Dec. 23, 1958 H. SCHAFFER 2,865,439

ARTICLES OF FURNITURE AND SUPPORTING MEANS THEREFOR

Filed June 27, 1952 5 Sheets-Sheet 1

Fig. 1

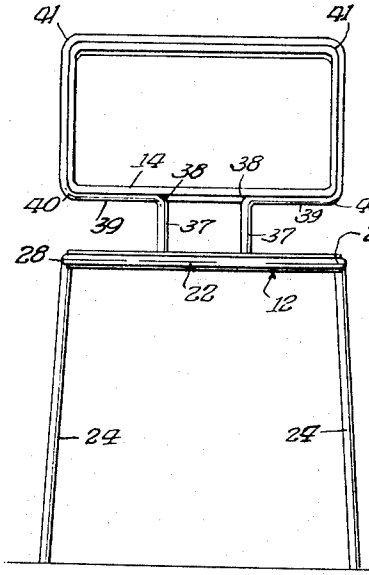


Fig. 9

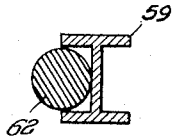


Fig. 10

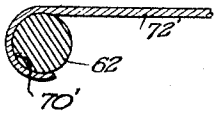


Fig. 3

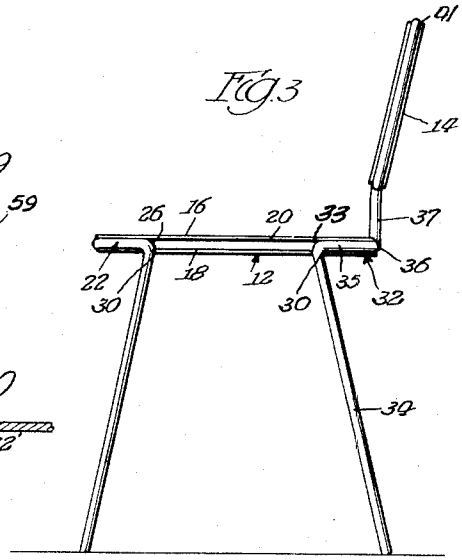


Fig. 2

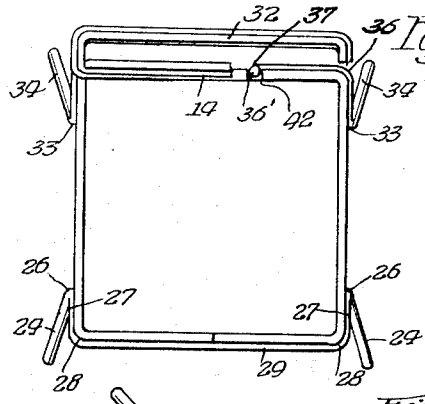


Fig. 4

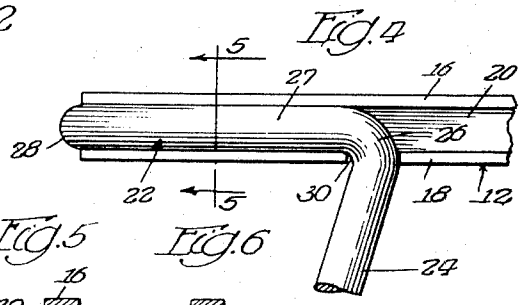


Fig. 5

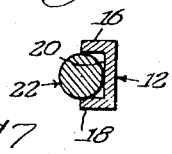


Fig. 6

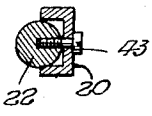


Fig. 7

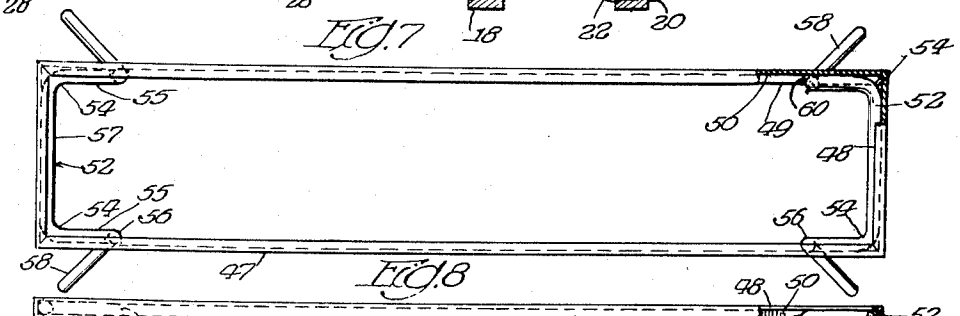
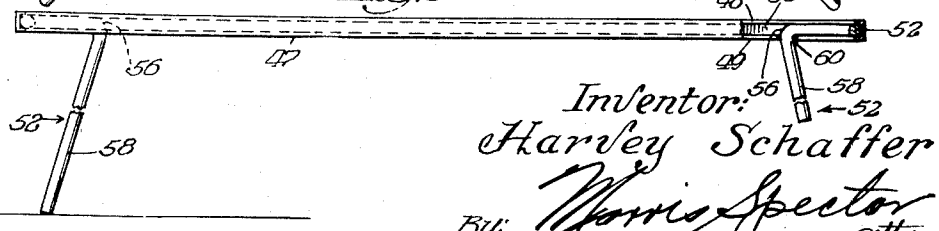


Fig. 8

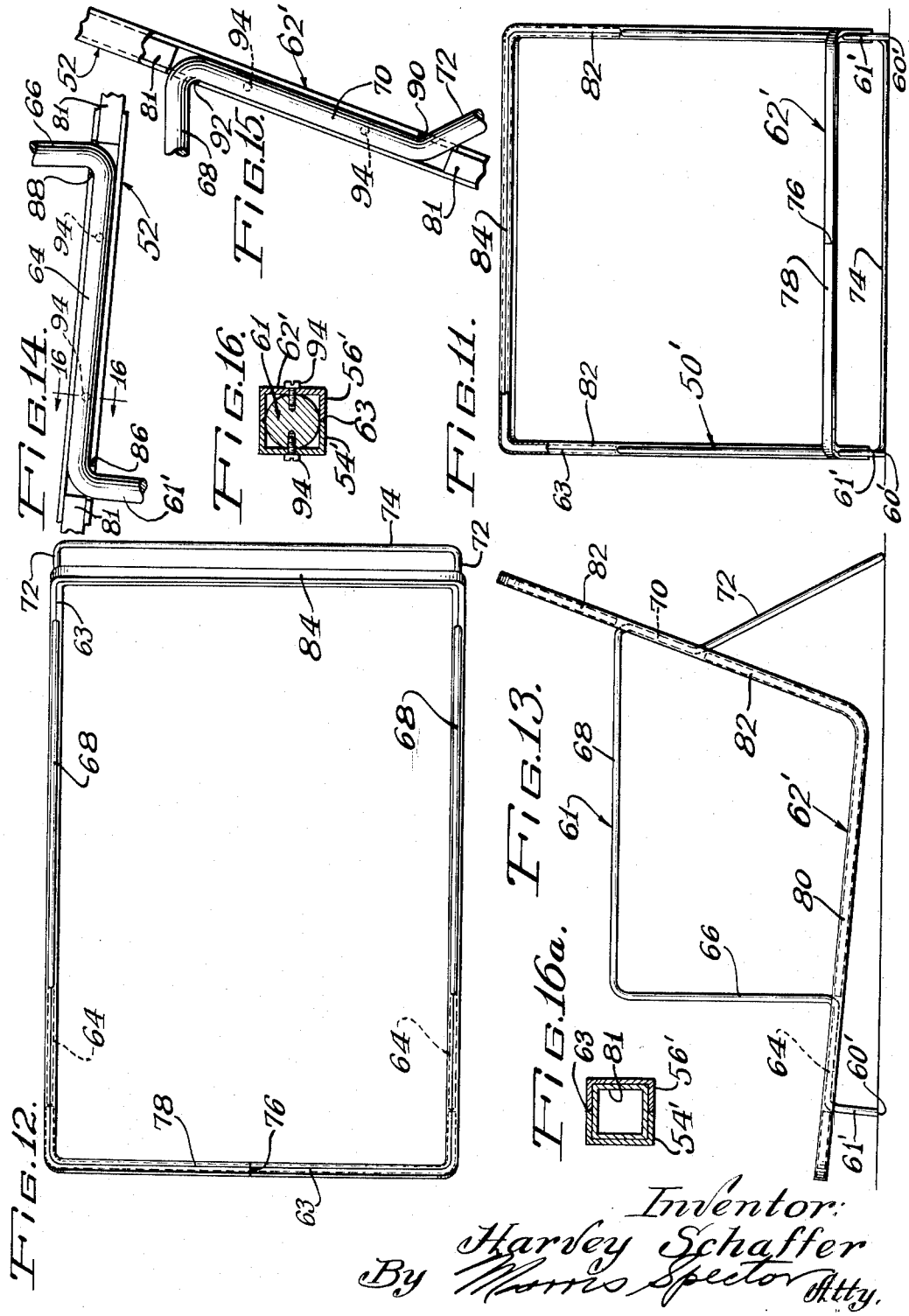


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ARTICLES OF FURNITURE AND SUPPORTING MEANS THEREFOR

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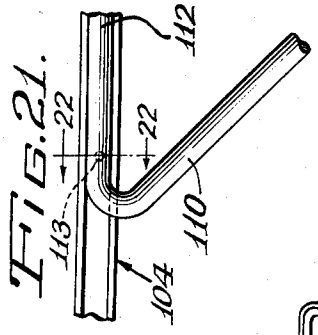


FIG. 21.

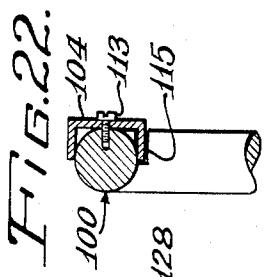


FIG. 22.

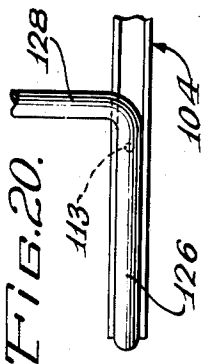


FIG. 20.

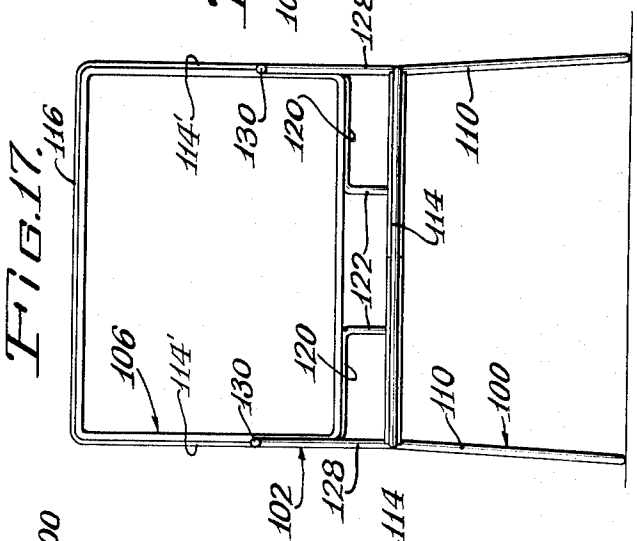


FIG. 17.

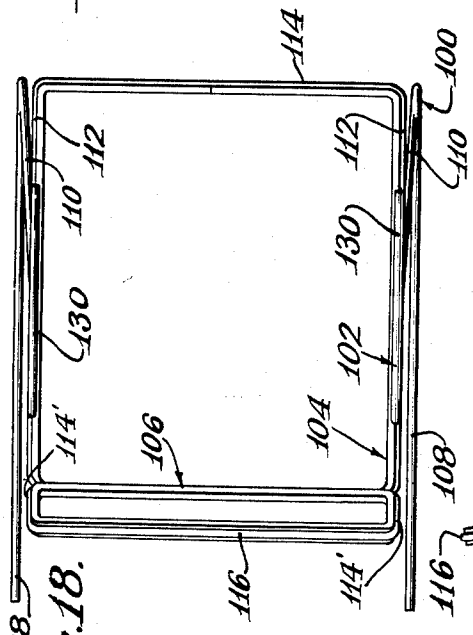


FIG. 18.

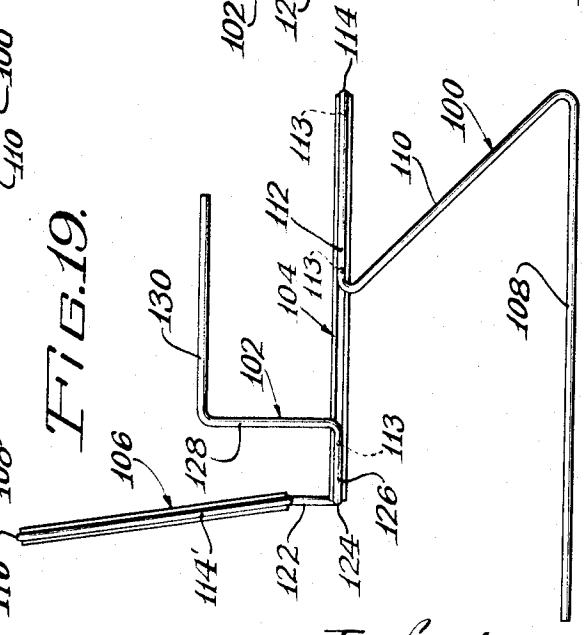


FIG. 19.

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ARTICLES OF FURNITURE AND SUPPORTING MEANS THEREFOR

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Fig. 23

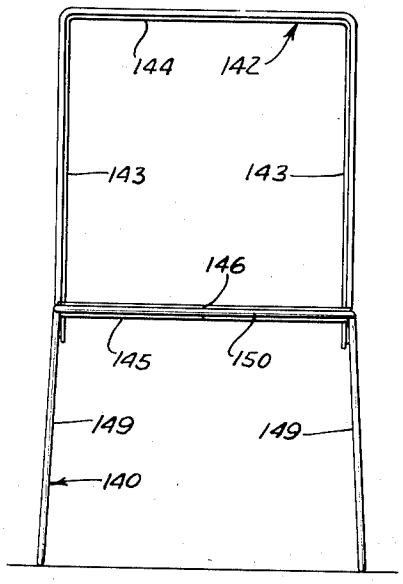


Fig. 24

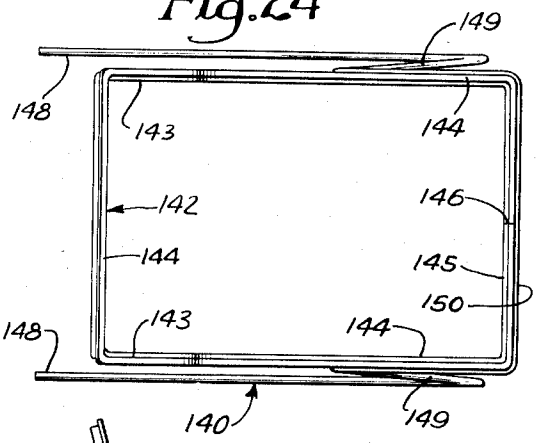


Fig. 25

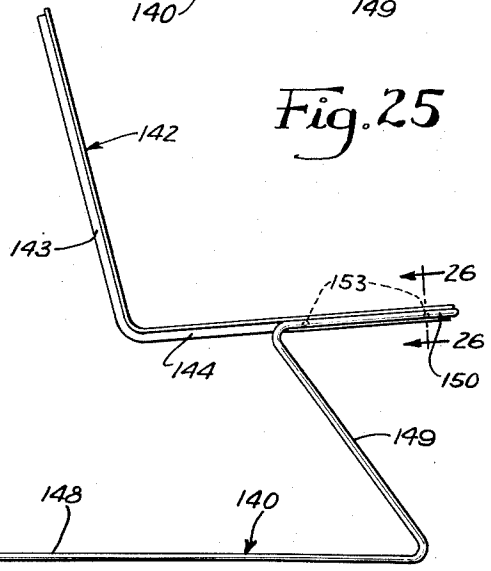


Fig. 27

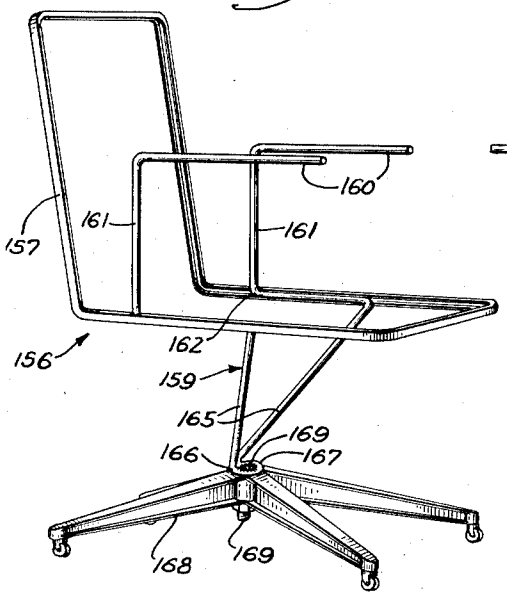
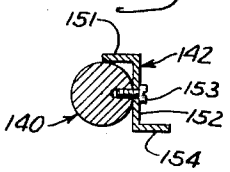


Fig. 26

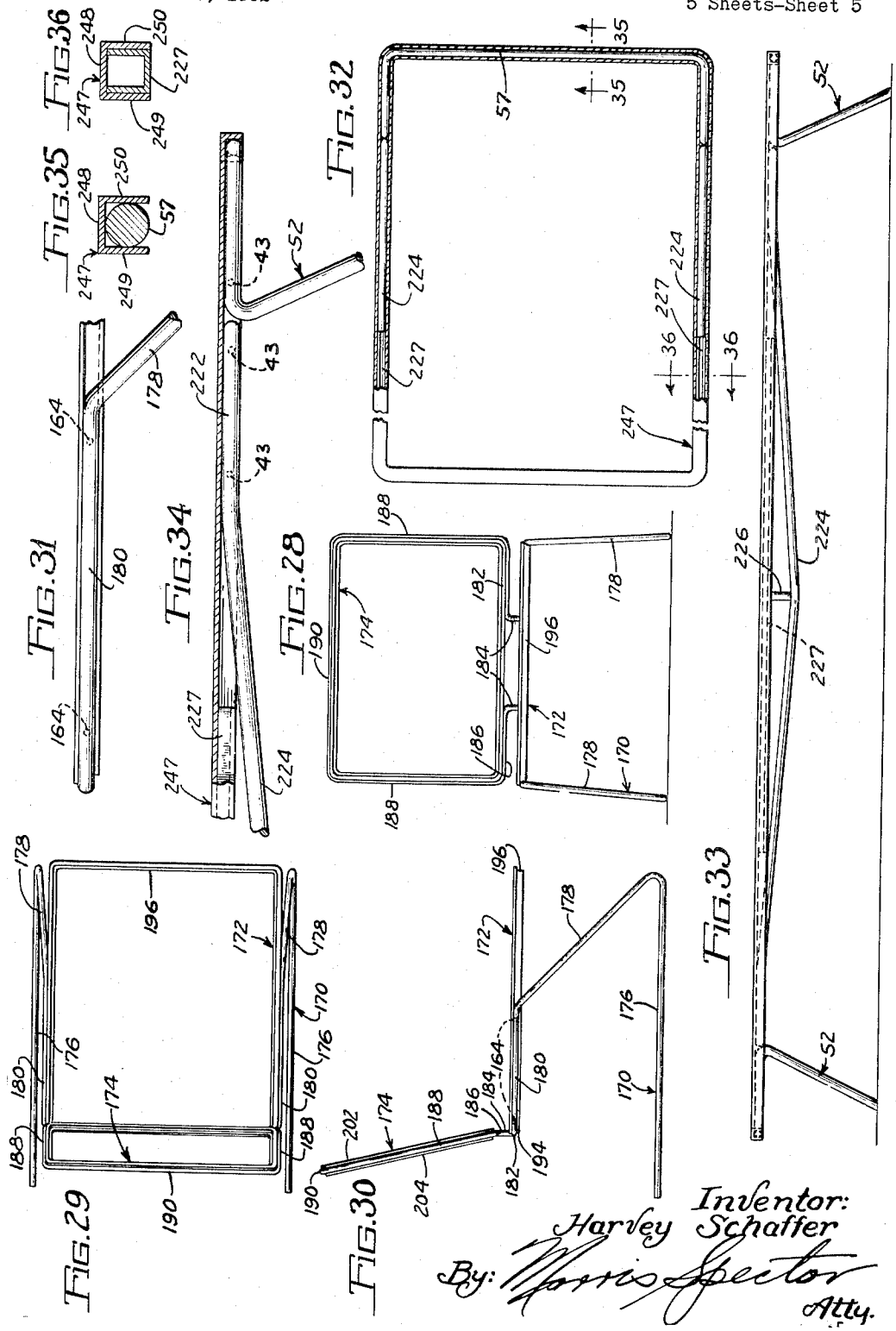


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ARTICLES OF FURNITURE AND SUPPORTING MEANS THEREFOR

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United States Patent Office 2,865,439
Patented Dec. 23, 1958

2,865,439

ARTICLES OF FURNITURE AND SUPPORTING MEANS THEREFOR

Harvey Schaffer, Chicago, Ill.

Application June 27, 1952, Serial No. 295,984

6 Claims. (Cl. 155—194)

The present application is a continuation-in-part of my co-pending application Serial No. 185,895, filed September 20, 1950, now Patent No. 2,719,579, granted October 4, 1955.

This invention relates to furniture, such as chairs, tables, sofas, beds, dressers, and the like, and to supporting structures or bases in general.

The few specific embodiments shown in the accompanying drawings are merely examples illustrating particular embodiments of the basic principles of the invention. The invention is capable of numerous modifications, and articles constructed in accordance therewith may assume many different forms. Essentially, each article that is constructed in accordance with the present invention has two types of elements, namely, one or more supporting or column elements and one or more supported or beam elements, each column element extending into a beam element and the two mutually reenforcing each other. In the embodiments herein illustrated the supported member or beam comprises a frame that is formed to the desired shape from a strip of structural metal whose cross section may be of a channel, or an angle, or a Z-section, or the like, and the supporting member is a rod or tube that is bent to the desired shape and includes parts that act as beams and are contiguous with the supported member. Where the two are contiguous the supporting member extends lengthwise of the beam member and at least partially into the beam member so that the two are interlocked to provide a composite beam.

It is a still further object of the present invention to provide a frame for an article of furniture which is highly pleasing in appearance and design and which includes a minimum number of parts and may be manufactured at a very low cost.

The attainment of the above and further objects of the present invention will be apparent from the following specification taken in conjunction with the accompanying drawings forming a part thereof.

In the drawings:

Figs. 1, 2 and 3 are, respectively, front, top and side views of a chair constructed in accordance with the principles of the present invention;

Fig. 4 is a detail view of a portion of the seat frame and showing a portion of the rod forming the front chair legs;

Fig. 5 is a sectional view taken along the line **5—5** of Fig. 4;

Fig. 6 is a sectional view similar to Fig. 5, but showing a different means for holding the column member in the beam member;

Figs. 7 and 8 are top and side views of a table embodying the present invention;

Fig. 9 is a view of a beam member in the form of an I-beam which may replace the beam member having a single channel;

Fig. 10 is a fragmentary sectional view of a member

which may be a table top, chair seat, or the like, which itself is bent at the edge thereof to provide a beam or trough for receiving the resilient column member;

Figs. 11, 12 and 13 are, respectively, front, top and side views similar to Figs. 1, 2 and 3 but showing a modified form of chair;

Figs. 14 and 15 are enlarged, detail, fragmentary views of portions of the chair of Fig. 13 with certain parts broken away;

Fig. 16 is a sectional view taken along the line **16—16** of Fig. 14;

Fig. 16*a* is a fragmentary, transverse sectional view through the front edge of the seat portion of the frame of Fig. 12;

Figs. 17, 18 and 19 are, respectively, front, top and side views similar to Figs. 1, 2 and 3 but showing another modified form of chair;

Figs. 20 and 21 are enlarged, detail, fragmentary, side views of portions of the chair shown in Fig. 19;

Fig. 22 is a sectional view taken along the line **22—22** of Fig. 21;

Figs. 23, 24 and 25 are, respectively, front, top and side views showing still another modified form of chair;

Fig. 26 is a sectional view taken substantially along the line **26—26** of Fig. 25;

Fig. 27 is a perspective view of another embodiment of the invention;

Figs. 28, 29 and 30 are, respectively, front, top and side views of another chair embodying this invention;

Fig. 31 is an enlarged, fragmentary, side view of a portion of Fig. 30;

Fig. 32 is a plan view of a table top, chair seat or the like, illustrating another embodiment of the invention, with certain parts broken away to show the interior construction;

Fig. 33 is a side view of the structure of Fig. 32;

Fig. 34 is an enlarged fragmentary view of a portion of Fig. 33; and

Figs. 35 and 36 are sectional views taken along the lines **35—35** and **36—36**, respectively, of Fig. 32.

In all of the following specification similar reference numbers designate similar parts.

A number of different chairs and a bed or table structures have been illustrated and, in addition, means have been disclosed whereby each of the structures may be constructed utilizing different structural elements while still preserving the same general chair or table forms.

In the embodiment illustrated in Figs. 1 to 5 inclusive there is shown a chair having a seat frame **12** and a back rest frame **14** each of which is a single, unitary, structural channel beam of any desired material bent into a generally rectangular shape, with the abutting edges of the bent beam separate from one another or joined, if desired. The beam **12** has upper and lower flanges **16** and **18** joined by a web **20**. The frames **12** and **14** may have the usual upholstering applied thereto. Since this forms no part of the present invention, the seat frame and the back rest are shown as open frames to which covering may be applied as desired.

The frame **12** is supported at the front by a front supporting column member **22** which is preferably of resilient metal rod or tube stock, bent to form a pair of legs **24**. The top of each leg is bent to form a short arm **27**, and an additional bend **28** forms a front portion **29**. To facilitate positioning of the column **22** in the beam **12**, the lower flange **18** of the beam is cut away at **30** on opposite sides of the chair adjacent to, but spaced from, the front of the frame. Before assembly of the supporting column **22** with the seat frame beam the front **29** of the column is of a length equal to the distance between the outer faces of the webs **20—20** on

opposite sides of the chair, and the angles of the bends 28—28 are each somewhat more acute than illustrated in Fig. 2, so that the bends 26—26 are appreciably closer together than the width of the frame 12. Thus, if the angles between the front and sides of the seat frame beam 12 are 90°, then the natural angles formed in the column 22 at the bends 28—28 are somewhat less than 90°. When the column 22 is assembled in the frame 12, the arms 27—27 are flexed apart to increase the spread between the bends 26—26 and to permit the leg portions 24—24 to ride on the outside of the lower flange 18 of the beam. The notches 30 are so positioned that when the portion 29 of the supporting column engages the web at the front portion of the beam 12, the leg portions 24—24 spring into the notches 30. The arms 27—27 are now flexed outwardly from their normal positions, but within the elastic limits of the materials involved. As the leg portion 24 slides along the flange 18, the arms 27 are under stress and, when the leg portion 24 reaches the notch 30, the arms 27 spring into the trough of the channel-shaped beam 12. This locks the leg structure 22 in position in the trough of the channel. The front edges of the notches 30 lock the resilient supporting column 22 against movement forward of the seat frame beam.

A rear supporting column 32, of the same material as the front supporting column 22, is seated in the channel at the rear of the frame 12 in substantially the same manner as is the front supporting column. The column 32 has bends 33—33 that extend from the legs 34 to rearwardly projecting arm portions 35 that correspond to the arm portions 22, and are bent as at 36 to follow in the channel along the back of the frame 12 and are then bent upwardly as at 37. The upwardly projecting portions 37 terminate in a bend 38 forming a horizontal portion 39 that lies in the frame 14 and follows in successive bends 40 and 41 around the bottom and top corners of the frame 14. The bottom flange of the beam 12 has notches 30 at the rear thereof for receiving the leg portions 34 of the rear supporting column 32. As the rear column 32 bends upwardly at 36' to form the upwardly projecting portion 37, it passes through a notch 42 in the upper flange 16 at the rear of the beam 12.

The bends in the supporting column 32 are suitably spaced and at proper angles so that the arms 37—37 thereof have been sprung apart by the back rest frame within the elastic limits of the material, and the loop of the column 32 resiliently grips the opposite transverse sides of the frame beam 12. Likewise, the arms 35—35 resiliently grip the transverse sides of the frame 12 into the channel of which the arms 35—35 have been sprung.

The supports which lie in the trough of the channel of the beam 12 become an inherent part of the frame and strengthen it. Since the arms 27—27 press the sides of the beam 12 toward each other, the meeting edges of the beam may be located in the front horizontal portion of the frame between between the arms 27—27 and are pressed together so that they need not be welded together.

If desired, the column 22 need not be held in place solely by its inherent resiliency, nor need it be sprung into the channel. It may be held in position by one or more screws 43 (Fig. 6) or the like each of which passes through the channel-shaped beam and is threaded into a tapped hole in the column 22. If the front of the frame 12 is split, then two holding screws 43 with the split portion of the frame 12 between them are sufficient to tie the member 22 to the frame 12 and to tie the ends of the frame 12 together.

From the above description it is apparent that the chair of Figs. 1 through 6 has two supporting elements 22 and 32, and two supported elements 12 and 14. Where the column members 22 or 32 extend into the channel members 12 or 14, and coextensive with the channel members, there is a region of mutual reinforcement wherein the channel member serves to reinforce the column member and vice versa.

Figs. 7 and 8 show this invention applied as a support for a table, a bed, or other article. A generally rectangular frame or beam 47, which comprises the base for a table top or for a bed spring or the like, or for an article of furniture to be placed thereon, is formed by bending a channel-shaped structural beam the same as the base 12 is formed. The flanges of the channel may face outwardly as in Fig. 2, or inwardly as in Fig. 7. The channel has upper and lower flanges 48 and 49 joined by a web 50. Two supporting columns 52—52, each like the column 22 previously described, are formed of either rod or of tubular stock. The rods are bent at 54 and 56 to form arms 55—55 joined by an intermediate portion 57 and from which arms a pair of legs 58 extend downwardly. The columns 52 extend inside of the frame member 47 and therefore the bends 54—54 are, in their normal position, of such an extent that the arms 55—55 form angles greater than 90° with the intermediate portion 57. When a supporting column 52 is to be positioned within the frame 47 it is moved into place to bring the intermediate portion 57 thereof against the inside surface of the web at the transverse side of the frame 47 and the arms 55 opposite the flanges 50 of the channel. The arms 55—55 are then flexed towards one another. The lower flange 49 has notches 60, similar to the notches 30 previously described, into which notches the legs 58—58 are then permitted to snap to lock the supporting member 52 in place by the outward pressure of the arms 55—55 against the webs of the channel of the frame 47.

In Figs. 7 and 8 the frame 47 may be rectangular having sharp corners as in some articles of furniture. The supporting structure is on the inside of the frame, therefore the bends 54 may be rounded at a considerable radius, since they clear the frame 47. If desired, the support members 52—52 of Figs. 7 and 8 may be secured to the channel frame as by screws such as 43 in Fig. 6, or by welding, in which case reliance is not placed on the resiliency of the support members 52—52 for holding the support members assembled in the frame 47.

It is understood that the frame 47 is covered with a flat member to constitute a table, or may be provided with means for supporting a bed spring where the structure is to constitute a bed support.

While I have described the frame of the chair of Fig. 1 as being an outwardly facing channel section, and the structures of Figs. 7 and 8 as being an inwardly facing channel section, either one may be inwardly facing or either one may be outwardly facing. Likewise, while I have spoken of the frames 12 and 47 as being of channel section, they may be of any other desired section that provides a channel. For instance, in Fig. 9 there is shown a structural member 59 of an H shape cross section or of a shape corresponding to that of an I-beam. This structural member is bent to the shape of the frame 12 or the shape of the frame 47 and then supporting members 62, which correspond to members 22 or 52, are positioned in the inwardly or in the outwardly facing channel, as desired.

Fig. 10 shows a structure wherein the rod-receiving channel, indicated at 70', is formed in a member 72' which may itself comprise a table top, or a chair seat, or a bed or sofa frame, or the like. The channel or trough 70', as is obvious from Fig. 10, is formed in the member 72' by die forming or bending over the edge of the member 72'. This trough or channel 70' would be arranged to extend around the periphery of the member 72' the same as in Figs. 1 or 7.

In the chair of Figs. 11 to 16 inclusive, a single supporting male column member 61 and a single female supported composite beam member 62' are provided. The supporting member provides the front and rear legs of the chair, as well as arm rests, while the supported channel member provides for the seat portion and the

chair back portion. The supporting column member 61' may be a solid cylindrical rod, while the supported beam member 62' may be of hollow tubular construction, square in cross section, and made of two mating channel sections which when assembled meet in edge-to-edge relationship as shown at 63 (Fig. 16).

As illustrated in Fig. 13, the composite supporting column member is continuous, and the portions thereof on opposite sides of the chair are substantially identical. Each end 60' of the column member 61 may rest upon the floor, from whence the column extends upwardly to provide a relatively short vertical leg, then rearwardly and downwardly at a slight angle to provide a short length 64 which is enclosed within a portion of the channel member 62'; upwardly as at 66 and laterally as at 68 to provide an arm rest; downwardly as at 70 to provide a short length which is enclosed by the beam member 62'; rearwardly and downwardly as at 72 to provide a rear leg for contact with the floor, and from thence laterally as at 74 to provide a connection between the two legs 72. The supported beam 62' consisting of the two mating channel sections 54' and 56' (Fig. 16) is in the form of a closed loop of irregular configuration having abutting ends 76 at the front of the beam structure. The beam is provided with a forward transverse portion 78 and a pair of downwardly and rearwardly inclined side portions 80 which, in combination with transverse portion 78, constitute the seat frame. At the rear of the seat the side portions 62' are turned to incline upwardly as at 82 at an angle to the vertical, and the upper ends of the portions 82 are connected by a transverse upper portion 84. The upwardly extending portions 82 and the transverse portions 84 of the beam member 62' constitute a chair back rest frame which is integral with the seat frame.

As shown in Fig. 14, portions of the flanges of the two channel sections 54' and 56' are cut away as at 86 to accommodate entrance of the leg portion 61' into the interior of the beam member and are also cut away as at 88 to permit entrance of the vertically extending part 66 into the beam member. Similarly, as shown in Fig. 15, the flanges of the beam 62' are cut away at 90 and 92 for entry of the leg portions 72 and arm rest portions 68 into the beam member.

To keep the inwardly facing channels of the supported beam 62' in line, at the the places where there is no rod between them, they may, optionally, be welded together or they may be provided with reinforcing fillers, each comprising a hollow rectangular metal tube 81 fitting snugly within the channels 54'—56', as shown in Fig. 16*a*. One such filler is U-shaped and extends continuously within the channel from adjacent the front leg 61', within the transverse portion 78 of the beam and then along the opposite side to the opposite leg 61'. Two other fillers extend within the beam continuously each at a side portion 80—82 on the side of the chair, and another U-shaped filler extends within the beam continuously in the sides 82—82 above the arm 68 and lengthwise through the upper cross transverse portion 84. Each of these fillers is an appropriately bent rectangular metal tube. These fillers also strengthen the frame.

In the assembly of the chair structure of Figs. 11 to 16 inclusive, the supporting column member 61' and the supported beam member 62' and the fillers are assembled. Thereafter the assembly may be secured in position by welding or by a series of anchoring screws 94 which project through the web portions of the channel sections 54' and 56' and are threadedly received within the rod-like member 61' at appropriate points therealong.

The vertical and horizontal portions 66 and 68 of the column structure in addition to serving as an arm rest, also lend rigidity to the back rest portion of the chair as well as to the seat frame portion thereof. If desired, the transverse length 74 may be omitted so that right and left hand portions of the column rod 61' are two separate members each of the shape shown in Fig. 13.

Figs. 17 and 22 inclusive show a rocking chair embodying this invention. Here two column members 100 and 102 and two beam frame members 104 and 106 are employed. The column 100 provides the supporting leg structure for the beam member 104 which in turn is the seat frame. The column member 102 provides an arm rest and also serves as a supporting structure encompassing the beam member 106 which in turn provides the back rest. The seat and back rest frames are the same as in Fig. 1. The column structure 100 includes a pair of parallel, horizontal base portions 108 adapted to extend in a fore and aft direction along the floor. The forward end of each portion 108 is turned upwardly to provide an upwardly and rearwardly extending leg portion 110 which, at its upper ends, is turned laterally to provide a side portion 112. The two side portions 112 are joined by a forward transversely extending portion 114. The two side portions 112 and the intermediate portion 114 constitute a horizontal loop of the channel-shaped frame or beam member 104, as in Fig. 1. Each column member 100 may be secured within the channel of the beam member 104 by anchoring screws 113 at suitable spaced points. In this chair I have avoided cutting of the flanges of the channels at the places where the column or columns enter the troughs of the channel and have obtained the equivalent result by forming a notch 115 at the appropriate place in the rod, which notch is of a depth approximately half of the thickness of the rod and of a width slightly in excess of the thickness of the flange of the channel. The flange of the channel extends into the notch 115 of the rod wherever the rod enters or leaves the trough of the channel. Since the notch 115 may somewhat weaken the rod at the place where the notch is formed, the weakened effect can be counteracted by welding the rod and the web of the channel together at the notch 115 after assembly.

The column member 102 which is supported by the seat frame beam member 104 includes a rectangular portion including vertical or slightly rearwardly inclined side members 114' which are turned inwardly at their upper ends to provide a horizontal top portion 116. At their lower ends the side members 114' are turned inwardly as at 120, downwardly as at 122, then at 124 in the channel along the rear of the seat beam 104, then forwardly as at 126 in the channel at the sides of the beam 104, upwardly as at 128 and forwardly as at 130 to the ends of the rods. The outwardly extending portions 124 and forwardly extending portions 126 may be secured to the seat frame by additional anchoring screws 113. The chair supporting column 100 may be formed of spring steel or other resilient material. Thus the weight of the chair and the occupant is supported entirely from the resilient column member 100 with the center of gravity also being disposed rearwardly of the forward up-turned ends of the base portions 108. The seat frame 104 is therefore capable of yielding under the weight of the occupant so that the structure in effect constitutes a rocking chair having an oscillatory motion because of the flexing of the metal about two spaced axes, namely the bends at the upper and lower ends of the leg portions 110.

In Figs. 23 and 26 inclusive another form of rocking chair is shown. The chair includes a single supporting rod member 140 providing supporting columns constituting the leg portions of the chair, and a single beam frame member 142. The column member 140 is a solid metal rod, while the beam member 142 is substantially Z-shape in cross section. The beam frame 142 has vertical sides 143 joined by a top portion 144 together constituting the back rest frame for the chair. The lower ends of the sides of 143 are turned forwardly to provide a pair of generally horizontally extending side portions 144' joined at their forward ends by a transverse portion 145, to constitute the seat frame for the chair. The ends of the substantially continuous beam member 142 may abut at

146 in the medial region of the transverse portion 145 of the seat.

The column member 140 is a single rod bent to form a pair of base members 148 each of which is turned upwardly to provide an upwardly inclined leg member 149 the upper ends of which are joined by a loop 150 embracing the front of the seat frame. The frame 142 has an upper flange 151 which overlies the loop 150. It also has a vertically extending web 152 which bears against one side of the rod 140 in the regions where the beam and column members are coextensive and which is secured thereto at suitable points therealong by suitable anchoring screws 153. The frame 142 has a lower inwardly extending flange 154 which may provide a convenient marginal support for retaining a seat cushion or back rest panel (not shown) in position.

Fig. 27 shows the present invention as applied to a rocking type swivel chair. The chair, indicated at 156, comprises a beam frame 157 which is made of structural steel bent in general to the same shape as is the beam frame 142 of Figs. 23–25. I have here shown the beam as formed of an inwardly facing channel section, although it may be of outwardly facing channel section or of a Z-shaped section as in Fig. 25. The column member, indicated at 159, comprises in this instance a single rod the two ends of which constitute arm rests 160—160. The rod extends from each arm rest downwardly at 161—161, and enters the trough of the channel where each of the downwardly extending portions is bent as at 162 to form a longitudinally extending portion 163 that lies in the trough of the channel and extends therein in a forwardly direction and is then bent to form two downwardly extending columns 165—165 which together form a V and are bent at the bottom at 166 in circular formation to form a loop 167. The loop 167 lies in a horizontal plane and rests on a pedestal 168 on which it is rotatable about a vertical center line and may be held in place in any desired manner as by a central shank 169 that fits snugly into the "eye" of the loop 167 and is welded thereto. This shank passes through a hole in the pedestal. A nut may be threaded on the shank to prevent retraction thereof from the pedestal. The V 165—165 may be in a vertical plane, or it may be inclined forwardly or rearwardly as desired. The V enters or leaves the trough of the channel on opposite sides of the channel in any of the ways previously described, namely, either by notching the appropriate flange of the channel, as illustrated in Fig. 4, or by notching the column, as illustrated in Fig. 22. The extending portions 163 may be resiliently sprung into the trough of the channel of the frame 157 and be held there by the inherent resiliency of the material, or they may be secured to the beam 157 by spot welding or by screws, as illustrated in Fig. 6 or 22. The V 165 enters the troughs of the channel of the supported chair seat forwardly of the center thereof, although the points of entry may be rearward of the position shown so that they are at the centers of the sides or even rearward of the center, depending upon the type of swiveling desired. The seat frame can rock by flexing of the column of the two bends 164 and by flexing of the V at the bends 166. In the embodiment illustrated in Fig. 27 a cross section through a longitudinal side of the beam frame 156 where the column rod lies between the flanges of the beam frame would appear as in Fig. 5 if taken where a screw does not extend through the web of the channel in the column, and would appear as in Fig. 6 if taken where a fastening screw does extend between the beam of the column, and would appear as in Fig. 22 if the column is notched where the flange crosses the column.

Figs. 28 to 31 show another form of rocking chair. Here a single rod is bent to constitute a supporting column 170. A rectangular seat frame is a single beam member 172, and a rectangular back frame is a single beam member 174 as in Fig. 1. The support 170 includes side base portions 176 each of which is bent to form upwardly and rearwardly inclined legs 178, then rearwardly extending side portions 180, inwardly extending portions 182 which extend rearwardly at 194 and at 184, the same as in Fig. 1, and then outwardly as at 186 to provide a continuous loop including side portions 188, and a top portion 190 which extends around the marginal regions of the back frame 174 to support the back as in Figs. 1 or 17. The side portions 180 are secured by suitable spaced anchoring screws 164 to the sides of the seat frame beam 172.

The seat frame beam 172 and the back rest frame beam 174 are substantially L-shape in cross section, as shown in Fig. 26, and the top horizontal flange thereof partially overlies those portions of the supporting rod with which it is coextensive. Similarly, the forward horizontal flange 202 of the back rest beam 174 extends laterally outwardly of the frame and partially overlies those portions 188 of the supporting rod 170 with which it is coextensive. This chair has a rocking motion about the two bends at the upper and lower ends of the legs 178.

In Fig. 25 the loop portion of the column 140 extends forwardly around the front end of the seat frame portion of the beam structure 142 whereas in Fig. 30 the loop portion of the column 170 extends rearwardly around the rear of the seat frame 172. Thus, in the case of the chair of Fig. 25, the expected center of gravity of the chair and occupant thereof is somewhat rearwardly from the geometrical center of the area subtended by the column loop. The net effect of this (disregarding the relatively minor weight of the chair frame parts themselves) is that the combined downward component of force exerted by the occupant on the seat frame 172 and on the back rest frame 174 applies a leverage on the forwardly extending column loop and the motion of which the seat frame is capable consists of a bodily shifting movement in an oscillatory path, the radius of which is the length of the legs 156, and the center of which is a transverse axis passing along the supporting surface or floor and through the lower ends of the legs. The seat frame is also capable of an oscillatory rocking movement about a shifting transverse axis extending through the upper ends of the legs.

In the chair of Fig. 30, the downward component of force exerted by the occupant on the seat frame and on the back rest frame exists at a point which is within the area subtended by the column loop. Thus, while the seat frame is capable of both the oscillatory and rocking types of motion described above, the former is greatly predominant.

Comparing the two types of motion outlined above, it may be generally stated that the seat frame motion of the chair of Fig. 30 is somewhat more resistive or "stiffer" than the seat frame motion of the chair of Fig. 25.

In Figs. 19 and 25 the seat of the rocker is supported by a forwardly extending arm of the column, whereas as in Figs. 27 and 30 it is supported by a rearwardly extending arm of the column. It is, of course, understood that the principles of Fig. 30 are equally applicable to the chair of Fig. 25, that is, the column portion that is coincident with the beam of the seat may extend rearwardly from the support rather than forwardly, if that type of rocking action is desired.

Reference may now be had to Figs. 32 and 33 that show a base or support analagous to that of Figs. 7 and 8. This base may be an ordinary table or a very low coffee table, it may be the base for a bed upon which base a usual spring and mattress are placed, or it may be the base for any article of furniture, such as, for instance, a dresser, cabinet, or the like. The base is formed of a channel-shaped beam member mounted with the trough of the channel facing downwardly. The beam shown at 247 includes a web 248 and depending flanges 249—250 within which the supporting columns 57 of Fig. 35 are mounted. The intermediate portion 57 of this support may be sprung between the flanges 249—250 of the

channel, or it may not be sprung in place but may be held by welding or by a set screw or the like as previously described. The supporting portion **57** reinforces the sides of the beam **247** and thus permits the use of a channel of comparatively thin across section. The beam **247** is reinforced along each longitudinal side of the support in two ways. At each side there is provided a reinforcing truss comprising a metal rod **224** the ends of which enter the troughs of the channel and are secured in place either by a set of screws such as **43** of Fig. 6, or by spot welds. The center of the rod **224** is below the longitudinal sides and is trussed with the longitudinal side as by a short strut **226** that extends between the truss and the bottom portion of the longitudinal sides of the beam **247** at the center thereof. The other reinforcement consists of a filler in the form of a channel **227** that fits within the channel of the beam **247** and extends almost the full length of the span between the places where the truss rod **224** is secured to the longitudinal sides of the channel near the opposite supports **52—52**. The filler **227** may be welded or otherwise secured to the beam **247** and together with that channel forms a box or girder-like structure extending the major portion of the length of each side of the table.

It is to be understood that in the different embodiments herein shown the supporting columns may be sprung into channels of the supported beams the same as in the structure of Figs. 1, 2 and 3, and even when sprung in place may be locked in place by screws, such as **43** of Fig. 6, or by spot welding or equivalent means. It is also to be understood that in those instances where I have shown one flange of the channel beam cut away to permit entrance or exit of the rod or column, the equivalent result may be obtained by slotting the rod, as in Fig. 22, so that the flange of the channel enters the slot in the rod rather than have the rod enter the channel through a slot in the flange thereof. In each such instance, also, it is within the purview of the present invention to weld the supporting column and the supported beam together at the place where the column enters the trough of the channel so that the weld eliminates what would otherwise be a weakened section at the point of entrance and that the slotted rod may be used in lieu of the notched flange.

The various supporting members or columns for the several forms of the articles illustrated have been described and shown as being of round rod stock. However, other forms of stock may be employed, for instance, hollow or solid rectangular rods, or circular tubes. These may be combined with any of the suggested beam members, such as the outwardly facing channel beam, the inwardly facing channel beam, the composite hollow tubular channel beam of Fig. 16, the Z-shaped beam of Fig. 27, or the downwardly facing channel beam of Fig. 32, to produce any of the articles shown, or to produce other desired furniture shapes. The strength of the column member will be utilized to supplement the strength of the beam member along the coextensive regions of the two members.

In compliance with the requirements of the patent statutes I have here shown and described a few preferred embodiments of my invention. It is, however, to be understood that the invention is not limited to the precise constructions here shown, the same being merely illustrative of the principles of the invention. What I consider new and desire to secure by Letters Patent is:

1. An article of furniture comprising a frame having a generally vertical portion extending continuously along substantially the entire perimeter of the frame, means forming with said vertical portion a tube extending around the perimeter of the frame and co-extensive with the length of the vertical portion, and supporting means for the frame comprising a continuous rod extending within the tube at spaced fractional parts thereof, the rod extending angularly out of the tube through an opening in one side thereof, the remaining part of the perimeter of the tube at a cross section therethrough at said opening being continuous.

2. A chair construction comprising a supported beam member, said beam being bent to provide a continuous, open, frame constituting a weight-supporting structure including a generally horizontal seat frame portion and a generally upwardly extending back rest portion, said beam being provided with a marginal projecting portion encompassing the contour of the frame, supporting means for the member comprising on each side thereof a column bent to provide in succession (*a*) an upwardly extending front leg portion, (*b*) a rearwardly extending portion embraced by the projecting portion of the beam and the parts adjacent thereto and coextensive therewith along a medial extent of the seat frame sides near the forward regions thereof, (*c*) an upwardly and rearwardly turned portion providing an arm rest, (*d*) a downwardly extending portion extending into and embraced by the marginal portions of the beam and parts adjacent thereto and coextensive therewith along a medial extent of the back rest portion, and (*e*) a downwardly extending rear leg portion.

3. An article of furniture comprising a frame having a generally vertical portion extending continuously along substantially the entire perimeter of the frame and having a flange projecting therefrom and co-extensive with the length of the vertical portion, and rod means shaped to extend along spaced fractional parts of the periphery of the article between the top and bottom of the vertically extending portion and secured thereto, the vertical portion with its flange being continuous between said parts, the rod means extending angularly out of the frame upwardly, around and then back to and along the periphery of the frame to constitute arm rest elements.

4. A chair construction comprising a supported beam member, said beam being bent to provide a continuous, open frame constituting a weight-supporting structure including a generally horizontal seat frame portion and a generally upwardly extending back rest portion, said beam being provided with a marginal projecting portion encompassing the contour of the frame, arm rest means for the member comprising on each side thereof a column bent to provide in succession (*a*) an upwardly extending front leg portion, (*b*) a laterally and rearwardly extending portion embraced by the projecting portion of the beam and the parts adjacent thereto and coextensive therewith along a medial extent of the seat frame sides near the forward regions thereof, (*c*) an upwardly and rearwardly turned portion providing an arm rest, and (*d*) a portion at a substantial angle to the rearwardly turned portion and extending into and embraced by the marginal portion of the beam and parts adjacent thereto and coextensive therewith along a medial extent of the back rest portion.

5. A chair construction comprising a supported beam member, said beam being bent to provide a continuous, open frame constituting a weight-supporting structure including a generally horizontal seat frame portion and a generally upwardly extending back rest portion, said beam being provided with a marginal projecting portion encompassing the contour of the frame, arm rest means for the member comprising on each side thereof a column bent to provide in succession (*a*) a rearwardly extending portion embraced by the projecting portion of the beam and the parts adjacent thereto and coextensive therewith along a medial extent of the seat frame sides near the forward regions thereof, (*b*) an upwardly and rearwardly turned portion providing an arm rest, and (*c*) a portion at a substantial angle to the rearwardly turned portion and extending into and embraced by the marginal portion of the beam and parts adjacent thereto and coextensive therewith along a medial extent of the back rest portion.

6. A chair construction comprising a supported beam member, said beam being bent to provide a continuous, open frame constituting a weight-supporting structure in-

cluding a generally horizontal seat frame portion and a generally upwardly extending back rest portion, said beam being provided with a marginal projecting portion encompassing the contour of the frame, arm rest means for the member comprising on each side thereof a column bent to provide in succession (*a*) a rearwardly extending portion embraced by the projecting portion of the beam and the parts adjacent thereto and coextensive therewith along a medial extent of the seat frame sides near the forward regions thereof, (*b*) an upwardly and rearwardly turned portion providing an arm rest, and (*c*) a portion at a substantial angle to the rearwardly turned portion and extending into and embraced by the marginal portion of the beam and parts adjacent thereto and coextensive therewith along a medial extent of the back rest portion, the columns comprising the two arm rest means comprising a continuous rod which includes a portion extending transversely of the supported member and

which joins the arm rest means on each side of said member.

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