

G. F. ELLS.  
Chair-Braces.

No. 136,824.

Patented March 18, 1873.

Fig. 1

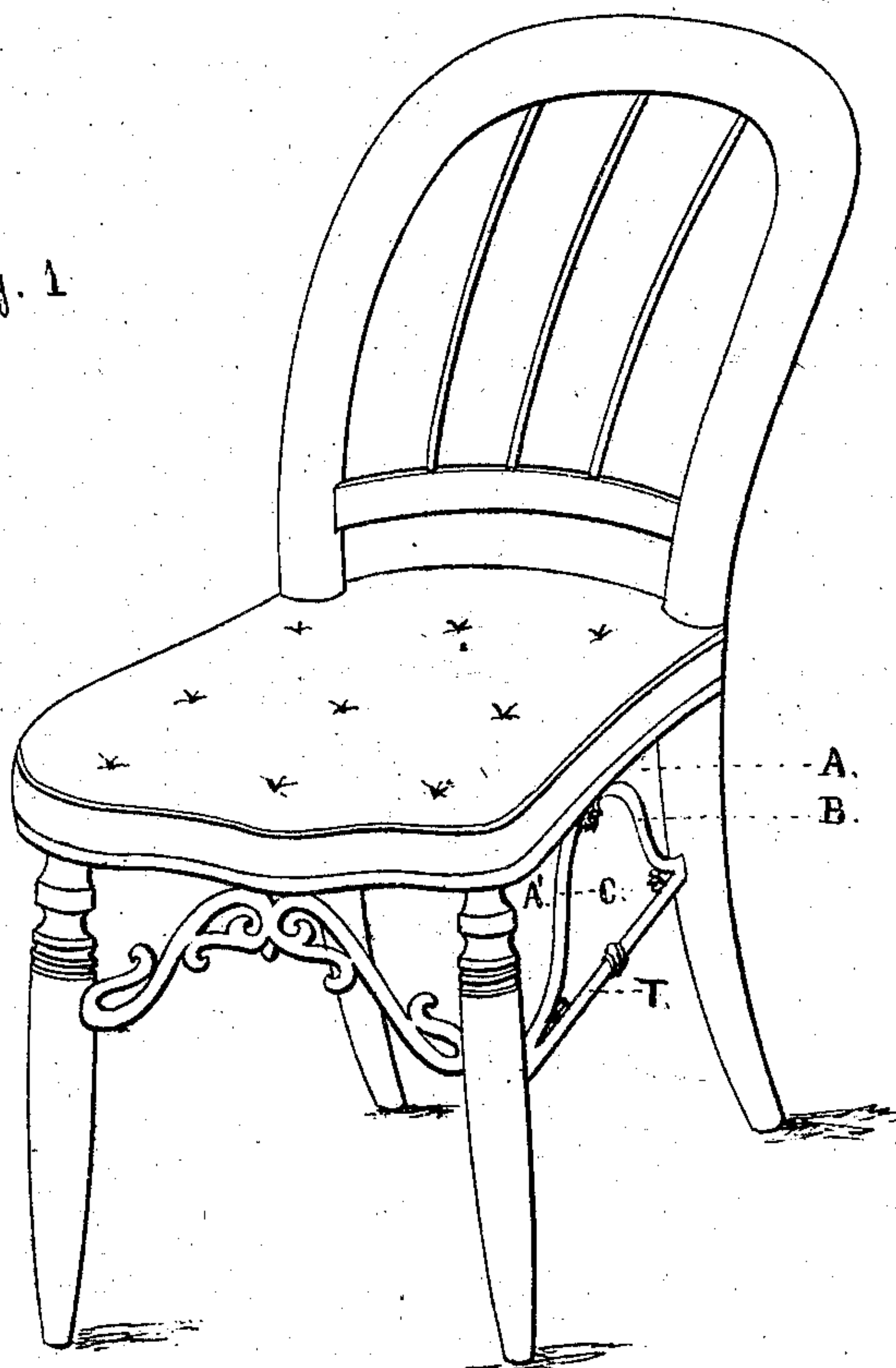


Fig. 2

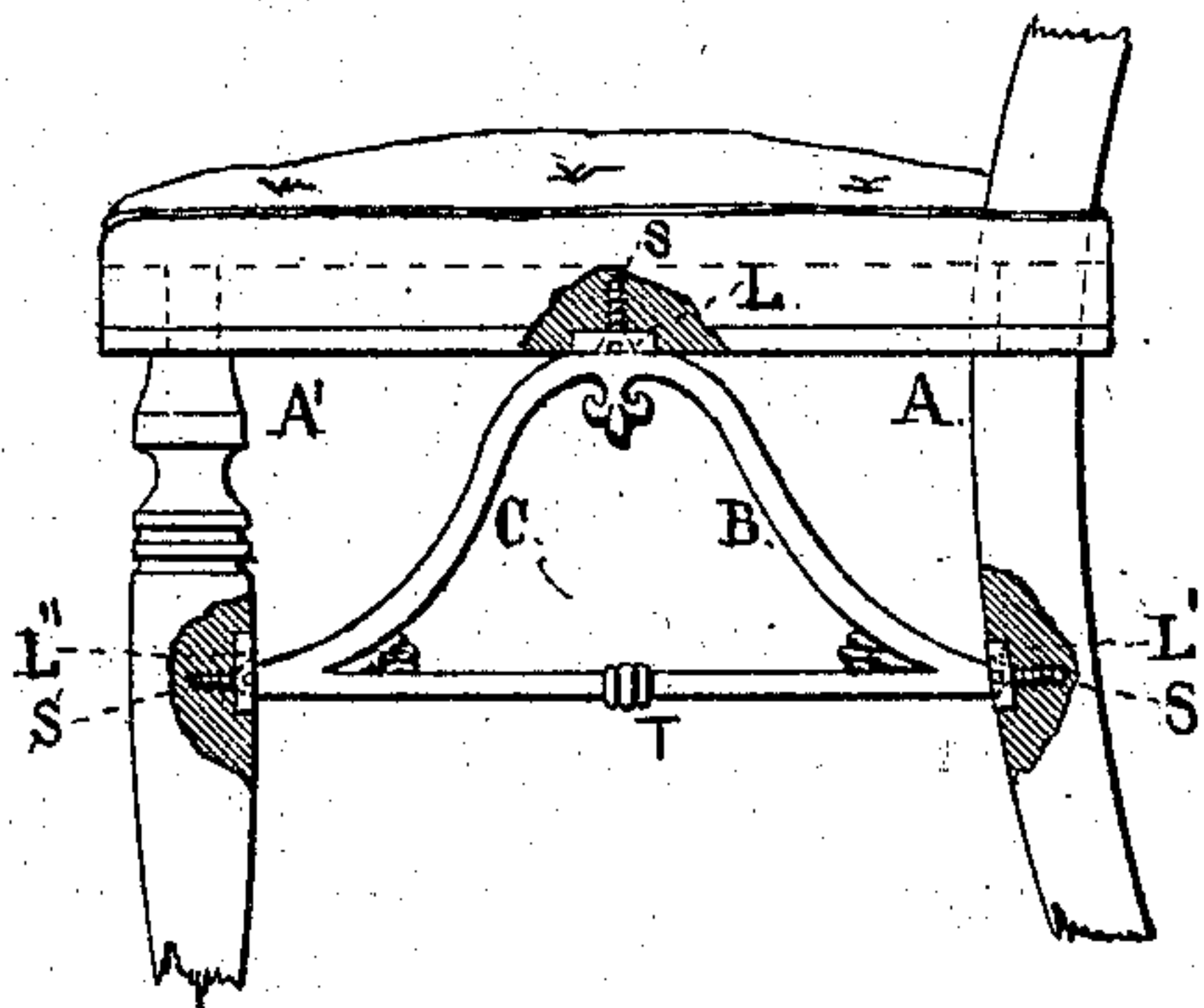


Fig. 3

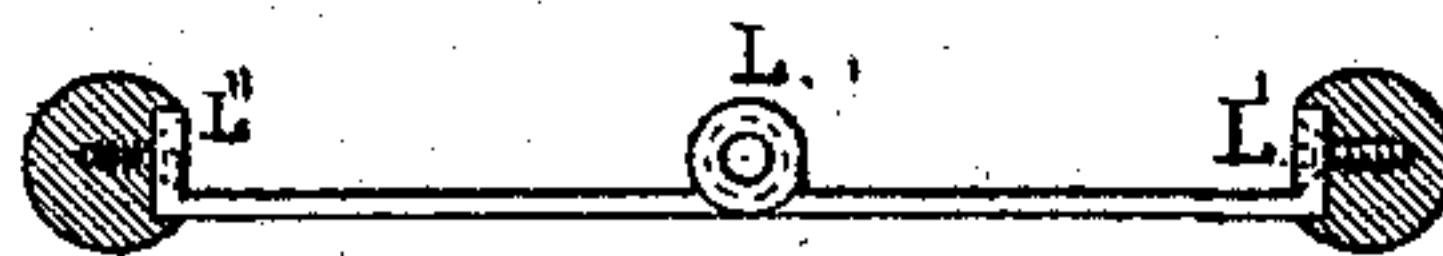
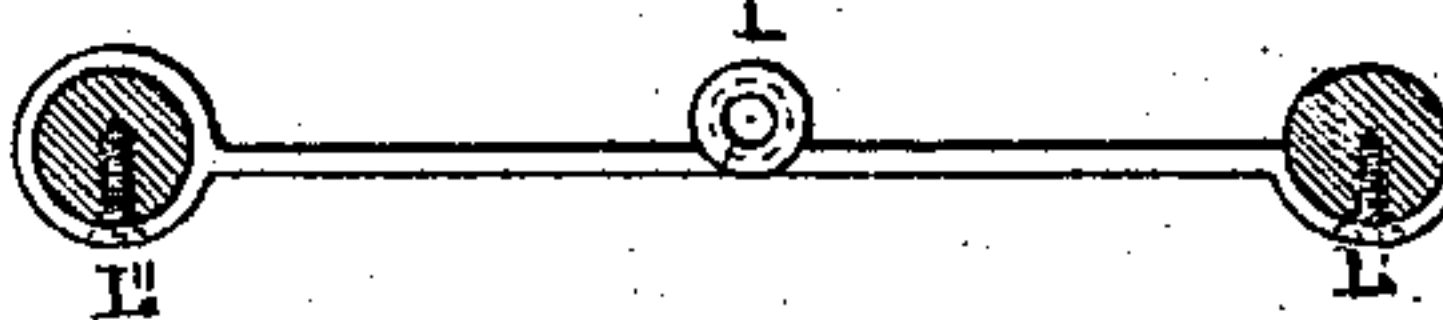


Fig. 4



Witnesses:

R. S. Whitaker  
James C. Webb.

Inventor,  
George F. Ells



# UNITED STATES PATENT OFFICE.

GEORGE F. ELLS, OF DEPOSIT, NEW YORK.

## IMPROVEMENT IN CHAIR-BRACES.

Specification forming part of Letters Patent No. 136,824, dated March 18, 1873.

*To all whom it may concern:*

Be it known that I, GEORGE F. ELLS, of Deposit, in the county of Delaware and State of New York, have invented certain Improvements in Household Chairs, of which the following is a specification, reference being had to the accompanying drawing, in which—

Figure 1 is a perspective view of a chair embodying my invention. Fig. 2 is a side view of one of the trusses and a portion of the chair, parts of the latter being broken away to show the manner of attachment. Fig. 3 is a plan of one of the trusses with horizontal section of legs, also showing manner of attachment. Fig. 4 is a plan of truss, showing other modes of attachment.

Like parts are indicated by the same letters in the drawing.

The object of my invention is to so construct household chairs and settees that they shall retain their original stiffness, and consequently usefulness, for the longest possible time. To accomplish this the strains which are ordinarily borne by chairs should be provided for by the most scientific disposition of material possible; or, in the same manner as the strains which occur in a bridge, by the introduction of brace, counter-brace, and tie, and in such a manner that one shall assist the other.

In wooden chairs and settees, as commonly constructed, the legs are tenoned into the "bottom" or seat, and the "rounds" are tenoned into the legs. The "back" is either a continuation of the back legs or is tenoned into the seat, as also the chair-arms, if there be any; and the chair, as a whole, depends for its stiffness entirely upon the excellence of the joinery in the said tenons (supposing the material to be well seasoned) and the tenacity of the glue used. If tilted or wrenched the tenons, owing to the great leverage brought to bear on them, are subjected to very great strains across the grain of the wood, and, owing to the compressible nature of the material, soon become loosened in their mortises, and the chairs get shaky, noisy, and past cure. I am aware that tie or tension rods are used in some forms of chairs to relieve the tenons of such injurious strains, but they are used as auxiliaries. My invention aims to do away with individual rounds and auxiliary ties entirely.

The most destructive strains upon a chair

occur when it is tilted back by a heavy occupant. The tendency is for the seat and back legs to close, or form a more acute angle, and for the seat and fore legs to open or form a more obtuse angle, as also for the fore legs to withdraw from the seat. To counteract this tendency I insert the brace B of the trussing B C T, as shown in Fig. 1, which brace directly opposes the closing of the angle A formed by the seat and back legs. The tendency of the angle A' to open is resisted by the counter-brace C of the trussing B C T, which in this instance acts as a tie, and which also resists the tendency of the fore legs to be drawn from the seat. The function of T of the trussing B C T is to equalize or distribute the strains upon both brace and counter-brace, it sometimes acting as a brace and again as a tie. Thus, if the forward leg is pulled forward, the counter-brace C would alone be strained were it not for the tie T, through which the brace B is also made to share the strain brought upon the counter-brace C. In fact, the various parts of the trussing, B, C, and T, act either as braces or ties, according to circumstances; and in order that they act in unison, and for cheapness of construction, I prefer to make them of metal, wrought or cast, "laid up," or in a single casting, as shown in Fig. 2. By a laid-up truss I mean a truss which may be made up of independent pieces or parts, which parts are riveted or fastened together, so that they form a unit composed of brace, counter-brace, and tie. At the angles of the truss are formed lugs L L' L'', which are let into the bottom and legs of the chair flush, and there firmly held by heavy-shanked wood-screws S. By letting the lugs into the wood the abutment is made and retained more perfectly, and the strain upon the screws is diminished.

Instead of the lugs L' L'', as shown in Fig. 3, the casting or truss may be shaped as shown in Fig. 4, to wholly or partly embrace the legs of the chair, and held by screws, in which case the strains upon the screws would be less than before.

The front and back trussings may be made lighter than those at the sides of the chair, as the strains across the chair are less; and the tie T may be shortened up, as shown in the scroll-work of drawing.

The use of such trussings permits of lighter

legs to the chairs, since there are no weakening mortises. The parts of the truss require to be only sufficiently heavy or strong to resist lateral flexure, and they may be made more or less ornamental. The trussings further act to securely hold the legs to the bottom of the chair, and, from their rigidity, the utmost stiffness and strength are secured to the chair, and permanently so, with the least material and labor.

I do not claim any feature or combination of features shown or described in reissue of United States Patent No. 3,882, dated March 22, 1870; neither do I claim the application

of single braces of metal or wood to household chairs or furniture.

What I claim as my invention, and desire to secure by Letters Patent, is—

The application or combination of metallic trusses as units (and consisting, essentially, of brace, counter-brace, and tie) with the bottoms or rails and the legs of household chairs, settees, and other furniture, substantially as and for the purpose hereinbefore set forth.

Witnesses:

GEORGE F. ELLS.

JAMES E. WEBB,  
R. S. WHITAKER.