July 14, 1931. S. GOLDBERG 1,814,084

METAL SHELVING

Filed June 6, 1930

Fig. 1.

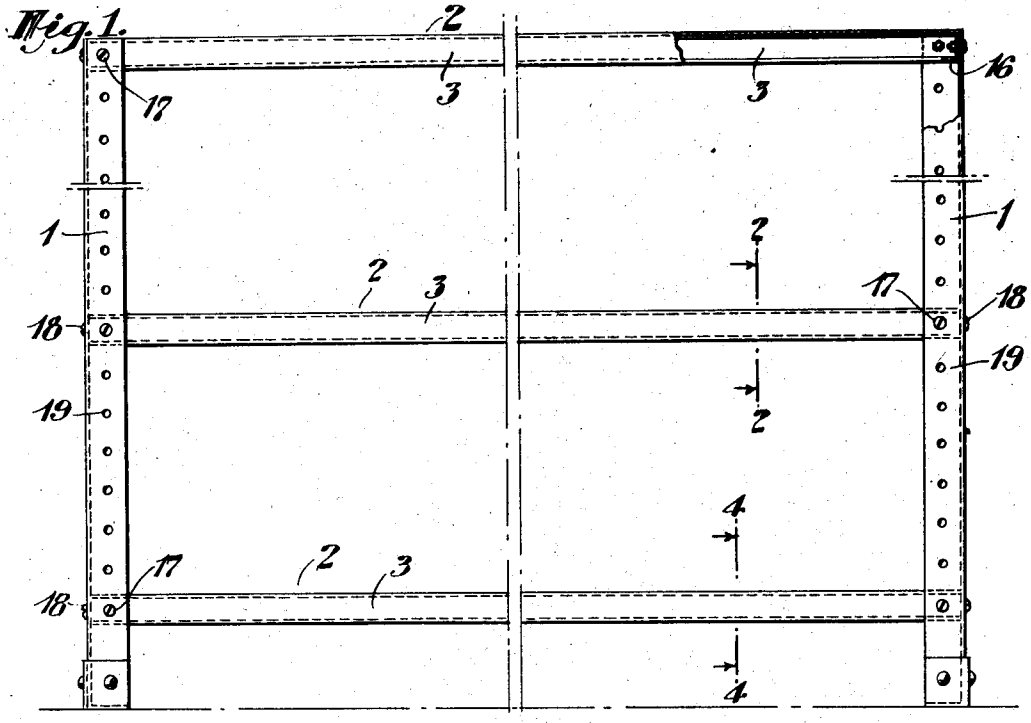
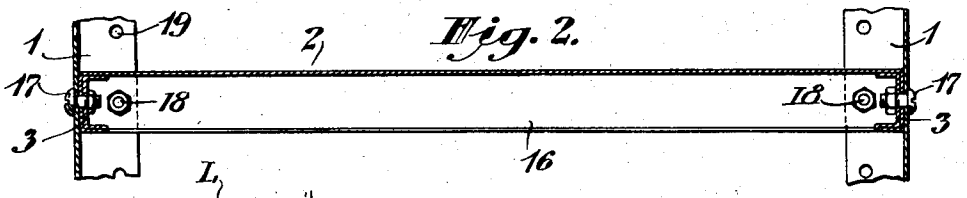


Fig. 2.



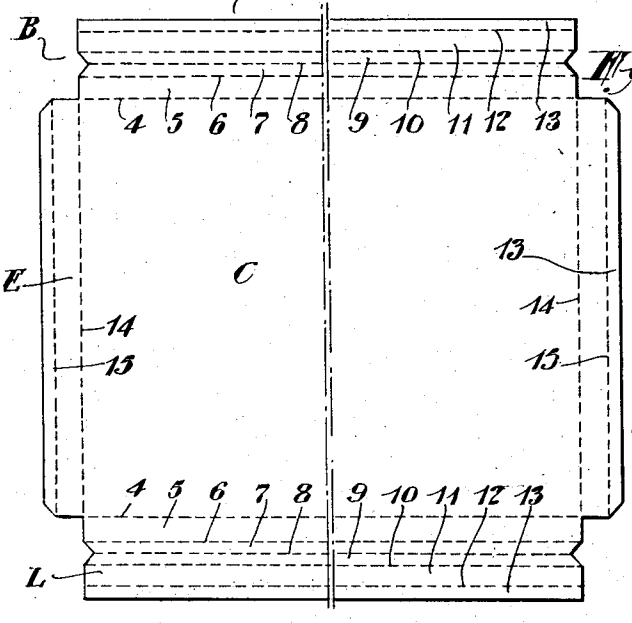


Fig. 3.

Fig. 4.

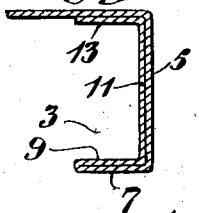


Fig. 5.

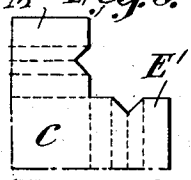
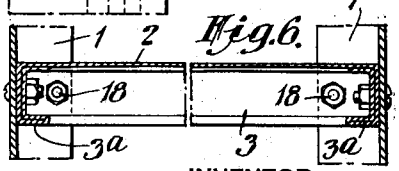


Fig. 6.



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UNITED STATES PATENT OFFICE

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METAL SHELVING

Application filed June 6, 1930. Serial No. 459,533.

Important objects of the present invention are, to provide an improved shelf design enabling the manufacture of a strong shelf entirely from sheet metal stock by a simple manufacturing process; to provide for the manufacture of such as shelf from a single blank of sheet metal; to produce strong sheet metal shelving at a low cost; to provide a sheet metal shelf with improved edge reinforcement of double-ply channel beam form made integrally with the body of the shelf from a single blank of sheet metal; and to provide for the manufacture of a strong, wear-resisting shelf from sheet metal of reduced thickness.

In the drawings, Fig. 1 is a front view, partly in section, of a shelving structure embodying my invention;

Fig. 2 a transverse section taken on the line 2—2 of Fig. 1, upon a larger scale;

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

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

Fig. 5 a fragmentary plan view of a shelf blank shaped for forming reinforcements at the shelf ends similar to those at the longitudinal edges; and

Fig. 6 a longitudinal sectional view of a shelf formed from said latter blank.

In the form illustrated the shelving structure includes four upright metal corner members or posts 1 for supporting the shelves. Preferably the posts are of angular form in cross section to fit the shelf corners. The shelves are designated 2 and embody an improved feature of design which will be described in detail later in the specification. 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 self, 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 are formed, by a simple manufacturing process, into depending reinforcing beam structures 3 which are designed to give great strength to the shelf and enable it to withstand the powerful stresses of great weights without rupture or deformation and in fact with no noticeable sagging or deflection.

Each beam is of a double-ply channel form and is produced by bending one of the longitudinal margins L of the blank vertically downward along a longitudinal line 4 to form the outer ply 5 of a web of material depth depending from the shelf. Then the margin is bent inward along a parallel longitudinal 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 a parallel longitudinal line 8 to form an upper or inner flange ply 9 covering the outer flange ply 7 and pressed into close contact with substantially the entire inner surface of the latter. At the bend between the outer plies 5 and 7 the margin is bent upward along a parallel longitudinal line 10 to form an inner web ply 11 covering the inner surface of the outer web ply 5 and pressed into close contact with substantially the entire inner surface thereof and with the bend between the inner plies 9 and 11 closely fitting in the bend between the outer plies. At the bend between the outer web ply 5 and the body C of the shelf the margin is bent inward along a parallel longitudinal line 12 to form an upper flange ply 13 which is pressed flat into close contact with the under surface of the shelf body. In width the ply 13 is substantially equal to the ply 9. The bend between the plies 11 and 13 is pressed in to fit closely into the bend between the shelf body and the outer ply 5. Plies 9, 11 and 13 then form a strong inner reinforcement integrally formed with the shelf body in a simple manner and lying entirely within the channel defined by the outer plies 5 and 7 and the edge of the shelf body.

Preferably the shelf is formed along both its front and rear edges in the manner described, with the said integral double-ply channel beams 3. The bending and folding of the longitudinal blank margins L and the pressing together of the plies and their op-

posed bends may be easily performed by a rolling process which is extremely simple and inexpensive. At its ends also, the shelf is provided with integral reinforcement. In the present instance this reinforcement is formed by bending the end margins E of the blank B first downward and then inward along parallel lines 14 and 15 respectively to form single-ply angle beams 16 of the same depth as the beams 3. Ordinarily this single ply reinforcement will give sufficient strength to the shelf ends. However my improved double-ply channel beam structure may also be employed at the ends of the shelf if required, as in the case of a shelf of exceptional depth.

In the present instance the reinforced shelves 2 are supported by the angle posts 1 with their corners, including the ends of the beams 3 and of the beams 16, fitting within the angles of the posts. Near their ends the beams 3 are secured to the supporting posts by bolts 17 each passed through an aperture in the double-ply vertical web of the beam. Bolts 18 secure the end beams 16 to the posts. In both cases, however, the fastening means may be varied. Vertical rows of holes 19 are preferably formed in the posts 1 for the bolts 17 and 18 to provide for the vertical adjustment of the shelves in the usual manner.

In many services, shelving structures are required to bear very heavy loads, and sagging, distortion and rupture of the shelves under the severe strain is quite common. It has been customary to make the shelves of heavy sheet metal stock and to employ separately fabricated reinforcing means such as angle irons, or the like, which objectionally complicate the shelf structure and add materially to its cost, without an adequate gain in strength. The present shelf design with its integrally formed double-ply, channel beam reinforcing structures enables the shelf, to support its load without rupture, distortion or appreciable deflection. For a strong shelf, it is extremely inexpensive to manufacture. Furthermore 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.

The longitudinal edges of the shelf, in addition to being adequately reinforced to resist flexure under the deposited shelf load, are also strongly reinforced to prevent denting and possible rupture at the longitudinal edge corners where the shelf body and the downturned margins join. This is an important practical feature. Often in placing a load upon a shelf or in removing it the extreme edge of the shelf is subjected momentarily to a concentrated weight and strain much greater than that which it will bear when the load is resting squarely upon the shelf with its weight distributed. The inturned ply 13 and the close fitting of the bend between ply 13 and ply 11 into the downward bend of the shelf margin, back-up and adequately reinforce the extreme edge of the shelf. The shelf edge is thereby enabled to withstand the concentrated weight as well as the wear and pounding to which it will be subjected in many services, without becoming dented or ruptured.

When the shelves are of very great depth, or when they are required to withstand exceptional strains, double-ply channel beams like those described may be formed along the end edges of the shelves as well as along the longitudinal edges. Fig. 5 shows one corner of a blank shaped for so reinforcing the shelf ends. The end margins E′ are shaped like the longitudinal margins M and are similarly folded to form double-ply channel reinforcing beams 3^a similar to the beams 3.

What I claim is:

1. A sheet metal shelf including a reinforcing structure extending along one edge thereof, integrally formed therewith from a single blank of sheet metal and comprising a depending beam formed by a margin of the shelf blank bent downward and inward to form a channel, bent reversely and pressed into close face to face contact with the downwardly and inwardly bent portions, within said channel, and formed with a bend closely fitting within and reinforcing the downward bend along the latter.

2. A sheet metal shelf including a reinforcing structure extending along one edge thereof, integrally formed therewith from a single blank of sheet metal and comprising a depending beam formed by a margin of the shelf blank bent downward and inward to form a channel, bent reversely and pressed into close face to face contact with the downwardly and inwardly bent portions, within said channel, formed with an inward bend closely fitting within the downward bend and reinforcing the latter therealong, and having its extreme margin pressed into close face to face contact with the under face of the shelf along said fitting bends.

3. A sheet metal shelf including a reinforcing structure extending along one edge thereof integrally formed therewith from a single blank of sheet metal and comprising a double-ply channel beam formed by a margin of the shelf blank bent downward to form a depending, vertical outer web ply, bent inward to form a horizontal 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 said outer flange ply, bent upward to form an inner web ply covering and closely contacting substantially the entire inner surface of said outer web ply and bent inward to form an inner flange ply ex-

tending inward from the downward bend of the outer web ply and having substantially its entire area closely contacting the under surface of the body of the shelf along the margin of the latter.

4. A sheet metal shelf including a reinforcing structure extending along one edge thereof, integrally formed therewith from a single blank of sheet metal and comprising a depending beam formed by a margin of the shelf blank bent downward and inward to form a channel, bent reversely and pressed into close face to face contact with the downwardly and inwardly bent portions, within said channel, and formed with a bend closely fitting within and reinforcing the downward bend along the latter; upright supporting members at opposite ends of the shelf; and fastening means securing said beam to the supporting members.

5. A sheet metal shelf including reinforcing structures extending along the front and rear edges thereof, each integrally formed with the body of the shelf from a single blank of sheet metal and comprising a depending channel beam formed by a margin of the shelf bent downward to form a depending vertical outer web ply, bent inward to form a horizontal outer flange ply along the base of said web ply, folded upon itself to form an inner flange ply covering substantially the entire upper surface of said outer flange ply and pressed into close face to face contact therewith, bent upward to form an inner web ply covering substantially the entire inner surface of said outer web ply and pressed into close face to face contact therewith, formed with an inward bend closely fitting within the downward bend and reinforcing the latter along the shelf edge and having a marginal strip portion pressed into close face to face contact with the under face of the shelf along and contiguous to said fitting bends.

In testimony whereof I hereunto affix my signature.

SAMUEL GOLDBERG.