Jan. 24, 1961 W. MACK 2,969,142

IRIS TYPE CLOSURE FOR LIPSTICK HOLDERS AND OTHER CONTAINERS

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FIG. 1.

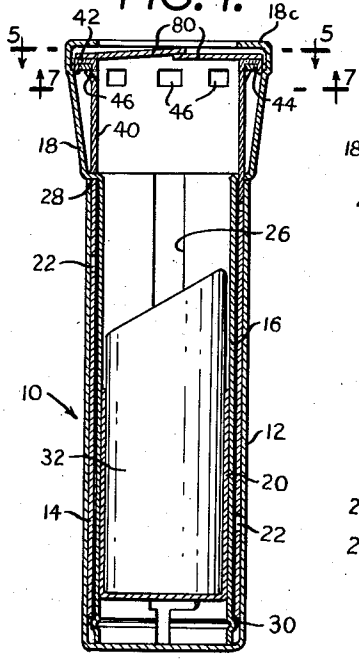


FIG. 2.

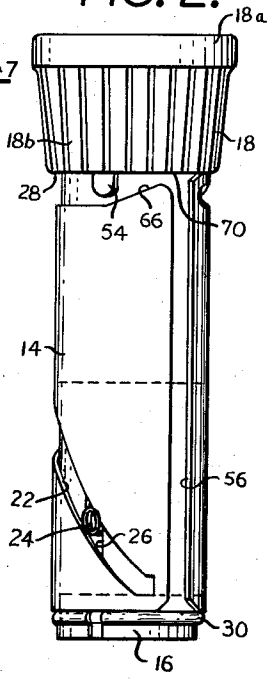


FIG. 3.

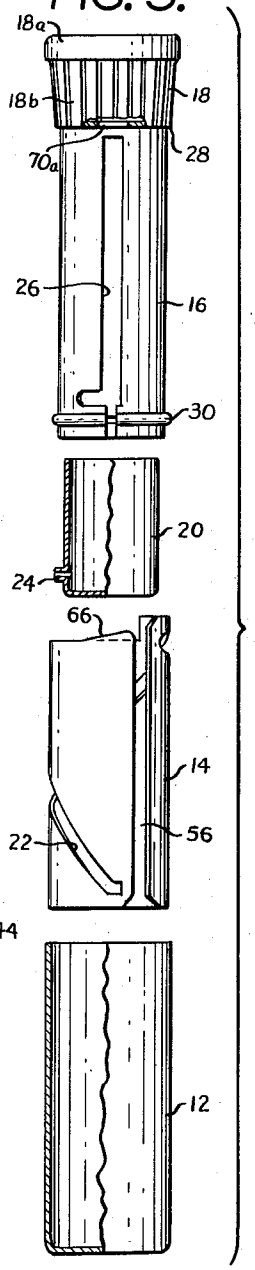


FIG. 4.

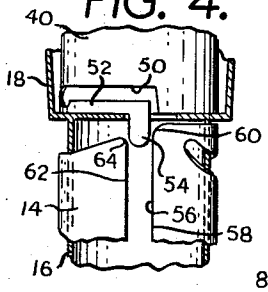
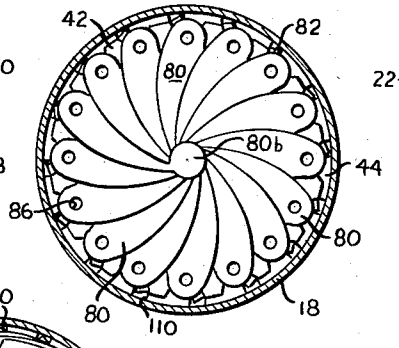


FIG. 5.



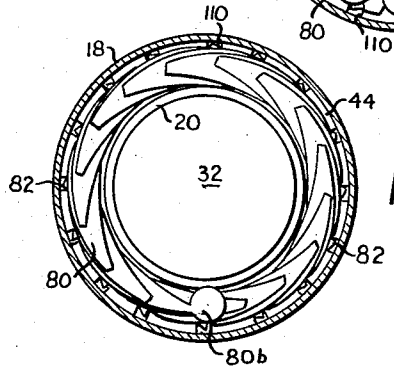


FIG. 6.

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FIG. 8.

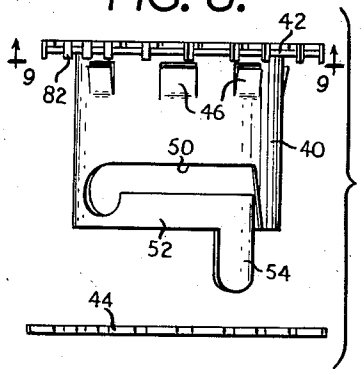


FIG. 7.

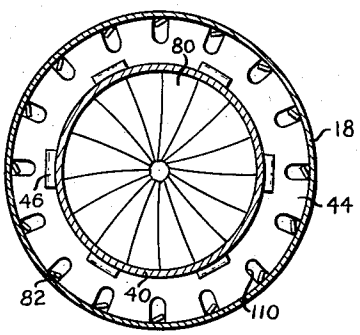


FIG. 9.

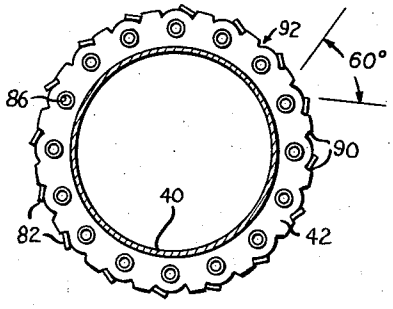


FIG. 10.

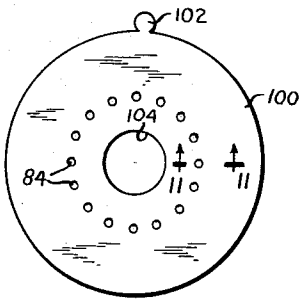


FIG. 11.

FIG. 12.

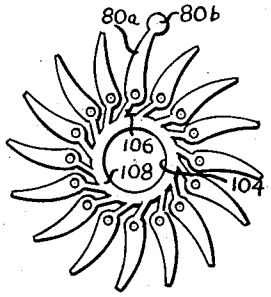
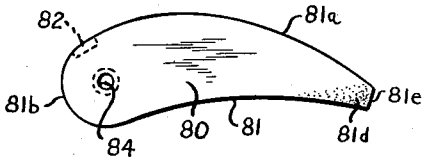


FIG. 13.



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United States Patent Office

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IRIS TYPE CLOSURE FOR LIPSTICK HOLDERS AND OTHER CONTAINERS

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7 Claims. (Cl. 206—56)

This invention relates to an iris type closure for lipstick holders and other containers.

The invention has wide application and may be used in connection with lipstick cases and other stick holding and dispensing cases such as for underarm deodorants, skin lotions, pomade, shoe polish, marking crayons, industrial belt dressings and various other products which are made or may be made in stick form. The invention may also be applied to bottles and jars such as are used for pills, tablets, capsules and also dry bulk formulations. In addition to the foregoing, the invention has application to other types of containers such as pancake make-up compacts, rouge compacts and the like.

Despite the wide application of this invention to containers of many kinds in various fields and industries, the present specification will deal solely with a lipstick holder. But this will be understood to be purely illustrative of the invention and not limitative thereof either as to structure, mechanism and function or as to scope of application.

The iris type closure herein described and claimed is, of course, provided with actuating means. But when the invention is applied to a lipstick holder, the iris actuating means is also connected to a lipstick (mass) elevating mechanism. Stated differently, a single actuating means operates both the iris closure and the elevating mechanism. In a preferred embodiment of this invention, the actuating means includes a ring (or annular bead) which is manually rotated relative to the outer case in order to actuate both mechanisms. Starting with the device in closed position, the ring may be turned approximately ten degrees relative to the outer case in order to open the iris. Further angular movement of the ring will elevate the lipstick to exposed operative position. To close the device, the ring is turned in the opposite direction, causing the lipstick elevator to descend, and in the final ten degress or so of angular movement of said ring relative to the outer case the iris will close.

An important object of this invention is the provision of an iris type closure of the general character described having an actuating means which is adapted to fully open or fully close the iris on angular movement of only approximately ten degrees. The range of angular movement of the actuating means will, of course, vary with individual applications of the invention from a low of below ten degress to a high of considerably more than ten degrees, say fifteen or twenty degrees or, when desired, even beyond.

Another important object of this invention is the provision of an iris type closure of the character described wherein the individual leaves of the iris are individually pivotally mounted on pivotal axes which are arranged on a common circular line in uniformly spaced relationship to each other, the center point of the iris being the center of said circle.

Still another important object of this invention is the provision of an iris type closure as described and claimed, wherein the individual leaves which comprise the iris are relatively narrow in width so that they may be stored, when the iris is opened to its widest, in a relatively shallow annular receptacle. The over-all dimensions of the iris closure may thereby be confined to relatively small proportions, while the aperture itself which the open iris defines is relatively large.

Another important object of the invention is the provision of an iris type closure of the character described and claimed wherein the individual leaves are symmetrically formed and arranged and provided with gently curved lead edges. The leaves are maintained in partly overlapping relationship at all times, irrespective of their relative positions at various stages of their opening and closing movements, and the curved lead edges assist in maintaining the leaves in such overlapping relationship. The fact that the leaves are symmetrical in shape and symmetrically arranged, coupled with the fact, as above indicated, that they are relatively narrow in width and individually pivotally mounted on a common circular line in equally spaced relationship, provides many advantages, including a relatively small build-up of thickness when overlapping of the leaves is most marked. This is to be contrasted with many conventional types of iris closures in which the leaves are asymmetrically formed and arranged and mounted only on a single pivot. In such case the build-up of thickness of the several leaves is highly disadvantageous, and closure difficulties are presented between the leaves and the casing in which they are mounted.

A further object of this invention is the provision of an iris type closure in which the leaves of the iris are positively actuated both to open and closed position, and they are at all times positively controlled both when in motion and when stationary by the actuating means. Consequently, the relationship among the several leaves is also completely under control at all times. This should be contrasted with various shutter-type closures which depend on friction to maintain the shutter segments in proper relationship.

Still a further object of the invention is the provision of an iris type closure in which the leaves do not extend to the center of the diaphragm, leaving a small aperture at the center even when in closed position. Complete closure takes place by reason of the use of a small extension piece on one of the leaves which covers said aperture when the leaves are in closed position. A build-up of thickness at the center of the diaphragm is thereby avoided, and this highly desirable condition should be opposed to that obtaining in other types of iris diaphragms in which the leaves overlap at the center to close the aperture. In the latter situation the leaves tend to intersect and jam at the center of the diaphragm, and even when jamming is avoided the build-up of laminations at the center causes an increasingly stiffer action.

Moreover, the use of an extension piece to cover the central aperture in the present design provides for a relatively tight seal.

Still another important object of the invention is the provision of an iris type closure which may be combined with a conventional elevator mechanism as used in many lipstick holders to produce a one-hand operated lipstick case in which the closure is an integral part of the case requiring no removal therefrom. The use of a conventional elevator mechanism is highly advantageous for many reasons, including the saving in tooling costs which

a new type of elevator mechanism, specific to the present iris closure, would require. Conventional lipstick holders are provided with separate removable caps, and two hands are required to remove such caps from the containers. This is a disadvantage, especially when coupled with the fact that the removed caps must be placed to the side or otherwise held apart while the lipstick is applied. Efforts have heretofore been made to devise a one-hand operated lipstick case and to some extent these efforts have succeeded. Reference is here made to Patent No. 2,026,868 and Patent No. 2,794,547 as illustrations of such prior efforts. But for one reason or another these one-hand operated devices of the prior art have not proved wholly satisfactory. Not the least of the disadvantages inherent in said prior art devices were their excessive over-all cross-sectional dimensions as compared with the conventional cross-sectional dimensions of the lipstick which they contained. The disproportionate size of the lipstick case necessitates holding the lipstick at an unnatural angle when applying it to the lips, in order to prevent contact between the case and the lips. To avoid this difficulty, many users project the lipstick a substantial distance beyond the case, but this results in frequent breakage of the lipstick.

There are other advantages in the present device which will become apparent from a reading of the specification, and they need not therefore be set forth herein in detail.

The invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a vertical section through a lipstick holder made in accordance with a preferred form of this invention, showing said lipstick holder in closed position with its mass in retracted position.

Fig. 2 is a side view of said lipstick holder with its outer case removed to expose its inner mechanism.

Fig. 3 is an exploded view showing the several components of the lipstick holder illustrated in Fig. 1.

Fig. 4 is a fragmentary view showing the relationship between the iris-actuating sleeve and the elevator-actuating cam sleeve.

Fig. 5 is a transverse section on the line 5—5 of Fig. 1 showing a top view of the iris diaphragm, viewed in closed position.

Fig. 6 is a view similar to that of Fig. 5, but showing the iris diaphragm in open position.

Fig. 7 is a sectional view on the line 7—7 of Fig. 1.

Fig. 8 is an exploded view showing the iris-actuating sleeve and the notched ring which cooperates therewith.

Fig. 9 is a sectional view on the line 9—9 of Fig. 8.

Fig. 10 is a plan view of a blank from which the iris leaves are made.

Fig. 11 is an enlarged fragmentary section on the line 11—11 of Fig. 10, showing an extruded tubular element on the blank of Fig. 10, said element being adapted to serve as a pivot means for one of the iris leaves.

Fig. 12 is a view of the blank of Fig. 10, following a stamping operation in which the individual iris leaves are formed, together with their actuating tabs.

Fig. 13 is an enlarged plan view of one of the iris leaves.

Lipstick holder **10** shown in Fig. 1 is provided, basically, with a conventional elevator mechanism and with an iris closure of the character herein claimed operating in conjunction therewith. Lipstick holder **10** is provided with an outer casing **12** which is generally cylindrical in shape and closed at the bottom and open at the top. A cam sleeve **14** is press-fitted into the outer casing **12**. This cam sleeve is a substantially conventional member which is part of the lipstick elevating mechanism. Rotatably disposed within said cam sleeve in an elevator-actuating inner sleeve **16**. The main body of said elevator-actuating sleeve is disposed within said cam sleeve, but the upper end **18** of said elevator-actuating sleeve projects outwardly both from the cam sleeve **14** and the outer casing **12**, so as to be accessible for digital actuation. Elevator **20** is slidably disposed within the elevator-actuating sleeve **16** for vertical movement relative thereto, and for spiral movement relative to the cam sleeve **14**.

It will be observed that cam sleeve **14** is a longitudinally split sleeve, and it possesses sufficient spring tension by reason of its split construction to frictionally engage the inner wall of outer casing **12** and thereby to prevent relative movement between said split sleeve and said outer casing under conditions of normal use. A helical cam slot **22** is formed in said split sleeve to receive cam follower **24** on elevator **20**. A longitudinally extending straight slot **26** is formed in elevator-actuating sleeve **16**, also to accommodate the cam follower **24**.

In the operation of the device as thus far described, outer casing **12** is held in the hand and exposed end portion **18** of the elevator-actuating sleeve **16** is turned by the fingers of the same hand. Longitudinal movement of said actuating sleeve **16** relative to outer casing **12** is prevented by annular shoulder **28**, which abuts the upper end of said outer casing, and annular bead **30**, which abuts the lower end of cam sleeve **14**. Since cam follower **24** is held captive within longitudinal slot **26**, it engages in angular movement integrally with actuating sleeve **16**. Since said cam follower **24** is also held captive within helical cam slot **22**, such angular movement of the cam follower causes it also to engage in vertical movement along longitudinal slot **26**. This causes the elevator **20**, together with the mass **32** which it contains, to move upwardly within the casing until the mass is exposed for use. Thus far the construction and method of operation are substantially conventional.

The iris closure mechanism will now be considered. This mechanism is confined, mainly, within the exposed upper end **18** of the elevator-actuating sleeve **16**. It will now be noted that said upper end **18** has an upper annular bead portion **18***a* and a lower portion of generally truncated cone shape **18***b*, the latter being longitudinally fluted or scored or the like and the former being knurled or similarly characterized with non-slip configurations. The combination of said knurled bead **18***a* and said fluted conical portion **18***b* will hereinafter be designated the actuating ferrule by which actuating sleeve **16** may be digitally rotated.

The annular shoulder **28** which abuts the upper end of the outer casing **12** also serves as a retaining shoulder for the iris-actuating mechanism and particularly the iris-actuating sleeve **40**. The upper end of iris-actuating sleeve **40** is bent radially outwardly to form an annular flange **42**. A notched ring **44** is provided below said annular flange **42** for a purpose which will shortly be explained. This notched ring may be press-fitted into bead portion **18***a* of the ferrule **18**. Preferably the ring would assume a slightly arched shape and its notched outer peripheral edge would engage the inner wall of bead **18***a* under spring tension. Embossments **46** may be formed on iris-actuating sleeve **40** immediately below said notched ring **44** in order to hold said ring captive between said embossments on the one hand and annular flange **42** on the other. Since the notched ring is held securely within bead **18***a*, this arrangement prevents longitudinal movement of the iris-actuating sleeve relative to the ferrule. Cooperating with this retaining aspect of the notched ring is the shoulder **28** at the bottom of the ferrule and an inwardly extending annular flange **18***c* at the top of the ferrule. The entire iris-actuating sleeve assembly is thereby held captive between said annular shoulder **28** and said annular flange **18***c*.

The coaction between the iris-actuating sleeve **40** and the cam sleeve **14** will now be described. It will be observed that a bayonet slot **50** is formed in iris-actuating sleeve **40**, resulting in the formation of an arm **52** which has a detent **54** depending from its free end. Arm **52** with its detent **54** comprises a form of leaf spring capable of flexing vertically as viewed in Fig. 8, that is, longi-

tudinally of the iris-actuating sleeve 40. It will further be observed that cam sleeve 14 is adapted to receive detent 54 in its longitudinal slit 56. This will be apparent in Fig. 4. Edge 58 of cam sleeve 14 disposed on the right side of slit 56 extends upwardly to form a shoulder 60 to the right of detent 54. The opposite edge 62 of cam sleeve 14 formed along the left side of slit 56 projects upwardly to form a rounded shoulder 64 disposed on the left side of detent 54 as viewed in Fig. 4. Shoulder 64 is lower than shoulder 60, but still it projects above the lower end of said detent 54. An inclined edge 66 is formed to the left of shoulder 64 leading upwardly to it for a purpose shortly to be described.

It will now be understood that a transverse slit 70 is formed in annular shoulder 28 of the elevator-actuating sleeve 16. It is through this slit that detent 54 projects when the iris-actuating sleeve 40 is disposed within ferrule 18. As has above been described, in the operation of this device casing 12 is held in one hand and ferrule 18 is turned relative to said casing by the fingers of the same hand. Since iris-actuating sleeve 40 is disposed within the ferrule, this angular movement of the ferrule would be expected to produce a corresponding angular movement of the iris-actuating sleeve simply by reason of the frictional drag between them. However, detent 54 will abut shoulder 64 (it is assumed that the direction of movement of the detent would be leftward as viewed in Fig. 4 but for the presence of shoulder 64), and consequently the iris-actuating sleeve 40 will remain in a stationary position despite the angular movement of the ferrule. As the ferrule continues to engage in angular movement, the right-hand edge 70*a* of slit 70 will engage the detent and force it to move leftwardly with said sleeve 40. This is possible because spring arm 52 will flex to enable detent 54 to ride over shoulder 64. The detent now is enable to move down the inclined edge 66, and it moves integrally with the iris-actuating sleeve from which it depends and said sleeve moves integrally with the ferrule. When the direction of angular movement of the ferrule is reversed, sleeve 60 will move along with it by reason of the frictional drag above mentioned. Eventually the detent 54 will reach inclined edge 66 and the spring arm 52 will yield to permit the detent to ride up on said incline and over shoulder 64. Further movement of the detent in the same direction will be prevented by shoulder 60, and that will terminate the angular movement of said detent and said sleeve 40, but further movement of ferrule 18 in the last mentioned direction will cause the iris to close, as will shortly appear.

It is this relative movement between iris-actuating sleeve 40 and ferrule 18 that causes operation of the iris diaphragm hereinafter described. Relative movement of said sleeve 40 in one direction will open the iris, and relative movement in the opposite direction will close the iris. The range of such relative movement in the preferred form of this invention is approximately ten degrees. Thus it is that the initial ten degrees of movement of the ferrule relative to casing 12 will open the iris, and further angular movement will elevate the mass and project it through the iris. Conversely, reverse angular movement of the ferrule relative to the outer case will retract the mass, and only in the final ten degrees of such relative movement will the iris close.

Turning now specifically to the iris diaphragm, it will be seen, particularly in Figs. 5, 6 and 13, that it comprises a plurality of leaves 80 which are all identical in size and shape except for one leaf 80*a* which differs to the extent of having a disc-shaped extension piece 80*b* formed at its free end, a plurality of actuating lugs 82 formed on said leaves, one such lug for each leaf, a supporting ring for said leaves which may simply be flange 42 of iris-actuating sleeve 40, means for actuating said lugs 82, said means being the notched ring 44 in the preferred form of this invention, and pivotal connecting means individually pivotally connecting leaves 80 (and leaf 80*a*) to flange 42. In the preferred form of this invention tubular extrusions 84 are formed on the iris leaves 80, and these tubular extrusions project through corresponding holes 86 formed in flange 42. The tubular projections 84 are peened over to lock them in place in said holes 86 while permitting angular movement of said tubular projections within said holes.

In the operation of this device it will be recalled that ferrule 18 is turned relative to the outer casing 12. Notched ring 44 is fixed to the ferrule and rotates with it. It will further be recalled that limited relative movement takes place between the ferrule and the iris-actuating sleeve 40. Lugs 82 of the several iris leaves project into the notches of the notched ring 44. Since the notched ring moves integrally with the ferrule, limited relative movement takes place between sleeve 40 and said notched ring. It is this latter relative movement which causes the notched ring to move lugs 82 relative to the iris-actuating sleeve 40, and this in turn causes the leaves to pivot about their respective pivotal axes. Pivoting in one direction brings them to closed position as shown in Fig. 5 and pivoting in the opposite direction brings them to open position as shown in Fig. 6.

It has above been noted that the relative movement between the ferrule and the iris-actuating sleeve 40 is only approximately ten degrees in each direction. It will now be understood that the range of pivotal movement of the individual iris leaves is approximately sixty degrees in the preferred form of this invention. Oppositely disposed edges 90 formed in the notches 92 which are formed along the peripheral outer edge of flange 42 serve as stops relative to lugs 82 on the iris leaves. As indicated in Fig. 9, the range of movement of these lugs in notches 92 is approximately sixty degrees.

Referring now to the individual leaves 80, particularly as shown in Fig. 13, it will be seen that they are relatively long and narrow with a slightly concave inner edge 81, and a convex outer edge 81*a*, the two edges tending to converge toward the right and being joined at the left by means of a generally semi-circular line 81*b*. At the opposite end, where said concave and convex edges tend to converge, they are joined by a relatively short transverse edge 81*c*. Tubular extrusion 84 is disposed centrally relative to semi-circular edge 81*b*. Reference to Fig. 7 will disclose the reason for the truncated end which edge 81*c* defines. When the several leaves are in closed position, their truncated or fore-shortened ends fall short of the center of the iris, and a small circular aperture is thereby formed in the closed iris. As has above been explained, the reason for this is to avoid building up the center of the iris in multilaminar fashion. The disc-shaped extension piece 80*b* on leaf 80*a* covers said aperture and completes the closing of the iris.

Reference to Fig. 6 will disclose the fact that when the iris is in open position the several leaves overlap each other to a considerable extent, and they are arranged on a circular line equidistant at all points from the center of the iris. The outer convex edges 81*a* of the leaves define the outer periphery of said circular arrangement, and the inner concave edges 81 define the inner periphery thereof. To facilitate relative movement among the several leaves into more extensive or less extensive overlapping relationship, the truncated ends of the several leaves, particularly along their concave edges 81, are curved out of the planes of the main body of said leaves to form curved lead portions 81*d*.

The manufacture of the iris assembly is a relatively simple matter which readily lends itself to mass production automatic handling procedures. For example, Fig. 10 shows a blank 100 which has been stamped out of a larger strip or sheet of suitable material such as sheet brass. Blank 100 is basically a disc with a small generally disc-shaped appendage 102 which eventually becomes extension piece 80*b* shown in Fig. 12. A central hole 104 is formed in blank 100 and in a circular line

concentric therewith are formed the tubular extrusions **84**. The individual leaves **80** (and **80***a*) are then stamped out of blank **100**, as shown in Fig. 12, and narrow neck portions **106** are left between the individual leaves and a ring-shaped portion **108** which is the only other portion of the blank remaining. The leaf assembly shown in Fig. 12 may be handled as a unit and positioned on flange **42** of iris-actuating sleeve **40**, extrusions **84** registering with and projecting through holes **86** in said flange. It is at this point or subsequently that extrusions **84** may be peened over to attach the leaves to said flange **42**. Narrow neck portions or stems **106** may now be severed from ring **108**, and they may then be bent laterally (downwardly) to form lugs **82** above mentioned. These lugs will enter notches **92** in flange **42** and registering notches **110** in the notched ring **44**. The leaves and their respective lugs are now completely assembled with annular flange **42** of iris-actuating sleeve **40** and notched ring **44**. In this connection it will be recalled that sleeve **40** is provided with a plurality of embossments **46**. In a subassembly preparatory to assembling the entire device herein described and claimed, notched ring **44** would be snapped over embossments **46** and between said embossments and annular flange **42**. This would hold said notched ring and sleeve **40** together and, when the leaves are also applied as above described, the entire iris assembly will be complete. The sequence of the several steps, of blanking, punching, forming, severing, peening and assembling, may be varied and arranged in accordance with individual practices, and no specific sequence is critical in the procedure herein described.

I claim:

1. A holder for lipstick and the like, said holder being provided with an outer casing, an elevator within said casing and movable longitudinally of said casing, said elevator being adapted to carry a mass, a sleeve carried by said casing and projecting outwardly therefrom, said sleeve being angularly movable relative to said casing but being fixed against longitudinal movement relative to said casing, an elevating mechanism operatively connected between said sleeve and said elevator whereby angular movement of the sleeve in one direction relative to the casing causes the elevator to rise in order to expose the mass for use and whereby relative angular movement in the opposite direction causes the elevator to retract in order to store the mass, and a diaphragm closure mounted at the outer end of said sleeve, said diaphragm closure comprising a plurality of iris leaves, separate pivot means for each leaf, means for simultaneously actuating said pivoting means for pivoting said leaves between open and closed positions thereof, means operatively connecting said pivot actuating means and said elevating mechanism for conjoint operation, said connecting means including means for pivoting said leaves to their fully open position before the said elevating mechanism becomes operative to raise said elevator and for retracting said elevator to a depressed position within said casing before said pivot actuating means becomes operative to pivot said leaves to their closed position, whereby angular movement of the sleeve relative to the casing causes the sequential operation of said pivot actuating means and said elevating mechanism relative to each other.

2. A holder for lipstick and the like in accordance with claim 1, wherein the iris leaves are supported on an annular ring, each leaf having an individual pivotal connection with said supporting ring, a sleeve connected to said supporting ring and provided with connecting means by which it is connected to said elevating mechanism, a second ring mounted in said first sleeve and fixed thereto against relative movement, said second ring being provided with actuating means connecting it to said iris leaves to cause pivotal movement of said iris leaves when relative angular movement between the two rings takes place.

3. A lipstick holder as in claim 1 and further including a supporting ring for said iris leaves within said sleeve, means for pivotally and independently mounting each of said iris leaves on said supporting ring, an actuating ring concentric with said supporting ring and arranged for conjoint angular movement with said sleeve, pivoting means on each iris leaf, and means on said actuating ring engageable with the pivoting means of each iris leaf for simultaneously pivoting said iris leaves relative to said supporting ring upon relative angular movement of said rings.

4. A lipstick holder as in claim 3 and further including means for restraining said supporting ring against angular movement relative to said sleeve for a portion of the total angular movement of said sleeve in either direction, and means for rendering said restraining means inoperative for the remainder of the total angular movement of said sleeve in either direction.

5. A lipstick holder comprising a casing, means movable within said casing for carrying a lipstick between raised and lowered positions relative to said casing, sleeve means rotatably mounted on said casing for angular movement to actuate said carrying means, an iris diaphragm closure for the open end of said casing, said closure comprising iris leaf supporting means, a plurality of iris leaves independently and pivotally mounted on said supporting means, leaf pivoting means concentrically and rotatably related to said supporting means, each leaf including means engageable by said leaf pivoting means for pivoting said leaves simultaneously upon relative rotation of said pivoting means and said supporting means, means for fixing said leaf pivoting means to said sleeve means for conjoint rotation, means for fixing said leaf supporting means against rotation relative to said sleeve means for a portion of the angular movement thereof to provide for relative rotation between said supporting means and said leaf pivoting means, and means for locking said leaf supporting means to said sleeve means for the remainder of the angular movement thereof to provide for conjoint movement of said supporting means and said leaf pivoting means during the remainder of the angular movement of said sleeve means.

6. Dispensing means as in claim 5 wherein each iris leaf comprises an outer convex edge and an inner concave edge, the concave edge portions of each leaf being curved downwardly out of the plane of the leaf whereby in the closed position of said leaves wherein said leaves are in overlapping relation, the concave edge of each leaf will be biased into engagement with the upper surface of the underlying leaf.

7. An iris diaphragm comprising a supporting ring, a plurality of iris leaves pivotally mounted on said supporting means, each leaf having its own individual pivotal connection with said supporting ring for pivotal movement relative to said supporting ring and relative to the other leaves, each leaf having an actuating lug projecting laterally therefrom in a generally parallel relation to the pivotal axis thereof, and an actuating ring mounted adjacent said supporting ring concentrically therewith for angular movement relative thereto, said actuating ring being provided with a plurality of lug-engaging elements which engage said actuating lugs, said supporting ring being peripherally notched to receive said actuating lugs and to provide stop means for limiting the angular movement of said actuating lugs and the leaves associated therewith, whereby relative angular movement between said rings causes pivotal movement of the actuating lugs and the leaves associated therewith relative to said supporting ring, such angular movement in one direction causing said leaves to pivot into a closed position while movement in the opposite direction causing said leaves to pivot into an open position.

(References on following page)

References Cited in the file of this patent

UNITED STATES PATENTS

761,756	Brueck	June 7, 1904
1,448,589	Ferguson	Mar. 13, 1923
2,026,868	Cornell	Jan. 7, 1936
2,172,452	Rese	Sept. 12, 1939
2,409,966	Voity	Oct. 22, 1946
2,439,330	Zander	Apr. 6, 1948
2,553,622	Zander	May 22, 1951
2,602,988	Klym	July 15, 1952
2,617,522	Coe	Nov. 11, 1952
2,695,547	Zander	Nov. 30, 1954

FOREIGN PATENTS

4,887	Great Britain	1894