Sept. 12, 1950 G. D. MYERS 2,522,394

TUBULAR STRUCTURE

Filed March 11, 1946 2 Sheets-Sheet 1

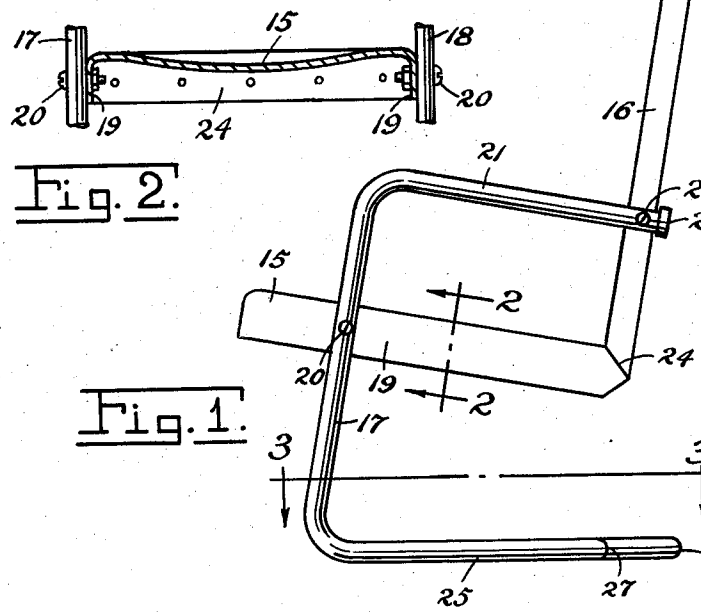


Fig. 2.

Fig. 1.

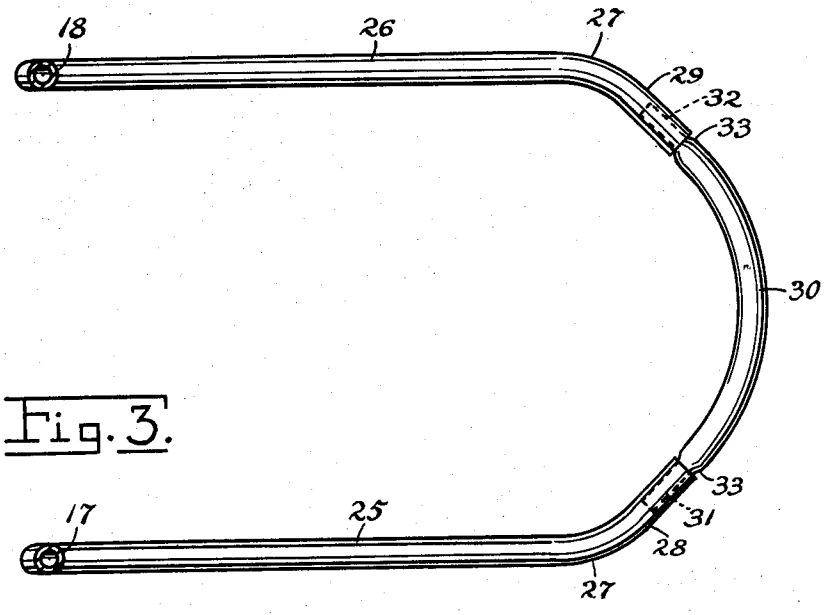


Fig. 3.

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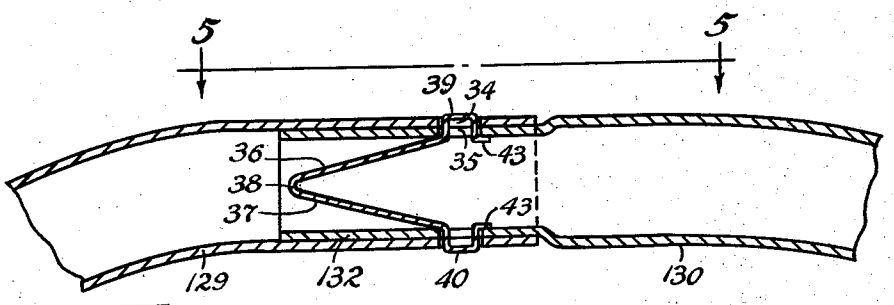


Fig. 4.

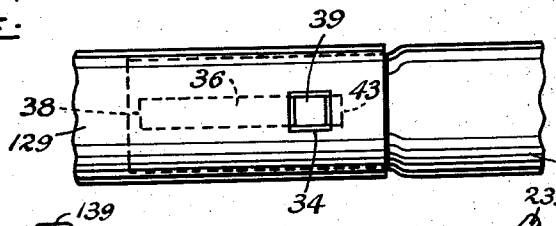


Fig. 5.

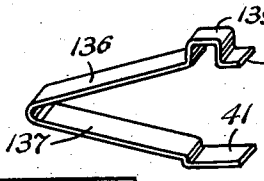


Fig. 6.

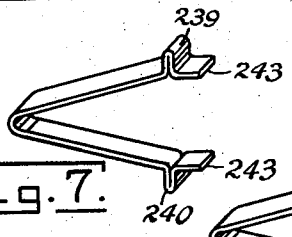


Fig. 7.

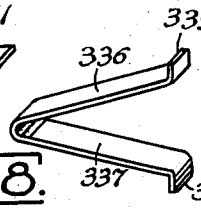


Fig. 8.

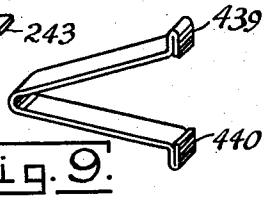


Fig. 9.

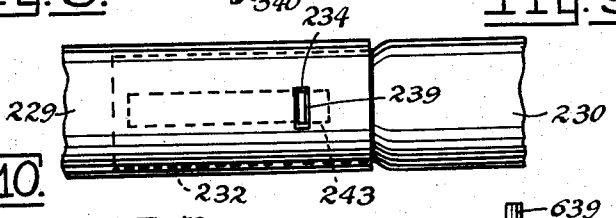


Fig. 10.

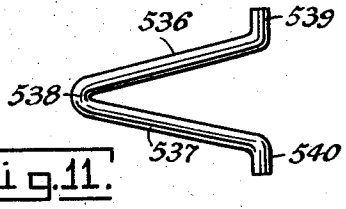


Fig. 11.

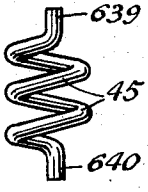


Fig. 13.

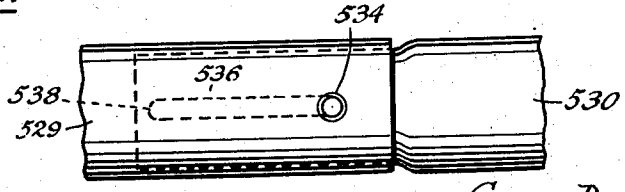


Fig. 12.

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TUBULAR STRUCTURE

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Application March 11, 1946, Serial No. 653,467

2 Claims. (Cl. 155—194)

1

This invention relates to a tubular structure which, in a broad sense, may be applicable in an infinite number of instances of usage and environment. As an example of one possible usage, there is disclosed herein an article in the form of a metal chair which may be improved by incorporating the means of the present invention; however it should be clearly understood that the invention is applicable to numerous other products, as will appear in the light of the present disclosure.

One of the objects of the invention is to provide an improved article of furniture, for example a metal chair or the like, which is so constructed that it may be shipped in knocked down condition as a compact parcel, and assembled by the purchaser with a minimum of effort and time expenditure.

Another object is to provide a sectional frame for a metal chair or the like, which may safely and expeditiously be assembled without the use of bolts, screws, or other fastening devices which are unsightly, and which are likely to damage floors, lawns, or the clothing of the user.

Another object is to incorporate in a sectional frame for furniture and the like, quick-acting latch means of a simple and inexpensive nature, for connecting the constituent parts of the frame whenever the use of latching means might be considered advantageous, as for example, from the sales viewpoint.

A further object is to provide improved quick-action locking means, simple, durable, and effective in character, for maintaining telescopic tube sections in connected relationship.

Another object is to provide locking means of the character mentioned, which may be produced expeditiously at low cost, and which in practice may be applied to telescopic tube sections with a minimum of expenditure of time and effort, the locking means being easily and quickly disengaged to effect separation of the tubular sections when desired.

The foregoing and other advantages are attained by the means described herein and illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevational view of a metallic chair constructed in accordance with the invention.

Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1.

2

Fig. 3 is an enlarged cross-sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is an enlarged fragmental cross-sectional view of a pair of telescopic tubes held in connected relationship by the improved latching means of the invention.

Fig. 5 is a fragmental plan view taken on line 5—5 of Fig. 4.

Figs. 6 to 9 inclusive, are perspective views of the latching devices variously modified.

Fig. 10 is a view similar to Fig. 5, showing the latching device of Fig. 7 applied to a pair of telescopic tubes.

Figs. 11 and 13 are elevational views of two additional modifications.

Fig. 12 is a plan view of a pair of telescopic tubes held in connected relationship by means of the latching device shown in Fig. 11.

Referring to the drawing Figs. 1, 2 and 3, there is illustrated a chair comprising a seat 15 and a back 16 preferably, though not necessarily formed of sheet metal. At opposite sides of the chair are mounted a pair of tubular frame elements each of which includes an inclined forward leg, said legs being indicated at 17 and 18. The inclined forward legs are fixedly secured to the sides 19 of the chair seat, as by means of a bolt or other fastener 20. In different forms of chairs the inclined forward legs may be extended to an elevation above the seat, and directed rearwardly to the back 16 for the purpose of providing arm rests 21, or as an alternative, the extension forming the arm rest might be located at a lower elevation to support the seat, thereby providing an armless chair. In either case, the seat is firmly fixed transversely of the inclined forward legs of the chair.

In a chair provided with arm rests as illustrated, the free ends of the arm rests may be bolted or otherwise secured, as at 22, to the opposite sides of back member 16, and since the frame elements constituting the inclined legs and arm rests are preferably formed of tubular metal, it is considered desirable to apply a cap 23 to the open end of the tubular portion 21. Such a cap enhances the appearance of the chair, and at the same time excludes water and other foreign materials. As will be understood, the seat and the back are to be firmly fastened together along the transverse joint 24 by means of suitable fasteners.

At the lower ends of the inclined forward legs 17 and 18, the frame tubing is directed rearwardly to provide base sections 25 and 26 which underlie the seat 15 and extend in substantial parallelism with one another. The base sections are adapted to rest upon a floor or other supporting surface, and for that reason will be disposed in a common plane. In the event that the chair is formed as a rocker, the base sections will be curved as is customary, but in that event will be considered to rest within a common mean plane.

In accordance with the invention, the rear ends of the base sections 25 and 26 are to be joined by means of a self-locking frame connector which may be in the form of a short rigid tube, bar, rod or the like 30 spanning the base sections. In the conventional chair of the general type herein disclosed, it has been customary to either form the frame connector as an integral part of the base sections, or to span the base sections at or near their rear ends with a separate connecting member meeting the base sections at right angles, with bolts or other fasteners employed in fixing such separate connecting member to the base sections. When the connecting member was formed integrally with the base sections, the forward legs, and the arm rests, the structure presented quite a problem in shipping due to the bulkiness of the chair frame so constructed. The shipping problem was solved heretofore by providing the separate side frames with a transverse connecting member to be bolted or otherwise fastened across the rear ends of the base sections; however, the use of tools was required in assembling a chair so constructed, and invariably the bolts or fasteners became loose in time, and corroded because of their proximity to the earth during use of the chair, with the result that the joints soon were found unstable and ineffective to maintain the desired shape and rigidity of the chair.

In accordance with the present invention, the use of bolts or other fasteners for connecting the base sections of the chair frame parts, is eliminated entirely so that the chair may be quickly assembled or disassembled, and at the same time a rigid and durable structure is obtained. Moreover, in the knocked down condition of the chair, it may be shipped as a relatively small parcel less than four inches thick, and approximately twenty-five inches square. To achieve these advantages, the frame members are constructed as follows.

The base sections 25 and 26 of tubular metal are bent at the locations 27 to provide short terminal end portions 28—29 turned inwardly toward one another at an oblique angle less than a right angle, and in the plane which includes both base sections. For purposes of illustration, the angularity of the short end portions approximates 45° to their respective base sections, however, this angularity may be varied within limits as will become evident. While the 45° angularity of the end portions is not critical, it is considered preferable from the standpoint of practicability.

As will be observed by referring to Fig. 3, the frame connector 30 includes opposite ends 31 and 32 disposed at an angle complementary to the angle of the terminal end portions 28 and 29 of the base sections, and these ends 31 and 32 are telescopically engaged with said end portions 28 and 29 of the base sections. Although it is preferred to telescope the ends of member 30 into the tubular open ends of the base section parts

28 and 29 illustrated, it would be quite possible, of course, to reverse the telescopic relationship by furnishing the member 30 with enlarged tubular ends to receive therein the portions 28 and 29 of the base sections. The construction last mentioned, however, is not to be preferred. The most practical construction is that of forming the frame connector 30 of rigid tubing having its ends 31 and 32 swaged down to a diameter such that they will nicely fit within the open ends of parts 28 and 29, as illustrated. The length of material between the swaged ends 31 and 32 may be arched as illustrated by Fig. 3, or it may be in the form of a substantially straight length having its ends angularly related so as to fit the angular portions 28 and 29 as previously explained. This suggests also a frame connector 30 of substantial V-shape, as well as contours of a more complex design. The important consideration is that the terminal ends 31 and 32 of the frame connector be disposed at an angle complementary to the augularity of the base section ends 28 and 29. The frame connector will preferably rest in the plane of the base sections 25 and 26.

By referring to Fig. 3, it will at once be appreciated that the angular relationship indicated at 28—31 and 29—32 will effectively prevent separation of the telescopic joints if the connector member 30 be grasped and pulled toward the right in Fig. 3; and in like manner the angular disposition of the parts effectually resists any attempt made to spread apart the base sections 25 and 26, even though the tubular material of the side frames may be inherently slightly flexible. In view of the coaction obtained between the angular end portions of the frame connector 30 and the base sections 25 and 26 of the chair frame, the structure may be properly considered self-retaining in character, meaning that there is no need to bolt or otherwise fasten the frame connector 30 to the base sections in order to ensure safety and rigidity in the chair construction.

The frame connector, in an alternative form, might conceivably be of uniform diameter from end to end, so as to telescope over or possibly into the frame ends 28—29.

Although as above related, the safety and rigidity of the chair construction is assured by utilizing the self-retaining means of Fig. 3, it will be appreciated that any slight movement at the telescopic connections mentioned, may result in defacing the finish of the frame connector 30 in the region of the shoulders 33, if the frame connector be painted rather than plated. In the case of painted furniture, therefore, it may be considered desirable to preclude the possibility of any slight relative movement at the telescopic connections. In consideration of this, it may be desirable to furnish the telescopic connections with some form of automatic locking means adapted to engage and prevent the anticipated slight relative movement of the telescopic parts subsequently to assembly of the chair. Various forms of self-locking means are illustrated by Figs. 4 to 12 of the drawings.

In Fig. 4, for example, the frame connector is indicated at 130, and has its reduced end 132 telescopically received in the angularly disposed terminal end portion 129 of a base section. The parts 132 and 129 are furnished with registering rectangular openings of equal size indicated at 34 and 35, respectively, said openings being duplicated at opposite ends of a diameter. Interiorly of the reduced tubular end 132, there is initially inserted a latch member of flat spring

metal comprising arms 36 and 37 which meet at a crotch 38. At a distance from the crotch 38, the arms are turned outwardly, forwardly, then inwardly, to form outwardly extending heads 39 and 40 which are properly dimensioned to nicely engage the rectangular or square registering openings 34 and 35. From the foregoing, it will be understood that one may slightly depress the heads 39 and 40 toward one another for the purpose of effecting disengagement of the telescopic ends of the tubular members, without necessarily dislodging the resilient latch member from its position within the reduced cylindrical end 132 of the frame connector 130. Conversely, a frame connector furnished with an initially inserted latch member may readily be telescoped relative to a tubular member 129, by simply inserting the end 132 into the open end of tubular member 129, and slightly depressing the heads inwardly to permit full insertion, whereupon in registering the rectangular openings 34 and 35, the heads will spring outwardly to effect automatic locking of the parts. As will readily be appreciated by observing Fig. 5, the latch head precludes both longitudinal and rotational relative movement of the parts 129 and 130.

In Fig. 6 is illustrated a modified form of resilient latch member formed of flat spring metal, and wherein a single rectangular head 139 is provided on the resilient arm 136. The remaining arm 137 carries an offset extension 41 which is adapted to rest substantially flatwise against the inside face of tubular end portion 132 for the purpose of keeping the crotch of the latch member centered within the tube. The member 41 may properly be considered a stabilizing extension, and in the preferred form of the latching members, a similar stabilizing extension for the same purpose may be formed adjacent the head 139, as at 42. It will be noted that the latch member of Fig. 4 likewise includes stabilizing extensions 43—43.

In that form of the latch member illustrated by Fig. 7, the construction and nature of the latch member are similar to Fig. 6, with the exception that the latching head is constructed so that it is long and relatively narrow in horizontal cross section. The head in this instance is indicated by the character 239, and may be duplicated at 240, as indicated. This form of latch member will require for its accommodation, elongated slits or openings 234 in the telescopic tube sections, as illustrated by Fig. 10. Such openings or slots are to be formed in both tube sections 229 and 230, at opposite ends of a diameter, and adapted to register as explained in connection with Fig. 4 upon fully inserting the reduced end 232 into the open end of the tubular member 229. The latch member of Fig. 7 includes stabilizing extensions 243 corresponding to those indicated at 43 of Fig. 4.

In accordance with Fig. 8, the latch member comprises flat spring metal arms 336 and 337 bent outwardly at their terminal ends to provide simple heads 339 and 340. This type of latch member may be utilized in the tubular assembly illustrated by Fig. 10.

The latch element of Fig. 9 is similar to that illustrated by Fig. 8, except that the heads 439 and 440 are formed by turning the terminal ends of the resilient arms outwardly and then inwardly upon themselves, to double the thickness of the metal. This form of latch device likewise may be utilized in the assembly of Fig. 10.

Fig. 11 illustrates a modification of spring metal latch member which differs from that of Fig. 8 in that the metal is of round stock. The metal in this instance may be a wire, a rod, or a bar, of spring metal bent to substantial V-shape, thereby providing resilient arms 536 and 537 connected at the crotch 538. The terminal ends of the arms are turned outwardly to provide heads 539 and 540 to perform the same function as the heads of the latch members previously described. In this instance, however, the telescopic sections 529 and 530 will be drilled transversely along a diameter to provide registering openings 534 in both telescopic members, for the reception of the heads 539 and 540 of the resilient latch member illustrated by Fig. 11. Like the forms of latch members previously described, that of Figs. 11 and 12 precludes relative rotation and relative axial displacement of the telescoped ends of the tubular members.

Fig. 13 illustrates a variation of spring latch member in which the wire, rod, or bar stock is twisted into helical formation, with several convolutions 45 disposed intermediate the outwardly extending heads 639 and 640. This form of resilient latch member may be substituted for the resilient latch member indicated within the assembly of Fig. 12.

It may here be noted that in every instance, the resilient latch member, exclusive of its head or heads, is embraced wholly within the reduced tubular end of the frame connecting member, so that the frame connecting member may be packed and shipped from the factory with the latch member inserted. Under the circumstances, the work of the purchaser in assembling the article of furniture is greatly facilitated and expedited, and it will at once be appreciated that the purchaser need not be a mechanic in order to effect assembly of the structure. In the event that the purchaser wishes to dismantle the article of furniture for storage purposes or the like, the operation may be performed easily and expeditiously.

What is claimed is:

1. A chair which comprises a substantially horizontal seat, a substantially vertical back, a pair of resilient tubular frame elements each comprising an upright leg section attached to a side of the seat near the forward edge thereof, an arm integral with the upper end of said leg section and extending rearwardly therefrom to said back, a base section integral with the leg section and extending rearwardly from the lower end of the leg section beneath the seat, and an end portion turned inwardly at an angle of approximately 45 degrees to the base section, means for attaching the arm of each frame element to a side of the back, and a short rigid bar having opposite ends each disposed at an angle, referred to the base section, complementary to the angle of the end portion of one of the frame elements, said end portions telescopically engaging the ends of said bar to hold the base sections and bar in assembled relation.

2. A chair which comprises a substantially horizontal seat, a substantially vertical back, a pair of resilient tubular frame elements each comprising an upright leg section attached to a side of the seat near the forward edge thereof, an arm integral with the upper end of said leg section and extending rearwardly therefrom to said back, a base section integral with the leg section and extending rearwardly from the lower end of the leg section beneath the seat, and an end portion turned inwardly at an angle of approximately 45

degrees to the base section, means for attaching the arm of each frame element to a side of the back, and a short rigid bar having opposite ends each disposed at an angle, referred to the base section, complementary to the angle of the end portion of one of the frame elements, said end portions telescopically engaging the ends of said bar to hold the base sections and bar in assembled relation, the base sections, end portions, and rigid bar being in a common plane to form a flat support for the chair.

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