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[31] **P 17 790 26.0**

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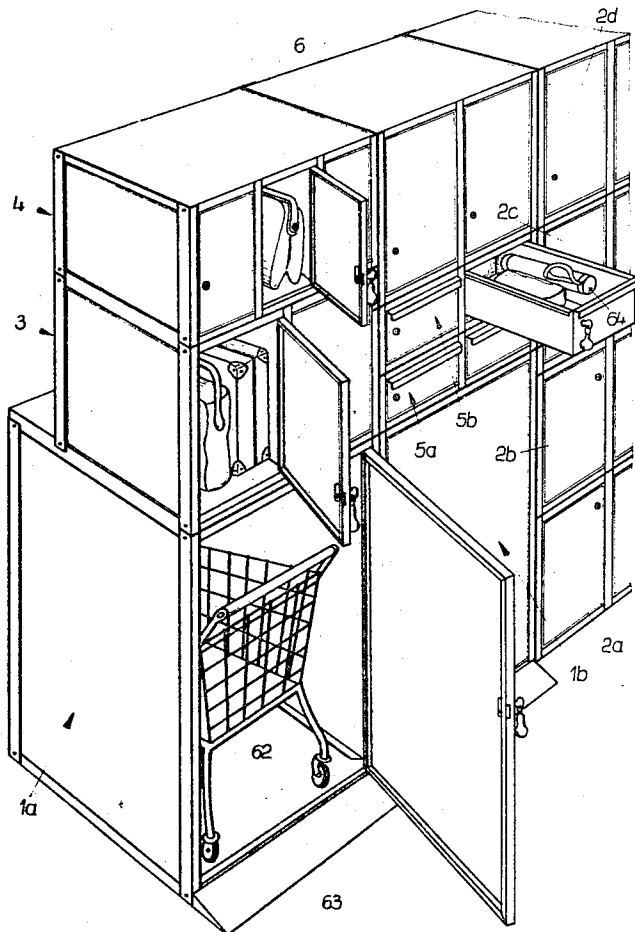
[54] **COLLAPSIBLE CABINETS**
11 Claims, 15 Drawing Figs.

[52] **U.S. Cl.**..... **312/257**

[51] **Int. Cl.**..... **A47b 43/00,**
A47b 47/00

[50] **Field of Search**..... **312/257,**
240-241, 257 S, 263, 264, 350, 111, 198, 108,
265; 217/12-16

ABSTRACT: A collapsible cabinet, preferably made of sheet metal, consists of a base, a top, rear wall, sidewalls, and a door frame. The sidewalls are located relative to the base and top by projecting angle portions which fit around the corners of the base and top, and the rear wall and door frame are secured in position by interlocking hooks which extend lengthwise thereof and of the sidewalls.



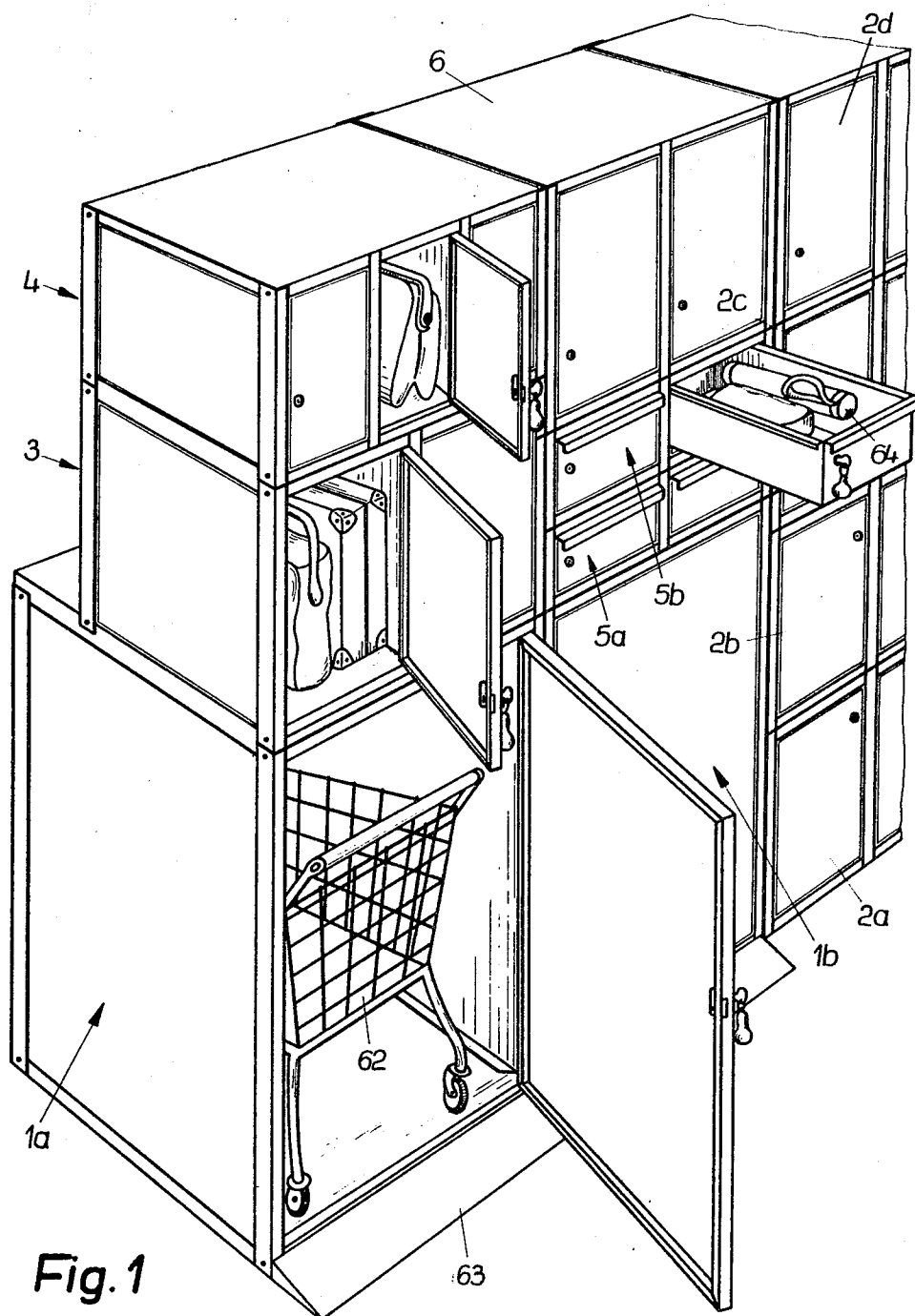


Fig. 1

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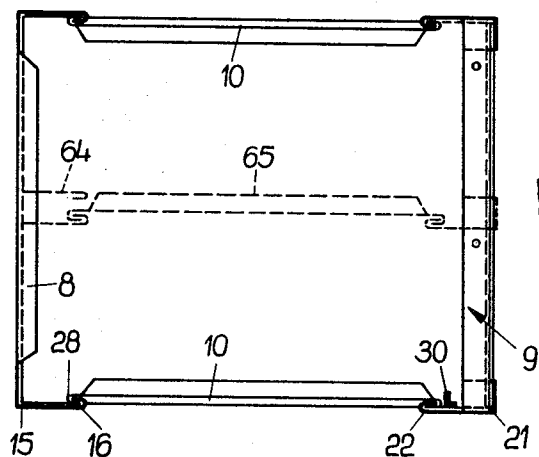


Fig. 3

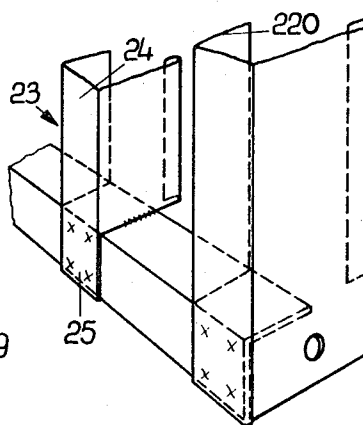


Fig. 4

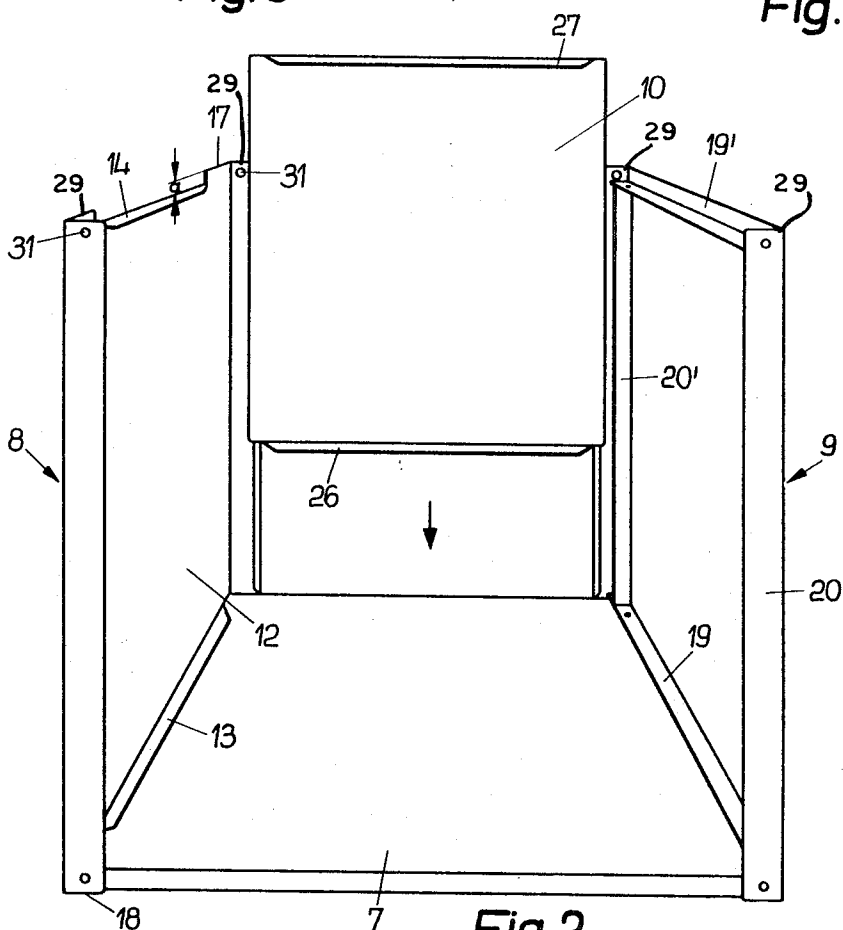


Fig. 2

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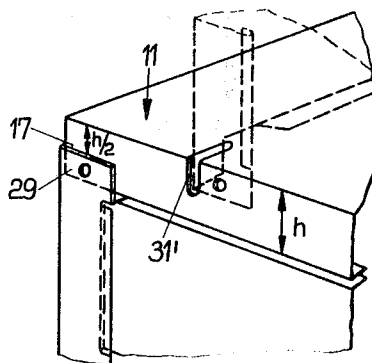
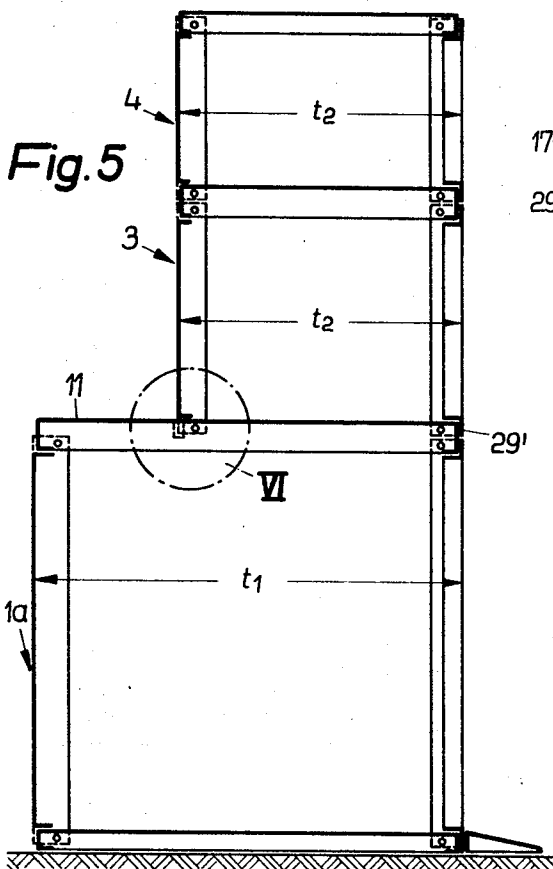


Fig. 6

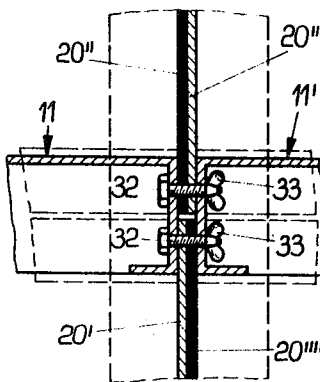


Fig. 7

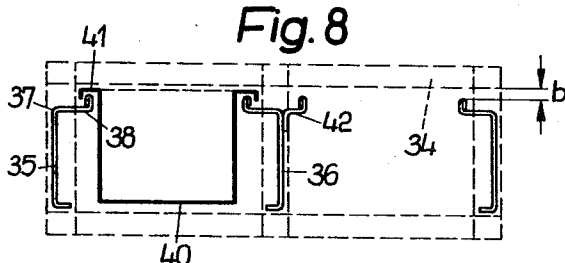


Fig. 8

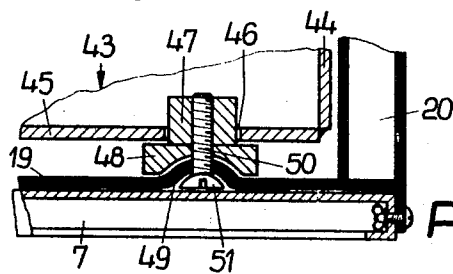


Fig. 10

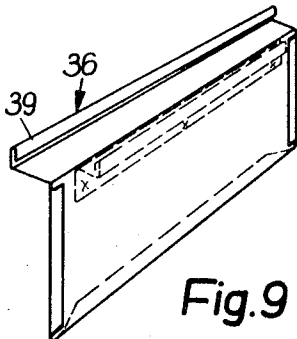


Fig. 9

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Fig. 11

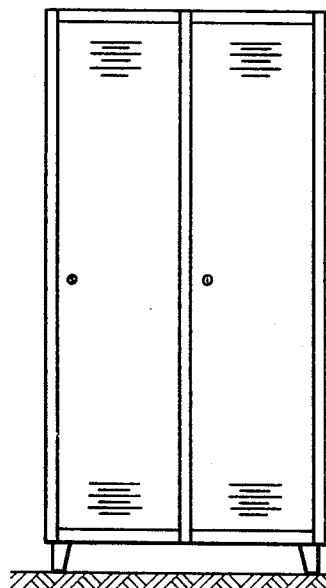


Fig. 12

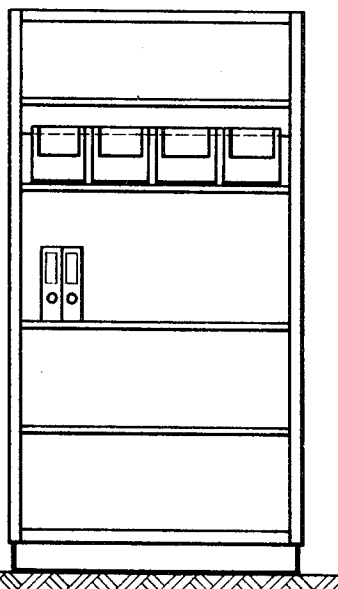


Fig. 13

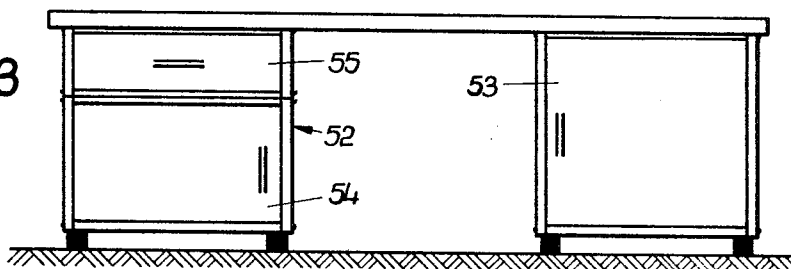


Fig. 14

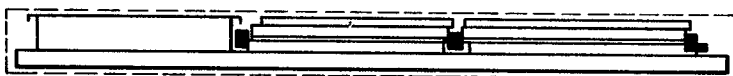
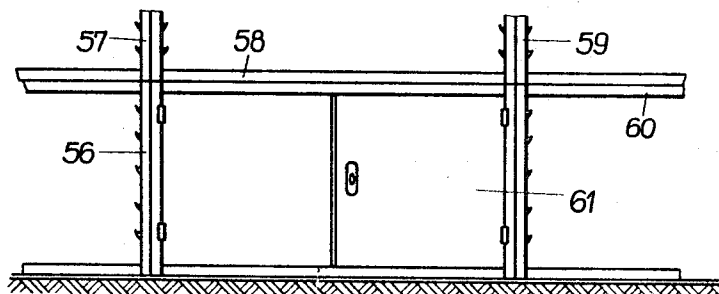


Fig. 15



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COLLAPSIBLE CABINETS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to collapsible cabinets comprising a base, a top, a door frame, a rear wall, and sidewalls the longitudinal edges of which are arranged for interlocking engagement.

Such cabinets may be employed for many purposes. Their special advantage reside in that the cabinets may be carried to the place of assembly in the collapsed state, and need not be assembled until after arrival. Great saving can thereby be obtained on transport charges, since the very great amount of space required in comparison to weight in the case of hollow units, in no longer needed. Economical shipping over long distances, e.g. overseas is also becoming possible.

2. Description of the Prior Art

In a known collapsible shelving assembly of sheet material (British Pat. Specifications Nos. 925,756 and 942,739), the vertical edges of the lateral sides are bent over twice at right angles to form a U-shaped element open towards the interior of the shelving assembly, and the engaging portions of the connecting elements possessing the corresponding detention elements correspond to the size of the opening of the U-shaped elements into which they are inserted with a friction fit at right angles to the longitudinal extension of the U-shaped elements. Extensive welding is unavoidable in order that the engaging elements may be adapted to the size of the aperture of the U-shaped elements for a shelving assembly or cupboard of this nature. The choice of material is restricted considerably by this requirement. High-grade sheet steel, which is difficult to weld, can be employed only with considerable labor costs. Plastic-coated sheet metal cannot be employed at all, since the plastic layer would be destroyed during welding.

It is an object of the invention to provide a stable cabinet the structure of which is such as to eliminate welding as far as possible, and which can be assembled with other similar cabinets in an interlocking manner.

SUMMARY

According to the invention there is provided a collapsible cabinet, comprising a base, a cover, a door frame and lateral sidewalls, the longitudinal edges of which are arranged for interlocking engagement, wherein the longitudinal edges are provided with portions bent over through approximately 180° to form hooks for interlocking engagement, two opposed sidewalls, a rear wall and an opposed door frame or two opposed door frames are provided with abutment angles arranged to flank the corner areas of the base and of the cover, and wherein horizontal bent over portions are provided on the sides and frames to determine the position of the base and cover relative to the walls and frames.

In a cabinet as just set forth the sidewalls and the door frame or frames are braced relative to each other by the base and the top. This is accomplished by virtue of the fact that the corners of the base and top are flanked by abutment angles or the like which prevent the walls and door frames from falling inwards. With this kind of cabinet it is unnecessary for the sides and the frame to be secured along their vertical edges and the hooks merely have to prevent the sides from being pulled apart. By appropriate dimensioning of the sidewalls relative to the base and top, a predetermined tension can easily be established, so that a fully shakeproof cohesion is established. The sides are of relatively simple form and can therefore be produced by sheet-metal working, by simple bending processes, without welding. Welding is thus needed only for door frames, and this is acceptable since it is applied to only a small part of the cabinet. The substantial elimination of welding has the advantage that it is possible, for example, to employ high-grade sheet steel or plastic-coated sheet metal, so that, for example, laboratory furniture can be built in the form of cabinets according to the invention. The invention is not

limited to application to sheet-metal structures. In a wooden structure, the interlocking parts and the abutment angles can be formed by special metal fittings.

Because the cabinet is collapsible it is easily transportable, and a plurality of the cabinets can be employed for erection of assemblies of lockers which may be set up in self-service stores. Such lockers are of special advantage in supermarkets having two halls, between which a vestibule with entries and exits is situated. The lockers can be set up on the vestibule. The customers can then place their bags, etc., in the lockers. After making purchases in one hall, baskets or trolleys carrying the goods can be locked up, leaving the hands free for purchases in the other hall.

In one embodiment of the invention made of sheet metal, the elements are provided with abutment angle members which are either bent over at right angles at their vertical sides or alternatively in the case of a door frame it is provided with vertical sections each having a portion bent over at right angles. In a structure of this kind, the longitudinal reinforcements of the sidewalls have their upper extremities acting as abutment angles. A structure of this kind is extremely simple and offers great rigidity.

According to an advantageous form of the invention, the distance between the upper end of an abutment angle and a bent over portion associated therewith is less than the height of the cover, said distance being preferably one-half that of the cover. In a cabinet having this structure, the lower abutment angles preferably project over the underside of the base by a distance equal to that by which the cover projects above the upper ends of the upper abutment angles. This structure of the cabinets renders it possible to stack them on each other, since the lower projecting abutment angles can fit over the top projecting beyond the upper abutment angles, thus providing a very satisfactory immobilization.

The cover for a deep cabinet may be provided with slots arranged to receive base abutment angles of less deep cabinets.

The vertical sidewalls and the door frames may have identical upper and lower edges so that they may be installed in positions turned through 180° around horizontal axes. This has the advantage that a frame made as a door frame can be employed for doors intended to open to the left as well as for doors intended to open to the right, since the door hinges are positioned at the other side by rotation of the cabinet through 180°. This ability to turn a cabinet also has the advantage that a lock arranged at the middle cannot be displaced to different vertical levels.

The term "door frame" when used herein is intended to include a frame surrounding an opening, which may, for example, be an opening for a drawer and which may be secured, as by screws, to the base and/or the top, preferably by means of bolts with wing nuts.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a cabinet system in which are combined a number of cabinets of different size constructed in the form of lockers;

FIG. 2 is a perspective view of a cabinet during assembly;

FIG. 3 is a plan view of a cabinet before a top is fitted thereto;

FIG. 4 is a perspective view of a lower corner of a door frame with a central post;

FIG. 5 is an end view of the cabinet system shown in FIG. 1;

FIG. 6 is a perspective view of the portion shown in the dotted circle VI, FIG. 5;

FIG. 7 is a section through the position of connection between two cabinets placed one on the other;

FIG. 8 is a diagrammatic front view of a cabinet with a drawer;

FIG. 9 is a perspective view of a cabinet side formed as a guide rail for a drawer;

FIG. 10 is a section through the mounting of a door;

FIG. 11 is a front view of a cabinet arranged as a double wardrobe;

FIG. 12 is a front view of a cabinet arranged as a set of shelves;

FIG. 13 is a front view of a writing desk comprising two cabinet units constructed according to the invention;

FIG. 14 is a diagrammatic view of the desk of FIG. 3

packaged for storage or transit, and

FIG. 15 is a front view of shelves having fitted therebetween a cabinet according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings, the cabinet system according to FIG. 1 comprises two identical and relatively large bottom cabinets 1a, 1b, adjoined laterally by smaller cabinets 2a to 2d. The cabinet 1a supports cabinets 3 and 4, of which the cabinet 3 has two compartments and the cabinet 4 has three compartments, each compartment being closed by a door. The cabinet 3 is of slightly greater height than the cabinet 4. The cabinet 1b carries small cabinets 5a, 5b which contain drawers, one of which is shown in the pulled out condition. The cabinet 5a supports a cabinet 6 of the same size as that of the cabinets 2a to 2d. All the cabinets are assembled according to the principle illustrated in FIGS. 2 to 10, irrespective of size, which is described in detail below.

Each cabinet has a base 7 (see FIG. 2), a rear wall 8, a front door frame 9 and sidewalls 10, only one such sidewall, as well as a top panel 11 (see FIG. 6) being illustrated in FIG. 2.

In the sheet metal structures illustrated in the drawings, the base 7 is formed from a plane sheet metal panel by bending the edges over twice at right angles, as apparent from the cross section according to FIG. 5. If need be, the base 7 may also have reinforcements. The rear wall 8 has the shape shown in FIGS. 2 and 3. In essence, it consists of the actual wall surface 12 which has a bent over portion 13, FIG. 2, at the bottom and a bent over portion 14 at the top. The vertical edges are bent over to form hooks as illustrated in FIG. 3, that is firstly through 90° (at 15) and secondly through 180° (at 16). As can be seen from FIG. 2, the bent over portions 13, 14, are inset relative to the upper edges 17 and the lower edges 18.

The door frame 9 has the shape shown in FIGS. 2 to 4. The lower member 19 of the frame 9 is an angle section, FIG. 2, and the upper frame member 19' is an identical angle section. The vertical members are formed by identical sections 20, 20', shaped as shown in FIGS. 3 and 4. FIG. 3 shows that the frame sections 20, 20' each have a portion bent over at 90° corresponding to the bent over portion 15 of the wall 8, and a bent over portion 22 at 180° corresponding to the bent over portion 21 (see FIG. 4). A limb 220 is incorporated moreover, so that the vertical profiles 20, 20' each have a J-shaped cross section with a flat base 24. The frames 9 may also have a central post 23 which has the same cross section as that of sections 20, 20'. The base 24 is extended to form a weld-on lug 25, FIG. 4.

The sidewalls 10 each have a lower horizontal bent over portion 26 (see FIG. 2) and an upper horizontal bent over portion 27. The configuration of the vertical edges is also shown in FIG. 3 from which it will be seen that the vertical edges are bent over through 180° to form hooks 28.

The cabinet is assembled in the following manner. The rear wall 8 and the door frame 9 are initially placed on the base 7. The two sidewalls 10 are then inserted from above, so that the 180° bends on the rear wall and door frame on the one hand and on the side walls on the other hand, interlock as shown in FIG. 3. During this insertion, the bent over portions 13 of the rear wall 8 and 26 of the sidewalls are placed on the upper side of the base, whereas the lower frame member 19 enflanks the front edge of the base. The top or cover 11 is then placed in position, being of analogous form to that of the base 7 i.e. being produced from a flat metal sheet or plate the edges of which are bent over at right angles twice. After the cover has been placed in position, the abutment angles 29, FIG. 2, which project above the bent over portions 14, enflank the corners of the cover 11, as shown in FIG. 6. The lower abutment angles enflank the corners of the base 7 in the same manner. As

will be understood from the drawings, the base 7 and the cover 11 hold the sidewalls in spaced relation in such manner that they cannot fall inwards. The base 7 and the cover 11 also have the effect that the interlocking hooks 16, 28 (see FIG. 3) cannot be pulled apart. The dimensions may easily be chosen in such manner that a definite state of stress is induced after insertion of the cover, which ensures that all parts of the cabinet are held together in wobbleproof manner.

Small guiding angles 30, FIG. 3, may be provided on the inner sides of the frame sections, to facilitate the assembly of the cabinet by preventing the sidewalls from falling inwards before positioning of the cover 11. Screw-holes 31, FIG. 2, may be provided in the abutment angles, to make it possible to connect the interlocked cabinet parts by means of bolts.

For securing partitions 65 (see FIG. 3) the rear wall 8 may carry a rail 64 having hooks corresponding to the hooks 16, 22.

FIGS. 5 and 6 show a system consisting of several cabinets, the cabinets shown in section in FIG. 5 being the cabinets 3 and 4 of FIG. 1. As will be seen from FIG. 6 the height h of the cabinet cover 11 is greater than the distance a (see FIG. 2) by which the bent over portion 14 lies below the upper extremities 17 of the abutment angles. As a result, the cover 11 extends above the upper extremities 17 by approximately the height h . The cabinet 3 placed on top of cabinet 1a is so constructed that its lower abutment angles 29' project below the underside of the base of the cabinet, so that the front abutment angles 29' of the upper cabinet 33 enflank the cover 11 of the cabinet 1a at the corners, see also FIG. 1.

Since the depth t_1 of the cabinet 1a is greater than the depth t_2 of the cabinet 3, the rear wall of the cabinet 3 is not situated in the same plane as the rear wall of the cabinet 1a. Accordingly, the cover 11 is provided with slots 31', FIG. 6, into which are inserted the rear abutment angles of the cabinet 3. The cabinet 4 also has a depth t_2 and its lower abutment angles can therefore enflank all four corners of the lower cabinet 3.

As shown in FIG. 7, the superimposed cabinets may be secured one to another. 11 and 11' are covers of two adjacent cabinets, say of the cabinets 1a and 1b, FIG. 1, whereas 20' is a frame section of the lower cabinet 1a, 20'' is a frame section of the cabinet 3, 20''' is a frame section of the cabinet 1b, and 20'''' may be a frame section of the cabinet 5a. The adjacent cabinets are then interconnected by means of bolts 32 and wing nuts 33. To this end, the bolts 32 are inserted through holes 31 in the covers 11, 11' and in the frame sections 20.

FIGS. 8 and 9 illustrate the structure of a cabinet comprising a drawer. The front opening frame of a cabinet, say of the cabinet 5a, is shown dotted at 34 in FIG. 8. The sidewalls, marked 35 and 36 in this case, and of which the partition 36 is shown in enlarged perspective in FIG. 6, are bent over at right angles twice, at the top, namely at 37 and 38, so as to form a Z-shaped cross section. The upwardly projecting limb is bent over through 180° at 39 and acts as a guiding rail for a drawer 40 whose lateral edges are bent over to U-shape at the top at 41, and enflank the guiding rails. The distance b between the upper edge of the guiding rails and the lower edge of the upper frame member of the door frame is just sufficient to allow the drawer to be inserted whilst still leaving a small gap. Since the lateral side 36 acts as a delimitation for both cabinet compartments, it carries a part 42 acting as a guide rail for the drawer situated in the right-hand cabinet compartment. This guide rail is shown dotted in FIG. 9.

FIG. 10 shows the mounting of a cabinet door. 7 is a cabinet base, 19 a lower door frame section and 20 a lateral door frame section. The door 43 has right-angle bends 44, 45. In the lower bend 45 is a hole 46 which receives a bearing pin 47. The bearing pin 47 has a bottom flange 48. A cavity 49 is formed in the flange 48. The bearing pin is held in the frame member 19 by means of the countersunk screw 50. Since the frame member must lie flush on the base 7, the screwhead 51 is countersunk. The countersinking is formed whilst tightening the screw 51, being drawn into the cavity 49.

Complementary to the application shown in FIG. 1, FIGS. 11 to 15 show additional applications, namely an application for a double cupboard or clothes-locker (FIG. 11), for a set of shelves (FIG. 12), for a writing desk (FIGS. 13 and 14) and for a shelf locker (FIG. 15). In each case, the fundamental principle is applied, according to which the sides and the door frame are so braced apart by the base 7 and the cover 11, that they cannot depart from their position. As shown in FIG. 14 a writing desk comprises cabinet units 52 and 53 according to the invention, which before assembly can be packaged in very space-saving manner. The unit 52 moreover comprises a smaller lower cabinet 54 and an upper drawer cabinet 55.

FIG. 15 shows that a cabinet according to the invention may also be a component of a set of shelves, composed of units 56 to 60. In this case, the cabinet 61 has the same dimensions as the shelf units 56 to 60.

The structure shown in FIG. 1 represents a locker system, the larger cabinets 1a, 1b being arranged to receive self-service trolleys 62.

To facilitate the insertion of the trolleys thereinto the cabinets have a small ramp 63. The smaller compartments or lockers can be used to store suitcases, shopping bags or small objects (see umbrella 64 in cabinet 5b). Such lockers may, for example, be set up in shops or self-service stores.

We claim:

1. A collapsible cabinet, comprising a base, a cover, a door frame and lateral sidewalls the longitudinal edges of which are arranged for interlocking engagement, wherein the longitudinal edges are provided with portions bent over through approximately 180° to form hooks for interlocking engagement, two opposed sidewalls, a rear element and an opposed front element are provided with abutment angles arranged to flank the corner areas of the base and of the cover, and wherein horizontal bent over portions are provided on the sidewalls and the rear element and base and cover relative to the walls and frames.

2. A cabinet according to claim 1 made of sheet metal, wherein the elements provided with the abutment angles are either bent over at right angles along their vertical sides.

3. A cabinet according to claim 1, wherein the distance between the upper end of an abutment angle and a bent over portion associated therewith is less than the height of the cover, said distance being preferably one-half that of the cover.

4. A cabinet according to claim 3, wherein the lower abutment angles project beyond the underside of the base by a distance equal to that by which the cover projects above the upper ends of the upper abutment angles.

5. A cabinet according to claim 3, wherein the cover for a deep cabinet is provided with slots arranged to receive base abutment angles of less deep cabinets.

6. A cabinet according to claim 1, wherein the sidewalls and the door frame have identical upper and lower edges so that they may be installed in positions turned through 180° around horizontal axes.

7. A cabinet according to claim 1, wherein the door frame has a central post and the rear wall has a guide rail, the central post and the guide rail having portions bent over through 180° for insertion of partitions constructed to be identical to the sidewalls.

8. A cabinet according to claim 1, wherein a lower member and preferably also an upper member of the door frame is an angle section which enflanks the front edge of the base of the cabinet.

9. A cabinet according to claim 1, wherein the sidewalls are bent over to Z-shape in cross section to form guide rails for drawers, an upwardly directed freestanding limb of the bent over portion acting as a guiding rail and preferably being doubly bent.

10. A cabinet according to claim 1, wherein a door is journaled by means of bearing pins secured to the door frame by means of bolts, the bolts being countersunk into the outer surface of the frame by the sheet metal being drawn into depressions on the bearing pins.

11. A cabinet according to claim 1, wherein the sidewalls and door frames are secured to the base and to the cover, preferably by means of bolts and wing nuts.