

May 6, 1924.

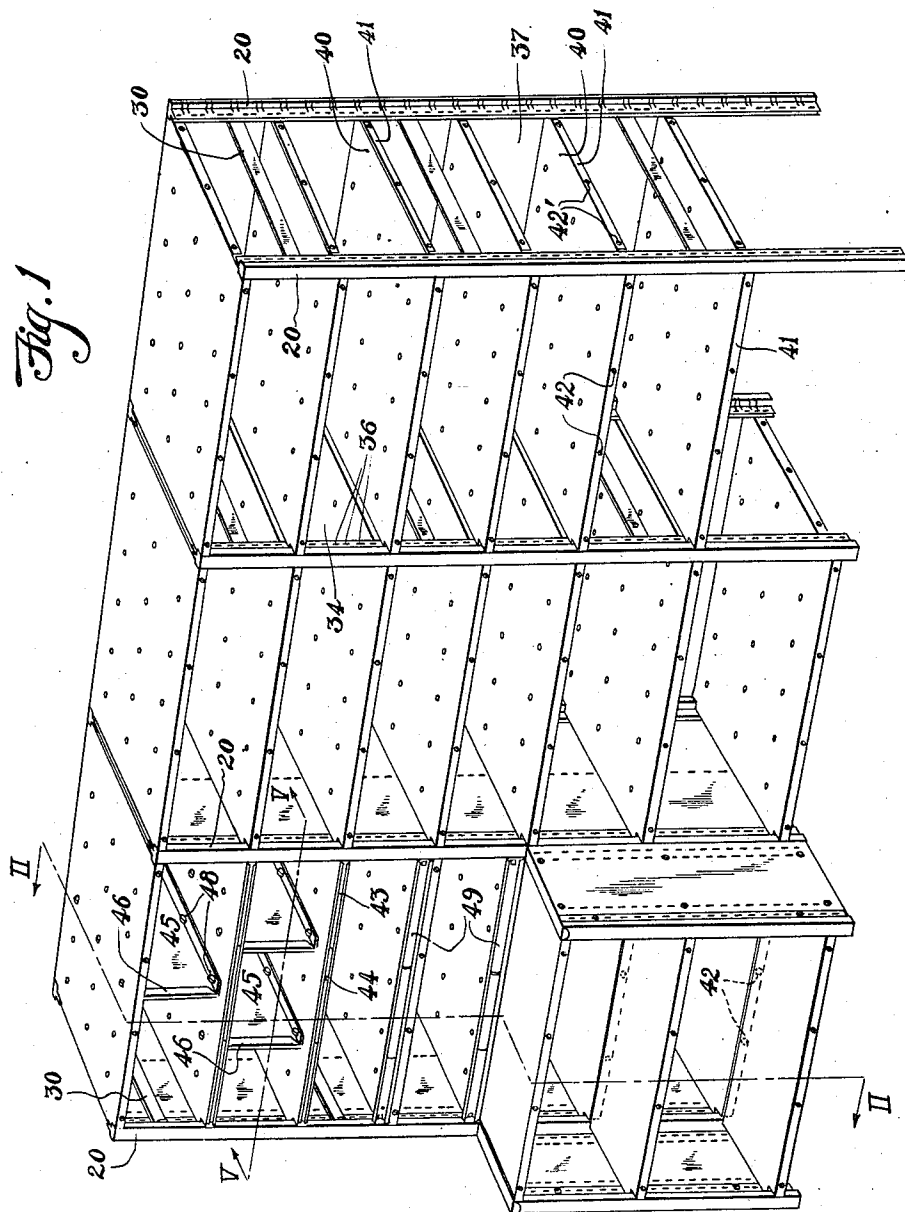
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SHEET METAL SHELVING

Filed Feb. 23, 1922

7 Sheets-Sheet 1



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7 Sheets-Sheet 2

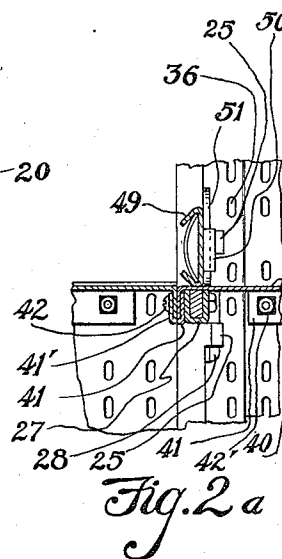
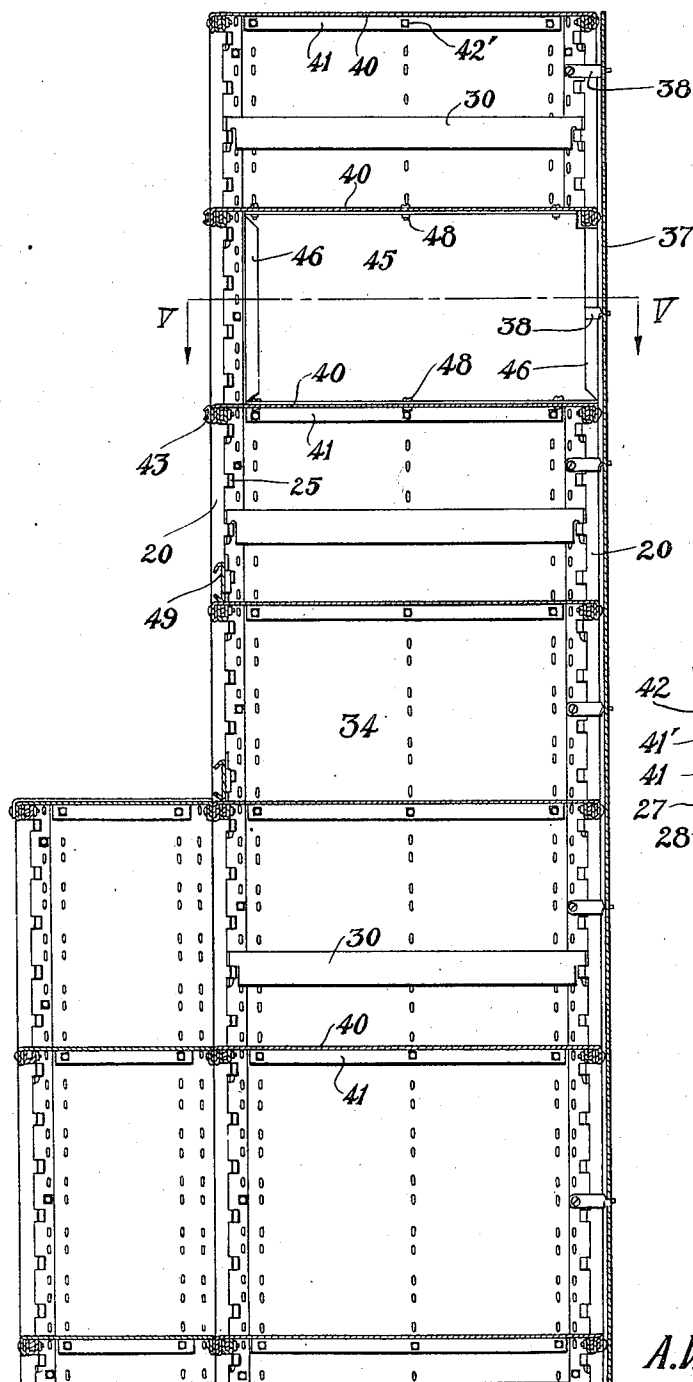


Fig. 2

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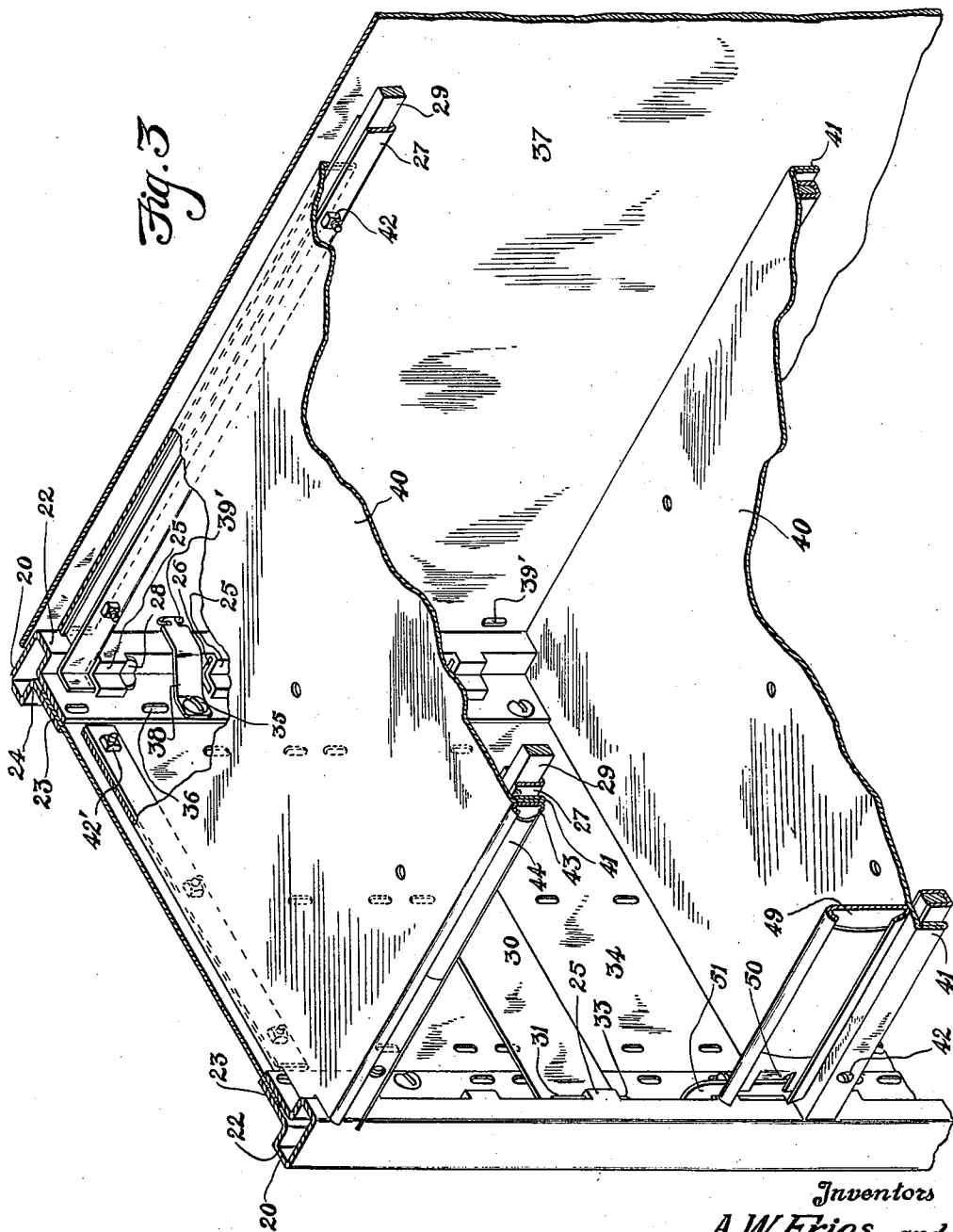
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7 Sheets-Sheet 3



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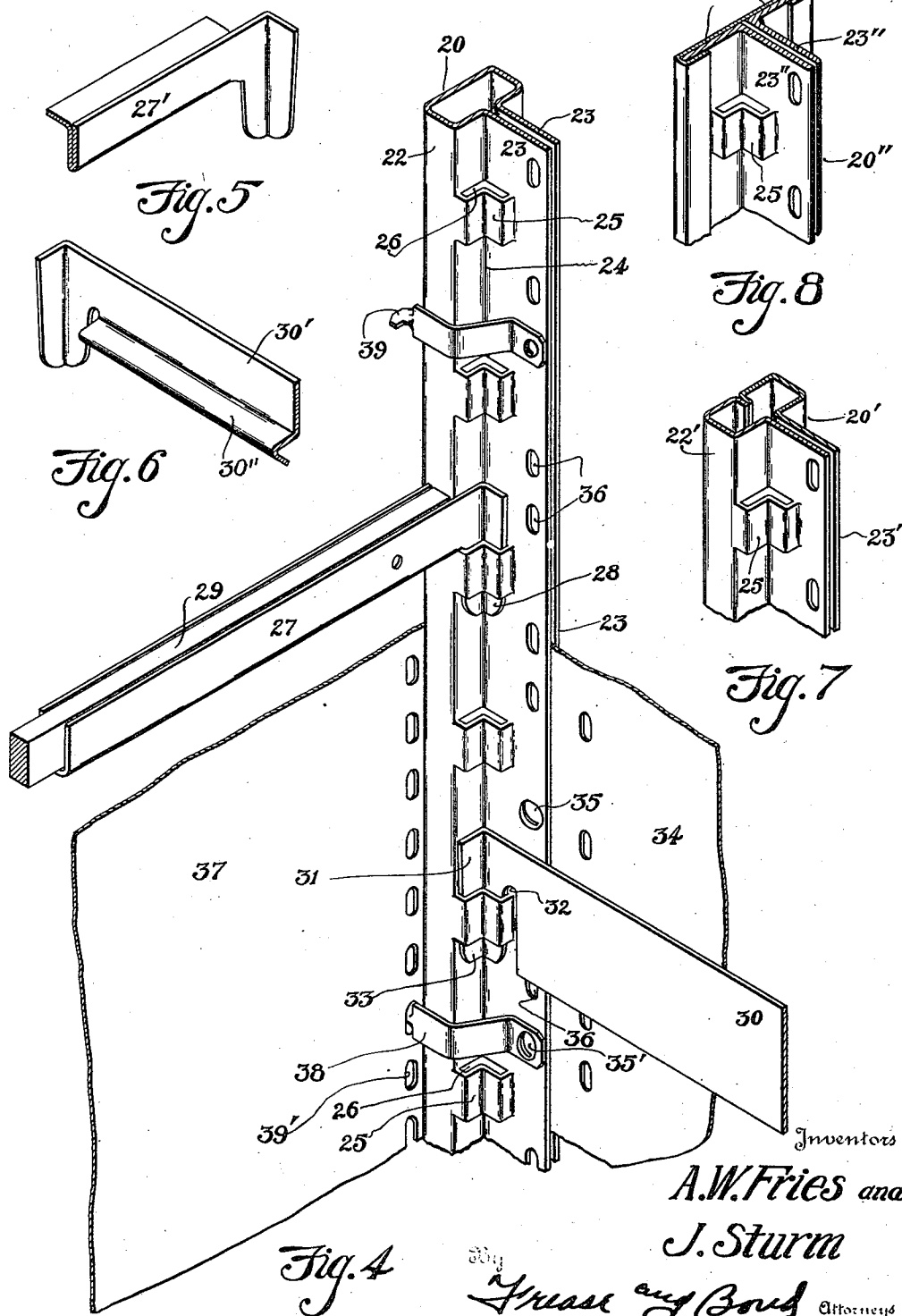
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7 Sheets-Sheet 4



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7 Sheets-Sheet 5

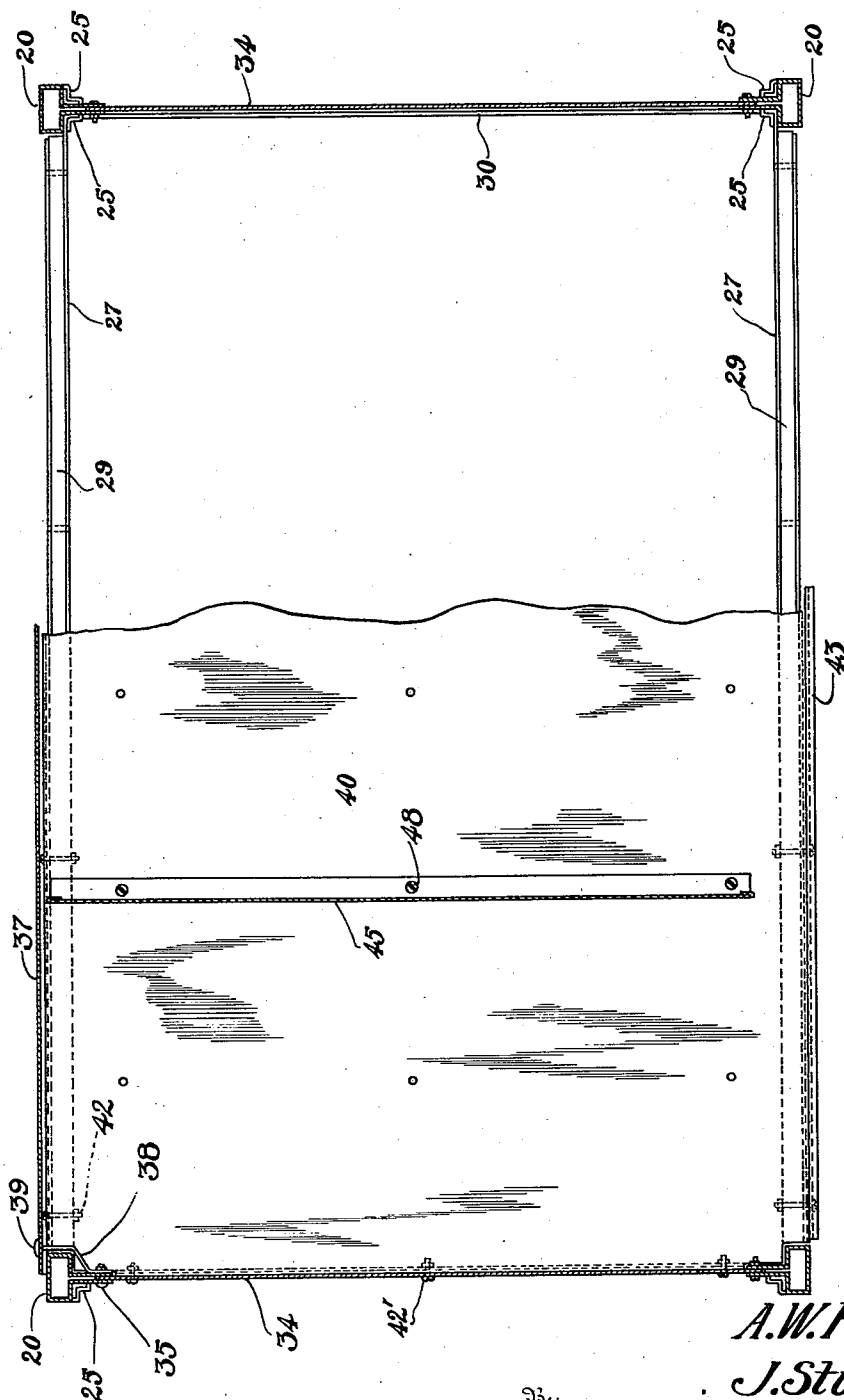


Fig. 9

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7 Sheets-Sheet 6

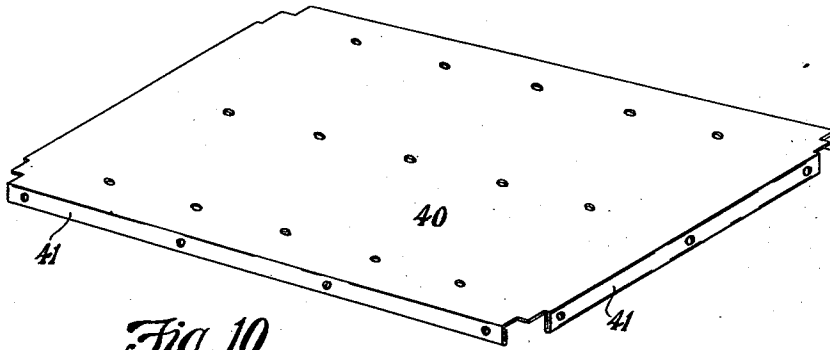


Fig. 10

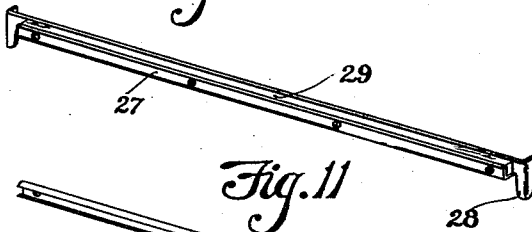


Fig. 11



Fig. 12

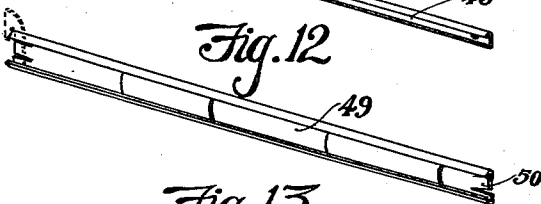


Fig. 13

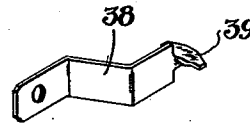


Fig. 17



Fig. 14

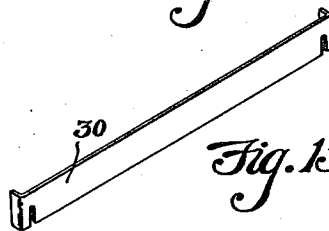


Fig. 15

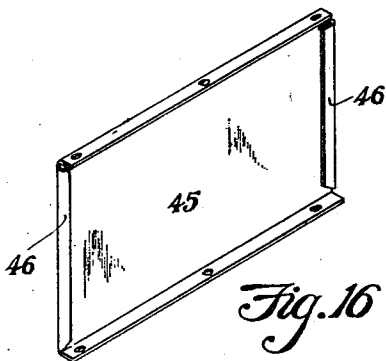


Fig. 16

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7 Sheets-Sheet 7

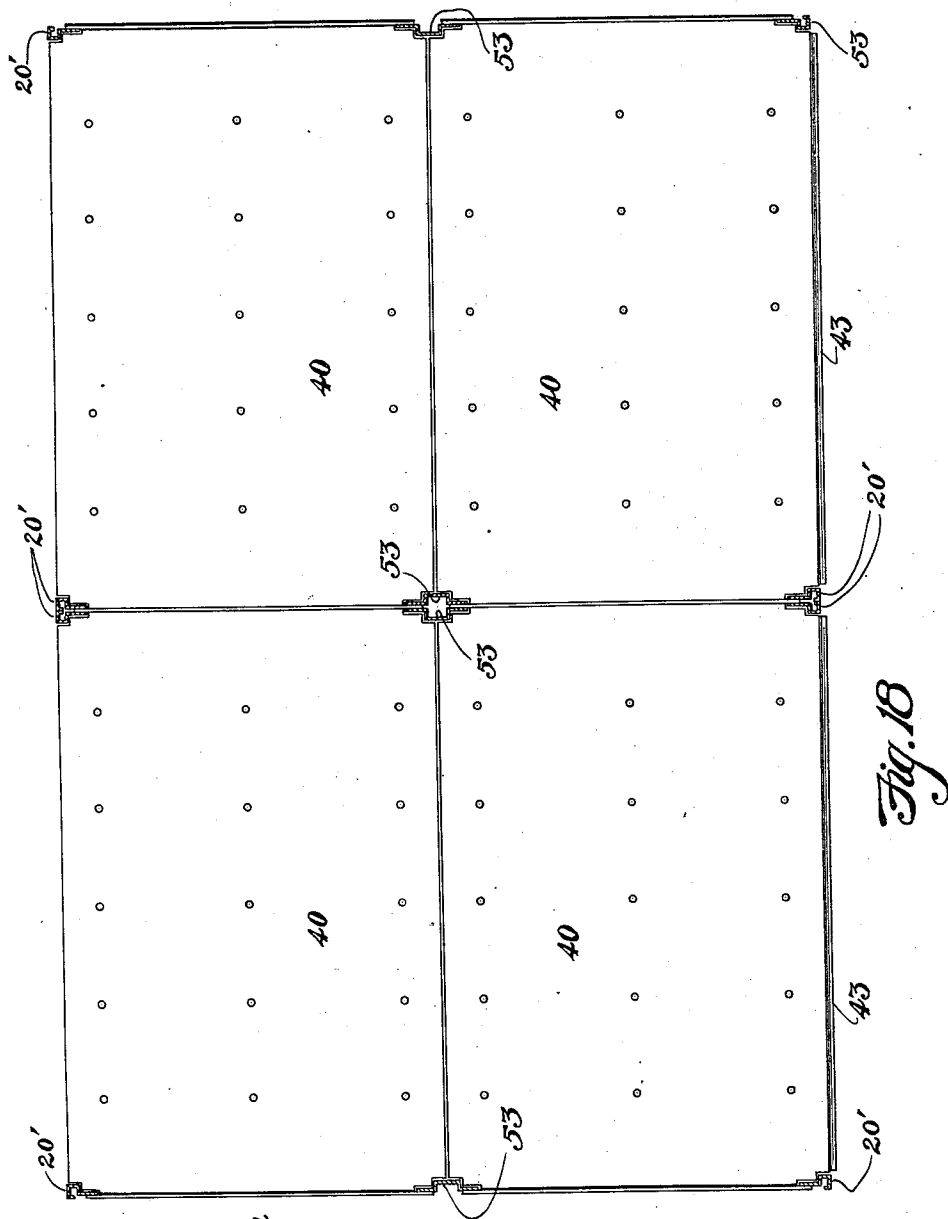


Fig. 18

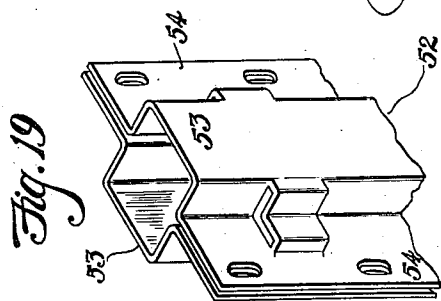


Fig. 19

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UNITED STATES PATENT OFFICE.

ARTHUR W. FRIES AND JOSEPH STURM, OF CANTON, OHIO, ASSIGNORS TO UNITED ALLOY STEEL CORPORATION, OF CANTON, OHIO, A CORPORATION OF NEW YORK.

SHEET-METAL SHELVING.

Application filed February 23, 1922. Serial No. 538,690.

To all whom it may concern:

Be it known that we, ARTHUR W. FRIES and JOSEPH STURM, citizens of the United States, both residing at Canton, in the county of Stark and State of Ohio, have invented a certain new and useful Improvement in Sheet-Metal Shelving, of which the following is a specification.

The invention relates to shelving construction made entirely of sheet metal, and the object of the improvement is to provide standard frame members which can be universally assembled for building various types of racks, bins, and open or closed shelving and the like, and to provide connections between the frame members which can be readily assembled to form strong and rigid joints without the use of bolts or other separate fastening means.

The improvement involves the use of upright members pressed or shaped from sheet metal to form inner angles from which angular loops are struck inward, and the use of connecting bars having angle-wedges, cross-heads on their ends for entering the angular socket formed by the loops and fitting into angles of the upright above and below the loops, to form a rigid joint.

Upon the frame thus formed various kinds of shelves, backs, partitions, bin fronts and other members can be mounted and secured, so as to make receptacles for receiving and storing a great diversity of products and commodities.

A preferred embodiment of the invention, and sundry modifications of its members, are illustrated in the accompanying drawings, forming part thereof, in which—

Figure 1 is a perspective view showing open shelving at one end, partitioned shelving at the other end, with some of the shelves subdivided, others provided with bin fronts, but others provided with forward extensions;

Fig. 2, an elevation cross section on line II—II, Fig. 1;

Fig. 2a, a fragmentary enlargement of the front extension connection shown in Fig. 2;

Fig. 3, a fragmentary perspective view showing details of construction and assembling;

Fig. 4, a fragmentary enlarged perspective view of an ordinary upright and connected frame members;

Fig. 5, a fragmentary perspective view of a modified front or rear bar;

Fig. 6, a similar view of a modified side bar;

Fig. 7, a similar view of a modified upright;

Fig. 8, a similar view of another modified upright;

Fig. 9, a plan of a divided shelf section on line V—V, Figs. 1 and 2;

Fig. 10, a detached perspective view of a shelf;

Fig. 11, a similar view of a front or rear bar;

Fig. 12, a similar view of a card holder;

Fig. 13, a similar view of a bin front;

Fig. 14, a similar view of a bin front clip;

Fig. 15, a similar view of a side bar;

Fig. 16, a similar view of a division;

Fig. 17, a similar view of a back clip;

Fig. 18, a plan section of a double face assembly; and

Fig. 19, a fragmentary perspective view of a double face upright.

Similar numerals refer to similar parts throughout the drawings.

Ordinary uprights 20 may be used at the corners or intermediate the ends of a frame, and as shown, is preferably formed of heavy sheet metal, say fourteen gauge, shaped with a hollow T-head 22 and parallel stem flanges 23 forming an inner angle 24 on each side between the head and the stem flange. A series of angular loops 25 are slit and struck from the inner angle and the adjacent parts of the head and flange, which loops form angular sockets 26 on the inner side of the angular walls of the upright.

A modified form of upright 20', shown in Fig. 7, may be used, in which the head 22' is formed in lateral halves with abutting inturned flanges in the face of the head; and one-half of such an upright may be used as a corner upright as shown in Fig. 18. Another modified form of upright 20'', shown in Fig. 8, may be made of two angle bars with two of their flanges 23'' placed together to form a stem and their other flanges diverging to form a T-head 22'', and the two angle bars may be held together by a sheet strip extending across the face and folded around the edges of the head forming flanges.

Connecting bars 27 for the front and back, are also made of heavy sheet metal, with a U-shaped section having the ends of the outer flange and the bottom yoke cut to abut the heads of uprights, and the ends of the inner flange extended, cut and shaped to form depending angle-wedge cross-heads 28 adapted to enter annular sockets 26 in an upright, so that the sides of the angular wedge will abut the head and flange of the upright, both above and below the loop, and so that both edges will wedge against the ends of the angular loop, as shown in the middle of Fig. 4.

A reinforcing bar 29 may be inserted in the hollow of each U-shaped front or rear bar, to strengthen the same and increase its carrying capacity, as well shown in Fig. 4; and where less strength is required, a modified form of bar 27' may be used wherein the U-walls are flattened together and a flange extended from the upper edge of the outer wall, as shown in Fig. 5.

Connecting bars 30 extending between the front and rear uprights of a frame, are also made of a strip of thick sheet metal having each end bent to form an angle flange 31, adjacent to which a slot 32 is cut upward from the lower edge to form a depending angle-wedge cross-head 33, which is adapted to enter an angular socket 26 in an upright, with the angle-wedge cross-head 33 in abutment with the head and stem walls of the upright when the edges are wedged against the ends of the loops, as well shown near the bottom of Fig. 4.

A modified form of side bar 30', shown in Fig. 6, may have its lower portion reversely bent to form a V-flange or rib 30'', as shown in Fig. 6, which not only strengthens the bar but may serve as a ledge upon which to support a shelf or the like.

A frame thus formed of the uprights and connecting bars, having all the joints wedged in two transverse directions and with a positive abutment between the angle-wedge cross-heads on the ends of the bars, and the walls of the heads and stem flanges of the uprights both above and below the angle loops; is thereby provided with rigid joints, braced in all directions, which are readily assembled without the use of bolts or the like, and which cannot be loosened except by a removal of the angle-wedge cross-heads from the angle sockets.

Partition sheets 34 may be placed in the frame, and when used their edges may be entered between the stem flanges 23 of the uprights, and secured in position by means of bolts 35 as shown in Fig. 4; the flanges of the upright being provided with suitable apertures 36 for receiving the bolts.

Back sheets 37 may be secured on the rear uprights, by means of clips 38 having cross T-heads 39 on their rear ends adapted to be

inserted through elongated apertures 39' in the back sheet and engaged by a turning of the clip, after which the forward ends thereof may be secured to the stem flanges of the upright by bolts 35' passed through apertures 36 therein; the clips being suitably bent to conform to the shape of the upright, as shown in Figs. 4 and 17.

Shelf sheets 40 are preferably made with depending folded flanges 41 along each side and end, and the side flanges are adapted to engage over the front and rear connecting bars, when the shelf is placed upon the same, as shown in Fig. 3. The shelves may be secured in place by means of bolts 42 and 42' passed through suitable apertures provided in the depending flanges and the front and back bars or the partition sheets; and a flanged channel holder 43 may be bolted to the front flange of a shelf which is adapted to receive a name card 44 to indicate the contents of the compartment formed above or below the shelf.

Division sheets 45, with folded flanges 46 on their forward and rear edges and L-flanges on their upper and lower edges, may be used to subdivide compartments between shelves, and may be secured in position by means of bolts 48 passed through suitable apertures provided in the flanges and the shelves; and a flanged channel bin front 49, extending between uprights, may be used on each shelf, and may be secured in position by tongues 50 struck from the webs at each end and deflected for a sliding engagement with a clip 51 engaged with one of the angle loops on the upright, as shown at the left in Fig. 3.

A forward extension frame and series of shelves may be assembled in front of an ordinary assembly of shelves, by securing the rear depending flange 41' of the extension shelves to the bolts 42 which secure the forward depending flange 41 of the ordinary shelf to the connecting bar upon which it rests, as shown in Fig. 2^a; and a double faced assembly of frames and shelves may be made by using the modified form of upright 52 made of two flanged channels 53, with their flanges 54 placed together, as shown in Figs. 18 and 19; in which event a single channel may be used at each end, as shown in Fig. 18.

The modified members are only intended for use in special cases, and it is evident that a standard form 20 of the ordinary upright, a standard form 27 of front and back connecting bars, and a standard form 30 of side connecting bars, each one of which may be reversed endwise to properly join another, can be assembled and rigidly secured together without the use of bolts, to form a universal frame; to which may be added partitions, backs, shelves, divisions, bin fronts and the like, to form a great variety of racks and receptacles.

We claim:—

1. A sheet-metal frame for shelving and the like, including uprights shaped to form inner angles having transverse angle-loops struck within the angles forming angle-sockets therein, and connecting bars with cross-heads on their ends shaped to form angle-wedges fitting in the angle-sockets and abutting the uprights above and below the angle-loops.

2. A sheet metal frame for shelving and the like, including uprights shaped to form hollow T-heads and stem flanges forming inner angles with the head having transverse angle-loops struck within the angles forming angle-sockets therein, and connecting bars with cross-heads on their ends shaped to form angle-wedges fitting in the angle-sockets and abutting the uprights above and below the angle-loops.

3. A sheet-metal frame for shelving and the like, including uprights shaped to form inner angles having transverse angle-loops struck within the angles forming angle-sockets therein, and connecting bars with cross-heads on their ends shaped to form angle-wedges fitting in the angle-sockets and abutting the upright above and below the angle-loops, some of the connecting bars being formed with U-shaped flanges.

4. A sheet-metal frame for shelving and the like, including uprights shaped to form inner angles having transverse angle-loops struck within the angles forming angle-sockets therein, and connecting bars with cross-heads on their ends shaped to form angle-wedges fitting in the angle-sockets and abutting the upright above and below the angle loops, some of the connecting bars being formed with U-shaped flanges with reinforcing bars therein.

5. A sheet-metal frame for shelving and the like, including uprights shaped to form hollow T-heads and stem flanges forming inner angles with the head having transverse angle-loops struck within the angles forming angle-sockets therein, and connecting bars with cross-heads on their ends shaped to form angle-wedges fitting in the angle-sockets and abutting the upright

above and below the angle-loops with partition sheets entered and secured between the stem flanges of the uprights.

6. A sheet metal frame for shelving and the like including uprights shaped to form heads and stem flanges forming inner angles with the head having transverse angle-loops struck within the angles forming angle-sockets, connecting bars with cross heads on their ends shaped to form angle wedges fitting in the angle sockets and fitting the uprights above and below the angle-loops, and partition sheets secured to the stem flanges of the uprights.

7. A sheet-metal frame for shelving and the like, including uprights shaped to form inner angles having transverse angle-loops struck within the angles forming angle-sockets therein, and connecting bars with cross-heads on their ends shaped to form angle-wedges fitting in the angle-sockets and abutting the upright above and below the angle loops, with shelf sheets resting on connecting bars having flanges depending outside the same.

8. A sheet-metal frame for shelving and the like, including uprights shaped to form inner angles having transverse angle-loops struck within the angles forming angle-sockets therein, and connecting bars with cross-heads on their ends shaped to form angle-wedges fitting in the angle-sockets and abutting the upright above and below the angle-loops, with shelf sheets supported by the connecting bars.

9. A sheet-metal frame for shelving and the like, including uprights shaped to form inner angles having transverse angle-loops struck within the angles having angle-sockets therein, and connecting bars with cross-heads on their ends shaped to form angle-wedges fitting in the angle-sockets and abutting the upright above and below the angle loops, with shelf sheets resting on connecting bars, flanged channel bin fronts on the shelves between uprights, and clips connected with the angle loops engaged with the bin fronts.

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