Dec. 31, 1929. S. GOLDBERG 1,741,293

METAL SHELVING

Filed March 2, 1929

Fig.1.

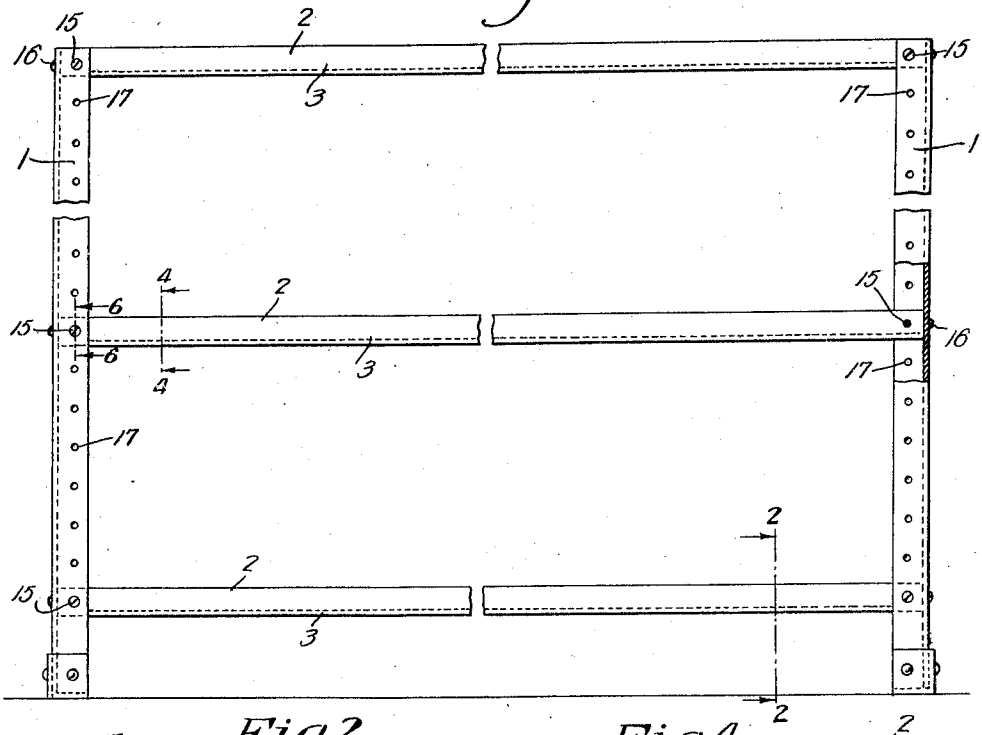


Fig.2.

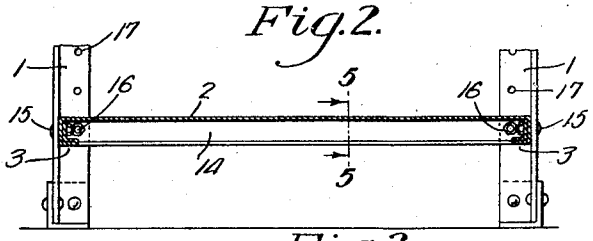


Fig.3.

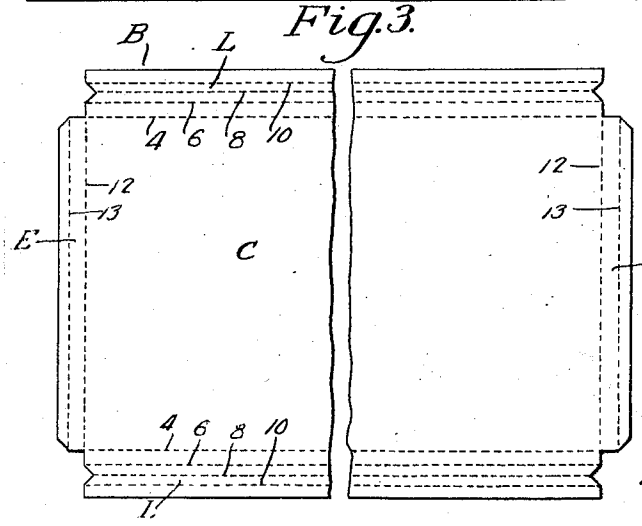


Fig.4.

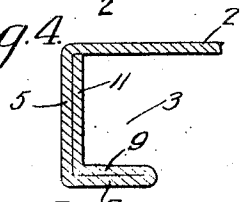


Fig.5.

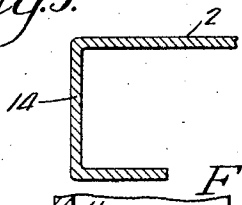
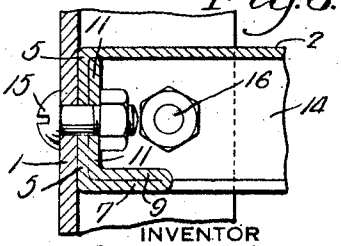


Fig.6.



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UNITED STATES PATENT OFFICE

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METAL SHELVING

Application filed March 2, 1929. Serial No. 343,999.

Important objects of the present invention are, to provide, in a shelving structure, a sheet metal shelf of generally improved design; to produce strong sheet metal shelving at a materially reduced cost; to provide for the manufacture of a shelf of great strength from a single blank of comparatively thin sheet metal; to provide a shelf design enabling the manufacture of a strong shelf, from a single sheet metal blank, by a simple manufacturing process; and to provide a shelf reinforced along its front and rear edges by double-ply angle beams integrally formed with the shelf from a single sheet metal blank and designed to give the shelf maximum strength.

In the drawing, Fig. 1 is a front view of a shelving structure embodying my invention;

Fig. 2 a transverse section taken on the line 2—2 of Fig. 1;

Fig. 3 a plan view upon a reduced scale of a blank for forming a shelf;

Fig. 4 a detail section upon a larger scale taken on the line 4—4 of Fig. 1;

Fig. 5 a detail section taken on the line 5—5 of Fig. 2; and

Fig. 6 a detail section taken on the line 6—6 of Fig. 1.

The shelving structure preferably includes four upright metal corner members or posts 1 for supporting the shelves. The posts are preferably of angular form in cross section to fit the shelf corners. The shelves 2 supported by the posts embody an improved feature of design which will be presently described in detail. All of the shelves are preferably of the same form, and a description of one will suffice for all of them.

Each shelf is formed from a single sheet metal blank B which contains a central rectangular area C to form the body of the shelf, extended longitudinal margins L of material width, and extended end margins E of less width than margins L. In forming the shelf from the blank the longitudinal margins L of the latter are formed, by a simple manufacturing process, into reinforcing beam structures 3 which are designed to give great strength to the shelf and enable it to withstand powerful bending stresses without rupture or deformation and in fact with no noticeable sagging or deflection.

Each beam 3 is of a double-ply, angular form and is produced by bending one of the longitudinal margins L of the blank downwardly along a longitudinal line 4 to form the outer ply 5 of a web depending from the shelf. The margin is then bent inwardly along a line 6 to form an outer or lower ply 7 of a flange disposed substantially at right angles to the depending web. Next, the margin is folded back upon itself along the line 8 to form an upper or inner flange ply 9 covering the outer flange ply 7 and pressed into closed contact with substantially the entire inner surface of the latter. At the bend between the outer plies 5 and 7 the margin is bent upwardly along the line 10 to form an inner web ply 11 covering the inner vertical surface of the outer web ply 5 and pressed into close contact with substantially the entire inner surface thereof and also with the bend between the plies 5 and 7. The upper edge of the inner ply 11 closely contacts, along its length, with the under surface of the shelf, along the bend between the body of the shelf and the outer ply 5. The plies 9 and 11 then form a strong inner reinforcement integrally formed with the shelf in a simple manner and lying within the channel defined by the plies 5 and 7 and the edge portion of the shelf body.

Along both its front and rear edges the shelf is formed in the manner described with the said double-ply, substantially L-shaped beams 3. The bending and folding of the blank margins L and the pressing together of the plies to form the beams may be easily performed by a rolling process which is ex-

tremely simple and inexpensive. At its ends the shelf is provided with reinforcing means formed by bending the end margins E of the blank B downwardly and inwardly along the lines 12 and 13 respectively to form single ply angle beams 14 of the same depth as the beams 3. This single ply reinforcement will ordinarily give sufficient strength to the ends of the shelf. However my improved double-ply structure may also be employed at the shelf ends if required, as in the case of a shelf of exceptional depth.

The shelves 2 are supported by the angle posts 1 with their corners, including the ends of the beams 3 and of the beams 14, fitting within the angles of the posts. The ends of the beams 3 are secured to the supporting posts by bolts 15 each passing through an aperture in the web of the beam. The end beams 14 are secured to the posts by bolts 16. In both cases however, the fastening means may be varied. Vertical rows of holes 17 are formed in the posts 1 for the bolts 15 and 16, to provide for the vertical adjustment of the shelves in the usual manner.

In many services, shelving structures are required to bear enormous weights, and sagging, distortion and rupture of the shelves under the severe strain is quite common. Efforts to give the shelves the required strength have heretofore involved the use of thick sheet metal stock and the employment of added reinforcing means which objectionably complicate the shelf structure and add materially to its cost, without an adequate gain in strength. The design of the present shelf with its integrally formed, double-ply, angular reinforcing structures fulfills all requirements. It gives the shelf sufficient strength to support the weight which metal shelving is required to bear in practically any service, without rupture, distortion, or appreciable deflection. For a strong shelf, it is extremely inexpensive to manufacture. Its design permits of a material reduction in the thickness of sheet metal stock used in a shelf of given strength, thus further reducing the cost of sheet metal shelving.

While I have shown a very satisfactory form of my invention, I do not wish to be limited strictly to this disclosure but reserve the right to make such changes as will lie within the scope of the claims.

What I claim is:

1. In a shelving structure, a sheet metal shelf; reinforcing structures extending along the front and rear edges of said shelf, integrally formed therewith from a single blank of sheet metal and each comprising a double-ply, sheet metal beam substantially L-shaped in cross section and formed by a margin of the blank bent downwardly to form a vertical depending outer web ply, bent inward to form an outer horizontal flange ply, folded upon itself to form an inner flange ply covering and closely contacting substantially the entire upper surface of said outer flange ply, and bent upwardly to form an inner web ply covering and closely contacting substantially the entire inner surface of the outer web ply, and having its edge in close contact along substantially the entire length thereof with the under surface of the shelf at the juncture of the outer web ply with the body of the shelf; upright supporting members for the shelf; and fastening means securing said double ply beams adjacent their ends to said upright members to support the shelf.

2. In a shelving structure, a sheet metal shelf; reinforcing structures extending along the front and rear edges of said shelf, integrally formed therewith from a single blank of sheet metal and each comprising a double-ply sheet metal beam substantially L-shaped in cross section and formed by a margin of the blank bent downwardly to form a vertical depending outer web ply, bent inward to form an outer horizontal flange ply along the base of said web-ply, folded upon itself to form an inner flange ply covering and closely contacting substantially the entire upper surface of the outer flange ply and bent upwardly to form an inner web ply covering and closely contacting substantially the entire inner surface of the outer web ply; supporting frame members for the shelf; and fastening means securing said reinforcing beams at points adjacent their ends to said frame members.

3. In a shelving structure, a sheet metal shelf; a reinforcing structure extending along one edge of said shelf integrally formed therewith from a single blank of sheet metal and comprising a double-ply, sheet metal beam substantially L-shaped in cross section and formed by a margin of the shelf bent downward to form an outer web ply, bent inward to form an outer flange ply along the base of said web ply, folded upon itself to form an inner flange ply covering and closely contacting substantially the entire upper surface of the outer flange ply and bent upwardly to form an inner web ply covering and closely contacting substantially the entire inner surface of the outer web ply and contacting the under surface of the shell along the juncture of the shelf and the outer web ply; upright supporting frame members at opposite ends of the shelf; and fastening means securing said double ply beam adjacent its opposite ends to said frame members to support the shelf.

4. A sheet metal shelf provided with reinforcing structures extending along one edge thereof, integrally formed therewith from a single blank of sheet metal and comprising a double-ply, sheet metal beam formed by a margin of the blank bent downwardly to form a depending outer web ply,

bent inward to form an outer flange ply, folded upon itself to form an inner flange ply covering and closely contacting substantially the entire upper surface of said outer flange ply, and bent upwardly to form an inner web ply covering and closely contacting substantially the entire inner surface of the outer web ply, and having its edge in close contact along substantially the entire length thereof with the under surface of the shelf at the juncture of the outer web ply with the body of the shelf.

5. In a shelving structure, a sheet metal shelf; reinforcing structures extending along one edge of said shelf, integrally formed therewith from a single blank of sheet metal and comprising a beam formed by a margin of the shelf blank bent downward vertically to form a depending outer web ply, bent inward to form an outer flange ply along the base of said web ply, and folded and bent to form an inner horizontal reinforcing member and an upright member, said horizontal and upright members being within the channel formed by the edge portion of the shelf, the vertical outer web-ply and the outer flange ply.

6. A sheet metal shelf provided with a reinforcing structure extending along the front edge of said shelf, integrally formed therewith from a single sheet metal blank and comprising a sheet metal beam formed by a margin of the shelf blank bent downward to form a vertical outer web ply, bent inward to form an outer horizontal flange ply along the base of said web ply and folded, bent and extended upward to contact along its length with the under surface of the shelf body at the juncture of the latter with said outer web ply and form an inner reinforcement lying within the channel defined by the edge portion of the shelf and said web and channel plies.

7. A sheet metal shelf provided with a reinforcing structure extending along one edge thereof, integrally formed therewith from a single blank of sheet metal and comprising a double-ply, sheet metal beam formed by a margin of the blank bent downwardly to form a depending outer web ply, bent inward to form an outer flange ply, folded upon itself to form an inner flange ply extending to the inner surface of the outer web ply, and bent upwardly to form an inner web ply contacting the inner surface of the outer web ply and having its edge in close contact along substantially the entire length thereof with the under surface of the shelf at the junction of the outer web ply with the body of the shelf.

8. A sheet metal shelf provided with a reinforcing structure extending along one edge thereof integrally formed therewith from a single blank of sheet metal and comprising a double-ply sheet metal beam formed by a margin of the blank and comprising a double-ply lower horizontal flange and a double-play vertical web, the inner side of the beam being open and in channel form to receive fastening means, whereby the fastening means may bear directly against the double-ply vertical web of the double-ply beam and lie within the channel.

In testimony whereof I hereunto affix my signature.

SAMUEL GOLDBERG.