United States Patent [19]

Faull

[11] **3,840,205**

[45] **Oct. 8, 1974**

[54] **ROCKER BOX ASSEMBLIES**

[76] Inventor: **James K. Faull,** P.O. Box 627, Niles, Ohio 44446

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[21] Appl. No.: **348,935**

[52] **U.S. Cl.** **248/385,** 297/263

[51] **Int. Cl.** **A45d 19/04**

[58] **Field of Search** ..... 297/261–269, 297/272; 5/245, 246, 248, 256, 263, 264 R; 248/382, 385

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Primary Examiner—James C. Mitchell

Attorney, Agent, or Firm—Michael Williams

[57] **ABSTRACT**

A rocker box assembly for attachment to the bottom of a chair to form a platform rocker or the like. The rocker box has swivel connection with the floor legs so that the user of the chair may not only rock but also swing about the legs. The improvement comprises an assembly formed mostly of steel stampings to facilitate quantity production. The interengaging rocker components are rigidly secured to superposed steel plates, and side plates are provided to insure proper alignment of the rocker components, and to prevent undesirable matter from being inserted between the rocker surfaces. A novel coil spring assembly maintains the rocker components in cooperating relationship and safety means are provided to insure against bodily harm in the event of failure of the coil spring assembly.

8 Claims, 10 Drawing Figures

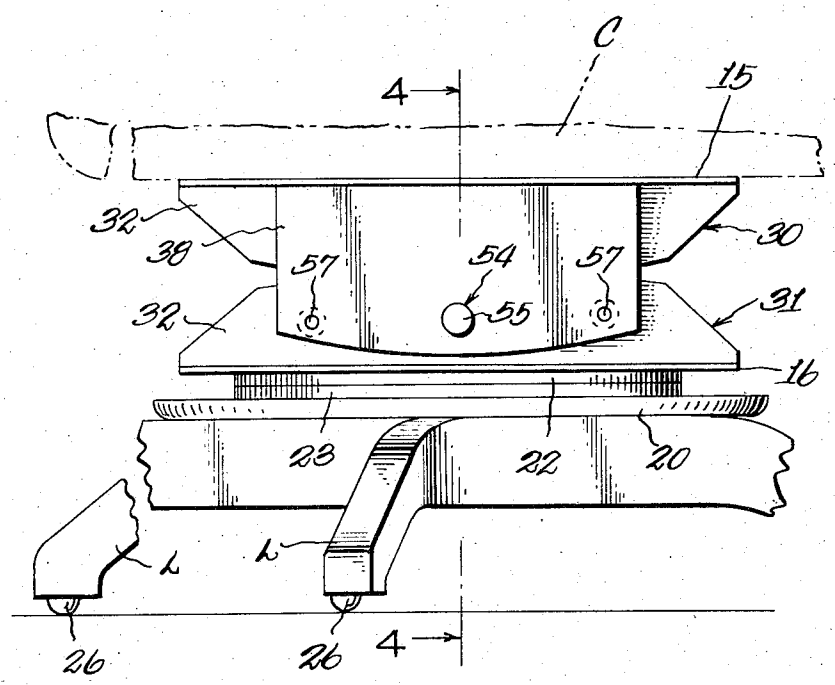


FIG. 1.

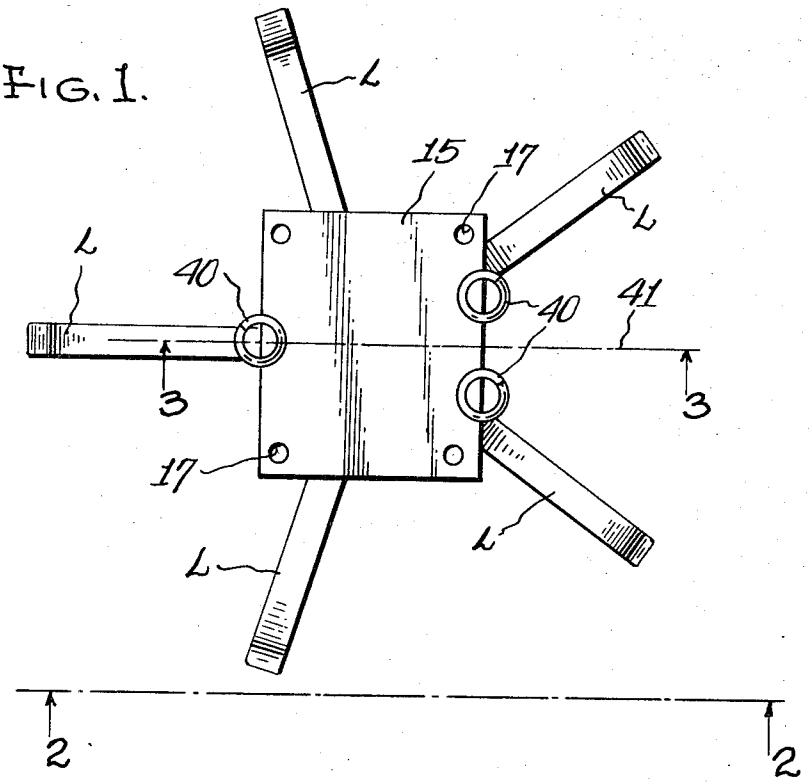

L
15
17
L
L
40
40
41
3
3
17
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2
2

FIG. 2.

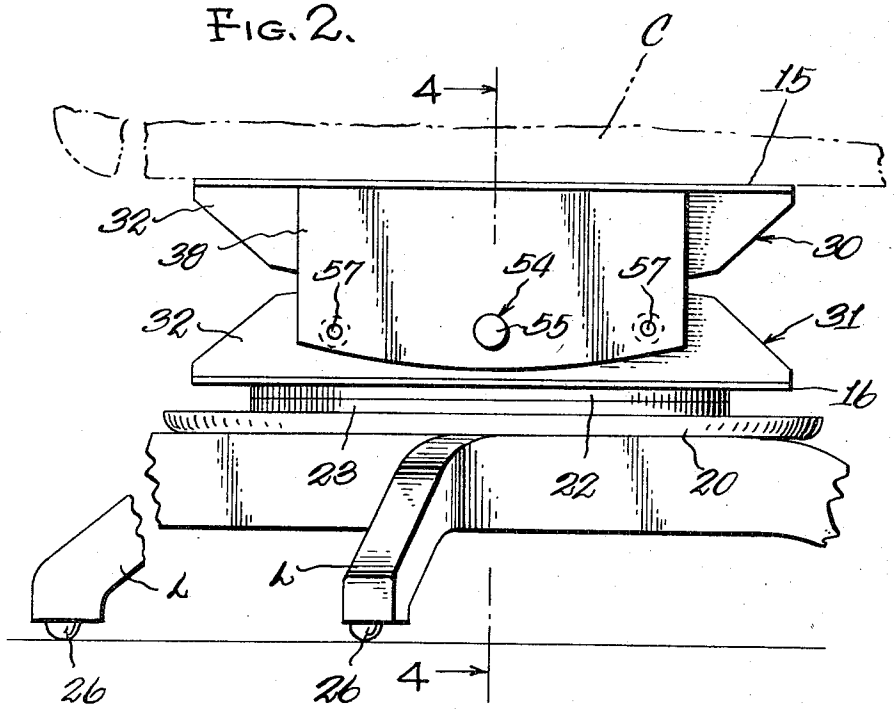

C
4
15
32
38
57
54
57
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55
31
16
23
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L
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26
4

FIG. 3.

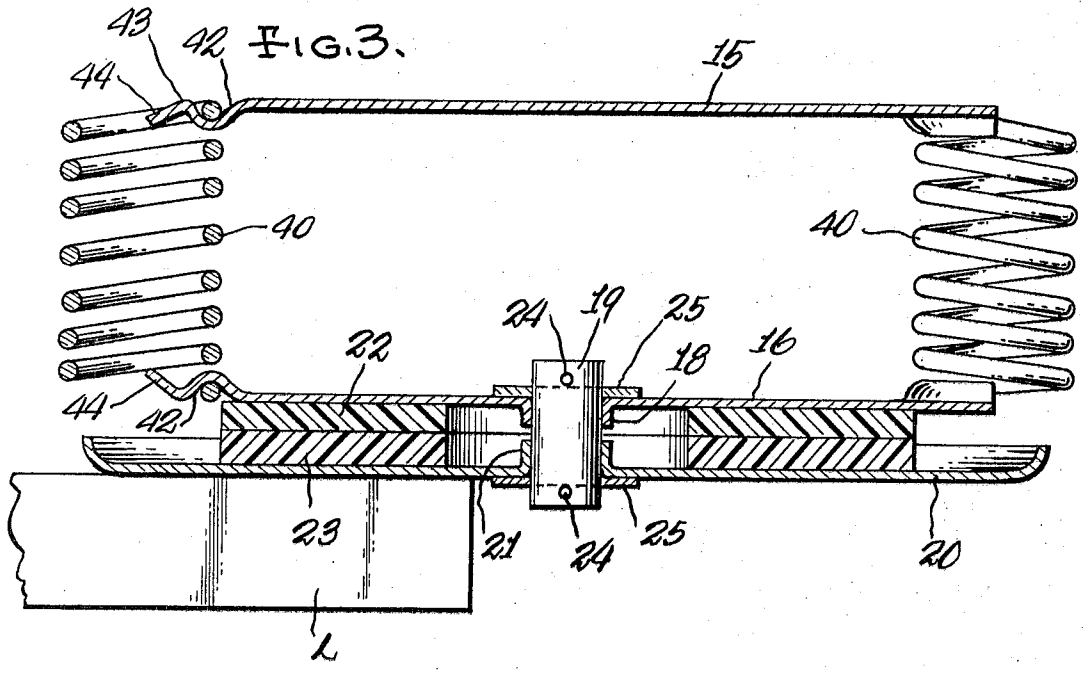


FIG. 4.

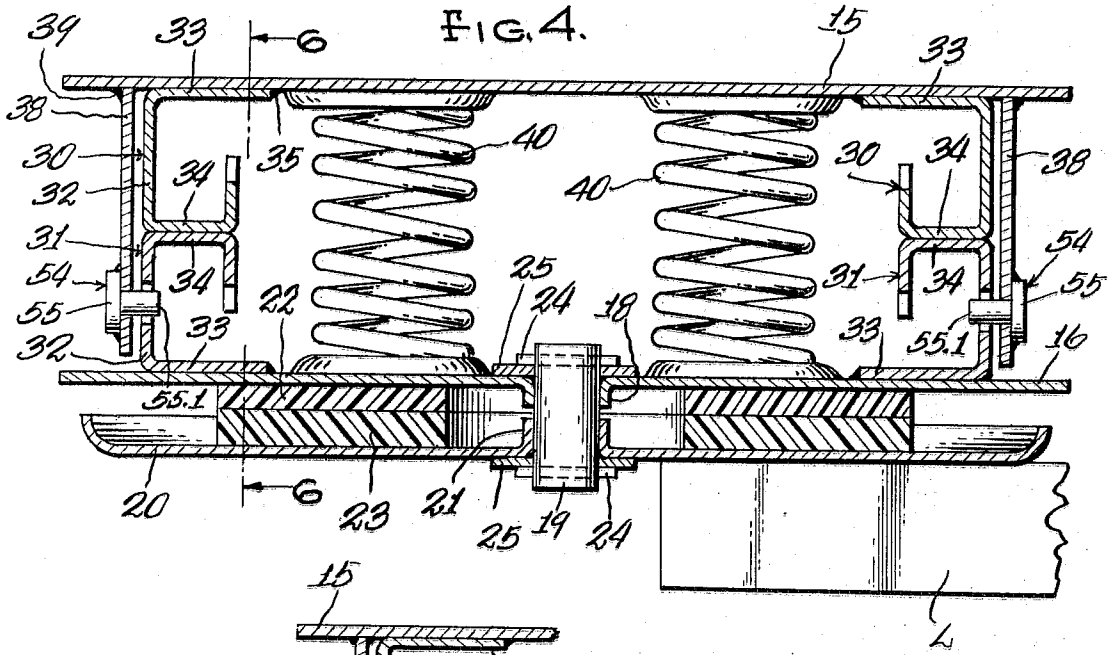


FIG. 5.

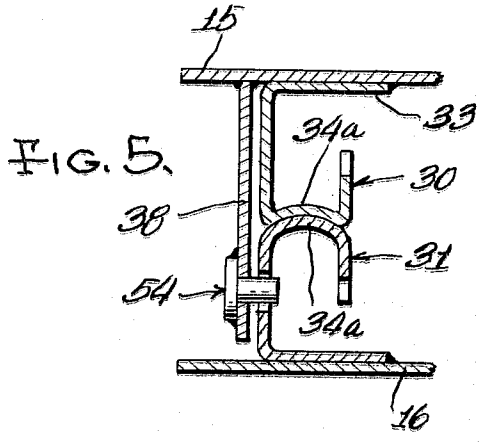


FIG. 6

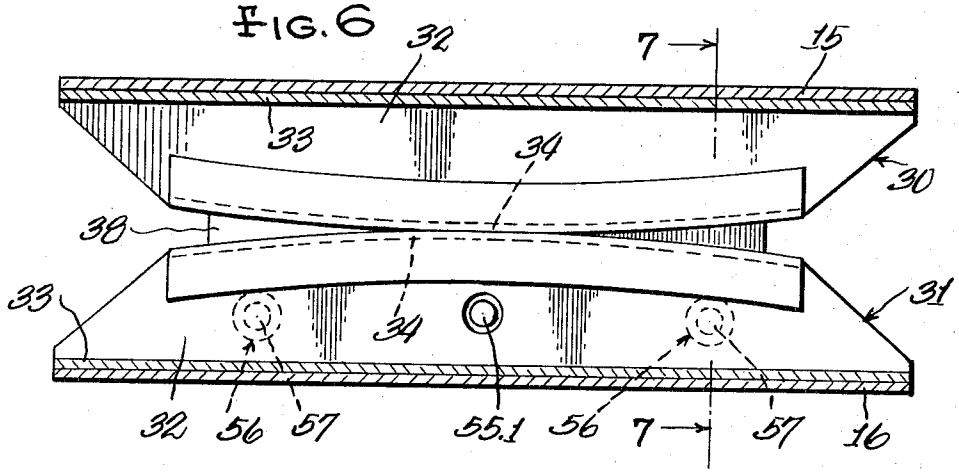


FIG. 7.

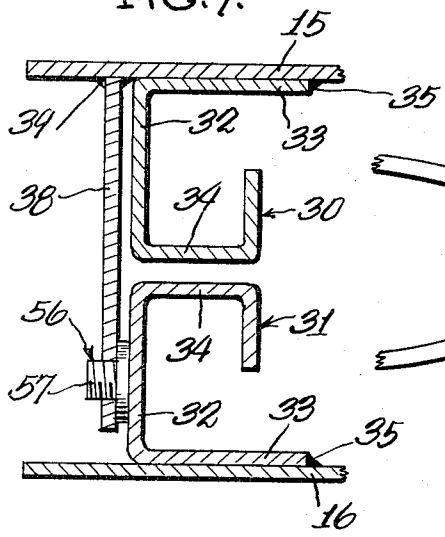


FIG. 8.

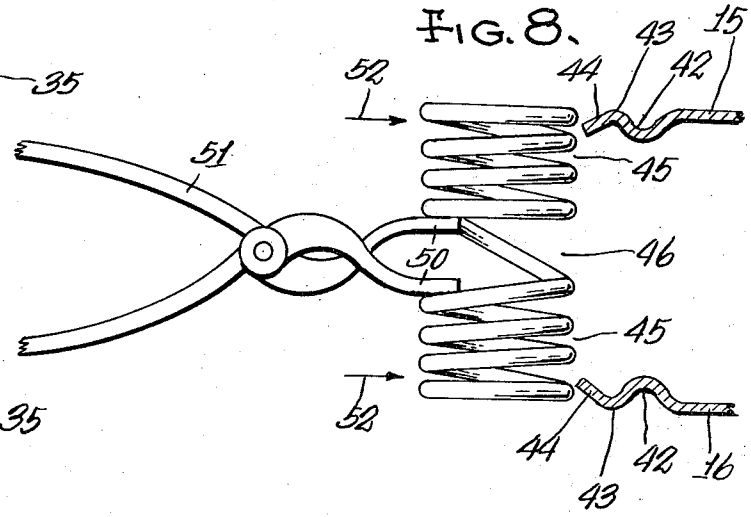


FIG. 9.

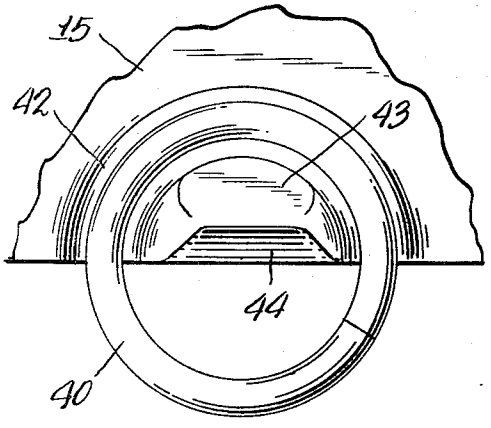
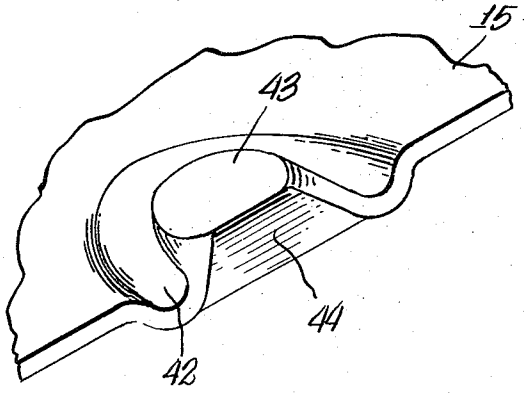


FIG. 10.



ROCKER BOX ASSEMBLIES

BACKGROUND AND SUMMARY

Rocker supports for chairs are well known in the prior art, and in more recent years, such supports have been formed of stamped components. However, such prior art rocker supports have had some inherent disadvantages from the standpoints of production, noise of operation, and safety, and my invention is intended to overcome the same.

Briefly, my improved rocker box assembly comprises two spaced, superposed support plates which are substantially flat and thus readily formed in a blanking operation. Pairs of cooperating rocker members are carried by the plates in position therebetween. Side plates are rigidly secured to one of the two spaced plates and act as guards to prevent things from getting between the cooperating rockers members. This is also a safety feature to prevent children or adults from putting their fingers between the rocker members. The side plates also prevent lateral movement between cooperating rocker members and thereby hold them in proper tracking relation. Plastic buttons are interposed between the rocker members and the side plates to decrease friction and noise.

A plurality of coil springs are disposed between the superimposed plates to hold the rocker members in engagement and urge the same to central position, and safety means is disposed between a rocker member and side plate to prevent separation of parts in the event one or more of the springs should break.

DESCRIPTION OF THE DRAWINGS

In the drawings accompanying this specification and forming a part of this application, there is shown, for purpose of illustration, an embodiment which my invention may assume, and in these drawings:

FIG. 1 is a top plan view of my improved rocker box assembly,

FIG. 2 is a broken, side elevational view corresponding to the line 2—2 of FIG. 1, but drawn to a larger scale, a portion of the chair being shown in phantom lines,

FIG. 3 is an enlarged sectional view corresponding to the line 3—3 of FIG. 1,

FIG. 4 is a sectional view corresponding to the line 4—4 of FIG. 2,

FIG. 5 is a fragmentary sectional view showing a slightly different transverse configuration of the cooperating rocker members,

FIG. 6 is a sectional view corresponding to the line 6—6 of FIG. 4,

FIG. 7 is an enlarged, fragmentary sectional view corresponding to the line 7—7 of FIG. 6,

FIG. 8 is a detail view illustrating a method of installing a coil spring,

FIG. 9 is a fragmentary, enlarged plan view showing a coil spring mounted on a support plate, and

FIG. 10 is a fragmentary perspective view showing the spring anchoring portion of the support plate.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The improved rocker box assembly comprises a pair of rectangular superposed steel support plates **15** and **16** which are largely flat and therefore readily formed in a blanking operation. The top plate **15** (see FIG. **1**) is formed with openings **17** at its corners to pass screws or bolts for securement to the base of a chair C, the latter being fragmentarily shown in FIG. **2**.

The lower plate **16** has a swivel connection with the legs L of the chair and this connection may be of any suitable form since its details are not a part of this invention. For illustration purposes, the bottom plate may have a central opening margined by a tubular boss **18**, as seeen in FIGS. **3** and **4**, to closely receive a swivel pin **19**. A cupped leg support plate **20** underlies the lower plate **16** and has a corresponding tubular boss **21** to receive the swivel pin. Plastic discs **22, 23** are secured to the facing surfaces of respective plates **16** and **20** and provide a bearing surface. The pin **19** may be held in position by cross-pins **24** which bear against washers **25**. The legs L are secured to the plate **20** and may have rollers or gliders **26** at their floor engaging ends.

Pairs of cooperating rocker members are disposed between the facing surfaces of the top and bottom support plates. Each pair includes an upper member **30** and a lower member **31**. Preferably, all rocker members are of the same construction and therefore may be made with the same blanking and forming dies, in matching pairs.

In transverse section, as seen in FIGS. **4** and **7**, each rocker member has a central web portion **32**, a leg portion **33** which is flat both crosswise and lengthwise and an opposed leg portion **34** which is flat crosswise, but arcuate lengthwise as seen in FIG. **6**. A further leg portion may be turned at right angles from the leg portion **34** for strength purposes, such further leg portion being spaced from but parallel to the corresponding web portion **32**.

The leg portions **33** of the upper rocker members **30** are secured to the upper support plate **15**, such as by welding shown at **35**. The leg portions **33** of the lower rocker members **31** are similarly secured to the lower support plate **16**. As seen in FIG. **6**, the lengthwise arcuate formation of the leg portions **34, 34** form interengaging rocker surfaces, so that the chair may be rocked by its occupant. The swivelpin **19** and bearing surfaces **22, 23** permit the chair to be swiveled by its occupant.

As seen in FIG. **5**, the upper and lower rocker members **30, 31** may be slightly modified by making the leg portions **34*a***, **34*a*** of interfitting concave-convex formation to further insure tracking of the cooperating surfaces.

In order to prevent insertion of objects between the interengaging rocker surfaces and to maintain the rocker members in tracking relation, side plates **38** are disposed exteriorly of and in juxtaposition with respect to the web portions **33** of the cooperating rocker members, as seen in FIG. **4**. This feature prevents damage to the interengaging surfaces and precludes objectional stresses from being applied to the rocker box components which otherwise might result if it were possible to insert a hardened object between the rocker surfaces. This is also a safety feature to prevent fingers and toes from being inserted between the interengaging rocker surfaces. Each side plate may have the configuration shown in FIG. **2** and may depend from and be welded to the upper support plate **15**, as seen at **39** in FIG. **4**.

A plurality of coil springs **40** are connected between the upper and lower support plates **15** and **16** to hold the rocker surfaces in interengagement and to urge such surfaces to the central position shown in FIG. **6.** All coil springs may be the same and, as seen in FIG. **1,** one coil spring may be disposed on the centerline **41** at the front of the support plates, and a pair of springs may be disposed on opposite sides of such centerline at the rear of the plates. This construction is preferable because more weight is imposed on the two rear springs when the chair is rocked backward.

My invention includes novel construction whereby each coil spring may be quickly, easily, and positively assembled with the top and bottom support plates. As best seen in FIGS. **9** and **10,** each support plate is formed with a spring anchorage portion at the place where the spring is to be connected to the plate. Such anchorage comprises a semi-circular recess **42** which is formed inwardly of the plate surface by a stamping operation. The recess provides a center anchor projection **43** which is also semi-circular in plan, as seen in FIG. **9.** The front surface of the projection **44,** which is at the straight edge of the support plate, is inclined toward the outer surface of the plate and forms a cam surface for a purpose to be explained.

Each of the coil springs has closely disposed convolutions at opposite end portions, as shown at **45** in FIG. **8,** and the adjoining convolutions at the central portion of the spring are spaced further apart, as shown at **46.** Normally, the length of each spring is less than the space between upper and lower support plates **15** and **16.** FIG. **8** illustrates the method of assembling a coil spring with the upper and lower support plates. The jaws **50** of a plier-like tool **51** are disposed between adjoining central convolutions of the spring and the spring is expanded lengthwise until the convolutions at opposite ends of the spring are aligned with upper and lower plates at the recesses **42.** A force is then applied as shown by the arrows **52,** either by a pressing action or by tapping with a hammer. The applied force causes the end convolution to ride over the cam surface **44** and snap into the recess **42** and thereafter the anchor projection **43** holds the spring against disassembly.

As before pointed out, the coil springs hold the rocker surfaces in engagement and the springs at the front and rear of the rocker box assembly are alternately compressed and stretched during rocking action of the chair. Sometimes a coil spring breaks, either because of a defect or wear, and in prior construction such breakage could cause a sudden, unexpected movement of the chair and might cause the chair's occupant to be thrown from the chair by reason of separation of the cooperating rocker members.

My invention provides an additional safety feature in that breakage of a coil spring will not result in any material separation of the cooperating rocker members. As best seen in FIGS. **4** and **6,** a retaining member **54** is disposed at the center of rocking action and this member comprises a headed stud having its head **55** welded to the outside surface of the adjoining side plate **38.** The shank **55.1** of the stud loosely passes through an oversized hole in the web **32** of the lower rocker member. Therefore, the stud does not interfere with rocking action and yet will prevent any material separation of the rocker members in the event a coil spring should break or become unfastened.

In order that the side plates **38** may be disposed close to the webs **32** of the rocker members **30, 31,** and yet not interfere with operation thereof or cause noise during operation, bearings are disposed therebetween. With reference to FIGS. **2, 6** and **7,** each of the bearings comprise a headed stud **56** formed of a suitable plastic material, such as nylon. The studs are disposed on opposite sides of the retaining member **54** and the shank **57** of each is threaded through an opening in a side plate **38.** The head of the studs are disposed between the inner surface of a side plate **38** and the facing surface of the web **32** of a lower rocker member **31** and provide bearing buttons for sliding engagement with the webs.

I claim:

1. A rocker box assembly for disposition between the seat and base of a chair and the like, comprising:

a pair of generally flat metal support plates, superposed in spaced relation, the upper support plate being adapted for connection to the chair seat and the lower plate being adapted for connection to the chair base,

two laterally spaced rocker means between said upper and lower plates, each rocker means comprising a first rocker member secured to and depending from said upper support plate and having a lower longitudinally convex rocker surface, and a second rocker member secured to and extending upwardly from said lower support plate and having an upper longitudinally convex surface engaging and cooperable with said lower convex surface, said lower convex surface being adapted to rock over said upper convex surface,

and a side guard disposed outwardly of each of said first and second rocker members, each side guard being connected to and depending from said upper support plate and extending short of said lower support plate so as not to interfere with rocking movement, each side guard overlapping substantially the full length of the engaging parts of said lower and upper convex surfaces to prevent disposition of foreign matter between the same in any normal rocking position.

2. The construction according to claim **1** wherein each of said upper and lower rocker members is formed of metal and is generally of channel shape in transverse section, including a web and legs extending at right angles from opposite ends of said web, one leg being rectilinear in longitudinal section and secured to its respective support plate and the other leg being arcuate in longitudinal section to provide the convex rocker surface.

3. The construction according to claim **2** wherein the rocker members of each rocker means have their webs in vertical alignment, each side guard comprising a flat metal rigidly connected to and depending from said upper support plate in closely spaced relation with respect to the aligned webs.

4. The construction according to claim **3** and further including slide bearing means between facing surfaces of each side guard plate and the web of a related lower rocker member.

5. The construction according to claim **4** wherein each slide bearing means comprises a headed plastic stud, the shank of said stud being fixed in a hole in said side guard plate and the head of said stud having sliding

engagement with the web surface of a related lower rocker member.

6. A rocker box assembly for disposition between the seat and base of a chair and the like, comprising:

a pair of generally flat metal support plates, superposed in spaced relation, the upper support plate being adapted for connection to the chair seat and the lower plate being adapted for connection to the chair base,

two laterally spaced rocker means between said upper and lower plates, each rocker means comprising a first rocker member secured to and depending from said upper support plate and having a lower longitudinally convex rocker surface, and a second rocker member secured to and extending upwardly from said lower support plate and having an upper longitudinally convex surface engaging and cooperable with said lower convex surface, said lower convex surface being adapted to rock over said upper convex surface,

a plurality of coil springs between said upper and lower support plates, providing means for holding said plates in assembled relation and for holding said convex surfaces in rocking engagement,

and means operative in the event of spring failure for holding said support plates and said convex surfaces against material separation.

7. The construction according to claim 6 wherein each of said upper and lower rocker members is formed of metal and is generally of channel shape in transverse section, including a web and legs extending at right angles from opposite ends of said web, one leg being rectilinear in longitudinal section and secured to its respective support plate and the other leg being arcuate in longitudinal section to provide the convex rocker surface, the rocker members of each rocker means having their webs in vertical alignment,

a side guard disposed outwardly of each of said first and second rocker members, each side guard comprising a flat plate rigidly connected to and depending from said upper support plate in closely spaced relation with respective aligned webs,

the last named means in claim 20 comprising a stud secured to a side guard plate to coincide with a central position of the cooperating lower and upper convex surfaces, said stud having its shank fitting into an oversized hole in the web of the related lower rocker member, whereby free rocking of said lower convex surface over said upper convex surface is permitted, but whereby the stud shank engages a margin of the hole in the web of the related rocker member in the event of spring failure.

8. A rocker box assembly for disposition between the seat and base of a chair and the like, comprising:

a pair of support plates, superposed in spaced relation, the upper support plate being adapted for connection to the chair seat and the lower support plate being adapted for connection to the chair base,

rocker means between said plates so that the latter may rock relative to each other,

and coil springs connected between said plates to yieldably oppose relative rocking movement of said support plates, the spring connection comprising a semi-circular recess in a marginal portion of a plate and a semicircular projection concentric within said recess and tapering from a larger size at the bottom of said recess to a smaller size at the top, said projection having a cam face at the marginal portion of said plate and being engageable with an end convolution of a coil and operable, upon application of lateral force to said end convolution to spring it apart from an adjoining convolution sufficiently to permit said end convolution to ride over said projection and snap into said recess.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,840,205 Dated October 8, 1974

Inventor(s) James K. Faull

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 57, after metal add -- plate --.

Column 6, line 5, change 20 to -- 6 --.

Signed and sealed this 3rd day of December 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

FORM PO-1050 (10-69)

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