United States Patent

[11] 3,586,394

[72] Inventor **Charles W. Hecksel**
Spring Lake, Mich.

[21] Appl. No. **849,981**
[22] Filed **Aug. 14, 1969**
[45] Patented **June 22, 1971**
[73] Assignee **Kent Products, Inc.**
Grand Haven, Mich.

[54] **FLEXIBLE PLASTIC DRAWER-TYPE RECEPTACLE GUIDE**
16 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **308/3.6,** 312/246
[51] **Int. Cl.** **F16c 29/00**
[50] **Field of Search** ..... 308/3.8, 3.6; 232/43.2, 43.5; 206/19.5; 312/312, 330, 349, 350, 332, 348, 307, 341 NR, 245, 246, 247, 248, 343

[56] **References Cited**

UNITED STATES PATENTS

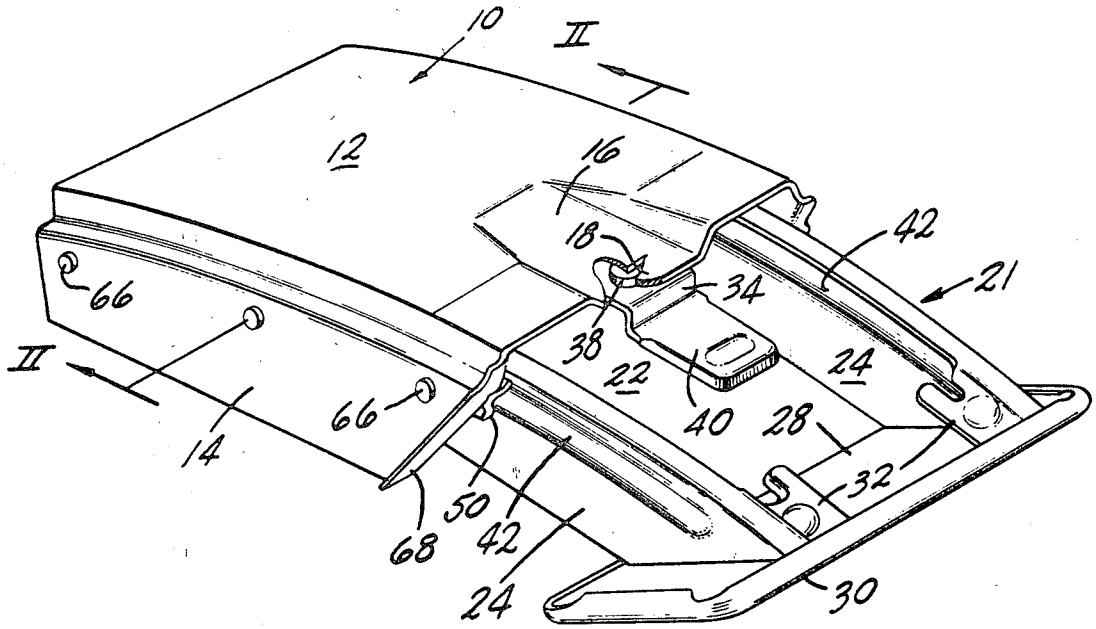
2,294,749	9/1942	Harbison	312/348
3,321,253	5/1967	Everburg	308/3.6

FOREIGN PATENTS

475,946	8/1951	Canada	308/3.6

Primary Examiner—Martin P. Schwadron
Assistant Examiner—R. H. Lazarus
Attorney—Beaman and Beaman

ABSTRACT: A glide arrangement for supporting drawer-type receptacles and the like wherein the drawer being supported is interposed between supporting members and the guide elements. The glide arrangement includes a longitudinal protuberance extending in the direction of relative movement between the drawer and its supporting member which cooperates with a generally U or channel-shaped guide element having a base region and spaced, parallel leg extension portions extending therefrom engaging the protuberance adjacent its base surface regions. The leg extensions are firmly flexible, having end regions arcuately disposed and depending away from each other and so engage the protuberance base regions as to firmly support the drawer against displacement transverse to the longitudinal length of the protuberances and guide elements under normal conditions, yet permitting such transverse displacement under predetermined conditions.



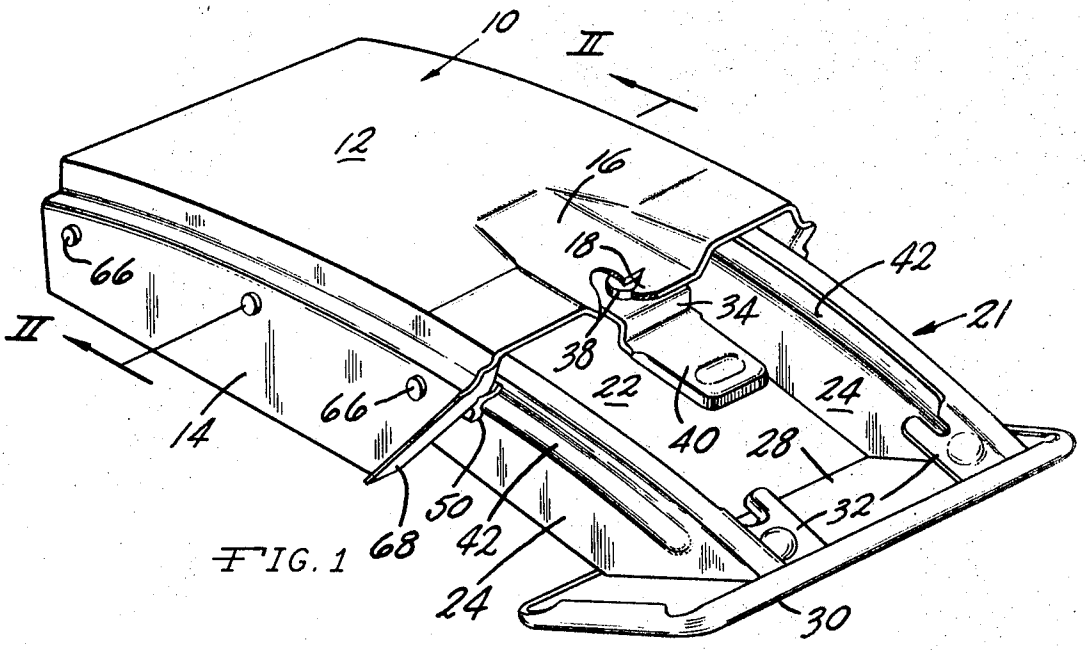


FIG. 1

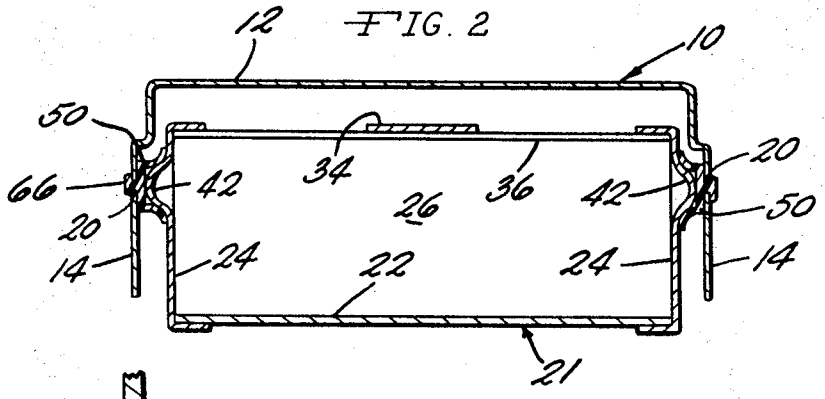


FIG. 2

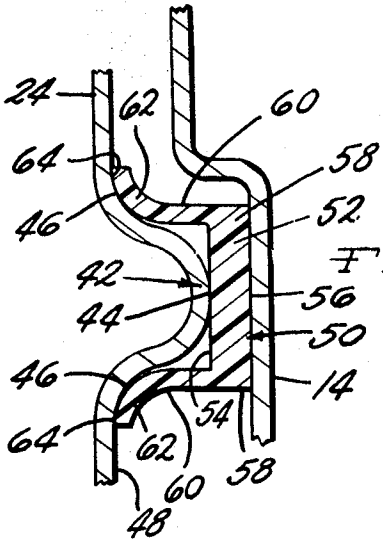


FIG. 3

INVENTOR
CHARLES W. HECKSEL
BY Beaman & Beaman
ATTORNEYS

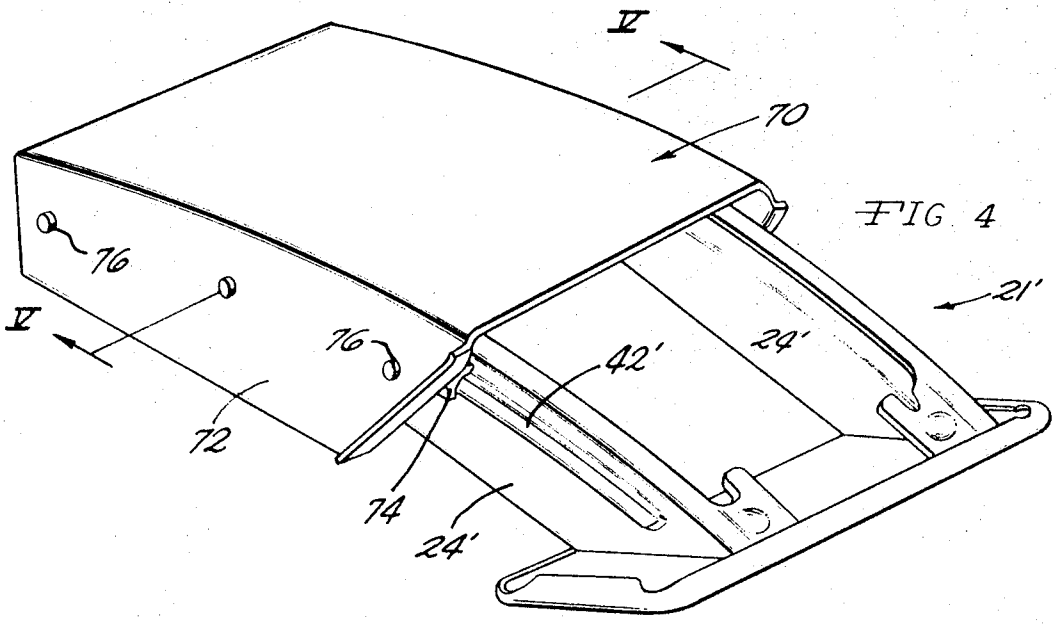


FIG. 4

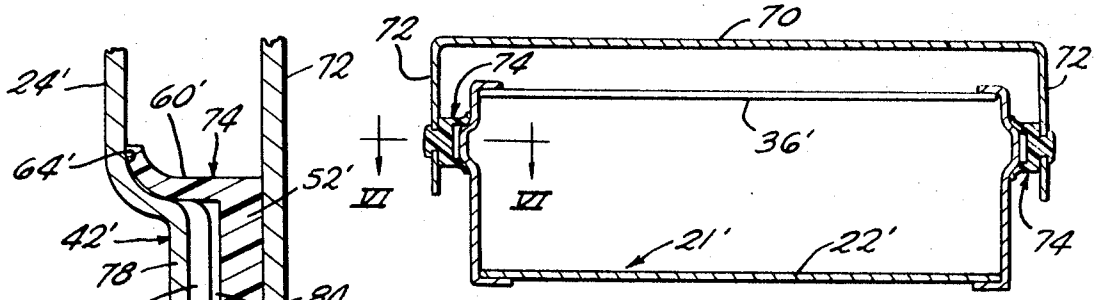


FIG. 5

FIG. 7

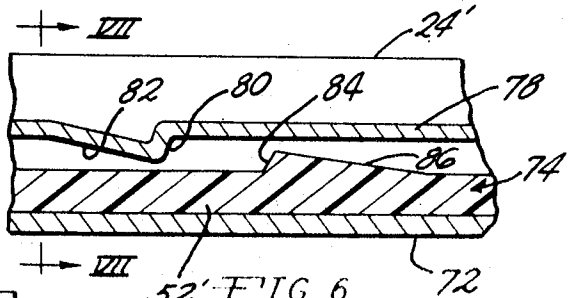


FIG. 6

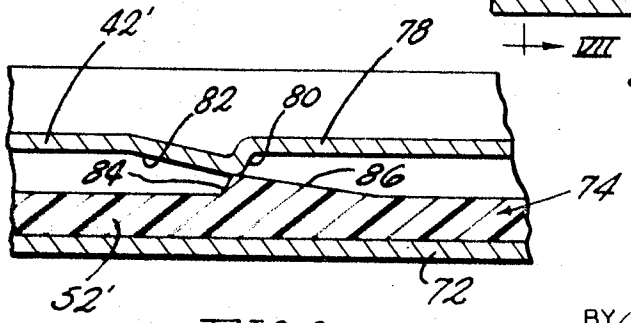


FIG. 8

INVENTOR
CHARLES W. HECKSEL

BY Beaman & Beaman

ATTORNEYS

FLEXIBLE PLASTIC DRAWER-TYPE RECEPTACLE GUIDE

BACKGROUND OF THE INVENTION

The invention pertains to the art of guides and slides for drawer members and the like wherein relative longitudinal movement between the drawer and its supporting structure occurs.

In the drawer guide art it has been common practice to use channel-shaped members, tongue and groove arrangements, rollers, ball bearing devices, and other types of bearing systems which permit a sliding movement of the drawer, or similar element, relative to its support. Depending upon the desired characteristics of the support, one of the above known types of bearing members is utilized. Where the drawer is to be freely movable, yet may be rather heavily loaded, it is common practice to use ball guide members having antifriction characteristics.

More recently, various types of synthetic plastic guides have become available for use with particular applications, and such guides are known to use flexible components. The state of the prior art is represented by U.S. Pat. Nos. 2,835,539; 3,032,377; 3,059,986; 3,126,230 and 3,321,253.

In certain applications, such as supporting a drawer-type ash receptacle mounted upon the dashboard of an automobile, it is desirable to support the receptacle rather firmly whereby the vibration of the vehicle does not cause a "rattling" of the drawer, nor permit the drawer to vibrate and inadvertently move relative to its support. Another important requirement for ash receptacles of this type is that they comply with the 1966 Motor Vehicle Safety Act in that the receptacle must be able to "break away" in the event it is struck, when in the extended position, by a vehicle occupant during a collision. Under these circumstances the receptacle must be able to be displaced from its supporting member upon application of a predetermined force transverse to the normal path of receptacle movement.

Prior art devices which have endeavored to meet the above requirements are expensive and often inconsistent in operation, and assembly techniques often are unduly complex.

SUMMARY OF THE INVENTION

It is an object of the invention to provide a glide arrangement for drawer type receptacles, particularly of the type which can be used with automobile ash receivers and the like, which is economical to manufacture and assemble to the associated components; which will support the receptacle firmly to prevent vibration and noise, yet permits the receptacle to easily slide in its desired path of movement; and which will permit the receptacle to "break away" from its support member in the event it is struck by an impact of predetermined force in a direction transverse to the normal path of movement.

In the practice of the invention the drawer member includes parallel spaced sidewalls having outwardly extending elongated protuberances defined thereon. The protuberances are of a configuration which corresponds to the desired path of movement of the drawer as it is moved between open and closed positions. The drawer-supporting member supports a pair of guide elements formed of synthetic plastic material which are of an elongated configuration complimentary to that of the protuberances. The guide elements are of a generally U or channel-shaped configuration including a base region and leg portions or extensions depending from a lateral side of the base region. The leg portions extend toward the drawer, and engage the drawer adjacent the base of the protuberance, and the protuberance is received between the leg portions.

The leg portions are of a firmly flexible nature as to impose a limited biasing force upon the drawer. In that the guide elements exert opposed biasing forces upon the drawer the drawer will be centered between the guide elements, yet is

firmly supported as to resist vibrations and inadvertent movement due to vibration. The leg portions include outer end regions which are of arcuate configuration depending away from each other to facilitate the flexible engagement with the drawer, and to improve the characteristics of the engagement between the guide element and the drawer sidewalls and protuberance base.

As previously mentioned, it is desired that the support of the guide element of the drawer be such as to permit the drawer to "break away" from the guide member under certain conditions. This characteristic is achieved by the shaping of the protuberance and the leg portions of the guide members, in conjunction with the firm, yet flexible, characteristics of the leg portions. Thus, upon a predetermined lateral force being imposed upon the drawer, the leg portions are able to deflect sufficiently in a direction transverse to their longitudinal length to permit the drawer to be displaced from its supporting guide element in a direction transverse to the normal operating path of movement of the drawer.

Preferably, the guide elements are formed of a synthetic plastic material such as acetal resin, which has self-lubricating characteristics, as well as a flexible resilient nature, which facilitates the operating movement of the drawer.

The guide member of the invention is self-adjusting with respect to the tension required to move the drawer and equal pressure will be imposed on the drawer by each guide element while the drawer is being moved, which minimizes "sticking" and binding and assures a smooth operating motion.

The practice of the invention minimizes the component parts required with an automobile ash receiver, for instance, yet permits the ash received to be opened to a greater extent than prior art types of ash receptacle supports. Additionally, the assembling techniques when using the practice of the invention are simplified and the entire construction is more economical than those previous constructions for vehicle ash receptacles.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a vehicle ash receptacle incorporating the guide of the invention,

FIG. 2 is an elevational, sectional view taken along Section II–II of FIG. 1,

FIG. 3 is an enlarged, detail, elevational, sectional view taken through the guide element,

FIG. 4 is a perspective view of a modified embodiment,

FIG. 5 is a section along V–V of FIG. 4,

FIG. 6 is a plan sectional detail view along VI–VI of FIG. 5,

FIG. 7 is an elevational detail section along VII–VII of FIG. 6, and

FIG. 8 is similar to FIG. 6 showing the protuberance shoulder passing over the guide abutment.

DESCRIPTION OF THE PREFERRED EMBODIMENT

It is to be appreciated that the inventive concept is directed to a guide arrangement for slidable devices such as drawers and the like, but may be used in a wide variety of applications. In particular, the invention is useful in conjunction with sliding drawer-type receptacles formed of sheet metal and the like, such as ash receptacles used in automobiles, and, for purposes of illustration, the inventive concept will be described in this context.

FIG. 1 illustrates a typical ash receptacle environment utilizing the concept of the invention. The ash receptacle is supported within a supporting member generally identified at 10 which would usually be formed of sheet metal and includes an upper panel 23 from which downwardly depend side supporting member walls 14. These walls may be offset adjacent the panel 12, if desired. The panel 12 is recessed at 16 and is provided with a lanced projection 18 for selective cooperation with the drawer receptacle stop mechanism, as will be later described.

A plurality of holes **20**, FIG. **2**, are defined upon the supporting member walls **14** for receiving the mounting rivet projections of the guide element in accord with the invention, and these holes are defined in an arcuate path to correspond with the drawer guide elements and protuberances as will be later apparent.

The ash receptacle is in the form of a drawer **21** having a bottom panel **22** to which are welded parallel sidewalls **24** by means of flanges formed on the sidewalls. A rear panel **26**, FIG. **2**, is formed by bending upwardly the rear portion of the bottom wall **22** which is attached to flanges on the rear of the sidewalls. The front wall of the receptacle is defined by an upwardly extending oblique portion **28** of the bottom panel, and an outer cover plate **30** attached to the front wall **28** by means of fasteners, not shown, which extend through the lower region of the cover and pass through the bottom panel **22**.

The sidewalls **24** are formed with snuffing lands **32**, and a cantilever supported arm **34** extends from the upper flange **36** of the rear panel **26** toward the front wall **28**, and includes an abutment **38** adapted to interfere with the lanced stop **18** and limit outward movement of the drawer relative to the support **10**. The arm **34** may be depressed by pushing down on the portion **40** to misalign the abutment stop **38** with the lanced stop **18** and thereby permit complete withdrawal of the drawer **21** from the support **10** when it is desired to empty the contents of the ash receptacle.

The sidewalls **24** are each formed with an elongated rib or protuberance **42** defined by displacing the metal of the sidewalls outwardly with respect to the general drawer configuration. The protuberances **42** are of a configuration corresponding to the path of movement that the drawer will take when being moved between the open and closed positions. In the disclosed embodiment the protuberances are slightly curved with respect to their longitudinal direction, but these protuberances may be linear, if desired.

The protuberances **42** have a transverse cross-sectional configuration as will be apparent from FIG. **3**. This configuration is of a somewhat semicylindrical shape whereby the protuberance defines an apex at **44**, and base surfaces at **46**, which are of a concave configuration where the protuberance blends into the plane of the outer sidewall surface **48**. It will be noted that as the base surfaces **46** are of a concave configuration and blend tangentially into the convex configuration of the protuberance toward the apex so that the outer configuration of the protuberances, with respect to the transverse cross section, is free of shoulders, sharp angles, and the like, and is of a relatively smooth and rounded shape.

The drawer receptacle **21** is supported upon a pair of guide elements **50** affixed to the support walls **14**. The guide elements are preferably formed of a synthetic plastic material such as acetal resin, which has self-lubricating qualities, and are of a configuration complimentary to the longitudinal configuration of the protuberances **42** having a generally U or channel cross-sectional configuration as will be appreciated from FIGS. **2** and **3**. The elements **50** include the base region **52** which has an outer base surface **54** and an inner planar surface **56**. The base region **52** includes lateral sides at **58** from which depend leg portions or extensions **60** transversely disposed to the plane of the element surface **54**. The leg portions **60** are arcuately formed at **62** whereby the free end regions of the leg portions depend away from each other and the outermost end surfaces **64** of the end regions engage the drawer sidewall surfaces **48** adjacent the protuberance base.

The elements **50** are maintained upon the supporting member sidewalls **14** by rivet projections **66** which extend through the holes **20** defined in the walls, and these rivets may be "headed" by a heat tool to form a head as will be apparent in FIG. **2**. In this manner the elements **50** are firmly attached to the support **10**.

As will be appreciated from FIG. **2**, the elements **50** are located in opposed relationship to each other and the assembled components are as shown in FIG. **2**. The spacing between the supporting walls **14** and the sidewalls **24** of the drawer **21** are such that the relationship between the protuberances **42** and the guide elements **50** will be such as shown in FIG. **3**. In this relationship the protuberance apex **44** is substantially engaging the element surface **54**, and the element leg portions **60** are engaging the sidewalls **24** at the protuberance base surfaces **46**. The spacing of the drawer sidewalls **24** is such that a slight deflection of the leg portions **60** occurs in the assembled relationship wherein the leg portions maintain a biasing force on the drawer away from the associated guide element. In this manner the guide elements **50** maintain the drawer **21** centered between the supporting walls **14**, and also impart a frictional interconnection between the guide elements and the drawer sidewalls. Additionally, the engagement between the protuberance apex **44** and the surface **54** aids in centering the drawer between the walls.

In that the leg portions **60** are formed of a flexible material, yet a material which is rather "firmly " resistant to flexing, the lower leg portions **60** serve to support the weight of the drawer, and the drawer may be slid between the open position shown in FIG. **1**, and a closed position whereby the cover **30** is disposed adjacent the wall flanges **68**. Because of the biasing force maintained upon the drawer by the leg portions **60** no "-metal to metal" contact exists between the drawer **21** and the support **10** and "looseness" and other relationships which would be noticeable when subjected to vibration are eliminated. The rather firm interconnection between the drawer and the support prevents rattling of the drawer, and the receptacle will remain "quiet" during movement of the vehicle, and also when sliding between its open and closed positions.

Should the drawer receptacle be located in its open position, as shown in FIG. **1**, when the vehicle is engaged in a collision, and is struck by a portion of the occupant's body, the leg portions **60** are able to deflect sufficiently to permit the drawer **21** to be laterally pushed from the guide elements **50** due to the flexing of the leg portions **60**. This "breaking away" of the receptacle from the support member is also facilitated by the smooth convex contour of the protuberances **42**. However, the firmness of the leg portions is such as to prevent accidental release of the drawer from the drawer guide during operation or casual "bumping" of the receptacle and the thickness, length, and other physical characteristics of the leg portions **60** are so determined that release of the drawer only occurs upon a predetermined force being applied to the drawer in a direction transverse to the length of the protuberances and guide elements.

It is to be appreciated that the guide elements **50** could be mounted upon the sidewalls **24** of the drawer, and the protuberances **42** formed in the walls **14** of the support member, and still utilize the practice of the invention.

FIGS. **4** through **8** are directed to a variation in the practice of the invention wherein a "built-in" for the drawer relative to its supporting member is provided, the stop structure being incorporated into the protuberance and guide elements.

With respect to FIG. **4** the support member **70** includes sidewalls **72**, and it will be appreciated that the structure of the supporting member is similar to that shown in FIG. **1** except for the presence of the stop structure **16** and **18**. Guide elements **74** are affixed to the inner surfaces of the support member sidewalls **72** by the rivet projections **76** defined on the guide elements and inserted through holes defined in the support member sidewalls.

The drawer element of FIG. **4** is identical to that shown in FIG. **1**, and similar components are indicated by primes. However, the stop mechanism **34**, **38** and **40** is not present in the drawer **21'**.

As will be appreciated from FIGS. **5** and **7**, the protuberances **42'** defined upon the drawer sidewalls **24'** do not have the rounded apex **44** of the protuberances of the previously described embodiment, but rather the protuberances include a rather flat portion **78** which terminates short of the base regions **52'** of the guide element **74**. Similar components of the protuberance and guide elements of the embodiment of FIGS.

4 through 8 are indicated with prime reference numbers to those previously described.

At least one, and preferably both, of the protuberances 42' defined on the drawer sidewalls 24' are formed with a stop shoulder 80, FIGS. 6 and 8, on the flattened apex portion 78. The stop shoulder 80 includes an oblique backing surface 82, and is defined by deforming a portion of the associated protuberance from its general configuration without the fracturing of the material of the drawer sidewall.

At least one of the guide elements 74, and preferably both, are formed with an abutment shoulder 84 defined homogeneously from a material of the associated guide element extending from the base region 52'. The abutment shoulder 84 is disposed at an oblique angle with respect to the length of the guide element and its projection toward the associated protrusion portion 78 places the abutment shoulder within the path of movement of the stop shoulder 80 of the associated protuberance. Thus, with respect to FIG. 6, as the drawer moves to the right with respect to the guide element 74 the stop shoulder 80 will engage the abutment shoulder 84 and limit withdrawal of the drawer 21' from its support member 70. However, should the operator desire to completely remove the drawer from the support member 21' to permit emptying of the drawer, it is only necessary to pull harder upon the drawer causing the stop shoulder 80 to ride up and over the abutment shoulder surface 84, FIG. 8, and thereby clear the abutment shoulder. This operation is permitted by the deformation of the support sidewalls 72, and as previously mentioned, this deformation, plus the ability of the guide element portions 60' to deform permits the drawer 21' to be released from the support member under emergency conditions when struck with a transversely directed impact.

Once the drawer 21' has been removed from the support member 70 it may be easily reinserted, with little force, in that the rather gently inclined protrusion cam surface 82 will engage the inclined guide element surface 86 to permit the stop shoulder 90 to again ride over the abutment shoulder 84 that the stop shoulder and abutment shoulder may assume the desired position for limiting normal withdrawal of the drawer with respect to the support member.

The embodiment of FIGS. 4 through 8 substantially reduces the cost of the construction as compared with the embodiment shown in FIG. 1 through 3 and provides a greater access opening in the drawer in that it eliminates the element 40 from the central region of the drawer opening.

I claim:

1. A guide for slidably supporting a first member relative to a second member comprising, in combination, first and second adjacently disposed members, said first member including a first surface disposed toward and spaced from said second member, an elongated protuberance defined on said first member extending from said first surface toward said second member, said protuberance including an apex surface and base surfaces adjacent the intersection of said protuberance with said first surface, said base surfaces being of a converging configuration in the direction of said apex surface, an elongated guide element mounted on said second member, said element including a base portion having lateral side portions, an elongated, firmly flexible, leg portion extending from each lateral side portion in a direction toward said first member and transversely to said first surface, said leg portions being substantially parallel to each other and spaced-apart a distance substantially corresponding to the cross-sectional width of said protuberance and located on opposite sides thereof with respect to said apex surface, said leg portions each including a terminating free end region of an arcuate configuration, the arcuate configurations curving away from said protuberance and said end regions resiliently engaging said first surface adjacent said base surfaces whereby said first member and protuberance may longitudinally slide relative to said guide element and is restrained against lateral displacement relative thereto by said leg portions.

2. In a guide as in claim 1 wherein said guide element base portion is engaged by said protuberance apex surface.

3. In a guide as in claim 1 wherein said guide element is formed of a synthetic plastic material.

4. In a guide as in claim 3 wherein said guide element is formed of an acetal resin.

5. In a guide as in claim 1 wherein a stop shoulder is defined on said protuberance extending toward the associated guide element base portion, an abutment shoulder defined on said associated guide element base portion extending toward the associated protuberance and within the relative path of movement of said stop shoulder wherein said shoulder and abutment are adapted to engage and limit movement of said first member relative to said second member.

6. In a guide for slidably supporting a first member relative to a second member as in claim 1 wherein said base surfaces are of a concave transverse cross-sectional configuration generally corresponding in configuration to that of said leg portions arcuate free end regions and are engaged thereby.

7. A guide arrangement for a drawer-type receptacle wherein the drawer includes spaced sidewalls and is supported between spaced supporting members disposed adjacent said sidewalls comprising, in combination, an elongated protuberance defined on each of the drawer sidewalls extending toward the associated supporting member, said protuberances each including an apex surface and base surfaces adjacent the associated sidewall, said base surfaces being of a converging configuration in the direction of said apex surface, an elongated guide element mounted on each of said supporting members in opposed relation to the adjacent protuberance, each element including a base portion, a pair of parallel, spaced, elongated, firmly flexible leg portions extending from said base portion toward the adjacent sidewall and a leg portion of each pair resiliently engaging the adjacent sidewall adjacent a base surface of the opposed protuberance, said leg portions each including a free end region capable of being resiliently deflected whereby the leg portions of said guide elements support said drawer relative to said supporting members permitting relative sliding movement therebetween in the longitudinal direction of said protuberances and said guide elements.

8. In a guide arrangement as in claim 7 wherein said leg portion end regions are of an arcuate configuration convexly disposed toward the adjacent protuberance and adjacent base surface.

9. In a guide arrangement as in claim 8 wherein said base surfaces are of a concave transverse cross section generally corresponding in configuration to that of said leg portions arcuate end regions and are engaged thereby.

10. In a guide arrangement as in claim 7 wherein said guide element includes a base portion having lateral side portions and said leg portions extend from said lateral side portions.

11. In a guide arrangement as in claim 10 wherein said guide elements are formed of a synthetic plastic material.

12. In a guide arrangement as in claim 7 wherein a stop shoulder is defined on at least one of said protuberances extending toward the associated guide element base portion, an abutment shoulder defined on said associated guide element base portion extending toward the associated protuberance and within the relative path of movement of said stop shoulder wherein said shoulder and abutment are adapted to engage and limit movement of said drawer relative to said supporting members.

13. In a guide arrangement as in claim 12 wherein said supporting members are deformable away from the adjacent drawer sidewall, and an inclined surface comprising at least a portion of said abutment shoulder adapted to engage said stop shoulder wherein said stop shoulder may deform the adjacent supporting member away from the adjacent sidewall permitting the stop shoulder to pass over the engaged abutment shoulder.

14. A drawer-type guide and support comprising, in combination, an elongated element having a generally flat base region, a pair of spaced, parallel, firmly flexible extensions extending from said base region in a common direction therefrom, said element and extensions being formed

homogeneously of a synthetic plastic material, said extensions each having a free end region, said regions each being of an arcuate transverse cross-sectional configuration and arcuately depending away from each other.

15. A drawer-type guide and support as in claim 14 wherein said element is formed of an acetal resin.

16. A guide arrangement for a drawer-type receptacle wherein the drawer includes spaced sidewalls and is supported between spaced supporting members disposed adjacent said sidewalls comprising, in combination, an elongated protuberance defined on each of the drawer sidewalls extending toward the associated supporting member, said protuberances each including an elongated apex surface and base surfaces adjacent the associated sidewall, said base surfaces being of a converging configuration in the direction of said apex surface, an elongated guide element formed of synthetic plastic material mounted on each of said supporting members in opposed relation to the adjacent protuberance, each element including an elongated recess adapted to receive the associated opposed protuberance in sliding relationship, said elements each including a pair of spaced leg portions extending toward the adjacent protuberance defining said recess, said leg portions each having a free end including a convex surface defined thereon engaging a protuberance base surface and said leg portions of a common element spaced-apart a distance sufficient to snugly hold the associated protuberance therebetween in sliding relationship.