June 25, 1968 R. A. STUDINSKI ET AL 3,389,949

FILING CABINET AND SUSPENSION SYSTEM THEREFOR

Filed June 14, 1966 6 Sheets-Sheet 1

FIG. 1

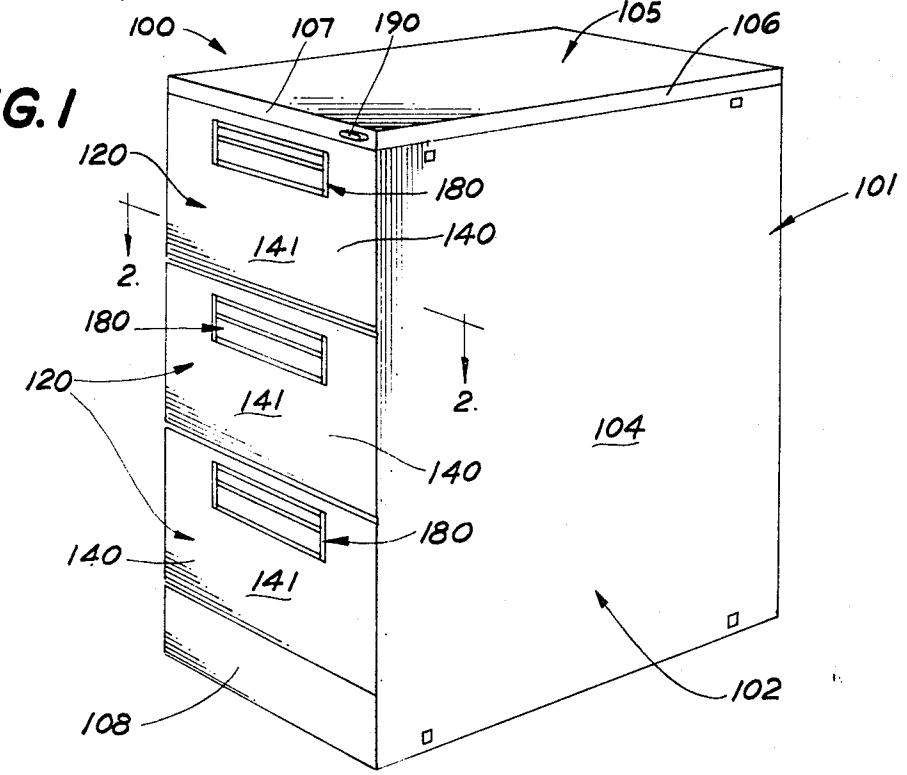
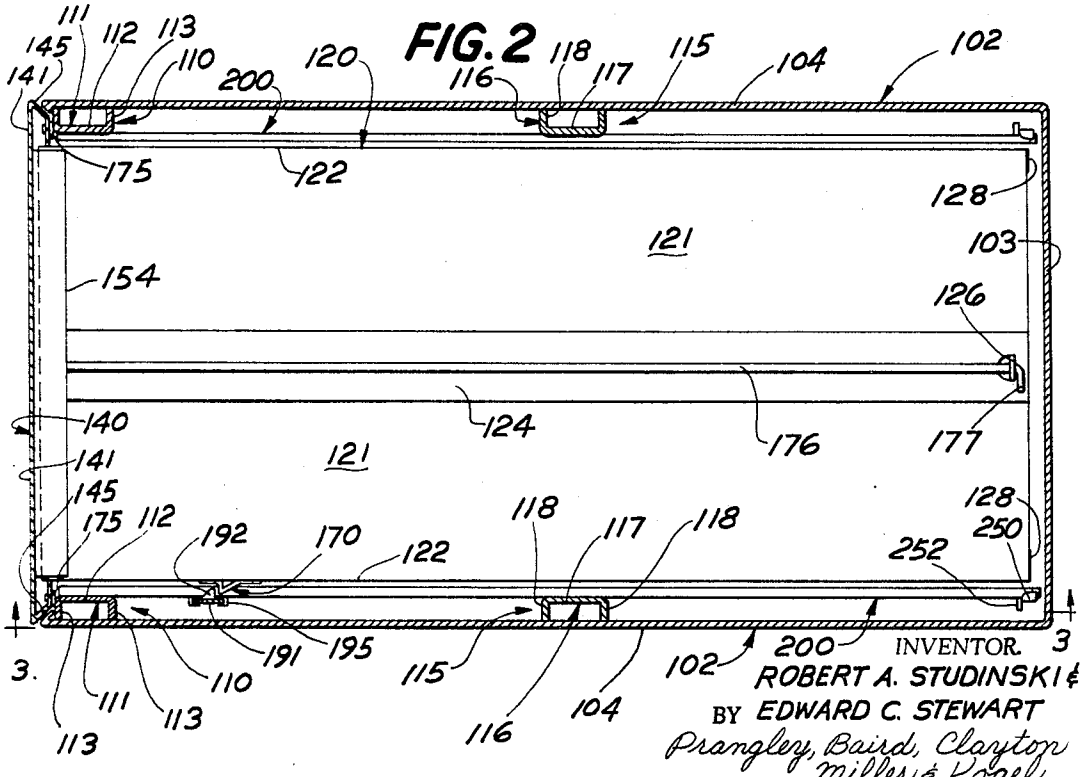



FIG. 2



FILING CABINET AND SUSPENSION SYSTEM THEREFOR

Filed June 14, 1966 6 Sheets-Sheet 2

FIG. 3

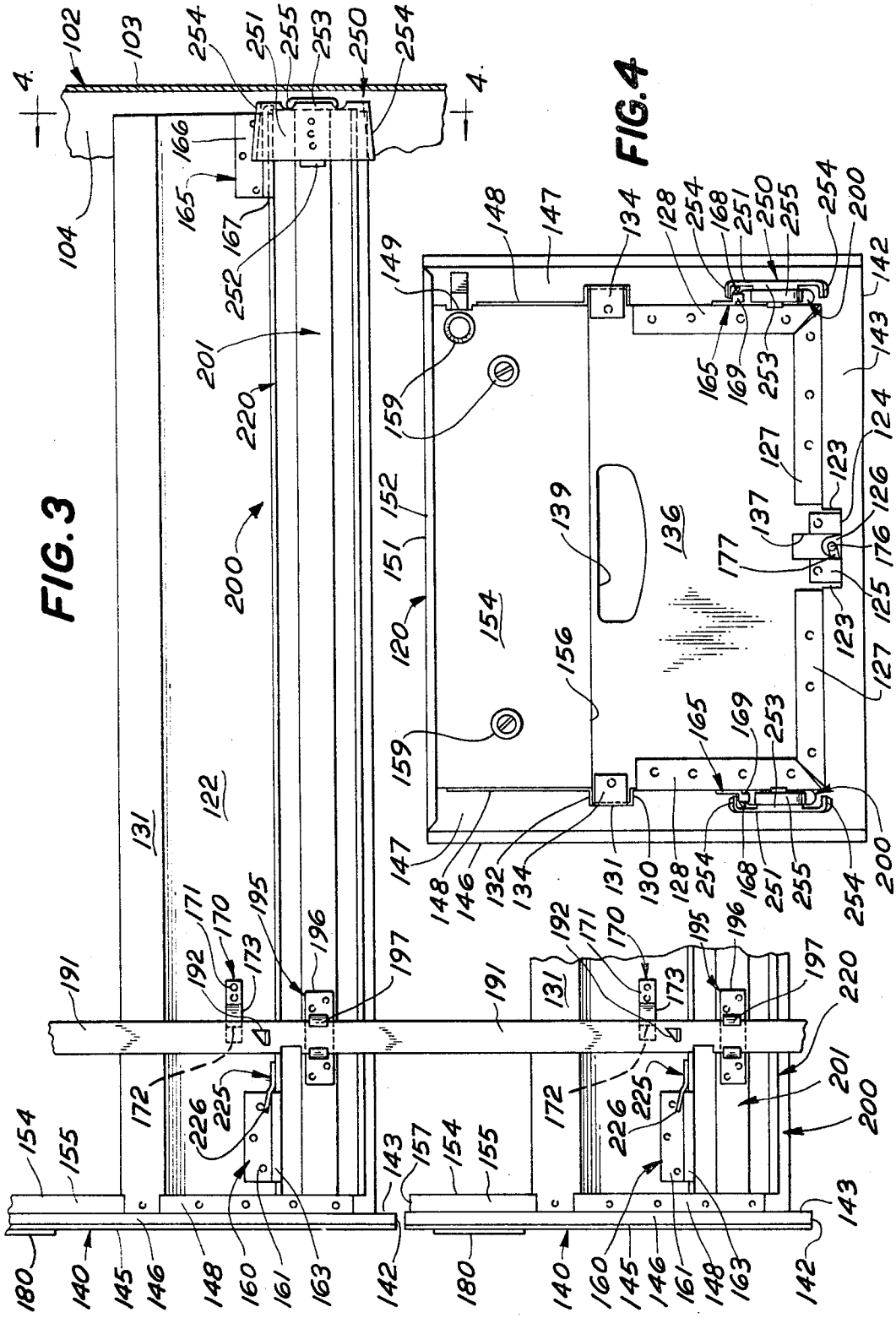


FIG. 4

FILING CABINET AND SUSPENSION SYSTEM THEREFOR

Filed June 14, 1966 6 Sheets-Sheet 3

FIG. 5

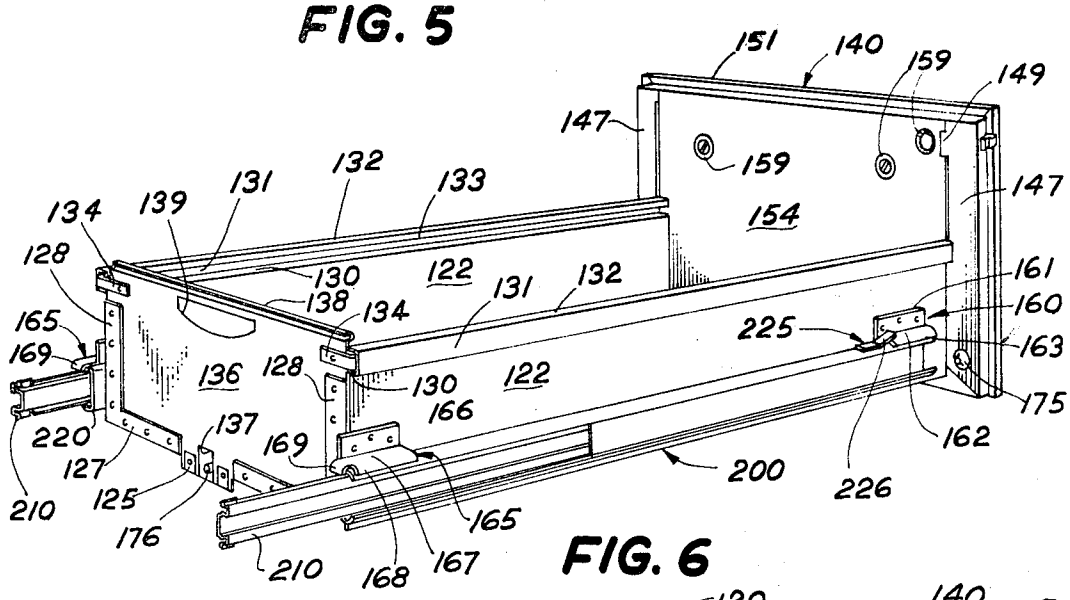



FIG. 6

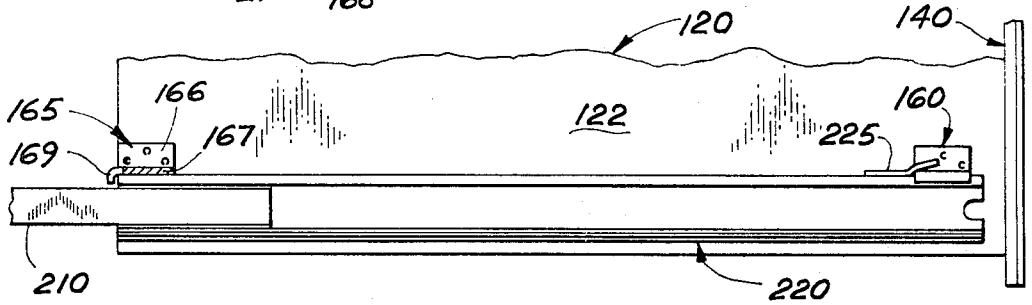



FIG. 7

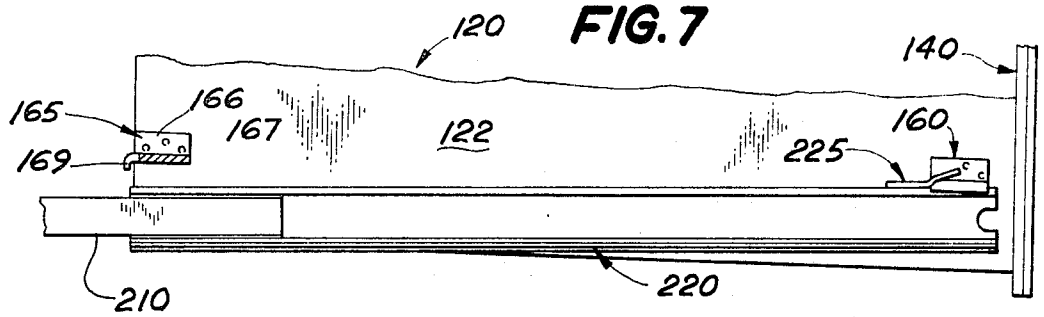
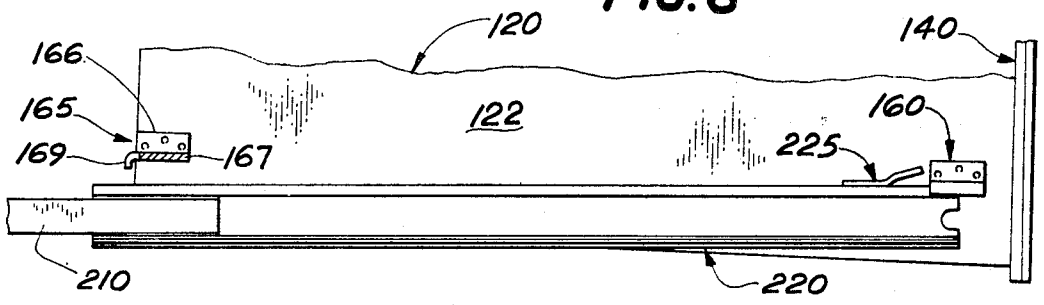



FIG. 8



June 25, 1968 R. A. STUDINSKI ET AL 3,389,949

FILING CABINET AND SUSPENSION SYSTEM THEREFOR

Filed June 14, 1966 6 Sheets-Sheet 4

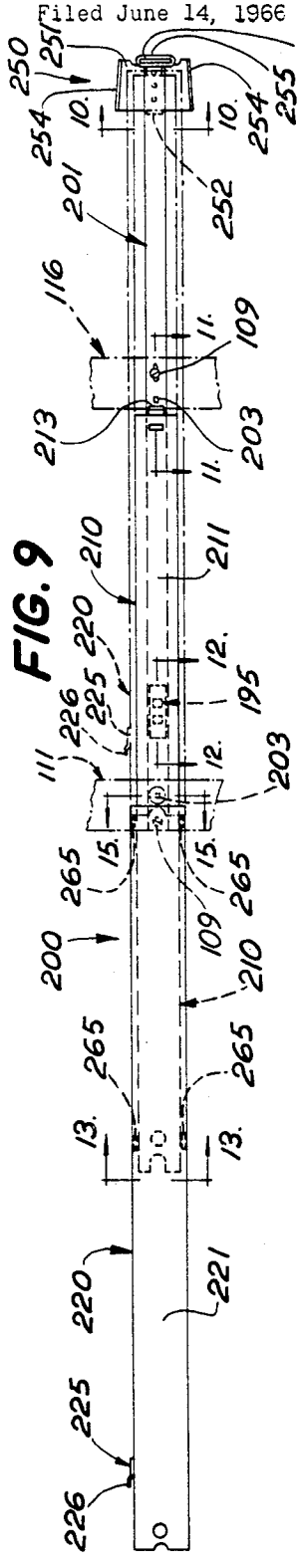



FIG. 9

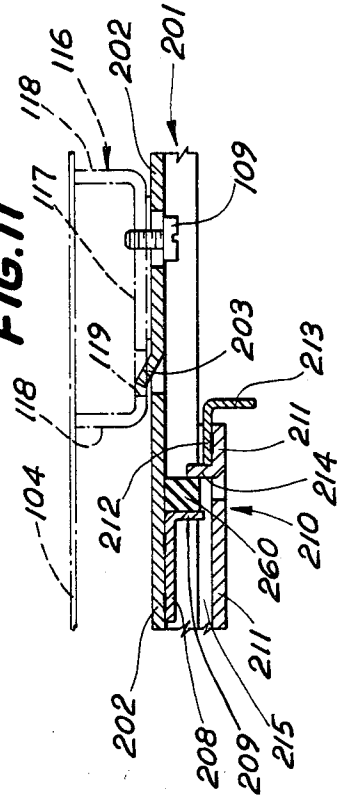



FIG. 11

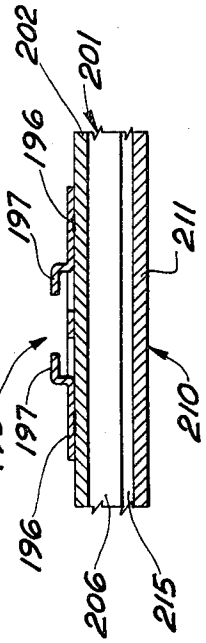



FIG. 12

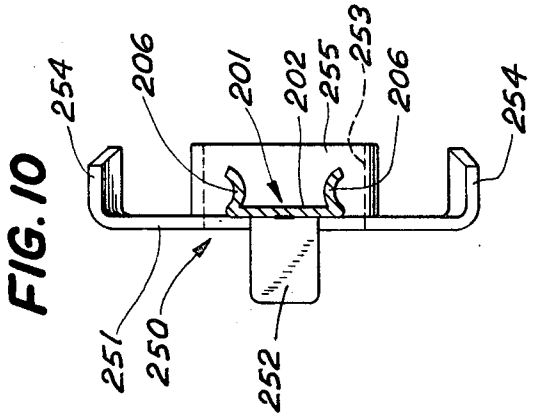



FIG. 10

June 25, 1968 R. A. STUDINSKI ET AL 3,389,949

FILING CABINET AND SUSPENSION SYSTEM THEREFOR

Filed June 14 1966 6 Sheets-Sheet 5

FIG. 13

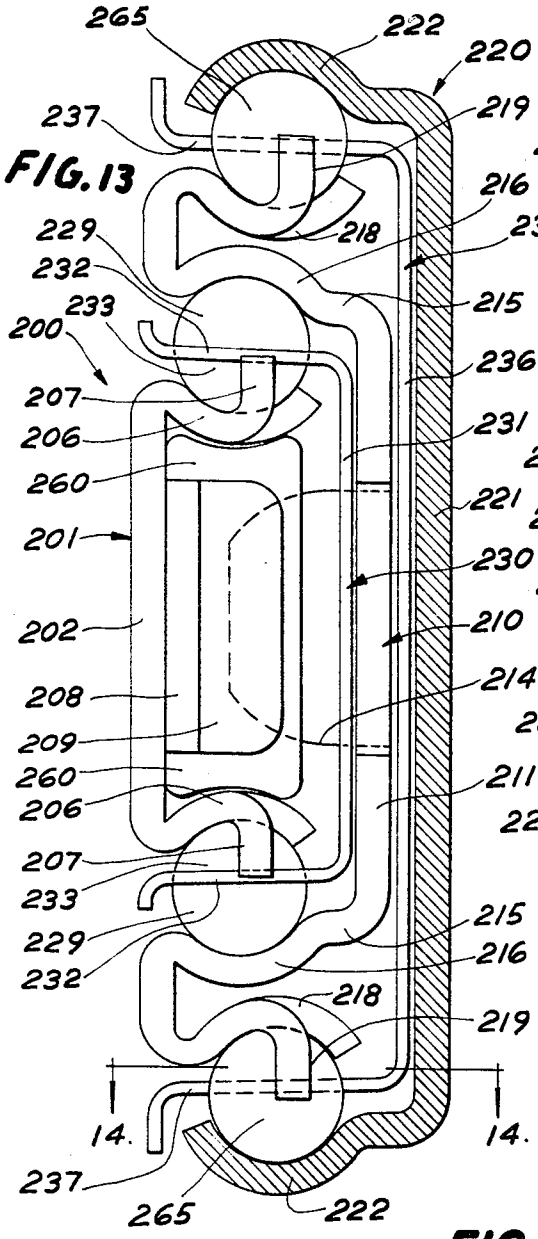



FIG. 15

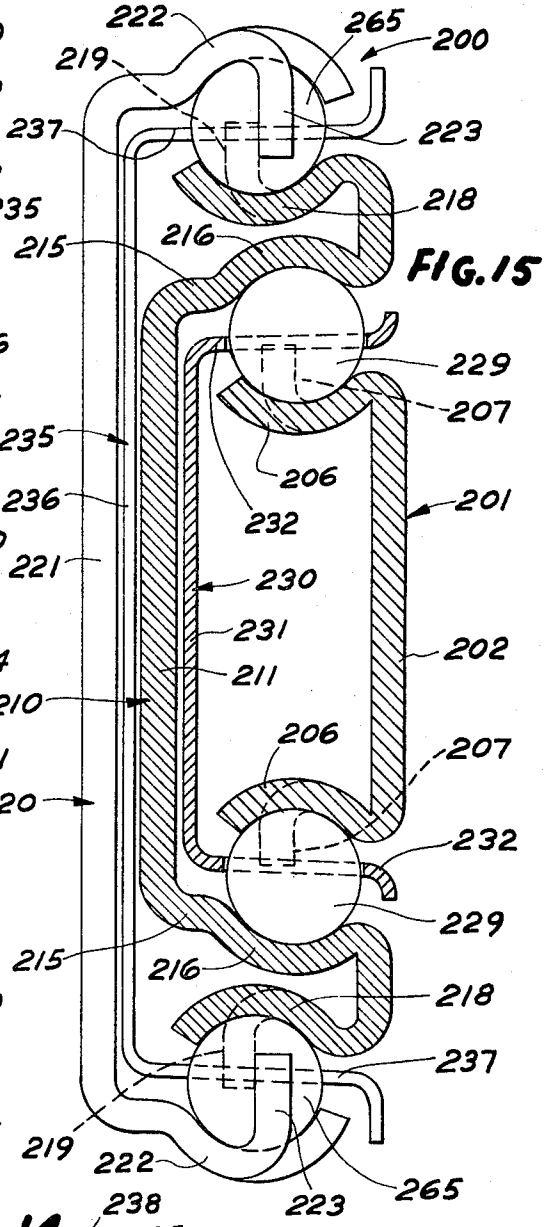
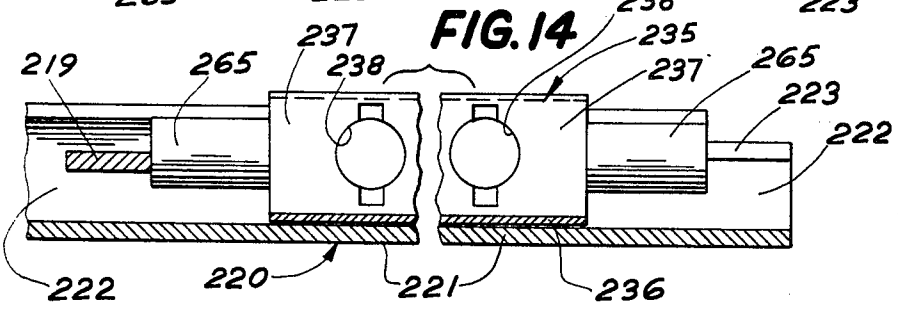



FIG. 14



June 25, 1968 R. A. STUDINSKI ET AL 3,389,949

FILING CABINET AND SUSPENSION SYSTEM THEREFOR

Filed June 14, 1966 6 Sheets-Sheet 6

FIG. 16

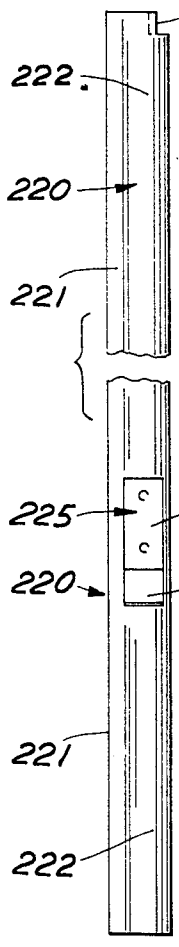



FIG. 19

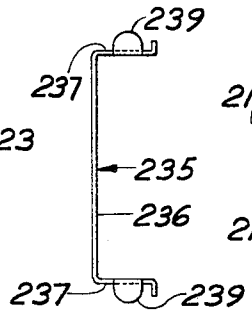



FIG. 18

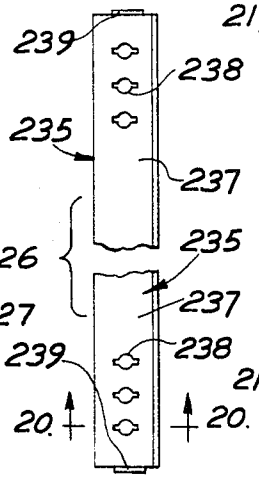



FIG. 20

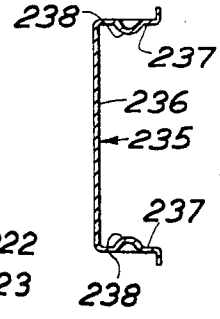



FIG. 21

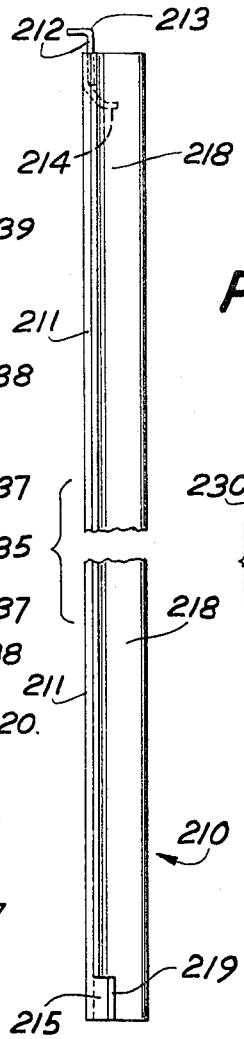



FIG. 17

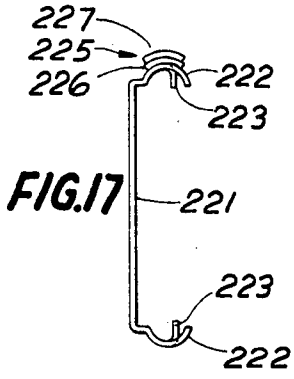



FIG. 22

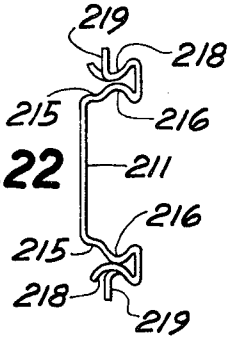



FIG. 24

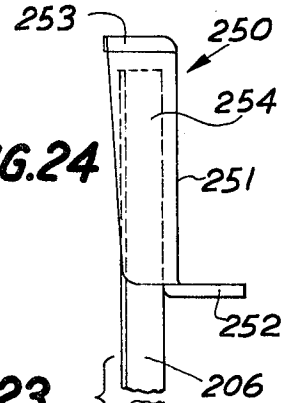
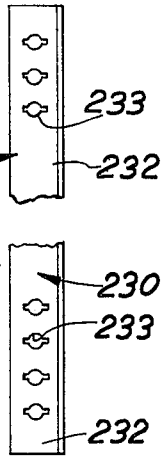



FIG. 23



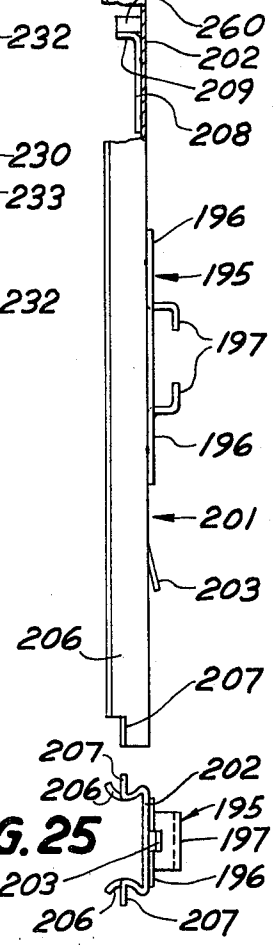




FIG. 25

United States Patent Office 3,389,949 Patented June 25, 1968



3,389,949

# FILING CABINET AND SUSPENSION SYSTEM THEREFOR

Robert A. Studinski and Edward C. Stewart, Aurora, Ill., assignors to Lyon Metal Products, Incorporated, Aurora, Ill., a corporation of Illinois

Filed June 14, 1966, Ser. No. 557,571
20 Claims. (Cl. 312—339)

## ABSTRACT OF THE DISCLOSURE

There is disclosed a drawer suspension system for mounting a drawer in a cabinet case for movement inwardly and outwardly. The drawer suspension system comprises a case rail, a drawer rail and an intermediate rail or neutral member. The case rail is secured to the cabinet case. The drawer is provided with drawer clips on each side of the drawer and adjacent the front and rear ends of the drawer for detachably mounting the drawer on the drawer rail. Anti-friction members, such as ball bearings, are disposed between the case rail and an intermediate rail or neutral member and between the neutral member and the drawer rail. A lock bracket is mounted on the rear end of each case rail and includes a flange which overlies the adjacent one of the drawer clips at the rear of the drawer when the drawer is in the fully closed position. Stop arms and brackets limit the inward and outward movement of the several rails relative to each other. The drawer clips are fashioned to permit ready detachment of the drawer from the suspension system when the system is in its extended position and to permit ready reattachment of the drawer to the suspension system when the system is in extended position.

The present invention relates to drawer suspension systems for mounting drawers in file cabinets and the like, and to file cabinets incorporating the improved drawer suspension systems.

The drawer suspension system of the present invention is of general utility and is useful for mounting drawers in a wide variety of types of furniture, but certain of the advantages are more fully realized when the drawer suspension system is incorporated in a file cabinet, and accordingly, the invention will be so described.

It is a general object of the invention to provide an improved file cabinet incorporating therein an improved drawer suspension system, the various parts of the drawer suspension system being essentially formed of sheet metal and being simple in construction and economical in manufacture.

Another object of the invention is to provide a drawer suspension structure for mounting a drawer having drawer clips on the opposite sides thereof within a cabinet case for movement inwardly and outwardly with respect thereto, the suspension structure comprising a case rail and a drawer rail and a plurality of anti-friction members such as ball bearings disposed therebetween to facilitate longitudinal movement therebetween, means mounting the case rails within the case, and a lock bracket mounted on the rear end of the case rail and including a flange overlying the adjacent one of the drawer clips when the drawer is in the fully closed position thereof, thereby to lock the rear end of the drawer on the drawer rail when the drawer is in the fully closed position thereof.

Yet another object of the invention is to provide an improved drawer suspension structure of the type set forth wherein both of the case rails carry on the rear ends thereof lock brackets engaging the rear drawer clips to prevent accidental or intentional disengagement of the drawer from the suspension system by the application of a pulling force on the drawer handle when the drawer is locked within the case.



Still another object of the invention is to provide an improved drawer suspension structure of the type set forth including a case rail carrying on the upper and lower edges thereof first inner ball races, a neutral member disposed about the case rail and carrying on the upper and lower edges thereof first outer ball races and carrying integral therewith and disposed outwardly with respect to the first outer ball races respectively second inner ball races, a drawer rail overlying the neutral member and carrying on the upper and lower edges thereof second outer ball races, a first pair of inner sets of balls disposed between the first inner ball races and the adjacent one of the first outer ball races, a second pair of outer sets of balls disposed between the second inner ball races and the adjacent one of the second outer ball races, and a stop bracket mounted on the rear of the neutral member and extending inwardly therefrom to engage the rear end of the associated drawer rail to prevent movement of the neutral member outwardly without corresponding movement of the drawer rail.

Yet another object of the invention is to provide an improved drawer suspension structure of the type set forth wherein blocks of frictional material are provided in the second inner ball races and the second outer ball races frictionally engaging the neutral member and the drawer rail and tending to cause movement of the neutral member and the drawer rail together.

In connection with the foregoing object, another object of the invention is to provide an improved drawer suspension structure of the type set forth wherein the outer end of the neutral member carries outwardly directed stop arms blocking the outer end of the second inner ball races, and the inner end of the drawer rail carries a pair of inwardly directed stop arms closing the rear ends of the second outer ball races, thereby to trap the blocks of frictional material in the operative position, the blocks of frictional material also serving as bumpers when the parts of the drawer suspension structure are in the fully extended positions thereof.

A further object of the invention is to provide a file cabinet having therein the improved drawer suspension structure of the type set forth.

Further features of the invention pertain to the arrangement of the parts and the interconnection thereof whereby the above-outlined and additional operating features thereof are attained.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following specification taken in connection with the accompanying drawings, in which:

FIGURE 1 is a perspective view of a file cabinet incorporating therein a drawer suspension system made in accordance with and embodying the principles of the present invention;

FIG. 2 is a view in horizontal section on an enlarged scale along the line 2—2 in FIG. 1;

FIG. 3 is a further enlarged fragmentary view in vertical section substantially as seen in the direction of the arrows along the line 3—3 of FIG. 2;

FIG. 4 is a view in vertical section of the rear of the drawer in FIG. 3 along the line 4—4 thereof;

FIG. 5 is a rear perspective view of a file drawer and the associated suspension structure therefor;

FIGS. 6 to 8 are fragmentary diagrammatic side elevational views of the drawer of FIG. 5 illustrating the removal of the drawer from the suspension structure therefor;

FIG. 9 is a side elevational view of one of the drawer

suspension structures, the parts being illustrated in an extended position thereof;

FIG. 10 is a view in vertical section on an enlarged scale along the line **10—10** of FIG. 9;

FIG. 11 is a fragmentary view in horizontal section on an enlarged scale along the line **11—11** of FIG. 9;

FIG. 12 is a fragmentary view in horizontal section on an enlarged scale along the line **12—12** of FIG. 9;

FIG. 13 is a view in vertical section on an enlarged scale along the line **13—13** of FIG. 9;

FIG. 14 is a view in section on a reduced scale along the line **14—14** of FIG. 13;

FIG. 15 is a view in vertical section on an enlarged scale along the line **15—15** of FIG. 9;

FIG. 16 is an enlarged side elevational view of the drawer rail of the suspension system;

FIG. 17 is an end elevational view of the drawer rail of FIG. 16;

FIG. 18 is a fragmentary side elevational view of the outer ball cage of the suspension system;

FIG. 19 is an end elevational view of the ball cage of FIG. 18;

FIG. 20 is a view in section along the line **20—20** of FIG. 18;

FIG. 21 is a fragmentary side elevational view of the neutral member of the suspension system;

FIG. 22 is an end elevational view of the neutral member of FIG. 21;

FIG. 23 is a fragmentary side elevational view of the inner ball cage of the suspension system;

FIG. 24 is a fragmentary side elevational view with certain parts broken away of the righthand case rail of the suspension system; and

FIG. 25 is an end view of the case rail of FIG. 24.

Referring now to the drawings, and particularly to FIGS. 1 to 8 thereof, there is illustrated a file cabinet **100** incorporating therein a drawer suspension structure of the present invention, a three-drawer file cabinet having been shown for purposes of illustration. The file cabinet **100** comprises a case **101** including a body **102** having a substantially rectangular rear wall **103** and a pair of substantially rectangular side walls **104** extending forwardly therefrom and disposed substantially perpendicular thereto and parallel to each other. The upper end of the body **102** carries thereon a top **105** having side flanges **106** overlying the upper ends of the side walls **104** and having a front flange **107** overlying the upper front portion of the body **102**. Closing the lower portion of the front opening in the body **102** is a base **108**.

Disposed in the forward portion of the case **102** is a front frame **110** (see FIG. 2) including a pair of vertically arranged U-shaped channels **111**, each U-shaped channel **111** including a main wall **112** and a pair of side flanges **113**. The channels **111** extend substantially the entire height of the cabinet **100** and are joined at intermediate portions thereof by cross braces (not shown). Also disposed within the case **101** and between the side walls **104** intermediate the front and rear edges thereof is a center support **115**, the center support **115** including a pair of upstanding U-shaped center channels **116** each including a main wall **117** and a pair of vertically and outwardly extending side flanges **118**. There preferably are provided braces (not shown) between the center supports **115** to hold them in the proper position. It will be understood that the front frame **110** and the center support **115** are suitably secured to the body **102** such as by welding to complete the file cabinet case **101**.

Disposed in the drawer-receiving opening provided about the front frame **110** are three file drawers **120**. Each of the file drawers **120** includes a bottom wall **121** that is generally rectangular in shape and has a width slightly less than the inner width of the cabinet case **101** and a length slightly less than that of the cabinet case **101**, the longitudinally extending inner edges of the bottom wall **121** carrying side walls **122** integral therewith and extending upwardly therefrom substantially normal thereto and substantially parallel to each other. Provided centrally in the bottom wall **121** is an index rod recess comprising a pair of downwardly directed flanges **123** joined at the bottom by a lower wall **124**, a pair of upstanding rear index flanges **125** being provided as well as an index rod tab **126**, all disposed substantially normal to the lower wall **124** for holding the rear end of the index rod.

There further are provided rear bottom flanges **127** and rear side flanges **128** disposed substantially normal respectively to the bottom wall **121** and the side walls **122**. The upper edges of the side walls **122** carry thereon outwardly directed holding flanges **130** that in turn carry on the outer edges thereof upstanding flanges **131** which in turn carry on the upper edges thereof an inwardly directed top flange **132** carrying on the inner edge thereof a dependent retaining flange **133**. The rear end of the upstanding flanges **131** also carry inwardly directed flanges **134**. The rear of the drawer **120** is closed by a rear wall **136** which is suitably secured as by welding to the various flanges **125**, **127**, **128** and **134** substantially to close all the space at the rear of the drawer **120** below the top flanges **132**, the exception being a slot **137** in the lower end thereof above the index rod tab **126**. The upper edge of the rear wall **136** carries a forwardly directed U-shaped top flange **138** and disposed immediately therebelow and centrally of the rear wall **136** is an opening **139** to receive the hand of a user therethrough for manipulating the drawer **120** as will be described more fully hereinafter.

The forward end of the drawer **120** is closed by a drawer head **140** that includes an outer wall **141** that is essentially rectangular in shape, the lower end of the front wall **141** extending below the bottom wall **121** and the lower wall **124** and having on the lower edge thereof a rearwardly directed flange on the rear edge of which is an upturned flange **143** extending upwardly to the underside of the bottom wall **121** and carrying a rearwardly directed attachment flange (not shown) which is suitably secured to the bottom portion of the section **121** as by welding. Formed on the side edges of the outer front wall **141** are side flanges **145** that are directed rearwardly and carry on the rear edges thereof rearwardly and inwardly directed flanges **146**, the inner edges of the flanges **146** carrying an inwardly directed back flange **147** thereon, the back flange **147** carrying rearwardly directed side attachment flanges **148** and inwardly directed holding tabs **149** thereon. The upper end of the outer front wall **141** carries a rearwardly and slightly downwardly directed top flange **151** carrying on the rearmost edge thereof a downturned holding flange **152**, the front wall **141** and the flanges **151** and **152** cooperating to form a substantially U-shaped retaining portion.

Disposed inwardly and spaced from the outer front wall **141** is an inner front wall **154** having side flanges **155** extending forwardly toward the outer front wall **141**, a bottom flange (not shown) also extending forwardly toward the outer front wall **141** and a top flange (not shown), the outer edge of the top flange having an upstanding flange (not shown) disposed within the holding flange **152** on the outer front wall **151**. It will be seen that the inner front wall **154** substantially closes the space between the drawer side walls **122** and closes the rear of the drawer head **140**. Finally, there is formed on the inner front wall **154** three inwardly directed embossments **159**, two of which have fastener receiving openings therethrough for mounting of the latch structure as will be described more fully hereinafter.

Each of the file drawers **120** is mounted within the file cabinet case **101** by means of a pair of drawer suspension structures **200**, and in order to mount a drawer **120** upon the suspension structure therefor, as will be explained more fully hereinafter, each of the drawer side walls **122** is provided adjacent to the forward end thereof with a drawer clip **160** (see FIGS. 5 to 8). The clip **160**

includes an attachment flange **161** that is suitably secured as by welding to the adjacent drawer side wall **122**, and extending outwardly from the attachment flange **161** and disposed substantially normal thereto is a support flange **162**, the support flange **162** carrying on the outer end thereof a downturned retaining flange **163**. A rear drawer clip **165** is also provided on each of the drawer side walls **122** adjacent to the rear thereof, the rear clip **165** including an attachment flange **166** secured as by welding to the associated drawer side wall **122**. Extending outwardly from the lower edge of the attachment flange **166** and disposed substantially normal thereto is a support flange **167**, the support flange **167** carrying on the outer edge thereof a downturned retaining flange **168**. There further is provided on the rear of the support flange **167** a downturned rear flange **169** for engaging the rear end of the associated drawer rail as will be described more fully hereinafter.

Referring to FIGS. 2 and 3, it will be seen that the righthand drawer side wall **122** as viewed from the front of the file cabinet **100** is provided thereon with a drawer stop or catch **170** that is utilized to lock the drawer **120** in the closed position thereof. The drawer catch **170** includes a pair of attachment flanges **171** which are suitably secured as by welding to the associated side wall **122**. Formed integral with the rear end of the forward attachment flange **171** and extending substantially normal thereto laterally from the side wall **122** is an abutment surface **172** which connects at the outer end thereof with an inwardly directed cam surface **173** that connects with the rear attachment flange **171**. In FIG. 5, it will also be seen that each drawer head back flange **147** carries thereon two rubber bumpers **175**, one of the bumpers **175** being provided on each of the back flanges **147** on each side of the drawer head, whereby to absorb the shock of the closure of the drawer **120**, the bumpers **175** engaging the front frame **110** and particularly the upstanding front channels **111** and specifically the side flanges **113** thereof. Disposed in the bottom of each of the drawers **120** is an index rod **176** that extends substantially the length of the drawer **120**, and specifically from the drawer head **140** rearwardly through an opening in the index rod tab **126**. The rear end of the rod **176** carries a retainer **177** disposed substantially at right angles to the axis of the rod **176** and extending laterally into the space between the rear wall **136** and the index rod tab **126**, whereby to maintain the retainer **177** of the index rod **176** in the operative position thereof.

Each of the file drawers **120** is provided in the drawer head **140** thereof with a combined pull and latch and label holder **180**, mechanism (not shown) being provided to latch each of the file drawers **120** in the closed position thereof. There further is provided a lock **190** disposed in the front flange **107** of the top **105** and which through mechanism (not shown) is useful in moving a lock bar **191** (see FIG. 3) between the locking and unlocked positions thereof, the lock bar **191** being provided with a plurality of tangs **192** struck therefrom and adapted to engage the abutment surface **172** on the drawer catch **170** when the lock bar **191** is shifted to a raised or locking position thereof by actuating the lock **190**.

Further details of construction of the file cabinet **100** and of the case **101** thereof and the file drawers **120** thereof and the combined pull and latch and label holder **180** and the lock **190** are set forth in the copending application for United States Letters Patent Ser. No. 534,382 filed Mar. 15, 1966, by Kenneth D. Schreyer, for File Cabinet, the description thereof being incorporated herein by reference.

Each of the drawers **120** is provided with a drawer suspension **200** for each side thereof for mounting of the drawer **120** in the file cabinet case **102**, the drawer suspension **200** being more particularly mounted upon the front frame **110** and the center support **115** and receiving the drawer clips **160** and **165** on the associated drawer **120**. With the exception of certain minor details which will be pointed out hereinafter, the drawer suspensions **200** disposed on the opposite sides of each of the drawers **120** are substantially identical, one being the mirror image of the other, and accordingly, like reference numerals have been applied to like parts throughout and only one of the drawer suspensions **200** will be described in detail. Each drawer suspension **200** includes a case rail **201** which extends substantially the entire length of the file case **101**, and as may best be seen in FIGS. 24 and 25 includes a main wall **202** that is substantially flat and has struck therefrom a pair of spaced apart mounting arms **203**, the mounting arms **203** being directed forwardly and adapted to engage in substantially rectangular cutouts (not shown) in the front channel **111** and rectangular cutouts **119** in the center channel **116**, the arms **203** actually resting upon the lower portions defining the cutouts. There further are provided openings in the main wall **202** to receive therethrough fasteners such as the bolts **109** passing therethrough and engaging threaded openings in the front channel **111** and threaded openings in the center channels **116**, shims being provided as required. Formed on the longitudinally extending edges of the main wall **202** are concave part-circular inner ball races **206** that extend substantially the entire length of the main wall **202**, ball retaining tangs **207** being provided on the forward ends of both of the inner ball races **206**. There further is provided on the inner side of the main wall **202** and between the races **206** and intermediate the ends of the case rail **201** a bracket **208** secured as by welding to the main wall **202** and having disposed normal with respect thereto a stop arm **209**. The stop arm **209** carries thereon a bumper **260** formed of a suitable resilient material such as rubber, the bumper **260** being secured to the stop arm **209**.

Disposed about the case rail **201** is a neutral member **210**, the details of construction of which are illustrated in FIGS. 21 and 22. The neutral member **210** includes a main wall **211** that is disposed vertically in use and substantially parallel to the main wall **202** but spaced outwardly therefrom. The rear end of the neutral member **210** carries a bracket **212** secured to the main wall **211** such as by welding, the bracket carrying an outwardly directed stop arm **213** adapted in use to engage the rear of the associated drawer rail, as will be described more fully hereinafter, to limit the outward movement of the neutral member **210** with respect to the drawer rail. Formed on the rear end of the neutral member **210** is a struckout stop arm **214** which is adapted to engage the bumper **260** on the stop arm **209** carried by the case rail **201** to limit the outward movement of the neutral member **210** with respect to the case rail **201**. Formed on the longitudinally extending upper and lower edges of the main wall **211** are laterally and outwardly extending flanges **215** which carry outer ball races **216** to cooperate with the inner ball races **206** on the case rail **201**. Extending upwardly and downwardly from the outer edges of the outer ball races **216** are outwardly directed inner ball races **218** that extend substantially the entire length of the neutral member **210** and are closed at the forward end thereof by outwardly directed tangs **219**.

Disposed about the neutral member **210** and cooperating therewith is a drawer rail **220**, the details of construction of which may be best seen in FIGS. 16 and 17. The drawer rail **220** includes a main wall **221** that is disposed substantially vertically in use and spaced outwardly with respect to the main wall **211** of the neutral member **210**. The longitudinally extending edges of the main wall **221** carry outer ball races **222** that extend over the inner ball races **218** upon the neutral member **210**, tangs or stops **223** being provided at the rear end of the drawer rail **220** to close the rear end of the outer ball race **222**. Mounted upon the upper outer race **222** is a drawer bracket **225** including an attachment flange **226** that is suitably secured as by welding to the drawer rail **220** and having

formed integral therewith and extending forwardly therefrom a retaining arm **226** adapted to overlie and engage the associated drawer clip.

Disposed between the various sets of inner and outer races are ball bearings **229**. A first pair of sets of ball bearings is maintained in the operative position by an inner ball cage **230**, see FIG. 23, the inner ball cage **230** including a main wall **231** having a pair of outwardly directed flanges **232** on the upper and lower edges thereof having ball receiving openings **233**, the inner ball cage **230** maintaining two sets of ball bearings **229** in the operative position, the one set being disposed between the upper inner ball race **206** and the cooperating outer ball race **216** and the other set being disposed between the lower inner ball race **206** and the cooperating outer lower ball race **216**.

A second pair of sets of ball bearings **229** is held in the operative position by an outer ball cage **235** having a main wall **236** carrying outwardly directed flanges **237** thereon having ball receiving openings **238** therein for maintaining the associated ball bearings in the desired operative position. More specifically, the outer ball cage **235** maintains a first set of ball bearings in position between the upper inner ball races **218** and the cooperating upper outer ball race **222** and a second set of ball bearings in position between the lower inner ball race **218** and the cooperating lower outer ball race **222**. There further is provided on each end of the flanges **237** a reversely bent tab **239** providing a smooth outer surface at the end thereof.

There further is provided between the neutral member **210** and the drawer rail **220** four buffers **265** formed of fibrous material interconnected by a synthetic organic resin and in the form of short cylinders or blocks of frictional material, two of the buffers **265** being disposed between the upper outer ball race **222** and the upper inner ball race **218** at the ends of the ball cage **235** and abutting the portions **239** thereon in certain positions thereof, and the other two buffers **265** being disposed between the lower outer ball race **222** and the lower inner ball race **218** and disposed on either side of the outer ball cage **235** to engage the portions **239** thereof. Furthermore, when the parts are in the fully extended position, the tangs **219** on the forward end of the neutral member **210** engage the associated buffer blocks **265** and push them rearwardly against the front end of the outer ball cage **235** and the rear end of the ball cage **235** pushes the rearmost buffer blocks **265** against the rear tangs or stops **223** on the rear end of the drawer rail **220**, thereby to provide a positive stop for the parts in the fully extended position thereof.

There further is provided on the rear end of the case rail **201** a Z-lock bracket **250**, the details of construction of which are best seen in FIGS. 3, 4, 9, 10 and 24. As illustrated, the bracket **250** includes a main wall **251** that is disposed substantially vertically and is suitably secured as by welding to the rear end of the main wall **202** of the case rail **201**. An outturned reinforcing flange **252** is formed on the forward edge of the main wall **251** and a stop flange **253** is formed on the rear edge of the main wall **251** and extends inwardly, i.e., in a direction opposite from the flange **252**. The main wall **251** extends upwardly and downwardly beyond the upper and lower surfaces of the associated drawer rail **220** and has upper and lower edges that converge rearwardly, these edges carrying retaining flanges **254** directed inwardly and overlying the associated drawer rail **220**. The stop flange **253** is further provided with a rubber bumper **255** thereon which engages the stop arm **213** on the neutral member **210** to absorb the shock of closing the associated drawer **120**. Two of the retaining flanges **254** are provided whereby the bracket **250** is symmetrical about a horizontal plane so that the same bracket construction can be used on both the lefthand case rail **201** and the righthand case rail **201**.

It will be understood that in the construction of the file cabinet **100**, the drawer suspensions **200** are first mounted upon the case **101** and specifically upon the front frame **110** and the center support **115** thereof by inserting the mounting arms **203** into the associated openings in the respective front and center channels **111** and **115**. To mount the associated drawer **120** upon its drawer suspensions **200**, the drawer rails **220** and the parts connected and driven thereby are pulled to the outermost positions thereof with respect to the cabinet case **101**. The drawer **120** is then placed in the approximate position over the drawer rails **220** and the drawer clips **160** are lowered upon the drawer rails **220** until they are resting thereupon and in front of the drawer brackets **225**. The rear end of the drawer **120** and specifically the rear drawer clips **165** are then dropped upon the upper surface of the drawer rails **220**. The drawer **120** is then shifted rearwardly with respect to the drawer rails **220**, whereby to move the front drawer clips **160** under the drawer brackets **225** and to move the rear drawer clips **165** rearwardly until the downturned flanges **169** drop behind the rear of the associated drawer rail **220**. The drawer **120** is now mounted in the operative position upon the drawer rails **220**.

As the drawer **120** is moved toward the closed position thereof within the cabinet case **101**, the drawer rail **220** moves inwardly until the stop arm **213** on the rear of the neutral member **210** strikes the bumper **255** on the Z-stop bracket **250**; continued inward movement of the drawer now causes relative movement between the neutral member **210** and the drawer rail **220** until the rear end of the drawer rail **220** strikes the stop arm **213** on the neutral member **210**; it will be appreciated that the bumpers **175** on the rear of the drawer head **140** finally abut against the front channel **111** also to stop inward movement of the drawer **120**. If the drawer **120** is now pulled outwardly toward its fully extended position, eventually the stop arm **214** on the neutral member **210** will engage the bumper **260** carried by the case rail **201** and thereafter the frictional engagement between the neutral member **210** and the drawer rail **220** will be overcome and the parts moved outwardly until the stop arms or tangs **223** on the rear of the drawer rail **220** abut against the fiber blocks **265**, after which the outer ball cage **235** will abut the rear end thereof against the rearmost fiber blocks **265** and the stop arms or tangs **219** on the neutral member **210** will push the forward ones of the fiber blocks **265** against the forward ends of the flanges **239** on the outer ball cage **235**, thereby to establish the final outer position of the drawer **120** with respect to the cabinet case **101**.

The above described suspension structure for mounting the drawer **120** upon the drawer rails **220** permits the drawer **120** to be readily removed therefrom. Referring to FIGS. 5 to 8 of the drawings, there is diagrammatically illustrated the simple manner in which the drawer **120** can be removed from the suspensions **200** therefore. First the drawer **120** is preferably pulled to the outermost position thereof, after which the user grasps the rear of the drawer through the handhold **139** in the rear wall **136** and lifts upwardly until the downturned flanges **169** on the rear drawer clips **165** are raised above the upper surfaces of the drawer rails **220**. Then the entire drawer is shifted forwardly until the front drawer clips **160** are disengaged from beneath the drawer brackets **225**, after which the drawer **120** can be removed from the file cabinet **100**. In order to remount the drawer **120** upon the suspensions **200** therefor, the operation is simply reversed as has been described above.

Although the above described ease of removal of the drawer **120** from the suspensions **220** therefore is highly advantageous when such removal is desired, such ready removal of the drawer **120** from the suspensions **200** is equally undesirable if no such removal is desired, i.e., if the drawer **120** is in the fully closed and locked position thereof. An important feature of the invention there-

fore resides in the provision of the Z-lock bracket **250** at the rear of the case rails **201**. Referring particularly to FIG. 3, it will be seen that when the drawer **120** is in the fully closed position thereof, the rear drawer clips **165** are disposed below the associated one of the retaining flanges **254** on the associated lock bracket **250**, whereby it is impossible for the rear of the drawer **120** sufficiently to clear the downturned flanges **169** from the rear of the drawer rails **220**, whereby it is impossible to remove the drawer **120** from the drawer suspensions **200** thereof when the drawer **120** is in the fully closed position.

In passing it is also pointed out that the righthandmost case rail **201** carries thereon a lock bar guide **195**, each of the lock bar guides **195** more particularly including a flat plate **196** suitably secured as by welding to the associated case rail **201** and having struck therefrom a pair of opposed and spaced apart retaining flanges **197** that guide the lock bar **191** in the vertical movement with respect thereto.

Yet another important feature of the present invention resides in the fact that all of the parts of the suspension structures **200** are formed of sheet metal rolled or otherwise shaped to the form described and illustrated herein, the only parts not so formed being the several bumpers and ball bearings. More specifically, the case rail **201** including the Z-lock bracket **250** thereon, the neutral member **210**, the drawer rail **220**, the ball cage **230** and the ball case **235** are all formed of sheet metal shaped as illustrated and described. Furthermore, the sheet metal forming the various parts is of relatively light gauge as will be appreciated from the following examples of the gauge of the sheet metal utilized. In a typical construction of the drawer suspensions **200**, the case rail **201** is formed of 16 gauge steel, the neutral member **210** is formed of 16 gauge steel, the drawer rail **280** is formed of 16 gauge steel, the Z-lock bracket **250** is formed of 12 gauge steel, and the ball cages **230** and **235** are formed of 24 gauge steel.

From the above description it will be seen that there has been provided an improved file cabinet, and specifically an improved drawer suspension structure therefor which fulfills all of the objects and advantages set forth above. While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

**1.** A file cabinet comprising a case including a body, a drawer disposed in said case, a pair of drawer suspension structures disposed respectively on the opposite sides of said drawer and mounting said drawer within said case for movement inwardly and outwardly with respect thereto, each of said suspension structures including a case rail and a drawer rail and a plurality of anti-friction bearing members disposed therebetween to facilitate longitudinal movement therebetween, means mounting said case rails within said case, a pair of drawer clips mounted on each of the outer sides of said drawer in longitudinally spaced apart positions and overlying and resting upon the associated one of said drawer rails respectively adjacent to the front and rear thereof, and a lock bracket mounted on the rear end of at least one of said case rails and including a flange overlying the adjacent one of said drawer clips when said drawer is in the fully closed position thereof, thereby to lock the rear end of said drawer on said drawer rail when said drawer is in the fully closed position thereof.

**2.** The file cabinet set forth in claim **1**, wherein a pair of said lock brackets is provided mounted respectively on the rear ends of said case rails.

**3.** A file cabinet comprising a case including a body having a front frame positioned at the forward end thereof and a center support positioned toward but spaced from and substantially parallel to said front frame, a drawer disposed in said case, a pair of drawer suspension structures disposed respectively on the opposite sides of said drawer and mounting said drawer within said case for movement inwardly and outwardly with respect thereto, each of said suspension structures including a case rail carrying on the upper and lower edges thereof first inner ball races, means mounting said case rail upon said front frame and said support, a neutral member disposed about said case rail and carrying on the upper and lower edges thereof first outer ball races and carrying integral therewith and disposed outwardly with respect to said first outer ball races respectively second inner ball races, a drawer rail overlying said neutral member and carrying on the upper and lower edges thereof second outer ball races, a first pair of inner sets of balls disposed between said first inner ball races and the adjacent one of said first outer ball races, a second pair of outer sets of balls disposed between said inner ball races and the adjacent one of said second outer ball races, a pair of drawer clips mounted on each of the outer sides of said drawer in longitudinally spaced apart positions and overlying and resting upon the associated one of said drawer rails respectively adjacent to the front and rear thereof, and a pair of lock brackets mounted respectively on the rear ends of said case rails and each including a flange overlying the adjacent one of said drawer clips when said drawer is in the fully closed position thereof, thereby to lock the rear end of said drawer on said drawer rail when said drawer is in the fully closed position thereof.

**4.** A file cabinet comprising a case including a body, a drawer disposed in said case, a pair of drawer suspension structures disposed respectively on the opposite sides of said drawer and mounting said drawer within said case for movement inwardly and outwardly with respect thereto, each of said suspension structures including a case rail carrying on the upper and lower edges thereof first inner ball races, means mounting said case rail upon said case within said body, a neutral member disposed about said case rail and carrying on the upper and lower edges thereof first outer ball races and carrying integral therewith and disposed outwardly with respect to said first outer ball races respectively second inner ball races, a drawer rail overlying said neutral member and carrying on the upper and lower edges thereof second outer ball races, a first pair of inner sets of balls disposed between said first inner ball races and the adjacent one of said first outer ball races, a second pair of outer sets of balls disposed between said second inner ball races and the adjacent one of said second outer ball races, and a stop bracket mounted on the rear of said neutral member and extending outwardly therefrom to engage the rear of the associated drawer rail to limit forward movement of said neutral member with respect to said drawer rail.

**5.** A file cabinet comprising a case including a body, a drawer disposed in said case, a pair of drawer suspension structures disposed respectively on the opposite sides of said drawer and mounting said drawer within said case for movement inwardly and outwardly with respect thereto, each of said suspension structures including a case rail and a drawer rail and a plurality of anti-friction bearing members disposed therebetween to facilitate longitudinal movement therebetween, means mounting said case rails within said case, a pair of drawer clips mounted on each of the outer sides of said drawer in longitudinally spaced apart positions and overlying and resting upon the associated one of said drawer rails respectively adjacent to the front and rear thereof, and a lock bracket mounted on the rear end of at least one of said case rails and including a flange sloping downwardly and rearwardly and overlying the adjacent one of said drawer clips when said drawer is in the fully closed position thereof whereby to wedge the rear end of the drawer into locking relation against the drawer rail.

6. A file cabinet comprising a case including a body, a drawer disposed in said case, a pair of drawer suspension structures disposed respectively on the opposite sides of said drawer and mounting said drawer within said case for movement inwardly and outwardly with respect thereto, each of said suspension structures including a case rail and a drawer rail and a plurality of anti-friction bearing members disposed therebetween to facilitate longitudinal movement therebetween, means mounting said case rails within said case, a pair of drawer clips mounted on each of the outer sides of said drawer in longitudinally spaced apart positions and overlying and resting upon the associated one of said drawer rails respectively adjacent to the front and rear thereof, the rear drawer clips each having a downturned rear flange engaging the rear of the associated drawer rail, a pair of drawer brackets respectively mounted on the drawer rails adjacent to the forward ends thereof, said drawer brackets having fingers extending forwardly of the drawer rails in overlying relation to the front drawer clips and abutting against the ear ends thereof, and a lock bracket mounted on the rear end of at least one of said case rails and including a flange overlying the adjacent one of said drawer clips when said drawer is in the fully closed position thereof, thereby to lock the rear end of said drawer on said drawer rail when said drawer is in the fully closed position thereof and positively preventing lifting of the rear edge of the drawer upwardly, thereby preventing disengagement of said drawer clips from said drawer rails and said drawer brackets.

7. A file cabinet comprising a case including a body having a front frame positioned at the forward end thereof and a center support positioned toward but spaced from and substantially parallel to said front frame, a drawer disposed in said case, a pair of drawer suspension structures disposed respectively on the opposite sides of said drawer and mounting said drawer within said case for movement inwardly and outwardly with respect thereto, each of said suspension structures including a case rail carrying on the upper and lower edges thereof first inner ball races, means mounting said case rail upon said front frame and said support, a neutral member disposed about said case rail and carrying on the upper and lower edges thereof first outer ball races and carrying integral therewith and disposed outwardly with respect to said first outer ball races respectively second inner ball races, a drawer rail overlying said neutral member and carrying on the upper and lower edges thereof second outer ball races, a first pair of inner sets of balls disposed between said first inner ball races and the adjacent one of said first outer ball races, a second pair of outer sets of balls disposed between said inner ball races and the adjacent one of said second outer ball races, a pair of drawer clips mounted on each of the outer sides of said drawer in longitudinally spaced apart positions and overlying and resting upon the associated one of said drawer rails respectively adjacent to the front and rear thereof, a pair of lock brackets mounted respectively on the rear ends of said case rails and each including a flange overlying the adjacent one of said drawer clips when said drawer is in the fully closed position thereof, thereby to lock the rear end of said drawer on said drawer rail when said drawer is in the fully closed position thereof, the flange on each of said lock brackets sloping downwardly and rearwardly thereby to wedge the rear drawer clips against the drawer rails when the drawer is in the fully closed position thereof.

8. A file cabinet comprising a case including a body having the front frame positioned at the forward end thereof and a center support positioned toward but spaced from and substantially parallel to said front frame, a drawer disposed in said case, a pair of drawer suspension structures disposed respectively on the opposite sides of said drawer and mounting said drawer within said case for movement inwardly and outwardly with respect thereto, each of said suspension structures including a case rail carrying on the upper and lower edges thereof first inner ball races, means mounting said case rail upon said front frame and said support, a neutral member disposed about said case rail and carrying on the upper and lower edges thereof first outer ball races and carrying integral therewith and disposed outwardly with respect to said first outer ball races respectively second inner ball races, a drawer rail overlying said neutral member and carrying on the upper and lower edges thereof second outer ball races, a first pair of inner sets of balls disposed between said first inner ball races and the adjacent one of said first outer ball races, a second pair of outer sets of balls disposed between said inner ball races and the adjacent one of said second outer ball races, a pair of drawer clips mounted on each of the outer sides of said drawer in longitudinally spaced apart positions and overlying and resting upon the associated one of said drawer rails respectively adjacent to the front and rear thereof, a pair of lock brackets mounted respectively on the rear ends of said case rails and each including a flange overlying the adjacent one of said drawer clips when said drawer is in the fully closed position thereof, thereby to lock the rear end of said drawer on said drawer rail when said drawer is in the fully closed position thereof, each of the rear drawer clips having a downturned rear flange engaging the rear of the associated drawer rail, and a pair of drawer brackets respectively mounted adjacent to the forward ends of said drawer rails and extending forwardly and overlying and abutting against the rear of the associated drawer clips, said lock brackets in the closed position of said drawer positively preventing lifting of said drawer upwardly, thereby positively preventing disengagement of said drawer clips from said drawer rail and said brackets.

9. A file cabinet comprising a case including a body, a drawer disposed in said case, a pair of drawer suspension structures disposed respectively on the opposite sides of said drawer and mounting said drawer within said case for movement inwardly and outwardly with respect thereto, each of said suspension structures including a case rail carrying on the upper and lower edges thereof first inner ball races, means mounting said case rail upon said case within said body, a neutral member disposed about said case rail and carrying on the upper and lower edges thereof first outer ball races and carrying integral therewith and disposed outwardly with respect to said first outer ball races respectively second inner ball races, a drawer rail overlying said neutral member and carrying on the upper and lower edges thereof second outer ball races, a first pair of inner sets of balls disposed between said first inner ball races and the adjacent one of said first outer ball races, a second pair of outer sets of balls disposed between said second inner ball races and the adjacent one of said second outer ball races, a stop bracket mounted on the rear of said neutral member and extending outwardly therefrom to engage the rear of the associated drawer rail to limit forward movement of said neutral member with respect to said drawer rail, a first pair of stop arms on the forward end of said neutral member and extending outwardly to close the forward ends of said second inner ball races, and a second pair of stop arms on the rear end of said drawer rail and extending inwardly to close the rear ends of said second outer ball races.

10. A drawer suspension structure for mounting a drawer having pairs of drawer clips on the opposite sides thereof within a case for movement inwardly and outwardly with respect thereto, said suspension structure comprising a case rail and a drawer rail and a plurality of antifriction bearing members disposed therebetween to facilitate longitudinal movement therebetween, means for mounting said case rail within an associated case, a lock bracket mounted on the rear end of said case rail and including a flange overlying the adjacent one of the associ-

ated drawer clips when said drawer is in the fully closed position thereof, thereby to lock the rear end of said drawer on said drawer rail when said drawer is in the fully closed position thereof, the rear drawer clip on the associated drawer having a downturned rear flange for engaging the rear end of said drawer rail, the drawer rail having a drawer bracket mounted thereon adjacent to the forward end thereof and having a portion extending forwardly to overlie and abut against the rear of the associated front drawer clip, said lock bracket in the closed position of the associated drawer positively preventing lifting of the rear thereof upwardly thereby positively preventing disengagement of the associated rear drawer clip from said drawer rail and disengagement of the associated front drawer clip from said drawer bracket.

**11.** A drawer suspension structure for mounting a drawer having pairs of drawer clips on the opposite sides thereof within a case for movement inwardly and outwardly with respect thereto, said suspension structure comprising a case rail carrying on the upper and lower edges thereof first inner ball races, means on said case rail for mounting said suspension structure upon the associated case, a neutral member disposed about said case rail and carrying on the upper and lower edges thereof first outer ball races and carrying integral therewith and disposed outwardly with respect to said first outer ball races respectively second inner ball races, a drawer rail overlying said neutral member for receiving the drawer clips on the associated drawer to mount the drawer thereon and carrying on the upper and lower edges thereof second outer ball races, a first pair of inner sets of balls disposed between said first inner ball races and the adjacent one of said first outer ball races, a second pair of outer sets of balls disposed between said second inner ball races and the adjacent one of said second outer ball races, a lock bracket mounted on the rear end of said case rail and including a flange overlying the adjacent one of the associated drawer clips when the associated drawer is in the fully closed position thereof, thereby to lock the rear end of the associated drawer on sad drawer rail when the drawer is in the fully closed position thereof, the flange of the lock bracket sloping downwardly and rearwardly thereby to wedge the rear drawer clip against the drawer rail when the drawer is in the fully closed position thereof.

**12.** The file cabinet set forth in claim **9**, and further comprising blocks of bumper material disposed between said second inner ball races and the adjacent one of said second outer ball races and disposed between cooperating pairs of said first and second stop arms.

**13.** A file cabinet comprising a case including a body, a drawer disposed in said case, a pair of drawer suspension structures disposed respectively on the opposite sides of said drawer and mounting said drawer within said case for movement inwardly and outwardly with respect thereto, each of said suspension structures including a case rail carrying on the upper and lower edges thereof first inner ball races, means mounting said case rail upon said case within said body, a neutral member disposed about said case rail and carrying on the upper and lower edges thereof first outer ball races and carrying integral therewith and disposed outwardly with respect to said first outer ball races respectively second inner ball races, a drawer rail overlying said neutral member and carrying on the upper and lower edges thereof second outer ball races, a first ball cage carrying a first pair of inner sets of balls disposed between said first inner ball races and the adjacent one of said first outer ball races, a second ball cage carrying a second pair of outer sets of balls disposed between said second inner ball races and the adjacent one of said second outer ball races, blocks of frictional material disposed in said second inner ball races and said second outer ball races at both ends of said second ball cage, a first pair of stop arms on the forward end of said neutral member extending outwardly therefrom to close the front ends of said second inner ball races, and a second pair of stop arms on the rear end of said drawer rail extending inwardly therefrom to close the rear ends of said second outer ball races, said blocks of material serving as bumpers between said neutral member and said drawer rail, when said drawer suspension structure is in the full extended position thereof.

**14.** A drawer suspension structure for mounting a drawer having pairs of drawer clips on the opposite sides thereof within a case for movement inwardly and outwardly with respect thereto, said suspension structure comprising a case rail and a drawer rail and a plurality of anti-friction bearing members disposed therebetween to facilitate longitudinal movement therebetween, means for mounting said case rail within an associated case, and a lock bracket mounted on the rear end of said case rail and including a flange overlying the adjacent one of the associated drawer clips when said drawer is in the fully closed position thereof, thereby to lock the rear end of said drawer on said drawer rail when said drawer is in the fully closed position thereof.

**15.** The drawer suspension structure set forth in claim **14**, wherein the flange on said lock bracket slopes downwardly and rearwardly, thereby to wedge the rear end of the associated drawer against said drawer rail when the drawer is in the fully closed position thereof.

**16.** A drawer suspension structure for mounting a drawer having pairs of drawer clips on the opposite sides thereof within a case for movement inwardly and outwardly with respect thereto, said suspension structure comprising a case rail carrying on the upper and lower edges thereof first inner ball races, means on said case rail for mounting said suspension structure upon the associated case, a neutral member disposed about said case rail and carrying on the upper and lower edges thereof first outer ball races and carrying integral therewith and disposed outwardly with respect to said first outer ball races respectively second inner ball races, a drawer rail overlying said neutral member for receiving the drawer clips on the associated drawer to mount the drawer thereon and carrying on the upper and lower edges thereof second outer ball races, a first pair of inner sets of balls disposed between said first inner ball races and the adjacent one of said first outer ball races, a second pair of outer sets of balls disposed between said second inner ball races and the adjacent one of said second outer ball races, and a lock bracket mounted on the rear end of said case rail and including a flange overlying the adjacent one of the associated drawer clips when the associated drawer is in the fully closed position thereof, thereby to lock the rear end of the associated drawer on said drawer rail when the drawer is in the fully closed position thereof.

**17.** A drawer suspension structure for mounting a drawer having pairs of drawer clips on the opposite sides thereof within a case for movement inwardly and outwardly with respect thereto, said suspension structure comprising a case rail carrying on the upper and lower edges thereof first inner ball races, means for mounting said case rail upon an associated case, a neutral member disposed about said case rail and carrying on the upper and lower edges thereof first outer ball races and carrying integral therewith and disposed outwardly with respect to said first outer ball races respectively second inner ball races, a drawer rail overlying said neutral member and carrying on the upper and lower edges thereof second outer ball races, a first pair of inner sets of balls disposed between said first inner ball races and the adjacent one of said first outer ball races, a second pair of outer sets of balls disposed between said second inner ball races and the adjacent one of said second outer ball races, and a stop bracket mounted on the rear of said neutral member and extending inwardly therefrom to engage the rear of the associated drawer rail to prevent forward move-

ment of said neutral member in the telescoped position independently of said associated drawer rail.

18. The drawer suspension structure set forth in claim 17, and further comprising a first pair of stop arms on the forward end of said neutral member extending outwardly to close the forward ends of said second inner ball races, and a second pair of stop arms on the rear end of said drawer rail extending inwardly to close the rear ends of said second ball races.

19. The drawer suspension structure set forth in claim 18, and further comprising blocks of bumper material disposed between said second inner ball races and the adjacent one of said second outer ball races and disposed between cooperating pairs of said first and second stop arms.

20. A drawer suspension structure for mounting a drawer having pairs of drawer clips on the opposite sides thereof within a case for movement inwardly and outwardly with respect thereto, said suspension structure comprising a case rail carrying on the upper and lower edges thereof first inner ball races, means for mounting said case rail upon the associated case, a neutral member disposed about said case rail and carrying on the upper and lower edges thereof first outer ball races and carrying integral therewith and disposed outwardly with respect to said first outer ball races respectively second inner ball races, a drawer rail overlying said neutral member and carrying on the upper and lower edges thereof second outer ball races, a first ball cage carrying a first pair of inner sets of balls disposed between said first inner ball races and an adjacent one of said first outer ball races, a second ball cage carrying a second pair of outer sets of balls disposed between said second inner ball races and the adjacent one of said second outer ball races, blocks of frictional material disposed in said second inner ball races and said second outer ball races at both ends of said second ball cage, a first pair of stop arms at the forward end of said neutral member extending outwardly therefrom to close the front ends of said second inner ball races, and a second pair of stop arms on the rear end of said drawer rail extending inwardly therefrom to close the rear ends of said second outer ball races, said blocks of material serving as bumpers between said neutral member and said drawer rail when said drawer suspension structure is in the fully extended position thereof.

**References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 1,725,338 | 8/1929 | Card et al. | 312—339 |
| 2,320,276 | 5/1943 | Gussack | 308—3.8 |
| 2,606,090 | 8/1952 | Straubel | 308—3.8 |
| 2,614,022 | 10/1952 | Kurtzon | 312—339 |
| 2,805,106 | 9/1957 | Penkala | 308—3.8 |
| 2,869,961 | 1/1959 | Gomersall | 312—339 |
| 2,926,048 | 2/1960 | Gussack | 312—338 X |
| 3,039,838 | 6/1962 | Koch et al. | 312—348 X |
| 3,150,902 | 9/1964 | Naab et al. | 312—217 |

JAMES T. McCALL, *Primary Examiner.*