

DESCRIPTION

KNOCKDOWN METAL CABINET

TECHNICAL FIELD

The present invention relates to metal cabinets for storing
5 documents and other articles, and in particular to knockdown metal
cabinets which can be readily assembled into an intended structure.

BACKGROUND OF THE INVENTION

A conventional metal cabinet for such a purpose typically has a
box-shaped cabinet main body which is formed by a back panel, two side
10 panels, a top panel, and a bottom panel. The cabinet main body may be
given with any one of a number of structures depending on its application.
The side panels may be provided with engagement pieces for securing
shelves inside the cabinet main body. The front opening of the cabinet
main body may be left open. The side panels may be provided with guide
15 rails to mount drawers. The front opening of the cabinet main body may
also be provided with a double door, a slide door or a glass door. Each
metal cabinet is assembled into a prescribed permanent structure at an
manufacturing facility, and is shipped to the retail store or to the end user
in its assembled state.

20 Because the conventional metal cabinet is already fully assembled
and is therefore bulky, and cannot be disassembled, a relative large space is
required to store or stock it at the assembling facility and the retail store,
and the transportation from the assembling facility to the retailer is both
costly and inconvenient. The same problems arise when the end user
25 moves the cabinet from one location to another.

It is also necessary to manufacture a large number of cabinets
having different structures and keep them in stock because of the need to
meet a wide range of different structures such as the presence of doors or
the types of the doors. This contributed to the increase in cost because of
30 the difficulty in allocating common component parts in an efficient manner,
and maintaining a proper amount of stock at all times.

It is conceivable to design a cabinet such that the back panel, the
side panels, the top panel and the bottom panel are joined together by
fastening means such as bolts and nuts, but the work required to assemble
35 and disassemble the cabinet may be too difficult for the end user, and a
sufficient assembling precision and a sufficient mechanical strength may

not be achieved.

BRIEF SUMMARY OF THE INVENTION

In view of such problems of the prior art, a primary object of the present invention is to provide a metal cabinet which allows component
5 parts thereof to be assembled both easily and accurately, and to disassemble and reassemble when such a need arises, and which allows a door of a desired type to be installed to a common cabinet main body.

According to the present invention, such an object can be accomplished by providing a knock down metal cabinet defining an open
10 front end, comprising a back panel, a pair of side panels attached to either side of the back panel, and top and bottom panels attached to the upper and bottom edges of the back panel across the side panels, characterized by that: mutually engaging frame portions are formed along edges of the panel, and the side panels are secured to the top and bottom panels via
15 engagement means formed in the frame portions.

According to the metal cabinet of the present invention, because the cabinet main body can be assembled from the back panel, the side panels, the top panel and the bottom panel in any place other than the assembling plant, and it is therefore possible to eliminate the need for a
20 large space for stocking the cabinets at the manufacturing plant or the retailer, and to reduce the cost of transportation.

The engagement means may comprise an engagement member secured to one of the frame portions, and a receiving opening provided in the corresponding frame portion for detachable engagement with the
25 engagement member. The engagement member may comprise a plastic member having a resilient engagement portion, and the receiving opening is formed in the corresponding frame portion. Thus, the cabinet main body can be assembled and disassembled very easily so that the cabinet can be moved from one location to another without any problem. In
30 particular, the engagement means allows the frame portions to be attached to each other in a highly secure manner even without using threaded bolts or other fasteners.

According to another aspect of the present invention, there is provided a metal cabinet including a cabinet main body defining an open
35 front end, a plurality of engagement means being provided along a periphery of the open end for interchangeably attaching one of a door

frame for accommodating a sliding door and a hinge for supporting a normal door.

Thus, according to the present invention, a common cabinet main body can be adapted for a cabinet with or without a door, or for a cabinet having a slide door or a normal door so that the number of the variations of the cabinet main body can be minimized. Therefore, common component parts can be used for different models, and stocking of component parts is simplified. These advantages are even more enhanced when the cabinet main body is adapted to be easily assembled and disassembled.

When the engagement means comprises guide slots for interchangeably receiving tongue pieces for attaching the door frame for a sliding door and tongue pieces for supporting a hinge pivot for the normal door, the door of the cabinet main body can be changed from one type to another without any difficulty. If the door frame for a sliding door comprises a pair of cross members and a pair of vertical members which are detachably joined into a frame structure via joint means formed at four corners, the overall assembly work is simplified, and more common component parts can be used for the door frame so that the overall cost can be significantly reduced.

According to a preferred embodiment of the present invention, the engagement means comprises a retaining member fitted into an opening defined inside each of the guide slot for receiving an associated one of the tongue pieces, the retaining member comprising a tubular front end defining an inner passage for receiving the tongue piece, a pair of clamp plates extending rearward from the tubular front end for receiving a forward end of the tongue piece between the clamp plates, and an engagement projection for retaining the retaining member in the opening, the passage being progressively narrower toward a rear end thereof in such a manner that walls defining the passage is pushed apart as the tongue piece is fitted into the passage, thereby causing the clamp plates to be pressed onto a free end of the tongue piece. This allows the cabinet to be assembled in a highly precise and sturdy manner.

Preferably, the retaining member is adapted to be disengaged from the cabinet body by depressing the engagement projection engaging the retaining member in the opening, and pulling the retaining member rearward out of the opening. Also, a free end of the tongue piece may be

provided with an opening while the retaining member is provided an inwardly directed projection which is adapted to be fitted into the opening of the tongue piece when the tongue piece is fully fitted into the passage.

Removable of the tongue piece can be easily accomplished if the
5 tongue piece is adapted to be disengaged from the retaining member by resiliently deforming the retaining member so as to disengage the inwardly directed projection out of the opening of the tongue piece.

BRIEF DESCRIPTION OF THE DRAWINGS

Now the present invention is described in the following with
10 reference to the appended drawings, in which:

Figure 1 is an overall perspective view of a metal cabinet embodying the present invention in an assembled state;

Figure 2 is an overall perspective view of the metal cabinet of Figure 1 in a disassembled state;

15 Figure 3 is a fragmentary perspective view of an arrangement for joining the back panel to the side panel of the metal cabinet of Figure 1;

Figure 4 is a fragmentary perspective view of the upper and lower ends of one of the side panels of the metal cabinet of Figure 1;

Figure 5 is a fragmentary perspective view of the top panel of the
20 metal cabinet of Figure 1;

Figure 6 is a fragmentary perspective view of the bottom panel of the metal cabinet of Figure 1;

Figure 7 is a schematic longitudinal sectional view of the metal cabinet of Figure 1;

25 Figure 8 is an exploded perspective view showing the mode of attaching a slide door frame to the metal cabinet of Figure 1;

Figure 9 is a perspective view showing the mode of attaching a normal door frame to the metal cabinet of Figure 1;

Figure 10 is a schematic longitudinal sectional view of a slide door
30 metal cabinet;

Figure 11 is a schematic longitudinal sectional view of a normal door metal cabinet;

Figure 12 is an enlarge perspective view of the retaining member for attaching the door to the metal cabinet of Figure 1;

35 Figure 13 is a longitudinal sectional view showing the mode of use of the retaining member; and

Figure 14 is an exploded perspective view of the slide door frame of Figures 8 and 10.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A metal cabinet embodying the present invention is now described in the following with reference to appended Figures 1 to 14. Figure 1 generally illustrates a cabinet main body 1 consisting of a rectangular box having an open front end which comprises a back panel 2, a pair of side panels 3 and 4, a top panel 5 and a bottom panel 6. Shelves 7 are optionally provided in the cabinet main body 1 so as to laterally extend across the two side panels 3 and 4. A base 8 may be optionally placed under the bottom panel 6 when the cabinet main body 1 is placed on a floor. The front edges of the top panel 5 and the bottom plane 6 may be provided with guide slots 9 and 10 for fitting the open front end with a door.

Figure 2 is an exploded perspective view of the cabinet main body 1. The back panel 2 is at first placed on a floor surface as a reference component. The side panels 3 and 4 are placed vertically on the back panel 2 with their rear edges down, and are slid sideways as indicated by arrows A and B until the rear frame portions 11 and 12 of the side panels 3 and 4 engage with lateral frame portions 13 and 14 of the rear panel 2.

The bottom panel 6 is placed obliquely up with its rear edge placed over the inner surface of the rear panel 2, and is moved more vertically up as indicated by arrow D while pushing the rear edge thereof again the outer periphery of the back panel 2 as indicated by arrow C. Thereby, a rear frame portion 15 of the bottom panel 6 engages with a lower frame portion 16 of the back panel 2 while side frame portions 17 and 18 of the bottom panel 6 engage with lower frame portions 19 and 20 of the side panels.

The top panel 5 is then placed vertically up with its rear edge on a part of the floor surface adjacent to the upper edge of the back panel 2, and slid horizontally inward as indicated by arrow E until a rear frame portion 21 of the top panel 5 fits into an upper frame portion 22 of the back panel 2. At the same time, side frame portions 23 and 24 of the top panel 2 are engaged with upper frame portions 25 and 26 of the side panels 3 and 4.

Each of the above mentioned component parts is now described in more detail with reference to Figures 2 to 6. Referring to the detailed perspective view of Figure 3, the side frame portions 13 and 14 (Figure 3

shows the right frame portion 14) are each formed in the back panel 2 by bending the side edge (bent piece 27) inward in the shape of letter-L in a symmetric fashion, and each of the bent pieces 27 is provided with receiving slots 28 cut out in the shape of letter-U, rectangular engagement
5 holes 29 formed on either lateral side of each receiving slot 28, and a clearance notch 31 to avoid interference with the side frame portion 23 or 24 of the top panel 5.

The upper frame portion 22 of the back panel 2 is formed by a bent piece 32 which is bent in the shape of a rectangular letter-C, and the
10 outermost edge of the bent piece 32 is provided with an L-shaped bent-back portion 33 so as to define a receiving slot 34 between the bent piece 32 and the bent-back portion 33 for receiving the rear frame portion 21 of the top panel 5. A retaining member 36 having the shape of a rectangular block, and made of synthetic resin material is fitted into a space defined by
15 the bent piece 32. The retaining member 36 is provided with slits 36a to give a flexibility to the retaining member 36, and an engagement projection 35 which projects from a surface thereof into the receiving slot 34 via an opening 37 formed in the bent piece 32. The bent-back portion 33 is made somewhat shorter than the bent piece 32 by cutting each side
20 edge thereof so as to fit with the corresponding parts of the side frame portion 23 or 24 of the top panel 5 in cooperation with the clearance notch 31.

Although it is not illustrated in great detail, as will be appreciated from the description directed to Figures 2 and 7, the lower frame portion
25 16 of the back panel 2 is similarly provided with a bent piece 38 which is bent from the lower edge thereof in the shape of letter-L, and a notch 40 is formed in each side edge of the bent piece 38 to define a fitting portion for the side frame portions 17 and 18 of the bottom panel 6 in cooperation with clearance notches 39 formed in the lower edges of the side frame
30 portions 13 and 14 of the back panel 6.

The side panels 3 and 4 are each given with a symmetric structure, and can be therefore interchangeably used for the right or left side panel by turning it upside down. As shown in the detailed perspective views of Figures 3 and 4, each side panel is given with a double-walled thick-walled
35 structure which includes an outer wall 41 and an inner wall 42 which is attached to the inner surface of the outer wall 41 by welding or the like.

The rear frame portion 11 or 12 of the side panel 3 or 4 is formed by bending bent pieces 43 and 44 outward in the shape of a rectangular letter-C, and a plurality of retaining members 45 (for instance two, one above and one below) are attached to the bent piece 43 for detachably retaining the back panel 2.

The front edge of each side panel 3 or 4 is formed with a front frame portion 46 or 47 by bending a bent piece 54 inward in the shape of letter-L, and the aforementioned inner wall 42 extends between the front frame portion 46 and the rear frame portion 11, or between the front frame portion 47 and the rear frame portion 12. The inner wall 42 may be provided with engagement holes 48 for detachably mounting engagement pieces for supporting shelves 7 at desired heights. Alternatively, although it is not shown in the drawings, guide rails and other arrangements may be fitted thereto for mounting drawers.

The upper frame portion 25 or 26 and the lower frame portion 19 or 20 of each side panel 3 or 4 are each provided with a frame piece 49 which is formed by bending the upper or lower edge of the panel material inward by a relatively small width so as to project more upward or downward than the corresponding edge of the rear frame portion 11 or 12, and a joint piece 50 defined by the upper or lower edge of the inner wall 42 so as to be thicker than the frame piece 49 by the thickness of the top panel 5 or the bottom panel 6 for snugly receiving the top panel 5 or the bottom panel 6 as the case may be. The joint piece 50 is provided with engagement projections 51 and 53, and is fitted with a retaining member 52.

The engagement projection 51 is given with a cylindrical shape, and provided with a tapered free end and a base end which is welded to the inner wall 42. The retaining member 52 is made of resilient plastic material, and has a free end formed as a hook-shaped engagement piece 55 which can be resiliently opened and closed, and a base end which is formed with a rectangular engagement hole 56 and fixedly secured to the inner wall 42 via this engagement hole 56. The engagement projection 53 is formed of a plate member cut into the shape of a hook, and has a base end which is welded to the bent piece 54 of the front frame portion 46 or 47.

As shown in the detailed perspective view of Figure 5, the top panel 5 is provided with a front frame portion 59 defined by a bent piece

57 having a rectangular C-shaped cross section, and a joint piece 58 which similarly has a rectangular C-shaped cross section and jointly forms a box shaped enclosure in cooperation with the frame piece 57. The front end surface of the bent piece 57 is provided with the guide slots 9 for mounting a door as mentioned earlier, and the inner end surface of the bent piece 57 is provided with engagement slots 60 for receiving the engagement projections 53 of the side panels 3 and 4 which were also mentioned earlier. The inner end surface of the bent piece 57 is further provided with holes 61 for receiving pins of engagement members 78 which are fitted into the guide slots 9 as described hereinafter. The joint piece 58 is fitted with a retaining member 62 for detachably engaging the engagement pieces 78.

The rear frame portion 21 of the top panel 5 is bent into a rectangular cross section by a width which allows the rear frame portion 21 to be snugly fitted into the fitting slot 34 on the upper edge of the back panel 2 which was described earlier. The end surface of the rear frame portion 21 is provided with rectangular receiving holes 63 for receiving the engagement projections 35 of the back panel 2.

The side frame portions 23 and 24 of the top panel 5 (only the left frame portion 23 is illustrated in Figure 5) are each provided with a symmetric shape, and bent into a rectangular cross section. The bottom surface of each side frame portion 23 or 24 is provided with a rectangular receiving hole 64 for detachably engaging the retaining member 52 of the side panel 3 or 4, and a circular receiving hole 65 for receiving the engagement projection 51.

As illustrated in the detailed perspective view of Figure 6, the bottom panel 6 is provided with a front frame portion 68 which is defined by a bent piece 66 having a rectangular C-shaped cross section, a joint piece 67 defining a closed rectangular cross section including a stepped side in cooperation with the bent piece 66. The front end surface of the bent piece 66 is provided with the guide slots 10 for mounting a door as described earlier. The inner end surface of the frame piece 66 is further provided with holes 70 for receiving pins of the engagement members 78 which are fitted into the guide slots 10 as described hereinafter. The joint piece 67 is fitted with retaining members 71 for detachably engaging the engagement members 78.

The rear frame portion 72 of the bottom panel 6 is formed by

bending the rear edge of the bottom panel 6 in the shape of letter-L, and a reinforcing bracket 73 consisting of a channel member is welded to the reverse surface of the bottom panel 6 across the rear and front edges of the bottom panel 6. The side frame portions 17 and 18 of the bottom panel 6
5 (only the left frame portion 17 is shown in Figure 6) are each provided with a symmetric shape, and is formed by a bent piece having an L-shaped cross section. The corners of the rear edge are each provided with a notch 74 to facilitate the fitting of this part to the rear panel 2, and the upper surface of the bottom panel 6 is provided with rectangular receiving holes
10 76 for detachably engaging the engagement projections 53 of the side panels 3 and 4, and circular receiving holes 77 for receiving the engagement projections 51.

When assembling the side panels 3 and 4 to the back panel 2, the bent pieces 44 of the rear frame portions 11 and 12 are placed over the
15 inner surface of the back panel 2 as illustrated in Figure 3. The side plates 3 and 4 are then slid outward as indicated by an arrow until the bent pieces 44 fit into the side frame portions 13 and 14, and are snugly received in the side frame portions 13 and 14 with the bent pieces 43 overlying the bent pieces 27. At the same time, the retaining members 45,
20 the receiving slots 28 and the receiving holes 29 ensure the engagement between the side panels 3 and 4 and the back panel 2.

The proper positioning of the back panel 2 and the side panels 3 and 4 which are joined with each other is accomplished by the engagement between an arcuate engaging surface 45a formed in each retaining member
25 45 and the corresponding receiving slot 28 in addition to the engagement pieces 45c on both sides of the retaining member 45 which are given with a resiliency by the slits 45b fitting into the engagement holes 29 while sliding along the inner surface of the bent piece 27 so as to establish a firm attachment, and the bent pieces 43 and 44 fitting into the side frame
30 portions 13 and 14 so as to establish a firm attachment.

When assembling the bottom panel 6 to the sub assembly formed by the back panel 2 and the side panels 3 and 4, as illustrated in the longitudinal sectional view at the bottom of Figure 7, the rear frame portion 72 of the bottom panel 6 is fitted into the lower frame portion 16 of
35 the back panel 2 from inside, and the front frame portion 68 of the bottom panel 6 is then pushed into engagement with the lower frame portions 19

and 20 of the side panels 3 and 4. As a result, the engagement projections 53, the retaining members 52 and the engagement projections 51 projecting from the side panels 3 and 4 fit into the engagement slots 76, the receiving holes 69 and 77 so as to join the bottom panel 6 to the side panels 3 and 4, and to the back panel 2 via the side panels 3 and 4.

The proper positioning between the bottom panel 6 and the side panels 3 and 4 which are joined with each other is accomplished by fitting the engagement projections 51 and 53 into the receiving holes 77 and 69. The retaining members 52 having the resilient engagement pieces 55 detachably but firmly fit into the engagement slots 76, and the rear frame portion 72 of the bottom panel 6 fits into the lower frame portion 16 of the back panel 2 from inside so that the three parts are firmly joined with each other.

When assembling the top panel 5 to the sub assembly formed by the back panel 2 and the side panels 3 and 4, as illustrated in the longitudinal sectional view at the top of Figure 7, the rear frame portion 21 of the top panel 5 is fitted into the engagement slot 34 of the upper frame portion 22 of the back panel 2 while the engagement projections 51 and 53 are fitted into the engagement holes 65 and the engagement slots 60 by pushing down the top panel 5. As a result, the engagement projections 35 projecting from the retaining members 36 fitted inside the upper frame portion 22 are engaged in the engagement holes 63 formed in the rear frame portion 21 while the retaining members 52 of the side panels 3 and 4 fit into the receiving holes 64 of the top panel 5 so that the top panel 5 is joined with the side panels 3 and 4, and to the back panel 2 via the side panels 3 and 4.

The proper positioning between the top panel 5 and the side panels 3 and 4 which are joined with each other is accomplished by fitting the engagement projections 51 and 53 into the receiving holes 65 and 60. The retaining members 52 having the resilient engagement pieces 55 detachably but firmly fit into the receiving holes 64, and the rear frame portion 21 of the top panel 5 fits into the upper frame portion 22 of the back panel 2 so that the three parts are firmly joined with each other.

The side panels 3 and 4, the bottom panel 5 and the top panel 6 are thus assembled to the back panel 2 as illustrated in Figure 1 without requiring fastening means such as nuts and bolts, and because the

component parts are joined with each other via the frame portions formed along the edges of the components in cooperation with detachable retaining members, the assembled cabinet is structurally very sturdy while the assembling work is very simple.

5 When disassembling the cabinet main body 1, a flat piece such as the tip of a screwdriver is fitted into a gap between the side panels 3 and 4 and the top panel 5, and with the resilient engagement pieces 55 of the retaining members 52 pressed into a compressed state, the top panel 5 is pushed upward from inside. As a result, the engagement pieces 55 are
10 disengaged from the receiving holes 64 of the top panel 5. Likewise, a flat piece such as the tip of a screwdriver is fitted into a gap between the top frame portion 22 of the back panel 2 and the rear frame portion 21 of the top panel 5, and while pushing the engagement projections 35 toward the upper frame portion 22, the top panel 5 is pushed upward from inside
15 with the result that the engagement projections 35 are disengaged from the engagement holes 63.

 When disassembling the bottom panel 6, similarly to the case of the top panel 5, the retaining members 52 are disengaged from the receiving holes 76, and the rear frame portion 72 can then be disengaged from the
20 lower frame portion 16 of the back panel 2.

 When disassembling the side panels 3 and 4 from the back panel 2, a flat piece such as the tip of a screwdriver is fitted into a gap between the rear frame portions 11 and 12 of the side panels 3 and 4 and the back panel 2, and while urging the engagement pieces 45c of the retaining members
25 45 out of the engagement holes 29, the side panels 3 and 4 are pushed out in the opposite direction from that for assembling.

 The cabinet main body 1 may be adapted for a glass or other slide door by mounting a door frame 79 having rails on the front opening of the cabinet main body 1 as illustrated in Figures 8 and 10 and for a double
30 door by mount a double door 80 as illustrated in Figures 9 and 11. This is accomplished by using the guide slots 9 and 10 formed in the front frames 59 and 68 of the top panel 5 and the bottom panel 6, engagement members 62 and 71 fitted in the front frames 59 and 68 via mounting plates 81 and 82, and retaining members 78 fitted into the guide slots 9 and 10 for
35 detachably engaging the retaining members 78.

 As illustrated in Figures 12 and 13, the engagement members 62

and 71 are made of resilient plastic material, and are each provided with a front end consisting of a rectangular and tubular portion 83, and a rear end consisting of upper and lower clamping plates 84 and 85 extending substantially in parallel with the upper and lower surfaces of the tubular portion 83. The inner surfaces of the upper and lower walls of the tubular portion 83 are provided with a plurality of tapered ribs 86 defining an inner passage which gradually narrows towards the rear end thereof. A part adjacent to a rear end of the central rib 86 is provided with an engagement projection 87. The tubular portion 83 is provided with notches 88 for giving a resiliency to the clamping plates 84 and 85, and lateral and vertical projections 89 and 90 for retaining the engagement members 62 and 71 onto the mounting plates 81 and 82.

When the planar retaining member 78, having an engagement hole 91 for receiving the engagement projection 87 adjacent to a free end thereof, is fitted into the corresponding engagement member 62 or 71, as shown in Figure 13, the two sides of the engagement member 78 expand the gap between the upper and lower clamping plates 84 and 85 as they slide along the surfaces of the ribs 86. Once the engagement projection 87 is engaged by the engagement hole 91, the two parts are firmly joined together. By setting the gap d between the two clamping plates 84 and 85 to be smaller than the thickness of the engagement member 78, it is possible to produce a force which tends to narrow the gap between the upper and lower walls of the tubular portion 83 as the forward end of the engagement member 78 pushes open the gap d between the clamping plates 84 and 85. As a result, it is possible to increase the force for retaining the engagement member 78.

When the cabinet is to be fitted with a slide door, it is convenient to mount a rectangular frame serving as a door frame 79 in advance. If the frame is assembled or mounted by welding, the assembling precision may be lost, and the productivity may be impaired. Therefore, according to the present invention, the upper and lower cross frame members 92 and 93 and the right and left vertical frame members 94 and 94 (only the right vertical frame member is illustrated in the drawing) are joined together by using connecting means as illustrated in Figure 14.

The cross frame members 92 and 93, and the vertical frame members 94 may consist of extruded aluminum members having a desired

cross section. Preferably, the inner surfaces of the cross frame members 92 and 93 are integrally formed with guide rails for a slide door while the outer end of the cross frame members 92 and 93 are formed with channel slots 97 and 98. The two end portions of each channel slot 97 or 98 may
5 be fitted with retaining members 99 and 100 made of plastic material and given with a suitable shape, and flanges 101 and 102 extend from parts adjacent to the guide rails 95 and 96 to be placed over the inner surfaces of the top panel 5 and the bottom panel 6.

Each vertical frame member 94 consists of a tubular member 103
10 having a substantially rectangular cross section, and is provided with a flange 104 which is to be placed over the inner surface of the corresponding side panel 3 or 4. The upper and lower ends of the tubular member 103 are closed by caps 106 having drop holes 105. Connecting brackets 78A (connecting brackets 78 for a slide door) extend
15 from parts adjoining the upper and lower ends of the tubular member 103.

The connecting bracket 78A comprises a tongue piece 107 for the retaining members 99 and 100, a receiving slot 108, a mounting piece 109 and an engagement slot 110 for the tubular member 103, tongue pieces 111
20 for the guide slots 9 and 10, and tongue pieces 112 for the retaining members 62 and 71. The mounting piece 109 is adapted to be fitted into a notch 113 provided in the inner surface of the tubular member 103, and at the same time, the engagement slot 110 is engaged by the edge of the opening so as to retain the connecting bracket 78A while the mounting
25 piece 109 is attached to the tubular member 103 along with the cap 106 by a threaded bolt 115 which is threaded into a threaded bore 114 via the drop hole 105.

The retaining members 99 and 100 each comprise a receiving slot 116 for receiving the tongue pieces 107, clamping pieces 117 and 118
30 formed above and below the receiving slot 116, a hollow portion 119 formed at a terminal end of the receiving slot 116, a tongue piece 120 formed by the rest of the hollow portion 119 and adapted to be fitted into the receiving slot 108, and engagement slots 122 for receiving bent pieces 121 formed on the edges of the slot 97 or 98 of each of the cross frame
35 members 92 and 93. The rectangular door frame 79 is thus formed by detachably securing the retaining members 99 and 100 in the end portions of the cross frames 92 and 93, and fitting the connecting brackets 78A

secured to the vertical frames 94 into the corresponding retaining members 99.

When the tongue pieces 111 and 112 of the connecting bracket 78A are pushed into the guide slots 9 and 10 of the cabinet main body 1, the retaining members 62 and 71 fitted on the free ends of the tongue pieces 111 and 112 retain the tongue pieces 112 as illustrated in Figure 10. At the same time, the flanges 101 and 102 of the cross frame members 92 and 93 overlie the inner surfaces of the top panel 5 and the bottom panel 6 while the flanges 104 of the vertical frame members 94 overlie the inner surfaces of the side panels 3 and 4 so that the slide door may be guide by the guide rails 95 and 96 and the cabinet is thereby fitted with a slide door.

When the cabinet is desired to be assembled as a cabinet fitted with a double door, a step is defined between the mounting piece 109 and the tongue piece 112 of the connecting bracket 78B serving as the connecting bracket 78, and a pivot shaft 123 is securely attached thereto so as to stand upright inwardly from the mounting piece 112. The connecting brackets 78B are fitted into the guide slots 9 and 10 of the cabinet main body 1 in a similar manner as in the case of the cabinet fitted with a slide door so as to be retained by the retaining members 62 and 71 while the upper and lower ends of each of the door 80 are pivotally supported by the pivot shafts 123.

The slide door or the double door can be separated from the cabinet main body 1 by pulling the connecting brackets 78 out of the retaining members 62 and 71, and it can be readily accomplished by pulling the engagement projections 87 from the engagement holes 91 while a flat piece such as the tip of a screwdriver is fitted into a gap d between the clamping plates 84 and 85 to push them apart. To even further reinforce the attachment of the connecting brackets 78 to the retaining members 62 and 71, threaded bolts may be threaded into threaded holes 124 formed in the connecting brackets 78 via through holes 6a and 70 formed in the top panel 5 and the bottom panel 6, respectively.

Thus, the cabinet main body 1 may be used with a wide open front end, or may also be equipped with a slide door or a normal door. When guide rails are appropriately provided in the side panels 3, and 4, drawers may be installed in the cabinet main body. Thus, the cabinet main body 1 can be readily adapted to various different applications by selectively fitting the cabinet main body 1 with a slide door, a double door or the like.

The retaining members 36 and 45 for joining the top panel 5, the bottom panel 6, and the side panels 3 and 4 to the back panel, and the connecting brackets 78 for mounting a door were detachably attached to the corresponding members, but they may also be permanently secured to the corresponding members. Alternatively, these retaining members and connecting brackets may be provided with latch means to facilitate the separation of the related component parts. The cabinet main body 1 may be equipped with a special tool for assembling and disassembling.

Although the present invention has been described in terms of preferred embodiments thereof, it is obvious to a person skilled in the art that various alterations and modifications are possible without departing from the scope of the present invention which is set forth in the appended claims.

CLAIMS

1. A knock down metal cabinet defining an open front end, comprising a back panel, a pair of side panels attached to either side of said back panel, and top and bottom panels attached to the upper and bottom edges of said back panel across said side panels, characterized by that:

mutually engaging frame portions are formed along edges of said side panels, top and bottom panels, and said side panels are secured to said top and bottom panels via engagement means formed in said frame portions.

2. A knock down metal cabinet according to claim 1, wherein the engagement means comprises an engagement member secured to one of said frame portions, and a receiving opening provided in a corresponding frame portion for detachable engagement with said engagement member.

3. A knock down metal cabinet according to claim 2, wherein the engagement member comprises a plastic member having a resilient engagement portion, and said receiving opening is formed in said corresponding frame portion.

4. A knock down metal cabinet comprising a cabinet main body (1) having an open front end which is provided with a plurality of engagement means for receiving and retaining tongue pieces of a door frame of a slide door or a hinge shaft of a normal door (79, 80) so as to interchangeably attach a slide door or a normal door to the front open end;

the engagement means comprising guide slots (9, 10) each for receiving a corresponding one of the tongue pieces (78) and a retaining member (62, 71) fit into a hole (61) provided inwardly of each guide slot;

each retaining member comprising a front tubular portion (83) defining an internal passage for receiving the corresponding tongue piece, clamping pieces (84, 85) extending rearward from the front tubular portion to clamp the free end of the tongue piece (78), and an engagement projection (90) for retaining the retaining member in the corresponding hole, the internal passage being progressively narrower toward a rear part thereof so that inserting the tongue piece into the front tubular portion causes the front tubular portion to open wider and the clamping pieces to be forced onto the free end of the tongue piece.

5. A knock down metal cabinet according to claim 4, wherein the cabinet main body comprising a back panel (2), a pair of side panels (3, 4) attached to either side of the back panel, and top and bottom panels (5, 6) attached to the upper and bottom edges of the back panel across the side panels so that the cabinet having an open front end may be integrally assembled as a knock down assembly,

edges of the panels are provided with mutually engaging frame portions (11, 12, 13, 14, 15, 16, 17, 18, 19, 20) that are provided with fitting means for mutually joining the panels in such a manner

that the side panels can be joined to the back panel with the side panels joined to the back panel via the frame portions by placing the back panel flat on a floor, abutting the rear ends of the side panels onto the back panel and sliding the side panels outwardly away from each other, and

that the top panel can be joined to the back panel and side panels via the rear frame portion and side frame portions, respectively, by placing the rear end of the top panel on the floor and sliding the top panel inwardly.

6. A knock down metal cabinet according to claim 5, wherein the fitting means comprises an engagement member (36, 45) provided on a side of one of the members that are joined to each other and an engagement hole (37, 28, 29) provided in the other of the members and adapted to be detachably retained by the engagement member.

7. A knock down metal cabinet according to claim 6, wherein the engagement member is provided with an engagement projection (45c, 35) including an engagement piece made of resilient plastic material, and the engagement hole is provided in the corresponding frame portion.

8. A knock down metal cabinet according to any one of claims 4 to 7, wherein the door frame for a slide door consists of a rectangular frame provided with connecting means (53) that fit into the upper and lower cross frame members and side vertical frame members.

9. A knock down metal cabinet according to any one of claims 4 to 8, wherein the retaining member (62, 71) can be removed from the cabinet by retracting an engagement projection (90) that retains the retaining member in the hole and pulling the retaining member rearward from the hole.

10. A knock down metal cabinet according to any one of claims 4 to 9, wherein an opening (91) is provided on the free end of the tongue piece (78), and the clamping pieces (84, 85) are provided with an engagement projecting piece (87) that fits into the opening.

11. A knock down metal cabinet according to claim 10, wherein the tongue piece can be released from the retaining member by resiliently deforming the retaining member so as to disengage the engagement projecting piece from the opening of the tongue piece.