Sept. 25, 1945. S. J. STANTON 2,385,738

CAM HINGE COMBINATION

Filed May 2, 1942 3 Sheets-Sheet 1

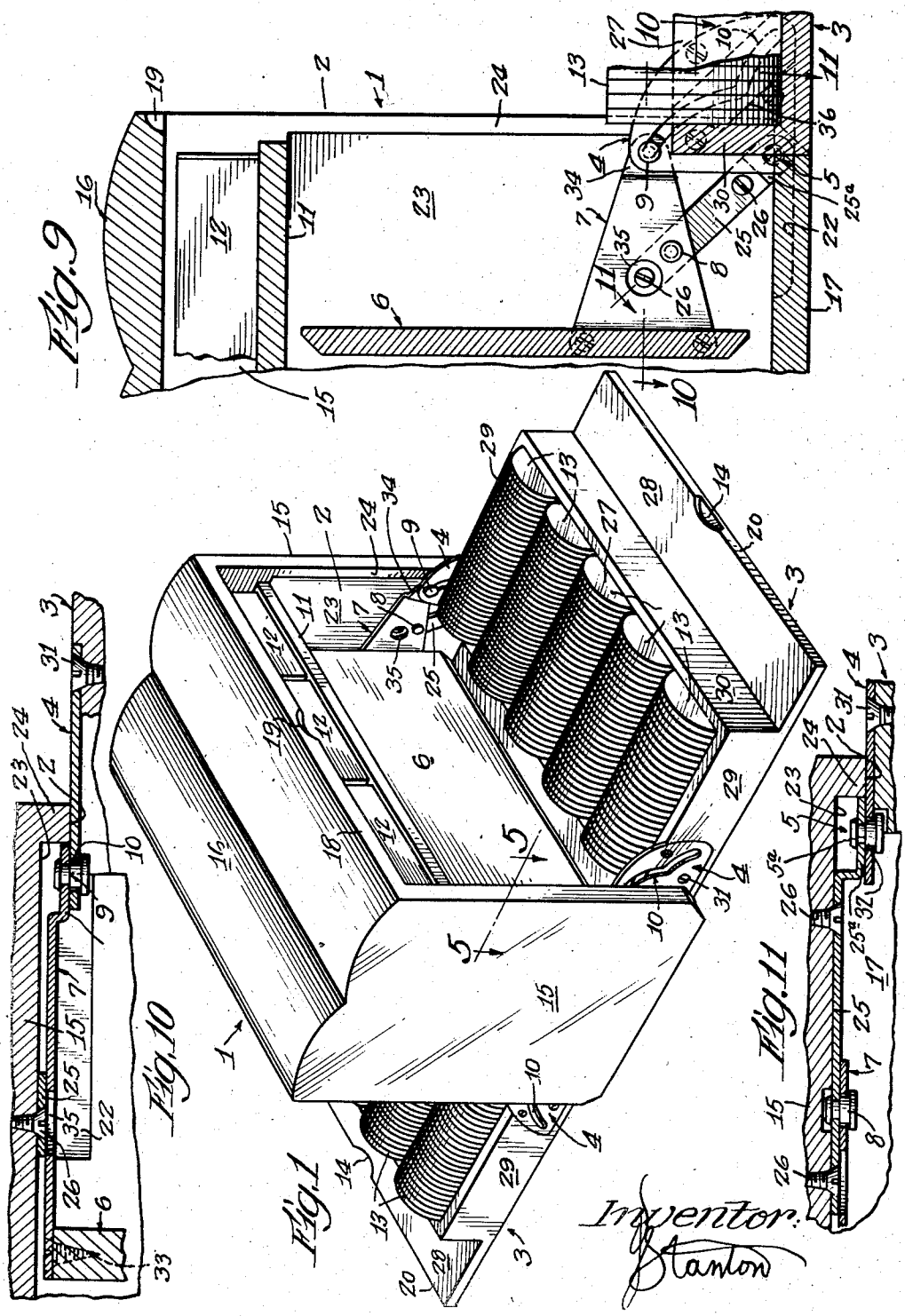


Fig. 9

Fig. 10

Fig. 11

Fig. 1

Inventor:
Stanton

Sept. 25, 1945. S. J. STANTON 2,385,738

CAM HINGE COMBINATION

Filed May 2, 1942 3 Sheets-Sheet 2

Fig. 2

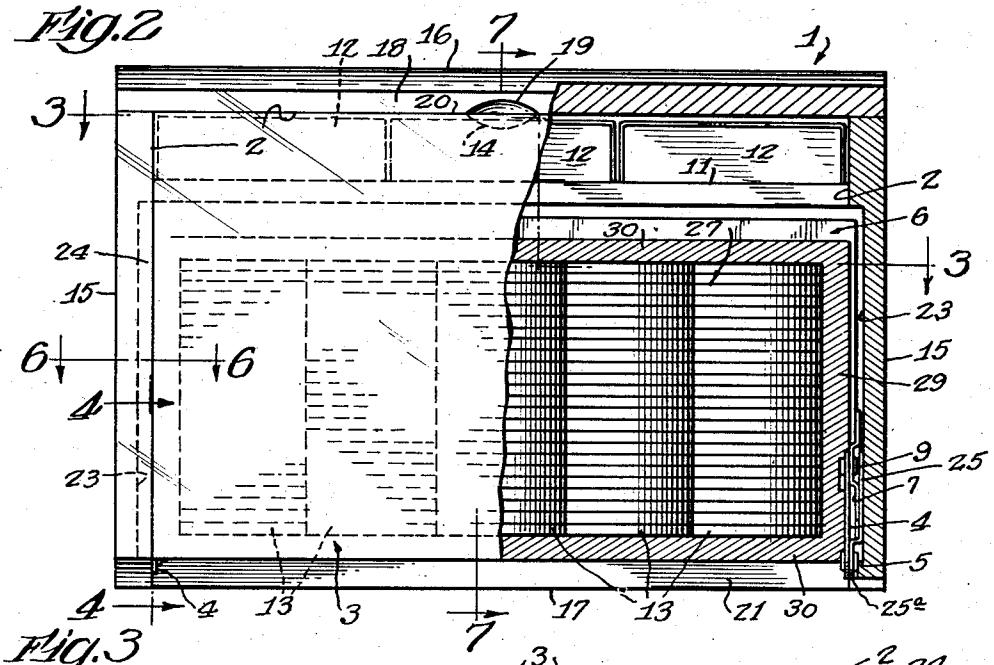


Fig. 3

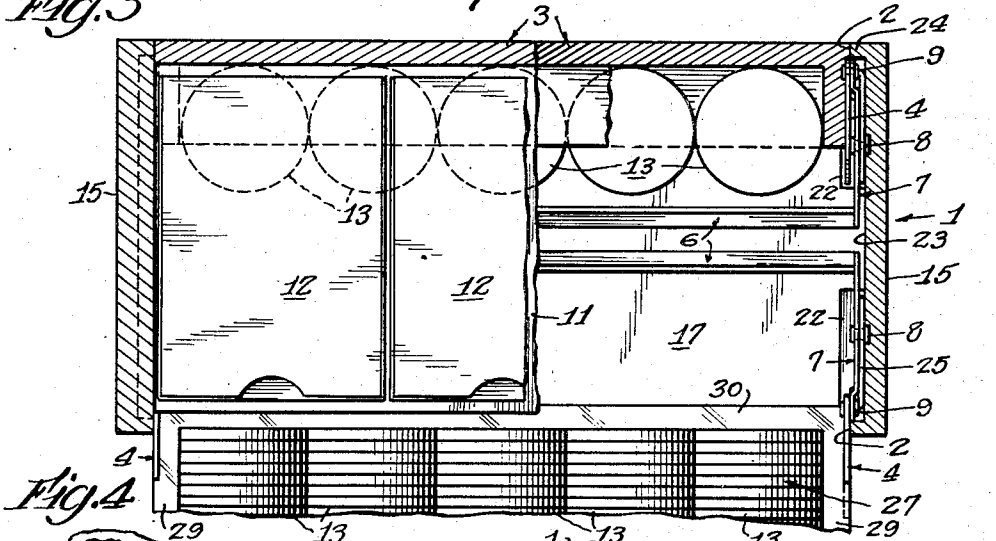


Fig. 4

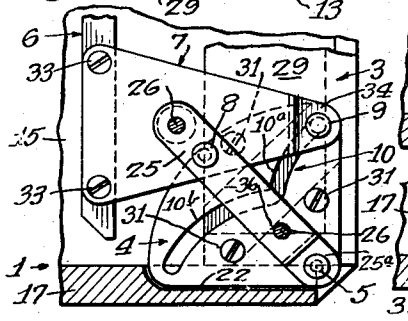


Fig. 5

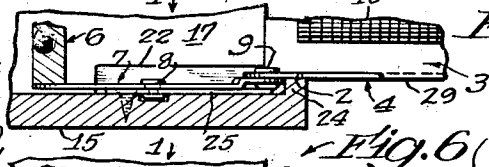
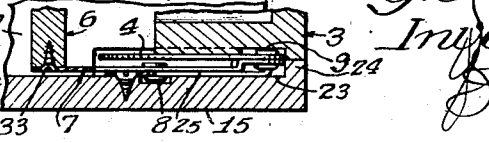


Fig. 6



Inventor:
Stanton

Sept. 25, 1945. S. J. STANTON 2,385,738

CAM HINGE COMBINATION

Filed May 2, 1942 3 Sheets-Sheet 3

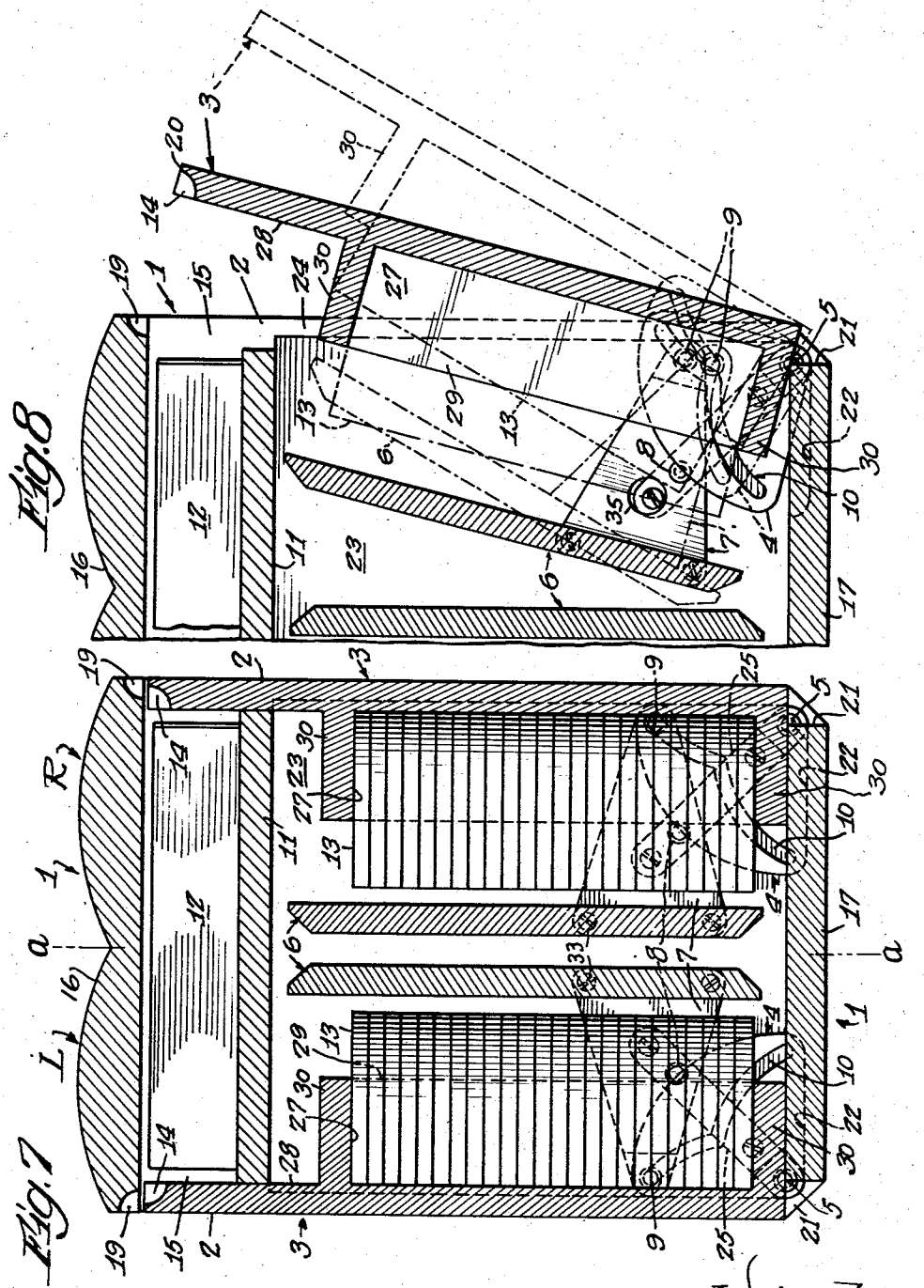


Fig. 8

Fig. 7

Inventor:
Stanton

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UNITED STATES PATENT OFFICE

2,385,738

CAM HINGE COMBINATION

Samuel John Stanton, Chicago, Ill., assignor to Patents Promotions Corporation, Chicago, Ill., a corporation of Illinois

Application May 2, 1942, Serial No. 441,503

16 Claims. (Cl. 312—155)

This invention introduces a combination in which at least two hingedly associated members, both pivotally associated with a third member, can, in association with a cam and follower member, act coordinately in predetermined special relationships to each other.

This combination may be further described as embodying a cam hinge device comprising three members. One of the three is a connecting or base member, two of them, associated with each other in a cam and follower relationship, are independently associated in a pivotal relationship with the third, but coactively coupled by means of an element which keeps them securely together. The device is so uniquely developed that the element coupling the two members serves also as the follower element in the cam and follower relationship.

A useful application of the present combination is disclosed in the present application in connection with a poker chip holder of the type shown in my Patent No. 2,196,818. In this connection, the cam hinge serves not only to pivotally connect sections of the poker chip holder but also to control and actuate one of them as a retaining means for the contents of another section.

The construction and various functions of this device will appear more clearly from a study of the accompanying drawings, which are made a part of this specification, terminating in a set of claims.

In the drawings:

Figure 1 is a perspective view of a poker chip holder, with the chip containers open for the removal of the contents.

Figure 2 shows a side elevation of the holder, a wall broken away in part to show therein internal arrangements.

Figure 3 is a cross section taken on line 3—3, Figure 2, with one of the containers shown therein in open position, and certain parts partly broken away.

Figure 4 is a fragmentary view of part of the poker chip holder showing in detail the mechanical combination to which this application primarily refers.

Figure 5 is a fragmentary cross section of the corner taken on line 5—5, in Figure 1.

Figure 6 is a fragmentary cross section of the corner taken on line 6—6 in Figure 2.

Figure 7 is a vertical cross section of the poker chip holder taken on line 7—7 in Figure 2, the letter L indicating the left hand side of the unit, the letter R indicating the right hand side thereof.

Figure 8 shows the right hand side of the unit with the containers 3 and the retainers 6 in different positions.

Figure 9 is a fragmentary view of the right hand side of the unit with a detailed view of the mechanical combination to which primarily the application refers.

Figure 10 is a fragmentary cross section taken on line 10—10 of Figure 9.

Figure 11 is a fragmentary cross section taken on line 11—11 of Figure 9.

In the drawings as detailed delineations the numeral 1 indicates a housing comprising a poker chip holder, as a whole, which is included in this application to disclose the mechanical combination conventionally defined in the appended claims. This housing 1 accommodates on each side of it a box-like container 3 accommodating therein several stacks of chips 13. Each container 3 includes a wall 28 forming one side of the housing 1 and the narrow walls 29 and 30 at right angles to wall 28 (see Fig. 1).

The housing is divided by axis A to indicate right R and left L half in the unit. The two being symmetrical, an explanation of one half is constructively an explanation of the other half.

The housing 1 has two end walls indicated by the numeral 15, a bottom wall indicated by the numeral 17, and a top wall divided into convex sections 16. When the box-like containers are turned into the housing 1, the unit looks like two volumes of books, which simulation yields itself to enhancement by leather covering or the like.

The mechanical combination primarily disclosed herein is the device which makes possible the movement of the container 3, into and out of the housing 1 without spillage of contents 13.

The housing 1 (see Figs. 1, 7 and 8) is generally of rectangular structure open on two sides and with the included containers 3, is a typical framework of walls in which two hinge combinations operate. The housing comprises two symmetrical halves L and R. The two hinge combinations are similar except that one is a right hand and one is a left hand hinge combination and therefore a description of one hinge combination will suffice for the present specification, especially since it is not the purpose to limit the application of the hinge combination to such use.

Associated with each container 3 is a wall 6 which, when the container is contained within the housing, extends parallel with the container and is spaced from the open side thereof far enough to leave room for a stack of poker chips

or other articles between the wall 28 of the container and the wall 6. In the operation of the hinge combination the wall 6 remains parallel with the wall 28 during part of the time that the container is being swung out of the housing so as to prevent spillage of the chips (see dotted lines in Fig. 8) and subsequently the wall 6 is moved back into its former upright position.

Each hinge combination comprises three members, namely a hinge plate 4 which is fastened to the side of the container wall 29 as by screws 31, a base plate 25 fastened to the inner face of the housing wall 15 as by screws 26, and hinged to the hinge plate 4 by a pin 5, and a bracket plate 7, fastened to a side edge of the wall 6 as by screws 33 and pivotally mounted between its ends on the base plate 25 as by a headed pin, or rivet 8.

The hinge plate 4 is formed with a cam 10, here shown in the form of a cam slot having two confluent curved parts 10*a*, 10*b* which diverge from a common point and progress outward away from the axis of the hinge pin 5, along arcs of circles struck from points disposed laterally of the hinge pin. The hinge plate 4 and bracket plate 7 are coupled together by a follower 9 here shown in the form of a headed pin secured in the bracket plate and travelling in the cam slot 10. The pin has a reduced part that extends through the slot 10 with annular shoulders at the outer sides of the plates 4 and 7 which serve to prevent disconnection between the follower and plate 4. The cam slot is plotted to first move the follower 9 from the point seen in Fig. 4 in a direction toward the hinge pin 5 (see Fig. 8) thereby swinging the bracket plate 7 and wall 6 upon the pivot 8 until the dotted line position of Fig. 8 is reached and subsequently to move the follower 9 away from the hinge pin to the position seen in Fig. 9, where the container has been lowered into horizontal position and the wall 6 has been moved back to its former upright position. The ends of the cam slot are approximately 90 degrees apart and equidistant from the hinge pin 5.

For structural reasons the base plate 25 is formed with a laterally offset part 25*a* (see Fig. 11) so as to lie contiguous the plate 4 and the plate 7 is offset as at 34 so as to lie contiguous with the plate 4, and the bottom wall 17 of the housing is formed with a recess 22 to receive the hinge plate 4 when the container occupies its upright position (see Figs. 4 and 5).

The operation of the hinge combination is as follows: when a tray 3 is swung into its open position from its upright closed position as seen in Fig. 4, the cam face of the branch 10*a* of the cam slot swings the follower 9 downwards thereby swinging the bracket plate 7 downwards upon its pivot pin 8 and therewith swinging the wall 6 forward toward the open front of the housing. This movement of the wall 6 continues until the follower reaches the point at which the branches 10, 10*b* meet and which is the dotted line position seen in Fig. 8. During the continued downward movement of the tray the cam face of the branch 10*b* of the cam slot swings the follower upward and therewith swings the wall back to its former upright position as seen in Fig. 9. Whenever the tray is swung back to its closed position, the cam face of the branch 10*b* of the cam slot swings the follower 9 and therewith the bracket 7 downwards thereby swinging the wall 6 forward towards the open front of the housing until the follower reaches the junction between the two branches of the cam slot and which is the dotted line position seen in Fig. 8 thereby bringing the wall 6 into parallel relation with the tray, after which the tray and wall move back into upright position.

From the above it is apparent that the wall 6 functions to prevent the contents of the tray from spilling out therefrom during the interval that the tray is approaching or receding from its upright position.

The invention outlined herein is of course susceptible to various changes and modifications, the details here shown being merely for disclosure and not in limitation. The text herein is limited in description. The accompanying drawings reveal only fundamentals. The right is therefore reserved to make such adaptations, developments and expansion as properly fall within the scope and purpose of the invention as defined in the appended claims.

I claim:

1. A device for hingedly securing two cooperating parts together and to a support, consisting of a base member constructed for securement to the support, said parts each independently pivotally secured to said base member, one part being provided with a cam slot and the other with a pin movable in the said slot and operative to move the pin carrying part in one direction, upon initial movement of the other part, and thence return the same, upon continued movement of said last mentioned other part.

2. In a device of the kind described and in combination, a support, a tray, and a cover therefor, and means for mounting the tray and cover on said support comprising a hinge device consisting of a base member secured to said support, a hinge member fixedly secured to said tray and pivotally secured to said base member, said hinge member having a cam face slot composed of two confluent diverging branches, a second hinge member fixedly secured to said cover and independently pivotally secured to said base member at a point spaced from the pivotal connection of the first hinge member to the base member, the free end of said second hinge member being provided with a pin movably engaging the first hinge member through said cam slot, said slot and pin connection being operative to move the cover in one direction with the tray upon initial movement of the tray in opening or closing and thereafter to retract it upon continued further movement of the tray.

3. In a device of the kind described and in combination, a housing formed with end walls and an open side, an open tray arranged at said open side with the open side of the tray faced inwardly, a cover for the open side of said tray arranged within the housing, a hinge member fixed to said tray and pivotally secured to the housing at the inner face of an end wall thereof, a hinge member fixed to the cover and pivotally secured to said inner face of the housing end wall, one of said hinge members being provided with a cam slot having two confluent oppositely directed branches, and the other with a part cooperating therewith, the said cam lot and cooperating part operative upon movement of the tray outwardly to positively move the cover with the tray to cover the same when the tray is initially moved outwardly of the housing and thence to positively retract the same into the housing upon continued movement of the tray outwardly.

4. A hinge device for securing a tray and cover therefor to an open sided housing, consisting of a supporting member constructed for fixed attachment to the housing, a hinge member for

the tray arranged to be fixedly secured thereto and pivotally secured to said supporting member, a hinge member for the cover arranged to be fixedly secured thereto and pivotally secured to the said supporting member, the hinge for the tray member being provided with a cam slot having two confluent oppositely directed branches, and the cover hinge member provided with a cooperating cam engaging member, said cam slot and the engaging member being operative to initially and positively move the cover hinge member outwardly about its pivotal support to bring the cover in overlying relation with the tray and maintain it in such relation upon initial pivotal outward movement of the tray hinge member, and thence upon further movement of the tray hinge member to retract the cover hinge member to return the same with the cover carried thereby to the interior of the housing.

5. A cam hinge combination comprising a stationary base member, a hinge member pivotally connected thereto, said hinge member having a cam slot therein composed of two oppositely directed arcuate sections, and a second hinge member pivotally connected to said base member and having a follower for travelling in said cam slot.

6. In combination with a stationary wall and two swingable walls, a cam hinge combination comprising a base member secured to the stationary wall, a hinge member secured to one of the swingable walls and pivotally connected to said base member, said hinge member having a cam slot therein composed of two confluent branches that diverge from each other, and a second hinge member secured to the other swingable wall and having a follower for travelling in said cam slot.

7. In combination with a stationary wall and two swingable walls, a cam hinge combination comprising a base member secured to the stationary wall, a hinge member secured to one of the swingable walls and pivotally connected to said base member, said hinge member having a cam slot therein composed of two confluent curved branches that diverge from each other, and a second hinge member secured to the other swingable wall and having a follower for travelling in said cam slot.

8. A device of the kind described comprising a housing having an open side, a tray movable into and out of the open side of the housing; a cover for the tray, in combination with means for movably mounting the tray and cover on the housing consisting of cooperating hinge members, one secured to the tray and one to the cover, and a supporting plate, the latter being secured to the housing and providing means for securing the hinge members to the housing, said hinge members being pivotally secured to said plate at spaced points and pivotally secured together by a pin and cam slot connection, the cam slot having two confluent oppositely directed arcuate branches operative to move the cover about its pivotal connection with the plate, with the tray upon initial outward movement thereof about its point of pivotal connection with said plate, and thereafter upon continued further outward movement of the tray to retract the cover within the housing.

9. In a device of the class described, a tray, a cover therefor, an open sided housing, and a hinge device consisting of a supporting member attached to the housing, a hinge member for the tray fixedly secured thereto, and pivotally secured to said supporting member, a hinge member for the cover fixedly secured thereto and pivotally secured to said supporting member, the hinge member for the tray being provided with a cam slot having confluent diverging branches, and the hinge member for the cover being provided with a cooperating cam engaging member, said cam slot and its cam engaging member being operative to initially move the cover hinge member about its pivotal support upon initial pivotal outward movement of the tray hinge member, and thence upon further outward movement of the tray hinge member to retract the cover hinge member.

10. In a device of the kind described, a housing formed with end walls and an open side, an open tray arranged at said open side with the open side of the tray faced inwardly, a hinge member therefor fixed to said tray and pivotally attached to the housing at the inner face of one end wall thereof, a cover for the open side of said tray arranged within the housing, a hinge member fixed to the cover and pivotally attached to said inner face of the housing end wall, one of said hinge members being provided with a cam slot having confluent oppositely directed branches and the other with a part cooperating therewith, the said cam slot and part operative to move the cover toward the tray in covering relation with the same when the tray is initially swung inwardly and thence to move with the tray within the housing upon continued movement of the tray inwardly.

11. In a device of the class described, a housing, an article holding cover swingably supported adjacent an opening of said housing, an auxiliary cover to prevent articles from dropping out of said article holding cover during the swinging of the latter out of said housing into open position, in combination with a cam hinge comprising a pair of brackets pivotally supported at spaced fixed points on one wall of said housing, one of said brackets being connected with said article holding cover and the other bracket being connected with said auxiliary cover, and cooperating cam means connecting said brackets to guide one of them during the individual movements of both brackets in their rotation about said spaced fixed points, whereby when said article holding cover is swung outwardly of said housing said auxiliary cover initially substantially follows the movement of said article holding cover, and thereafter moves oppositely to said article holding cover to expose said articles.

12. In a device of the class described, a housing, an article holding cover swingably supported adjacent an opening of said housing, an auxiliary cover to prevent the articles from dropping out of said article holding cover during the swinging of the latter out of said housing into open position, in combination with a cam hinge comprising a pair of brackets pivotally supported at spaced fixed points on one wall of said housing, one of said brackets being connected with said auxiliary cover and one connected with said article holding cover, cooperating means connecting said brackets to guide one of them during individual movements of both brackets in their rotation about said spaced fixed points comprising a cam guideway carried by one of said brackets and a follower operating in said guideway connected with the other of said brackets whereby when said article holding cover is swung outwardly of said housing, said auxiliary cover substantially follows the movement of said article holding cover, thereafter moving oppositely to said article holding cover to expose said articles.

13. In a device of the class described, a housing, cooperating tray and cover units adapted to provide a swingable article carrying container movable into and out of said housing, in combination with a first bracket connected with one of said units, a second bracket connected with the other of said units, means on said housing for pivotally supporting each bracket independently of the other, and coacting cam means connecting said brackets, whereby one bracket controls the movements of the other and of said cover unit as the tray unit is moved out of said housing whereby both tray and cover units initially swing outwardly from a normal nested relation within said housing into an intermediate position, said cover unit thereafter swinging in the reverse direction to uncover the tray articles.

14. In a device of the class described, a housing, a tray and a cover together adapted to provide a swingable article carrying container with the tray thereof movable from vertical position within the housing into a horizontal position adjacent said housing, in combination with a bracket connected with said tray, a bracket connected with said cover, means carried by said housing to pivotally support said brackets at spaced fixed points, and cam means connecting said brackets for guiding the movements of one bracket and cover as said tray is swung out of said housing from vertical to horizontal position, whereby both tray and cover initially swing substantially together with the cover following the tray to hold the articles therein until said tray assumes an intermediate position, the movement of said cover thereafter being reversed to uncover said tray and to resume its initial vertical position as said tray moves into horizontal position.

15. The combination of a base member and at least two hinge members pivotally connected thereto, one of said hinge members having a cam course composed of at least two sections extending from a common origin, and another of said hinge members having a follower for traveling along said cam course.

16. The combination of a base member, a hinge member pivotally connected thereto, said hinge member having a cam course therein composed of two confluent arcuate sections diverging from a common origin, and a second hinge member pivotally connected to said base member and having a follower for traveling along said cam course.

SAMUEL JOHN STANTON.