

May 1, 1962

G. NELSON ET AL

3,032,307

LEG STRUCTURE FOR FURNITURE

Filed Aug. 3, 1959

2 Sheets-Sheet 2

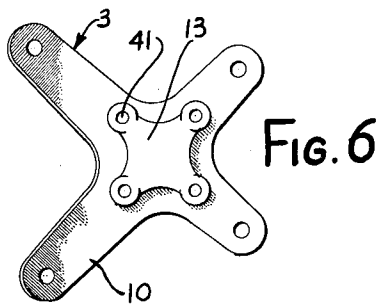


FIG. 6

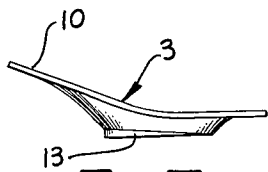


FIG. 7

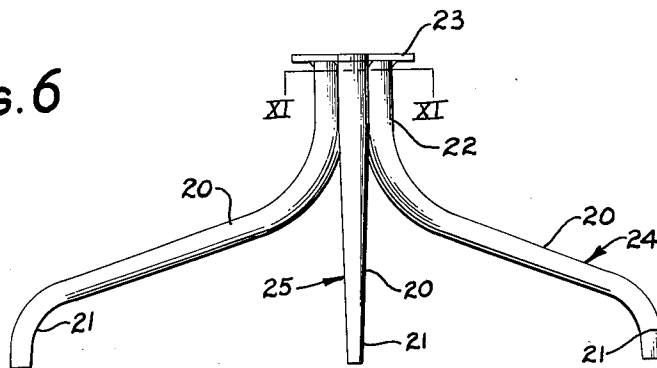


FIG. 5

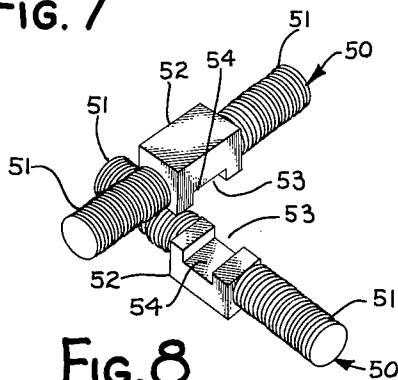


FIG. 8

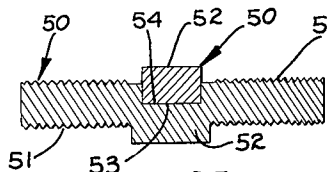


FIG. 9

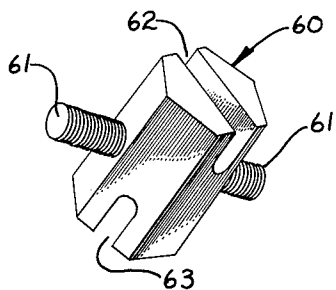


FIG. 10

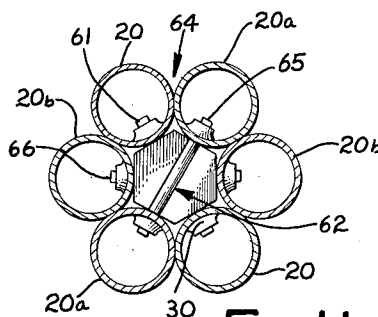


FIG. 11

INVENTOR
GEORGE NELSON
CHARLES R. POLLOCK

BY

Prin & Hensel

ATTORNEYS

1

3,032,307

LEG STRUCTURE FOR FURNITURE

George Nelson, Quogue, and Charles R. Pollock, New York, N.Y., assignors to Herman Miller, Inc., a corporation of Michigan

Filed Aug. 3, 1959, Ser. No. 831,243

1 Claim. (Cl. 248—194)

This invention relates to furniture and more particularly to a novel pedestal construction for furniture utilizing a simple high speed means of anchoring the independent legs of the pedestal into an assembly.

Furniture pedestals employing a multiplicity of independent leg elements clustered together to form a single supporting unit have long been known in the furniture art. While these have distinct functional and aesthetic advantages, they have been considered too costly for many applications. This has arisen from the complexity of the problems involved in firmly securing the legs together to withstand the long and severe loading characteristic of furniture usage. This is particularly true of pedestals for chairs. Although the conventionally employed attachment and assembly means for this type of pedestal structure is complex and expensive, as a whole such pedestal assemblies have been characterized by early failure due to the torsional and racking loads applied in usage.

This invention provides a simple and effective solution to this problem. The resulting pedestal is stable and capable of withstanding the most severe racking and torsional loads. Its nature is such that it is simple, quick and inexpensive to assemble and involves the usage of relatively low cost components.

The invention provides a positive lock between the independent standard members of the pedestal. This lock is of a nature that it is not subject to failure under racking and torsional loads.

Besides its structural advantages, it also affords an assembly structure for this type of pedestal capable of complete concealment. It is adaptable to many types of leg structures and thus may be utilized with a wide variety of design concepts and configurations. The simplicity of its assembly permits the units to be shipped in knocked-down condition since the only tool the customer has to have to assemble the pedestal is a common screw driver.

These and other objects and advantages of this invention will be immediately understood by those acquainted with the design and construction of furniture upon reading the following specification and the accompanying drawings.

In the drawings:

FIG. 1 is an oblique bottom view of a chair incorporating this invention;

FIG. 2 is a fragmentary plan view of a pedestal assembly incorporating this invention;

FIG. 3 is a partially broken fragmentary sectional view taken along the plane III—III of FIG. 2;

FIG. 4 is a partially broken fragmentary sectional view taken along the plane IV—IV of FIG. 2;

FIG. 5 is a side elevation view of the assembled pedestal.

FIG. 6 is a bottom view of the base fitting used for securing the pedestal to the chair shell;

FIG. 7 is a side elevation view of the base fitting illustrated in FIG. 6;

FIG. 8 is an oblique exploded view of a modified tie stud construction for this invention;

FIG. 9 is a central sectional elevation view of the assembled tie studs illustrated in FIG. 8;

FIG. 10 is an oblique view of a modified spacer construction for this invention;

FIG. 11 is a sectional view taken along the plane XI—

2

XI of FIG. 5 but illustrating the use of the spacer shown in FIG. 10 with a hexalegged pedestal.

In executing the objects and purposes of this invention, there is provided a pedestal having four separate standards. These are assembled into a cluster adjacent their upper portion. In this area each of the standards has a straight shank portion. The pedestals are arranged in pairs oriented normal to each other. The standards of each pair are joined by a tension member. The tension member is surrounded by a spacer which predetermines the desired spacing between them. The lateral width of the spacer of one pair is equal to the length of the spacer of the other pair whereby the legs, when assembled, are in bearing with the spacer along their joining tension member and with the spacer joining the other pair. The tops of the legs are provided with means to fixedly secure them to the unit of furniture for whose support they are to be used.

Referring specifically to the drawings and to FIG. 1, there is illustrated a chair having a pedestal 1, a shell 2 and a base fitting 3. The base fitting serves the purpose of joining the shell to the pedestal. Since this invention lies in the structure of the pedestal, the fact that a chair shell 2 is illustrated as being used with the pedestal is to be considered as merely a means of showing a total embodiment of the invention as applied to a piece of furniture rather than as showing a limitation of the invention. This pedestal may be applied to any type of furniture or to any other objects requiring support.

The base fitting 3 has a plurality of outwardly extending arms 10, each of which is joined at its end to the shell 2 through a resilient mount 11. The resilient mounts 11 are secured to the shell by any suitable means such as adhesive bonding. Assembly of the base fitting 3 to the mounts 11 is by means of screws 12. The base fitting 3 also has flat embossments 13 on its lower face for mounting the hereinafter described pedestal assembly 1.

It will be recognized that in other applications of this invention, the pedestal may be attached directly to the unit it is used to support, thereby omitting the base fitting 3.

Referring specifically to FIGS. 2 and 5, the pedestal 1 in the preferred embodiment illustrated has four legs or standards 20. As illustrated, these legs are identical in configuration and length. This is not essential to the invention since the legs may be different lengths if it is desired to adapt the standard to an inclined unit. It is also not essential that they be of the same configuration except in their upper portions. Each of the legs 20 has a foot portion 21, designed to make floor contact and extended outwardly from the geometric center of the pedestal sufficiently to provide adequate stability.

The upper portion of each of the legs 20 is identical and includes a straight shank portion 22. Each of the shank portions 22 terminates at its upper end in an anchor lug 23. While the anchor lugs make a simple and convenient means of securing the legs to the unit with which they are to be used, such as the base fitting 3, other means of attachment may be employed at this point without affecting this invention.

The legs 20 are arranged in pairs, the first pair being identified by the numeral 24 and the other pair being identified by the numeral 25. The legs of each of the pairs are arranged with their shank portions parallel and spaced apart. Each of the shank portions of each of the legs is provided with an internal embossment 30. The embossments 30 are internally threaded to receive the threaded stud 31 (FIG. 3). Surrounding each of the studs 31 is a spacer 32. As illustrated in FIG. 3, each of the shank portions of each of legs 20 has a pair of embossments 30, one spaced lengthwise of the shank portion from the other. This is not necessary but does per-

mit a single leg structure to be used in all four positions in this pedestal. As illustrated in FIG. 3, the embossments 30, stud 31 and spacer 32 of the leg pair 25 are all displaced vertically from the corresponding embossments 30a (FIG. 4), the stud 31a and the spacer 32a of the leg pair 24. It is important to this invention that the width of the spacer 32 be equal to the length of the spacer 32a and that the width of the spacer 32a be equal to the length of the spacer 52. This is necessary because the sides of each of the spacers must be in bearing with the adjacent walls of the shank portions of the legs of the other pair when the pairs are assembled to form a pedestal. It is also important to this invention that the studs 31, and accordingly their associated spacers 32, be located at some distance from the point of attachment of the adjacent ends of the legs 20 to the unit to which the pedestal is to be secured. This requirement is based upon the fact that the stability or strength of an attachment made at two points increases in proportion to the spacing between the two points of attachment. It is obvious to prevent mechanical interference that the studs 31 and 31a, as they are constructed, must be displaced longitudinally of the shank portions 22 as is illustrated by FIGS. 3 and 4.

An anchor lug 23 is rigidly secured to the upper end of each of the individual legs 20 by suitable means such as welding. In the preferred embodiment shown, the anchor lugs are elongated and project outwardly from the upper end of each leg in alignment with and over the feet 21. At the outer end of each of the anchor lugs 23 is an opening 40. The opening 40 in the four anchor lugs 23, when the pedestal is assembled, align with corresponding openings 41 in the base fitting 3. The anchor lugs are secured to the base fitting 3 by suitable means such as the screws 42. When the screws 42 are tightened, the upper surfaces of the anchor lugs 23 will be pulled into tight abutment with the faces of the embossments 13.

The pedestal assembly, once joined securely to the base fitting 3 or to any other rigid structure substituting for the base fitting 3, is stable and durable. Each individual leg is secured at three points. The first point is its threaded attachment at its embossment 30 to the stud 31. Since this stud is also threadably engaged to a similar embossment in the opposite leg of a pair of legs, separation of the legs axially of the stud 31 at this point is impossible. Also, at this point, the legs of the assembled pair preferably are drawn tightly against the ends of the bushing surrounding the stud 31. This provides a substantial area of bearing contact supporting the legs against rocking motion in a vertical direction about the stud 31.

The second point of contact is the bearing between the inside surfaces of the assembled leg pair with the spacer associated with the other pair of legs making up the pedestal. This point of contact is spaced vertically from the point of contact with the spacer surrounding the stud joining the particular pair. Thus, the bushings provide two points of contact and, therefore, a reasonably stable structure.

Limited twisting motion of the legs about each other may occur, however, in some assemblies because of accumulated tolerances. This is entirely eliminated when the anchor lugs 23 are secured to the base fitting 3 or its equivalent. This latter attachment provides a third point of anchorage spaced from both of the other two points of anchorage previously explained. The result is a highly stable structure capable of withstanding severe shock and torsional loadings without twisting, racking or otherwise loosening.

It will be noted in FIG. 3 that each leg 20 has a pair of vertically spaced embossments 30 although only one on each leg is actually utilized. This is done, however, to make the legs universal, eliminating the necessity for leg selection on the basis of embossment location.

This problem can be resolved in another way. FIGS. 8 and 9 illustrate such an alternate solution. In this

arrangement a pair of identical studs 50 are utilized. Each has a pair of oppositely threaded ends 51, i.e., one end has a right hand thread and the other a left hand thread. The center portion or body section 52 of the studs are offset to form a notch 53. The bottom or back wall 54 of the notch is on the centerline of the stud and its width is equal to the width of the center portion 52. Thus, the centerlines of the threaded holes into which the threaded ends 51 of a pair of studs are received may all be in a single plane with the center portions 52, interfitted as illustrated in FIG. 9.

This arrangement eliminates the necessity for dual embossments 30 in each leg. The interfitted of the center portions 52 prevents the studs from rotating and, thus, loosening in service. Also, firm or tight fit between the center portions 52 forms a highly stable lock, supporting the legs against twisting and racking.

FIGS. 10 and 11 illustrate a modification of this invention adapting it to use with pedestals having an even number of legs more than four. In this construction a single polygon spacer 60 is used having one side for each leg in the pedestal assembly. The spacer 60 has a pair of oppositely projecting, threaded studs 61. On one end of the spacer is a transverse slot 62 opening through two opposite faces other than those associated with the studs 61. On the other end of the spacer is a second slot 63 opening through and connecting the remaining two faces.

The studs 61 thread into the embossments 30 of a pair of the legs 20 of the pedestal 64. The slot 62 receives the shank of a tie stud 65 connecting the pair of legs 20a. The stud 65 may be identical to the stud 31 illustrated in FIG. 3. The slot 63 receives the shank of a second tie stud 66 connecting the pair of legs 20b. Thus, the cluster of legs are firmly assembled to and about the spacer 60. In making the assembly, the legs 20 will be attached first. The leg pairs 20a and 20b will be subassembled and joined to the leg and spacer subassembly by sliding them into position, one from each end of the spacer.

In practice, the individual legs 20 are preferably shipped as separate disassembled components. To assemble the pedestal, as illustrated in FIGS. 2-5, the user merely has to select a pair of legs, place a bushing about a stud and then turn the legs on the stud until they are drawn tightly against the ends of the bushing. The same operation is completed with respect to the other pair of legs. One pair of legs is then placed over the other pair of legs and the two pairs are assembled simply by sliding one pair telescopically between the other pair parallel to the shank portions of the legs. No tools are required for this assembly operation. Once all four legs have been assembled into a pedestal, the pedestal itself is secured by installation of the screws 42. This completes the assembly and mounting of the pedestal.

It is obvious that the same basic assembly procedure is followed in the constructions illustrated in FIGS. 8-11. In the case of the studs 50 (FIGS. 8 and 9) care must be exercised that the studs are properly oriented to readily interfit as they are brought together. The top ends of the legs in all the constructions are stabilized by attachment to a suitable fitting or plate such as the base fitting 3.

While the legs in this preferred embodiment are illustrated as being anchored to the base fitting 3 by means of projecting lugs 23, it will be understood that any other suitable means of securing them to the base fitting is embraced within the scope of this invention. As for example, an internally threaded plug may be inserted or press-fitted into the upper ends of the tubular leg member 20. These may be secured to the base fitting 3 by screws installed downwardly through the fittings into the threaded openings in the press-fitted lugs.

It will also be recognized that while the legs are shown

to have a tapered shape, this is merely a matter of design selection and has no bearing on the invention. The legs themselves may be fabricated from any suitable material such as metal or plastic. They may also, so far as this invention is concerned, be either tubular or solid. In either case, this invention may be employed and the results will be the same so far as operation, function and result are concerned.

It will be further recognized that while the spacers are illustrated as circular in cross section, with equal facility they may be rectangular, square or elliptical so long as they provide bearing on the ends for the pair of legs to which they are secured and bearing on their sides for the other pair of legs involved in the pedestal assembly.

Having described a preferred embodiment of this invention and modifications thereof, it will be understood that other modifications may be made without departing from the principles of this invention. Such of these modifications as incorporate the principles of this invention are to be considered as included in the hereinafter appended claims unless these claims, by their language, expressly state otherwise.

We claim:

A furniture base comprising: a plurality of standards arranged in pairs; the standards of each pair having spaced apart straight shank portions adjacent one end; a spacer having a plurality of straight faces a tension member extending between and joining the standards of each pair; the tension member of one pair being spaced

longitudinally of said shank portions from the tension member of the others of said pairs and being secured to said spacer and projecting from oppositely disposed faces of a plurality of straight faces on said spacer; a transverse slot at one end of said spacer opening through another pair of oppositely disposed straight faces, another transverse slot at the other end of said spacer and opening through at another pair of oppositely disposed straight faces, said transverse slots each telescopically receiving a tension member, said spacer embracing each of said tension members and having one of said faces in bearing with each of said standards whereby said standards are locked together as a pedestal.

References Cited in the file of this patent

UNITED STATES PATENTS

303,238	Strifler et al.	Aug. 5, 1884
1,036,203	Fackler	Aug. 20, 1912
1,397,764	Kunishige	Nov. 22, 1921
1,654,539	Ferris	Jan. 3, 1928
1,997,660	Smith	Apr. 16, 1935
2,458,890	Booth	Jan. 11, 1949
2,474,318	Molla	June 28, 1949
2,528,950	Engstrom	Nov. 7, 1950
2,562,022	Duer	July 24, 1951
2,664,141	Musselman	Dec. 29, 1953

FOREIGN PATENTS

155,256	Australia	Feb. 12, 1954
---------	-----------------	---------------