector arm 16 thickness equals the height of the housing determined by the clearance between the two main sides of the housing which equals the maximum thickness of a cards stack tightly fitting in the housing. The maximum ejector arm 16 35 thickness could be slightly thinner to allow movement of the arm 16 within the housing without undue friction with the inner faces of the opposite housing main sides along which the top

and bottom side, respectively, of the arm 16 slide.

The opposite main side walls 31 have smooth, level and flat inner faces, extending mutually parallel.

Fig. 5 and 6 show an embodiment of the invention during normal operation. Also the modified application of the reset spring 20 is illustrated, clearly different from the prior art solution (as shown in fig. 3). At location 9, spring 20 is mounted to barrel 6. The opposite end (not visible) of spring 20 is mounted to the ejector arm fixture 10 adjacent the pivot 17. In this manner spring 20 remains parallel to arm 16 during pivoting of arm 16.

The arm 16 is assembled from two separate parts: barrel 6 and trigger 7, sharing a common pivot 17 and mutually reversibly coupled by slide cam 8 at barrel 6. Trigger 7 is rigidly coupled with button 18. Barrel 6 is biased towards the retracted position according to fig. 5 by the spring 20. By operating button 18, trigger 7 is pivoted to the fig. 6 position, carrying barrel 6 along due to engagement between the distal or free end 11 (also called nose) of the trigger 7 and the slide cam 8.

Fig. 7 and 8 illustrate heavy duty operation. During pivoting of the trigger 7 towards its extended state, when the barrel 6 experiences resistance, e.g. due to jamming of barrel 6 or the cards stack, the nose 11 and the slide cam 8 mutually move, causing the barrel 6 to move longitudinally (see arrow C), opposite to the bias of the spring 20. While nose 11 and slide cam 8 are still engaged, if actuation of button 18 is stopped, spring 20 returns barrel 6 to its original state. If actuation of button 18 is continued with increasing force, nose 11 pushes slide cam 8 and thus barrel 6 forward such that finally nose 11 can pass slide cam 8, at which time the coupling between trigger 7 and barrel 6 breaks reversibly and trigger 7 is free to pivot further towards its extended state (fig. 8). As soon as barrel 6 is uncoupled from trigger 7, the spring 20 returns barrel 6 to its retracted state as fig. 8 shows.

From the fig. 8 position, the trigger 7 is pivoted back to its initial position by operating button 18, during which

nose 11 will hit slide cam 8 from above. Application of some additional force to button 18 will cause that nose 11 pushes slide cam 8 and thus barrel 6 forward such that finally nose 11 can pass slide cam 8, after which spring 20 moves barrel 5 6 back and the engagement between nose 11 and slide cam 8 as shown in fig. 7 is recovered.

The skilled person is able, without inventive effort, to adapt the shape of the nose 11 and the slide cam 8 to obtain the reversible break coupling between trigger 7 and barrel 6.

10 Fig. 9 and 10 show the arm 16 from the opposite side, illustrating the elongated pivot hole 29 in the barrel 6 to allow barrel 6 to move longitudinally (arrow C) during heavy duty operation. Fig. 9 shows the initial state and fig. 10 the forward moved barrel 6, caused by engagement of the nose 11 15 and slide cam 8.

Fig. 11 and 12 show the arm 16 from the opposite side during normal operation (fig. 11) and heavy duty operation (fig. 12), in both states the trigger 7 is pivoted to its second position. In fig. 11 trigger 7 is pivoted together with barrel 6, such 20 that trigger 7 is hidden behind barrel 6, reason why trigger 7 is referred by a dotted arrow in fig. 11.

Fig. 13 and 14 illustrate the forward movement of the barrel 6, against the bias of spring 20. Appreciate that trigger 7 slightly pivots relative to barrel 6 to cause barrel 6 to 25 move forward. The dotted line at the right hand side of the drawing illustrates the rate of forward movement of barrel 6.

Fig. 15 and 16 illustrate the same as fig. 13 and 14, this time in perspective view.

Fig. 17 illustrates the separate arm 16 while trigger 7 30 uncoupled from barrel 6.

Fig. 18 and 19 show perspective exploded views from opposite sides of parts 6, 7 of arm 16 and the fixture 10, in fig. 19 the shaft of pivot 17 is visible.

Fig. 20 - 26 show five alternative embodiments of the arm 35 16 designed for reversibly switching between normal and heavy duty operation.

Fig. 20-21 and fig. 22-23, respectively, show a first and

second example in two operating states of a double hinged embodiment, wherein the barrel 6 is hingedly mounted to the distal end of the trigger 7 by a pivot 21 in addition to the pivot 17. Trigger 7 and barrel 6 are mutually separate parts 5 and kept mutually in line by a reversible break coupling.

Fig. 20-21 show an at location 22 active friction coupling (viz. fig. 21) which disengages above a predetermined load acting on the barrel 6 while ejecting the cards, at which time barrel 6 is released for free pivoting around pivot 21 (viz. 10 fig. 21) such that the distal end of trigger 7 only will urge the cards out of the housing. Operating button 18 opposite the direction of ejecting the cards forces the trigger 7 and barrel 6 mutually in line, recovering the friction coupling acting as reversible break coupling.

15 Fig. 22-23 show a different reversible break coupling, provided by form fit, wherein a flexible backward extension 23 of the barrel 6 carries a hooking edge 24 which during normal duty use (not shown) when the trigger 7 and barrel 6 are mutually in line, hooks behind a corresponding hooking edge 25 at barrel 20 6. Above a predetermined load carried by the barrel 6 during ejecting the cards, extension 23 yields such that hooking edge 24 moves free from hooking edge 25, causing the break coupling to disengage. By operating button 18 opposite the direction of ejecting the cards recovers the break coupling.

25 Fig. 22 and 23 also show the application of the reset spring 20 corresponding to the prior art, thus similar to fig. 3 and clearly different from fig. 5 which shows an inventive example.

Fig. 24A-B show a normal duty ejector arm 6 operated by button 18 and a heavy duty ejector arm 7 operated by button 30 26, such that operation of these arms 6, 7 is mutually independent. Fig. 24A shows the retracted and fig. 24B the extended position of both arms 6, 7. In stead of mutually opposite as shown, in an alternative the arms 6, 7 and/or buttons 18, 26 could be located differently, e.g. side by side.

35 Fig. 25 shows the trigger 7 and barrel 6 as a single part wherein barrel 6 can pivot relative to trigger 7 by application of a living hinge 27 at the area where barrel 6 and trigger

7 merge. This living hinge provides a virtual hinge, thus a physical pivot axis 21 is absent. The fully extended position of the eject arm during heavy duty operation is shown. The dashed lines show the barrel 6 position during normal duty operation. 5 Arrow d indicates the direction of pivoting of barrel 6 when switching from normal to heavy duty operation.

Fig. 26A-B show an ejector arm 16 as a unitary item, similar to fig. 3, carrying a fixed projection 28 at the side facing the cards within the house. When pivoting from the retracted 10 state of fig. 26A to the extended state of fig. 26B, the projection 28 first engages the facing edge of the cards urging them outwards, subsequently the distal end of arm 16, carrying the stepped profile, takes over the engagement with the facing cards edge to further urge them outwards. In this manner, 15 projection 28 operates similar to the trigger 7 during heavy duty operation, and the distal end of arm 16 operates similar to the barrel 6. In this example, however, projection 28 always engages the cards during the initial phase of pushing the cards outward, while the distal end of arm 16 only engages the cards 20 after the initial phase is completed. Thus, with this example, the initial phase is always as if heavy duty operation is required.

Fig. 27A-E illustrate operation of the break coupling applied in the embodiment shown in e.g. fig. 13. Starting from 25 fig. 27A showing the engaged coupling, the one inclined stop face and the contact edge of the two coupling parts start mutually bearing and sliding (fig. 27B) when operating the button 18 (viz. fig. 13) to eject the cards, opposite the bias of spring 20. At arrival of the threshold load the coupling 30 becomes disengaged since the coupling parts no longer provide a mutual barrier for the load from the trigger 7 to pivot the barrel 6 (fig. 27C). To re engage the coupling parts the button 18 is operated oppositely and the other inclined stop face and the contact edge start mutually bearing and sliding (fig. 27D) 35 until they can mutually pass (fig. 27E), after which the reset spring 20 moves the parts to the initial stage (fig. 27A) completing re engagement.

Fig. 28A-E illustrates the same stages as fig. 27A-E for a different shape of the contact face. Fig. 28F shows additionally an intermediate stage between fig. 28E and fig. 28A, illustrating the movement caused by the reset spring 20.

5 Fig. 29 the view when looking into the holder 1 from the entrance 3 and illustrates the small thickness of the trigger 7 compared to the barrel 6 in the area provided with the faces 19 (here barrel 6 fits tightly between the main sides 31). The trigger 7 is sandwiched between the thin part of barrel 6
10 adjacent pivot 17 and a spacer 30 (also illustrated in, e.g., fig. 4 and 6) to locate the trigger 7 stably between the opposite main sides 31 of the housing 1. Thus, the trigger 7 is kept spaced from both main sides 31.

Fig. 30 the view according to arrow Z in Fig. 7 (the view
15 opposite Fig. 29). The one minor side 32 is shown by a dashed line since covered by button 18. The fixture 10 contains a window 33 (also referred to in Fig. 9) through which the barrel 6 and trigger 7 are visible. The barrel 6 and the trigger 7 project into this window 33.

20 The mutual spacing of the components shown in fig. 29 and 30 is exaggerated for clarity.

Fig. 5-8 and 11 show the reset spring 20 is present straight aside the trigger 7 and barrel 6 and extends parallel to these parts 6, 7 and covers these parts 6, 7 partly. This is different
25 from Fig. 3 in which the spring 20 is present straight above the eject arm and also the steps 19. The spring 20 is merely fixed to the barrel 6.

The drawing, the specification and claims contain many features in combination. The skilled person will consider these
30 also individually and combine them to further embodiments. Also different embodiments belong to the invention. Features of different in here disclosed embodiments can in different manners be combined and different aspects of some features are regarded mutually exchangeable. All described or in the drawing
35 disclosed features provide as such or in arbitrary combination the subject matter of the invention, also independent from their arrangement in the claims or their referral.

CLAIMS

1. A holder for cards, comprising a housing (1) which preferably tightly fits around a stack of at least three cards (2) and has at least one card opening (3) for locating and removing cards, while within the housing, preferably opposite the card opening (3) , a card eject feature is provided such that the cards through the card opening (3) can be partly slid from the housing, which card eject feature comprises an ejector arm which is designed to move within the housing between a first and a second position and during said movement ejects the cards by engaging and forcing the cards simultaneously to partly exit the housing, and the holder comprises an external actuating feature, e.g. finger button, to provide the force to eject the cards by the card eject feature, the eject arm comprises a short lever arm (7) engaging the cards and an at least 10% longer long lever arm (6) engaging the cards, having a pivot (17) in common.
2. Holder according to claim 1, the break coupling comprises a biasing reset means (20) and an assembly of two oppositely sloping stop faces at the one coupling part and a contact edge at the other coupling part in sliding engagement with alternately one of said two stop faces, such that the load acting on the coupling (8, 11) to mutually engage or disengage the coupling parts causes the contact edge and the relevant stop face to mutually slide opposite the bias of the reset means.
3. Holder according to any of claims 1-2, wherein it comprises means such that during operation the free longitudinal end of the ejector arm can move away from its pivot at least 0.5 millimeter.
4. Holder according to claim 3, the ejector arm comprising two separate parts (6, 7) that share a pivot (17) with the housing, for the one part (6) the pivot comprises an elongated pivot hole (29) such that this part (6) can travel lengthwise at least 0.5 millimeter, against the bias of a spring (20).

5. Holder according to any of claims 1-4, wherein the reset spring (20) of the ejector arm is mounted such that in both the retracted and extended position of the ejector arm, the spring (20) extends substantially parallel to the longitudinal direction of the ejector arm (16).

6. Holder according to any of claims 1-5, wherein the reset spring (20) of the ejector arm is joined to the holder at a location between the location of the joint (9) of the reset means (20) to the arm, when the ejector arm is in the completely retracted position, and the pivot (17) of the arm or beyond this pivot as viewed from said joint (9).

7. Holder according to any of claims 1-6, the one part (7) transmits the driving force from the actuator (18) to the other part (6) via the mutual coupling (8, 11).

8. Holder according to any of claims 1-7, the reset means (20) is present straight aside the eject arm (16) side facing in the direction of movement between the extended and retracted position of the eject arm and it (20) extends parallel to such side and covers such side at least partly; and/or the element closing the holder opposite the cards access opening preferably has a aperture or window through which the barrel and trigger are visible and/or project into (see Fig. 30).

9. Holder according to any of claims 1-8, wherein at the inner side of the housing a friction element is located which exerts a friction force to the side edge of each individual card within the housing, which friction element is of sufficient width/dimension to simultaneously engage all cards in the stack and/or is not rigid.