A modular cabinet system is disclosed. Posts are mounted between a top member and a bottom member to form a sturdy frame. The frame is configured to slidably receive side panels to form an exterior. The frame is also configured to receive doors and shelving to form a door cabinet or drawers to form a drawer cabinet. The doors rotate on a hinge rod, which is received in the top and bottom members of the frame. Alternatively, the frame receives a set of drawers. The frame slidably receives drawer brackets in the posts of the frame. The drawer brackets are spaced to provide a desired clearance between drawers. The disclosed cabinets use the same frame and panels whether the cabinet is to receive doors or drawers. The cabinet is also easily assembled such that it can be shipped in a compacted form and assembled by the purchaser or user.
MODULAR STORAGE CABINET

BACKGROUND OF THE INVENTION

[0001] 1. The Field of the Invention

[0002] The present invention relates to modular cabinet. More specifically, the present invention relates to a knockdown cabinet with a frame that can interchangeably receive doors, drawers, and shelves.

[0003] 2. Related Technology

[0004] Storage cabinets are well known articles used in garages, homes, offices and like for various organizational and storage purposes. Storage cabinets are manufactured in various sizes, sturdiness, and quality, depending on the desired use for the cabinet. Generally, the larger and sturdier the cabinet, the more it will cost to manufacture.

[0005] Assembly and shipping costs are generally a significant expense associated with manufacturing storage cabinets. Because typical cabinets are big and bulky, they are difficult and expensive to ship. They also require a large amount of packaging and take up valuable space during shipping. In addition to taking up shipping space, the bulky nature of storage cabinets often requires wholesalers or retailers to use significant amounts of valuable floor space or storage space to store or display the storage cabinets.

[0006] One technique used to reduce the manufacturing costs of large bulky items is to ship the item disassembled and provide the purchaser with assembly instructions. However, large sturdy cabinets tend to be of knockdown type because they require more structural support than existing knockdown techniques can provide. For instance, storage cabinets used in garages to store heavy tools generally have metal frames that are spot welded or bolted before shipping. These cabinets are typically not sold in disassembled form because it is not practical for most purchasers to assemble the cabinet where welding or other sophisticated connecting means are necessary to provide proper structural support.

[0007] It is also known in the field of cabinets to make and sell sets of differently shaped cabinets in a storage cabinet system. These cabinet systems generally have several cabinet pieces that accommodate different needs. For instance, one cabinet may be tall and narrow to accommodate tall items and another cabinet may have a drawer system for accommodating numerous items such as a tool set.

[0008] Existing storage cabinet systems are expensive to manufacture because many of the pieces that make up the different cabinets are unique to each cabinet. Because of this uniqueness, manufacturing costs for one unique piece cannot be shared with the manufacturing costs of another.

[0009] In addition, the cabinet user is limited in his or her ability to modify existing cabinets. If a person’s cabinet needs change, he or she must purchase an entire cabinet to meet that need. Generally, a user cannot modify an existing cabinet to form a cabinet having a significantly different shape or feature.

[0010] Therefore, what is needed is a modular storage cabinet system that includes cabinets that are lightweight and provide adequate structural support for relatively heavy objects. Each piece of the cabinet system also needs to knockdown and be easily assembled by a user. Furthermore, the cabinet system needs to be efficiently manufactured.

BRIEF SUMMARY OF THE INVENTION

[0011] The present invention relates to a modular storage cabinet system that overcomes the problems associated with existing knockdown storage cabinet systems. In one version of the invention, a plurality of posts are mounted between a top member and a bottom member to form a frame. Each post has a panel groove formed longitudinally therein. A plurality of panels attach to the frame to form an exterior. The panels slide in the grooves of two of the posts. In one embodiment, the frame is further configured to interchangeably receive a drawer assembly or a door.

[0012] The cabinets of the present invention can be knocked down for shipping and then easily assembled by a user. In one embodiment, the posts are attached to the top and bottom member with screws. The side panels are easily attached to the frame by sliding the panels into the grooves in the posts. The sliding connection is a particularly easy assembly step that makes the cabinet simple and quick to assemble.

[0013] The cabinets of the present invention are lightweight and sturdy. In one embodiment, the posts of the frame are made from extruded aluminum and the top and bottom members are made from blow-molded plastic. The frame provides adequate structural support such that the side panels can be made lightweight. The frame also provides a sturdy support for receiving drawers, doors, or shelves.

[0014] The sturdy, lightweight construction of the present invention significantly reduces the shipping costs associated therewith. Because the cabinets are sturdy, the cabinets can be used to store heavy objects such as tools in a garage.

[0015] Because the frame is configured to receive different assemblies, such as a drawer, a door, or a shelf, the general frame structure can be used for different cabinets in a modular cabinet system. For instance, in one embodiment, the frame receives a door and side panels to form a cabinet.

[0016] The door is easily installed in the frame. The top and bottom members of the frame each have a receptacle (e.g., an aperture or a recess) formed therein that receive a hinge rod mounted in the door. The door pivots on the hinge rod so as to move between an open and a closed position.

[0017] Alternatively, the cabinet is made into a drawer cabinet by attaching drawers to the frame. The drawers knock down and are easily assembled by a purchaser or user. In an exemplary embodiment, the frame’s posts have a channel in addition to the panel grooves.

[0018] In one embodiment, drawer brackets slide into the channel and are screwed into the posts at a selected position. Because the brackets are slid into the channels on the frame, the drawers will be aligned properly within the cabinet. In an exemplary embodiment, the assembly grooves provide a quick and easy method to securely and properly assemble a cabinet with a drawer assembly.

[0019] Because different cabinets within the modular cabinet system are built on the same or a similar frame, fewer different pieces are produced, thereby reducing the manufacturing costs associated therewith. For instance, a tall...
cabinet and a short cabinet may share the same top and bottom members and other components such as casters and shelf brackets.

[0020] The similar frame used in the various cabinets of the cabinet system also allows a user to more easily modify the cabinet system. For instance, if a user wants to convert a shelf cabinet into a drawer cabinet, the user can install drawers on the same frame as the shelf cabinet. Alternatively, to make the cabinet taller, the user can install longer posts and side panels.

[0021] A novel and useful cabinet drawer design and assembly method are also discussed.

[0022] These and other objects and features of the present invention will become more fully apparent from the following description and appended claims, or may be learned by the practice of the invention as set forth hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] To further clarify the above and other advantages and features of the present invention, a more particular description of the invention will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. It is appreciated that these drawings depict only typical embodiments of the invention and are therefore not to be considered limiting in its scope. The invention will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

[0024] FIG. 1 is a perspective view of an exemplary modular cabinet of the present invention;
[0025] FIG. 2 illustrates an exploded view of the modular cabinet of FIG. 1;
[0026] FIG. 3 illustrates an exploded view of a first door of the modular cabinet of FIG. 1;
[0027] FIG. 4 illustrates an exploded view of a second door of the modular cabinet of FIG. 1;
[0028] FIG. 5A is a perspective view of a rear post of the modular cabinet of FIG. 1;
[0029] FIG. 5B is a top plan view of the rear post of the modular cabinet of FIG. 1;
[0030] FIG. 6A is a perspective view of a front post of the modular cabinet of FIG. 1;
[0031] FIG. 6B illustrates the placement of the panels into the posts of the modular cabinet of FIG. 1;
[0032] FIG. 7 is a perspective view of the modular cabinet of FIG. 1 with the doors and shelf removed;
[0033] FIG. 8 is a perspective view of the modular cabinet of FIG. 1 disassembled and in a compacted form;
[0034] FIG. 9 is a perspective view of the modular cabinet of FIG. 7 with drawers installed therein, rather than doors;
[0035] FIG. 10 is a partially exploded perspective view of the modular cabinet of FIG. 9 with the top and side panels removed to show the interior components of the cabinet;
[0036] FIG. 11 shows a rear perspective view of the cabinet of FIG. 9 partially exploded;
[0037] FIG. 12 is a perspective view of the modular cabinet of FIG. 9 with the top and side panels removed to show the interior components of the cabinet;
[0038] FIG. 13 shows a perspective view of the drawer bracket, slide rail, and slide rail insert upon which a drawer of the modular cabinet of FIG. 9 slideably opens;
[0039] FIG. 14 shows an exploded view of a drawer of the modular cabinet of FIG. 9; FIG. 15A shows a front view of the drawer retainer of the modular cabinet of FIG. 9;
[0040] FIG. 15B shows a side view of the drawer retainer of the modular cabinet of FIG. 9;
[0041] FIG. 16A shows a perspective view of the drawer retainer of the modular cabinet of FIG. 9 installed therein and rotated to the closed position; and
[0042] FIG. 16B shows a perspective view of the drawer retainer of the modular cabinet of FIG. 9 installed therein and rotated to the open position.
[0043] FIG. 17A shows an exploded view of various components of the drawer of the modular cabinet of FIG. 9.
[0044] FIG. 17B shows a drawer groove of the side plate of the drawer of FIG. 17A in more detail.
[0045] FIG. 17C shows a tab of the bottom plate of the drawer of FIG. 17A.
[0046] FIG. 18A shows the various components of FIG. 17A fully assembled and a front plate partially assembled.
[0047] FIG. 18B shows a portion of the connection between the side plate and bottom plate of the drawer of FIG. 18A.
[0048] FIG. 18C illustrates a portion of the connection between the bottom plate and rear plate of the drawer of FIG. 18A.
[0049] FIG. 19 illustrates the Drawer of FIG. 18A with the front plate fully assembled.
[0050] FIG. 20 illustrates a partial exploded view of the drawer of FIG. 18A with additional assembly components.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0052] With reference to FIG. 1, a modular storage cabinet 20 according to the present invention is shown. In one version of the invention, the cabinet 20 has a plurality of posts 22a-22d mounted between a bottom member 24 and a top member 26 to form a frame. Side panel 28 is slidably received by posts 22b and 22c. Doors 30a and 30b connect to bottom member 24 and top member 26. Doors 30a and 30b, shown in a closed position, are selectively movable between an open and a closed position such that doors 30a and 30b provide access to the interior of storage cabinet 20. In an exemplary embodiment, cabinet 20 has casters 32a-32c (fourth caster at left rear corner not shown in FIG. 1), which allow the cabinet 20 to roll on a surface.

[0053] FIG. 2 shows various parts of cabinet 20 in exploded view. The posts 22a-22d, bottom 24, and top 26 are configured to be connected to form a frame. Each corner of bottom member 24 has a slot 34a-34d wherein one end of
each post attaches to bottom member 24. Top member 26 has corresponding slots in each corner to receive the other end of each post 22a-22d. The posts 22a-22d are mounted between bottom member 24 and top member 26 by inserting posts 22a-22d into slots 34a-34d and fastening bottom member 24 and top member 26 to posts 22a-22d, using a fastener such as a screw or bolt. Once assembled, posts 22a-22d, bottom member 24 and top member 26 form a sturdy frame that is configured to firmly support other features of cabinet 20, as described more fully below.

[0054] Side panels 28a-28c slidably connect to posts 22a-22d to form an exterior of the frame of cabinet 20. For instance, posts 22a and 22d receive side panel 28a, posts 22b and 22c receive side panel 28b, and posts 22e and 22f receive side panel 28c. Posts 22a and 22b are also configured to receive doors 30a and 30b. In an exemplary embodiment, each post 22a-22f is also configured to slidably receive a shelf bracket 36a-36d. Shelf brackets 36a-36d are configured and arranged to support shelf 38.

[0055] As shown in FIG. 2, cabinet 20 has a pair of door panels 39a and 39b. Door panels 39a and 39b pivot on hinge rods 40a and 40b respectively. Bottom member 24 has hinge receptacles 42a and 42b for pivotally receiving one end of hinge rod 40a and 40b respectively. Receptacles 42a and 42b may be an aperture or a recess formed in bottom or top member 24 and 26. Top member 26 has corresponding receptacles for pivotally receiving the other end of hinge rods 40a and 40b thereby forming a hinge on which doors 30a and 30b can pivot. In one embodiment, hinge rod 40a is spot welded to door panel 39a such that hinge rod 40a rotates within hinge receptacles 42a rather than door panel 39a.

[0056] Handles 44a and 44b connect to doors 30a and 30b, respectively, for opening and closing doors 30a and 30b. A lock 46 is mounted on door panel 39b for securing doors 30a and 30b. Guide brackets 48a and 48b facilitate the locking mechanism of doors 30a and 30b. Casters 32a-32c mount to the bottom side of bottom member 24 and provide the cabinet 20 with mobility.

[0057] Turning now to FIG. 3, the components of door 30b are shown in exploded view. Panel 39b has a top hinge hole 50 where rod 40b is slidably received in panel 39b. Panel 39b also has a bottom hinge hole (not shown) opposite hinge hole 50. Hinge rod 40b extends through both hinge holes in door panel 39b so as to be disposed along the inside edge of door panel 39b.

[0058] Hinge rod 40b is formed longer than panel 39b. The length of hinge rod 40b is selected to extend beyond the upper and lower ends of panel 39b such that hinge rod 40b can extend into receptacles 42b of bottom member 24 and the corresponding receptacle of top member 26.

[0059] Door panel 39b also has a lock hole 52 where lock 46 can be mounted thereon. Lock 46 includes lock rods 54a and 54b. Guide brackets 48a and 48b are mounted to door panel 39b and are configured to slidably receive lock rods 54a and 54b. Guide brackets 48a and 48b provide structural support for lock rods 54a and 54b and position lock rods 54a and 54b for engagement with bottom member 24 and top member 26.

[0060] Lock 46 has a key member 56 configured to receive a key and rotate a cam 58. Rotation of cam 58 causes lock rods 54a and 54b to extend. When lock rods 54a and 54b are in the retracted position, doors 30a and 30b are unlocked. When lock rods 54a and 54b are extended, they engage bottom member 24 and top member 26, thereby preventing door 30b from rotating about hinge rod 40b, and thus locking door 30b. Locking door 30b prevents access to the interior of cabinet 20.

[0061] Locking mechanisms for cabinets are well known. Any type of locking mechanism can be used with the cabinets of the present invention. In addition, the lock 46 may be mounted on door 30b at any desired location.

[0062] Door panel 39b also includes handle holes 60a and 60b for mounting handle 44b. In one embodiment, handle 44b is mounted to door panel 39b with spacers 62a and 62b therebetween. Any suitable means can be used to connect the handle to the door, such as a screw.

[0063] Door 30b can be made from different types of materials depending on the desired strength, weight, and cost of the door. In one embodiment, panel 39b is formed from tred plate. In another embodiment, panel 39b is formed from another type of metal or plastic. Hinge rod 40a is preferably formed from a sturdy material such as metal or hard plastic. Handle 44b can be made of metal or plastic as desired.

[0064] Hinges for doors are well known. Cabinet 20 may have a hinge system that is different from rods 40a and 40b. For instance, hinge brackets may be attached or slidably received in posts 22a-22d, such that the weight of doors 30a and 30b is supported by posts 22a-22d rather than bottom member 24 and top member 26.

[0065] As shown in FIG. 4, door 30a is formed similarly to door 30b. Door 30a includes panel 39a, which receives hinge rod 40a in hinge holes 50 such that hinge rod 40a is disposed along the inside edge of door panel 39b. Hinge rod 40a is formed to extend beyond door panel 39a at both ends so as to engage hinge receptacle 42a in bottom member 24 and an opposing receptacle in top member 26.

[0066] Panel 39a has a rim 63 on the inner side edge thereof. When doors 30a and 30b are in the closed position, rim 63 extends from door 30a behind door 30b such that door 30a does not open unless door 30b is open. Rim 63 prevents access to the inside of cabinet 20 via door 30a when door 30b is locked.

[0067] As mentioned above with reference to FIG. 2, posts 22a-22d are mounted between bottom member 24 and top member 26 to form a frame. FIGS. 5A and 5B show rear post 22c in more detail (in an exemplary embodiment, rear post 22d is formed substantially similar to post 22c discussed hereafter). In one embodiment, post 22c is an elongate member shaped or formed to have two panel grooves 64a and 64b and a channel 66. In an exemplary embodiment, post 22c is also formed with screw holes 68 and a screw mount 70 formed therein.

[0068] In one embodiment, panel grooves 64a and 64b are square or rectangular and have an opening that forms a slit where panels 28b and 28c are inserted. The opening is configured to be the same width or smaller than the thickness of panels 28b and 28c such that panels 28b and 28c engage the sidewalls and may flex the sidewall and/or walls of panel grooves 64a and 64b out slightly.

[0069] Panel grooves 64a and 64b can receive panels 28b and 28c by means other than frictionally. For instance, in another embodiment, the edge of panels 28b and 28c is shaped to slide into panel grooves 64a and 64b from the top end of post 22c. The shape on the edge is substantially larger.
than the opening, such that panels 28b and 28c are prevented from sliding out of panel grooves 64a and 64b, thus interlocking panels 28b and 28c with post 22c.

[0070] Channel 66 runs longitudinally along the inside of post 22c and opens to the interior of cabinet 20. Channel 66 is configured to receive a corresponding bracket or structure. Because channel 66 opens to the interior of cabinet 20, channel 66 serves as a mounting apparatus for slidably receiving structures in the interior portion of cabinet 20. Screw holes 68 are centered in the opening of channel 66 such that structures slidably received in channel 66 can be secured or positioned at a desired location along channel 66.

[0071] As shown in FIG. 5B, in an exemplary embodiment, channel 66 is formed in post 28c in the cross-sectional shape of a short “T”. Channel 66 has recesses 74a and 74b that oppose each other such that opposite ends of a plate slidably fit in channel 66.

[0072] In one embodiment, channel 66 is configured to receive a drawer bracket 82 discussed in detail below with reference to FIG. 14. Channel 66 is also configured to receive a shelf bracket 36a-36d (FIG. 2). Shelf brackets 36a-36d are configured to slidably fit within the particular shape of channel 66. Channel 66 retains shelf brackets 36a-36d therein. The height of shelf brackets 36a-36d is selected by fastening shelf brackets 36a-36d to channel 66. Shelf brackets 36a-36d support a shelf 38.

[0073] Cabinet 20 may have any number of shelves positioned at any desired height therein. For a second shelf, an additional bracket is placed on each post 22a-22d at the desired height.

[0074] Another example of a channel (not shown) in a post of the present invention comprises a notch rather than an elongate slot. In the case of notches, clips or other fastening devices may be placed in the notches to support a shelf or a drawer. The clips may clip into position and/or may be fastened with a fastener such as a screw.

[0075] In an exemplary embodiment, posts 22a-22d are formed by extruding aluminum or another material or by blow molding plastic. Posts 22a-22d extruded from aluminum are particularly lightweight and sturdy. Extruding posts 22a-22d also allows any number of desired grooves and/or channels to be formed therein. Posts 22a-22d may also have grooves or channels (e.g., elongate grooves or channels) formed on the outside thereof such that other structures or features can be attached to the outside of cabinet 20 (e.g., with a connecting panel or bracket positioned between adjacent posts). Using outside grooves or channels, cabinets can be connected together or mounted to a wall.

[0076] In an exemplary embodiment, posts 22a-22d are single piece posts. Forming posts 22a-22d as a single piece reduces the complexity of assembling cabinet 20 and provides for a more sturdy cabinet 20.

[0077] FIGS. 6A and 6B, show front post 22a in more detail (front post 22b is formed substantially similar to post 22a described hereafter). Post 22a has panel groove 64 formed in one side thereof and a flange 74 formed in the other side. Post 22a also has a screw mount 70 and a channel 66 with screw holes 68 formed therein.

[0078] As shown in FIG. 6B in an exemplary embodiment, post 22a is identical to post 22c except that post 22a only has one panel groove 64 and post 22c has a flange that extends along one side thereof. Panel groove 64 of post 22a is configured to slidably receive side panel 28a in the same way that panel groove 64 of posts 22c and 22d slidably receive side panel 28c. Channel 66 of post 22a is also formed the same as channel 66 of posts 22c and 22d. Screw holes 68 can be used to secure interior components of cabinet 20 to the frame of cabinet 20. Screw mount 70 is used to connect top member 26 to post 22a.

[0079] Flange 74 is formed in post 22a to be adjacent door 30a when the door is closed. Hinge rod 40a of door 30a is mounted in bottom member 24 such that door 30a is positioned adjacent to flange 74. Flange 74 provides some enclosure for the gaps that occur do to the spacing needed between door 30a and post 22a for door 30a to open and close.

[0080] FIG. 7 shows the frame of cabinet 20 with side panels 28a-28c inserted therein to form an exterior. Posts 22a-22d are mounted between bottom member 24 and top member 26 by inserting posts 22a-22d into slots 34a-34b of bottom member 24 and secured thereto by screwing a screw or the like through bottom member 24 and into screw mount 70 (FIGS. 5 and 6) in the end of each post 22a-22d. In a similar manner, top member 26 is mounted over posts 22a-22d on the end opposite bottom member 24.

[0081] With top member 26 removed, side panels 28a-28c are installed between posts 22a-22d. Side panels 28a-28c are received between two posts 22a-22d by sliding the side panel in the panel groove 64 of each of the two posts.

[0082] In another embodiment, the panel grooves are attached to the frame by a means other than the panel grooves formed in posts 22a-22d.

[0083] In yet another embodiment, grooves can be formed in the top and bottom members of the frame. While one or more of the side panels are received in the grooves in the top and bottom members to form the exterior. In one such embodiment, vertical corner posts are not employed.

[0084] Casters 32 are mounted to the underside of bottom member 24. Four caster apertures 77 are formed in each corner of bottom member 24 and are configured to receive a screw or the like for securing the corresponding four casters (e.g., casters 32a-32c) to cabinet 20. Such casters 32a-32c are known in the art and may have known features such as the ability to lock or swivel.

[0085] Cabinet 20, as shown in FIG. 7, is configured to receive doors 30a and 30b. Bottom member 24 and top member 26 have hinge holes 50 for receiving hinge rods 40a and 40b of doors 30a and 30b (not shown). Posts 22a-22d each have a channel 66 for receiving a shelf bracket 36 for installing a shelf in cabinet 20.

[0086] A stop 76 is formed in bottom member 24. Door 30a abuts stop 76 when door 30a is in the closed position. Stop 76 prevents door 30a from rotating into the interior of cabinet 20. Rim 63 (FIG. 3) abuts door 30b and prevents door 30b from rotating into the interior of cabinet 20 when door 30a is in the closed position.

[0087] A lock aperture 78 is positioned adjacent to stop 76 and is configured to receive lock rods 54a and 54b of lock 46 (FIG. 2). Guide brackets 48a and 48b of door 30b position lock rods 54a and 54b over lock aperture 78 such that when lock rods 54a and 54b are extended, lock rods 54a and 54b slide into lock aperture 78. Top member 26 has a corresponding stop 76 and lock aperture 78.

[0088] The frame of cabinet 20 can be used in multiple cabinet designs. In addition to receiving doors, modular
cabinet 20, shown in FIG. 7, is configured to receive drawers to form a drawer cabinet (discussed in detail below). For instance, channel 66 functions as a point of attachment for alternative interior components such as shelves or drawers. An exterior channel may also be formed on the exterior of posts 22a-22d such that components (e.g., additional cabinets) may be attached to the exterior of cabinet 20.

[0089] Cabinet 20 can be modified by attaching different components to the frame thereof. Alternatively, the frame can be modified to create a similar but different design. For instance, cabinet 20 can be made taller by replacing four 22a-22d and side panels 28a-28c with longer posts and taller side panels. In yet another embodiment, cabinet 20 is made wider by replacing one or more of side panels 28a-28c and top and bottom members 26 and 24, respectively, with wider versions of each. Cabinet 20 does not necessarily need to be on casters 32. For instance, in one embodiment, cabinet 20 has no casters and is mounted on a wall.

[0090] Referring now to FIG. 8, the components of modular cabinet 20 can be disassembled and stacked, as shown, for easy and compact shipping. Modular cabinet 20 can be shipped as a kit in a container (e.g., a box) with assembly instructions for the user to assemble at his or her convenience. Shipping cabinet 20 in compacted form and allowing the purchaser or user to assemble cabinet 20 significantly reduces shipping and manufacturing costs.

[0091] Because of the simple construction of modular cabinet 20, a purchaser or user can easily assemble modular cabinet 20. A user assembles cabinet 20 by fastening casters 32 to bottom member 24. Posts 22 are mounted to bottom member 24 with a screw or like fastener. Side panels 28a-28c slide into panel grooves 64 of posts 22a-22d. Doors 30a and 30b are assembled by screwing handles 44a and 44b to door panels 39a and 39b with spacers 62a and 62b therebetween. Lock 46 and guide brackets 48a and 48b are attached to panel 39b. Doors 30a and 30b are then slidably received in hinge holes 50 of bottom member 24. Top member 26 is mounted on the partial assembly of cabinet 20 by inserting hinge rods 40a and 40b into hinge holes 50 of top member 26. Top member is then fastened to posts 22a-22d at its corners using screws or the like.

[0092] As shown in FIG. 9, modular cabinet 20 can have drawers 80 installed therein in place of doors 30a and 30b. In an exemplary embodiment, drawers 80 include four drawers. However, cabinet 20 can have any desired number of drawers or both drawers and doors.

[0093] Modular cabinet 20 with drawers 80 has the same posts 22a-22d, bottom member 24, top member 26, side panels 28a-28c and casters 32a-32c. Drawers 80 can also use the same handle 44 and spacers 62 as used on doors 30a. Top drawer 80a has a drawer lock 81 for securing and locking drawers 80a and preventing access thereto.

[0094] FIG. 10 shows an exploded view of cabinet 20 with drawers 80a-80d. Drawer brackets 82 are mounted between two posts on either side of cabinet 20. Drawer brackets 82 are positioned at a desired height to allow clearance between individual drawers 80a-80d and/or top or bottom members 26 and 24, respectively. A slide rail 84 is attached to drawer bracket 82. A slide rail insert 86 attaches to drawers 80a-80d. Slide rail 84 is configured to slidably receive slide rail insert 86. The sliding mechanism of slide rail 84 and slide rail insert 86 allows drawers 80a-80d to slidably move relative to drawer bracket 82 such that drawers 80a-80d can move between an open and a closed position. A slit 87 is formed in drawers 80a-80d to provide a location for latching drawers 80a-80d.

[0095] FIG. 11 shows drawer brackets 82 mounted between posts 22b and 22c. Each drawer bracket 82 is slidably received within channel 66 of post 22b and 22c.

[0096] The drawer version of cabinet 20 also includes a retainer 88 that can prevent drawers 80a-80d from opening when drawer 80a is closed. An activator tab 89 runs parallel to the back of drawers 80a-80d and is configured to be contacted by drawer 80a when drawer 80a is in the closed position. Latches 90 run parallel to the side of drawers 80a-80d and each latch is configured to engage one of drawers 80a-80d when drawer 80a is moved to the closed position.

[0097] FIG. 12 shows cabinet 20 with drawers 80a-80d installed therein. Drawer brackets 82 are connected to and supported by posts 22a-22d. Drawer brackets 82 provide the necessary structural support for drawers 80a-80d. Drawer brackets 82 are mounted on posts 22a-22d at a desired height such that drawers 80a-80d are properly spaced in cabinet 20.

[0098] Drawers 80a-80d are shown in FIG. 12 in the closed position. With top drawer 80a in the closed position, latches 90 of retainer 88 are partially inserted into slits 87 thereby engaging drawers 80a-80d and preventing them from sliding to the open position.

[0099] FIG. 13 shows, slide rail 84, slide rail insert 86, and drawer bracket 82 in more detail. Slide rail 84 has an inner rail 92 that is formed to slidably receive slide rail insert 86. Inner rail 92 also slides within slide rail 84. When one of drawers 80a-80d is opened, slide rail insert 86, and if necessary inner rail 86, extend to open drawers 80a-80d. Slide mechanisms for drawers are well known in the art. Any slide mechanism capable of connecting to the frame of cabinet 20 can be used with the present invention. For instance, the slide mechanism for drawers 80a-80d may have ball bearings to facilitate sliding.

[0100] Drawer bracket 82 has an elongate plate 94 with holes 96 for attaching slide rail 84. At each end of elongate plate 94, a mounting plate 98 is formed thereon. As discussed above, drawer bracket 82 is mounted between two posts 22. Plate 98, located on each end of drawer bracket 82, is configured to slide into channel 66 of post 22. Drawer bracket 82 slides within channel 66 and is positioned at a desired height by placing a screw through hole 100 in mounting plate and into screw hole 68 of post 22 (FIGS. 5 and 6).

[0101] Drawer bracket 82 has a leg 102 at each end that is angled to position mounting plate 98 at the proper angle to be received by channel 66 of posts 22a-22d. In addition, by angling leg 102, elongate plate 94 extends inward thereby providing clearance between drawers 80a-80d and posts 22a-22d. Drawer bracket 82 also provides additional structural support for the frame of cabinet 20. This additional structural support allows cabinet 20 with drawers to withstand greater loads.

[0102] In an exemplary embodiment, drawer brackets 82 are made from a single planer elongate strip of metal. Plate 98 is formed by punching out a portion of leg 102 to leave a hole 104. Forming drawer bracket 82 from a single piece minimizes manufacturing costs.

[0103] Drawer 80 is shown in an exploded view in FIG. 14 to illustrate the drawer components and knock down capability of drawer 80. Drawer 80 is formed from a bottom plate
two side plates 106, a front plate 108 and a rear plate 110. The drawer plates can be made of thin metal or alternatively any or all of the drawer plates may be made of plastic or another sturdy material. Drawer 80 may knock down as described more fully below with reference to FIGS. 17-20. Alternatively, the plates of drawer 80 may connect by fastening such as by screwing, or the plates may connect by other means such as by snapping or adhesive.

[0104] Drawer 80 also has a cover 112 that fits over front plate 108. Cover 112 is made of a finished material such as a tread plate to protect drawer 80. Handle 44 and spacers 62 are connected to cover 112 and front plate 108. Handle 44 provides means for moving drawer 80 between the open and closed positions. Slide rail inserts 86 are connected to each of the two side plates 106. As discussed above, drawer 80 slides between an open and a closed position on slide rails 84. Side plate 106 has slit 87 where latches 90 of retainer 88 (FIG. 12) can latch drawer 80 and prevent it from sliding.

[0105] Drawer 80 is modular such that it can be shipped in pieces to be assembled by a purchaser or a user. Shipping drawers 80 disassembled and compacted reduces shipping costs and eliminates most of the manufacturer’s expenses that would be associated with assembling drawers 80.

[0106] FIG. 15A shows retainer 88 of cabinet 20 in more detail. Retainer 88 forms a shaft having activator tab 89 and latches 90 connected thereto. Activator tab 89 is formed generally perpendicular to latches 90. Upper and lower pins 114a and 114b are formed in respective ends of retainer 88.

[0107] A top bracket 116 and a bottom bracket 118 receive pins 114 of retainer 88 such that retainer 88 is mounted between top bracket 116 and bottom bracket 118. Top and bottom brackets 116 and 118 allow retainer 88 to rotate thereon. Top and bottom brackets 116 and 118 also connect to post 22c thereby connecting retainer 88 to the frame of cabinet 20. When top drawer 80 contacts activator tab 89, retainer 88 rotates within brackets 116-118, thereby causing latches 90a-90c to move into slits 87. This retains each of drawers 80a-80d in a locked position.

[0108] Bottom plate 10a and bottom bracket 118 are connected by a spring 122. As shown in FIG. 15B, bottom latch 90a has a hook 124 where spring 122 attaches on one end. Bottom bracket 118 has a hook 125 for attaching the other end of spring 122.

[0109] In FIG. 16A, retainer 88 is shown in the latched position. When drawer 80 contacts tab 89, retainer 88 is rotated and bottom latch 90a is inserted in slit 87 of bottom drawer 80d. The latches 90a-90c engage respective drawers 80a-80d to prevent drawers 80a-80d from sliding to the open position. When drawer 80a is not moved against tab 89, spring 122 exerts a force on latch 90a, which biases latch 90a and retainer 88 to move to the unlatched position. However, when drawer 80a (FIG. 12) is in the closed position, drawer 80a engages activator tab 89 and causes retainer 88 to rotate until latches 90 engage slits 87 in drawers 80a-80d. Thus, drawer 80a in the closed position forces latch retainer 88 to rotate to the closed position.

[0110] In FIG. 16B, drawer 80a is in the open position and retainer 88 is rotated to the unlatched position. Spring 122 biases retainer 88 such that when drawer 80a is in the open partially open position, latches 90 are automatically disengaged from slits 87 in drawers 80a-80d.

[0111] In one embodiment of the present invention, the drawers 80a-80d knock down and are readily assemblable by a user. FIG. 17A illustrates various plates of an exemplary drawer 80. In one embodiment, side plates 106 each have a first drawer groove 126a formed along the bottom thereof and a second drawer groove 126b formed along the rear thereof.

[0112] FIG. 17B shows a close-up view of the drawer groove 126 formed in side plate 106. As shown in FIG. 17B, the edge of side plate 106 is folded over to form a tongue 127. The drawer groove 126b is likewise formed from a folded edge to form a tongue 127.

[0113] Rear plate 110 has a similar drawer groove 126c, including folded edge to form a tongue, that is formed at each end thereof and is configured to slidably receive and interlock correspondingly configured drawer grooves 126b of side plates 106.

[0114] Likewise, bottom plate 104 has a drawer groove 126d that includes a tongue is formed in each side thereof. Drawer groove 126d is configured to be slidably received in respective bottom drawer groove 126a of each side plate 106.

[0115] A flange 128a is formed on the bottom edge of rear plate 110. A plurality of tabs 130a (FIG. 17C) are formed along the rear part of bottom plate 104. One such tab 130 is shown in a close-up view in FIG. 17C. Tab 130 forms a drawer groove and is configured to receive and engage flange 128 of a rear plate 110. Tab 130 is a type of drawer groove that does not include the tongue 127.

[0116] Bottom plate 104 also has a flange 128b that is configured to engage front plate 108 (FIG. 18A).

[0117] Drawer 80 is assembled by holding first and second side plates 106 vertical and sliding the drawer grooves 126c of rear plate 110 into the drawer groove 126b of respective first and second side plates 106. Bottom plate 104 is then slidably received by side plates 106 by sliding opposing drawer grooves 126d on bottom plate 104 in the bottom drawer groove 126a of respective side plates 106. As bottom plate 104 reaches complete insertion, the plurality of tabs 130 engage flange 128a.

[0118] In FIG. 18A, side plates 106, rear plate 110 and bottom plate 104 are fully engaged. As shown in FIG. 18B, when drawer grooves 126a and 126d are slidably engaged, they form a double tongue-and-groove relationship. Tongue 127 that forms groove 126a fits in groove 126d and tongue 127 that forms groove 126d fits in groove 126a. In an exemplary embodiment, rear plate 110 also engages side plates 106 in a double tongue and groove relationship.

[0119] Turning now to FIG. 18C, bottom plate 104 and rear plate 110 are configured to engage another. As shown in FIG. 18C, tab 130 of bottom plate 104 engages flange 128a of rear plate 110 in a single tongue and groove fashion where tab 130 forms the groove and flange 128 is a tongue.

[0120] FIG. 18A also illustrates how front plate 108 is connected to form drawer 80. Front plate 108 is initially inserted between flange 128 (FIG. 17A) and fastener tabs 134 of side plates 106. Front plate 108 is then slidably received by bottom plate 104.

[0121] FIG. 19 shows front plate fully installed in the drawer assembly. Tabs 130 on front plate 108 are slidably received by flange 128 of bottom plate 104. The connection between bottom plate 104 is a single tongue and groove relationship similar to the engagement between bottom plate 104 and rear plate 110.
FIG. 20 shows the final assembly step for assembling an exemplary drawer of the present invention. Screw 136 is inserted through hole 140 of side plate 106 and secured with a nut 138. Screws 142a and 142b are inserted through respective holes 144a and 144b in front plate 108 and respective holes 146a and 146b of cover 112 and respective spacers 62a and 62b and attached to handle 44. Connecting screws 142a and 142b to handle 44 secures cover 112 to drawer.

In another embodiment of a knock down type drawer of the present invention, the groove and tongue connections between plates are arranged differently. For instance, the front plate may engage the side plates by a double tongue and groove relationship. In yet another version of the drawer of the present invention, clips are used to connect the plates of the drawer to assemble the drawer.

The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed is:
1. A modular cabinet comprising:
   a plurality of posts mounted between a top member and a bottom member to form a frame, the frame being configured to interchangeably receive at least one drawer or at least one door or at least one shelf;
   wherein each of the plurality of posts has at least one panel groove formed longitudinally therein; and
   a plurality of panels attached to the frame of the cabinet to form an exterior.
2. The modular cabinet of claim 1, wherein each of the plurality of posts is a single-piece post.
3. The modular cabinet of claim 2, wherein each post is formed from extruded aluminum.
4. The modular cabinet of claim 1, wherein the top and bottom members are formed from blow molded plastic.
5. The modular cabinet of claim 1, wherein the frame further comprises a channel formed longitudinally in each of the plurality of posts and wherein at least one drawer is mounted to the frame using a drawer bracket, the drawer bracket being received in the channel, the drawer bracket being fastened to the post at a selected height.
6. The modular cabinet of claim 1, wherein the at least one door comprises a hinge rod, and wherein the top and bottom members of the frame each have an receptacle formed therein, the receptacle in the top and bottom members being configured to receive the hinge rod.
7. The modular cabinet of claim 1, wherein the components of the cabinet are compactable and form a kit such that the modular cabinet can be transported in a compact form, the kit being configured to be assembled by a user or purchaser, wherein the user or purchaser assembles substantially all the components of the kit by screwing, sliding or snapping the components together.
8. A modular cabinet comprising:
   a plurality of posts mounted between a top member and a bottom member to form a frame, the frame being configured to interchangeably receive at least one drawer or at least one door of at least one shelf, wherein the at least one door is received in first and second receptacles formed in respective bottom and top members and wherein the frame has a drawer bracket that is received in respective channels formed in each of two of the plurality of posts, wherein each of the plurality of posts has at least one panel groove formed longitudinally therein; and
   a plurality of panels attached to the frame of the cabinet to form an exterior.
9. The modular cabinet of claim 8, wherein each of the plurality of posts is a single-piece post.
10. The modular cabinet of claim 8, wherein each post is formed from extruded aluminum.
11. The modular cabinet of claim 8, wherein the drawer bracket is slidably received in the channel.
12. A modular cabinet comprising:
   a plurality of posts mounted between a top member and a bottom member to form a frame, each of the plurality of posts having at least one panel groove and at least one channel formed longitudinally therein, the at least one channel being configured to receive a shelf bracket or a drawer bracket; and
   a plurality of panels attached to the frame to form an exterior, each panel being slidably received in the panel groove of two of the plurality of posts.
13. The modular cabinet of claim 12, wherein the frame is configured to interchangeably receive at least one drawer or at least one door.
14. The modular cabinet of claim 12, wherein each of the plurality of posts is a single-piece post.
15. The modular cabinet of claim 14, wherein each post is formed from extruded aluminum.
16. The modular cabinet of claim 12, wherein the top and bottom members are formed from blow molded plastic.
17. The modular cabinet of claim 12, wherein the components of the cabinet are compactable and form a kit such that the modular cabinet can be transported in a compact form, the kit being configured to be assembled by a user or purchaser, wherein the user or purchaser assembles substantially all the components of the kit by screwing, sliding or snapping the components together.
18. A modular cabinet comprising:
   a pair of rear posts and a pair of front posts mounted between a top member and a bottom member to form a frame, each of the rear posts having at least two panel grooves, and each of the front posts having at least one panel groove, each post of the rear posts and front posts each having a channel formed longitudinally therein, the channel being configured to receive a shelf bracket or a drawer bracket; and
   a plurality of panels attached to the frame to form an exterior, each panel being slidably received in the panel groove of two of the posts.
19. The modular cabinet of claim 18, wherein each of the plurality of posts is a single-piece post.
20. The modular cabinet of claim 18, wherein the front posts further comprise a flange positioned adjacent the door or drawer.
21. The modular cabinet of claim 18, wherein each post is formed from extruded aluminum.
22. A modular cabinet comprising:
a plurality of posts mounted between a top member and a
bottom member to form a frame, each of the plurality
of posts being a single piece post having at least one
panel groove formed longitudinally therein;
a plurality of panels attached to the frame to form an
exterior, each panel being slidably received in the panel
groove of two of the plurality of posts;
a channel formed longitudinally in each of the plurality of
posts; and
at least one drawer mounted to the frame by a drawer
bracket, the drawer bracket being slidably received in
the channel, the drawer bracket being fastened to the
post at a selected height to suspend the drawer so as to
provide clearance for the drawer.
23. The modular cabinet of claim 22, wherein the frame
is configured to interchangeably receive at least one door
instead of the drawer.
24. The modular cabinet of claim 22, further comprising
a retainer and a first and a second drawer, wherein the
retainer is configured to prevent the second drawer from
moving to an open position when the first drawer is in the
closed position.
25. The modular cabinet of claim 22, wherein the com-
ponents of the cabinet are compactable and form a kit such
that the modular cabinet can be transported in a compact
form, the kit being configured to be assembled by a user or
purchaser, wherein the user or purchaser assembles substan-
tially all the components of the kit by screwing, sliding or
snapping the components together.
26. The modular cabinet of claim 22, wherein the posts
are formed from extruded aluminum.
27. A modular cabinet comprising:
a plurality of posts mounted between a top member and a
bottom member to form a frame, each of the plurality
of posts being a single piece post having at least one
panel groove formed longitudinally therein;
a plurality of panels attached to the frame to form an
exterior, each panel being slidably received in the panel
groove of two of the plurality of posts;
a channel formed longitudinally in each of the plurality of
posts;
a plurality of shelf brackets, each shelf bracket being
slidably received in the channel, the shelf brackets
being fixed to the post at a selected height; and
at least one shelf mounted on the plurality of shelf
brackets.
28. The modular cabinet of claim 27, wherein the frame
is further configured to receive at least one door, the door
having a hinge rod that pivots in a hinge receptacle formed
in the bottom member.
29. The modular cabinet of claim 28, wherein the frame
is also configured to interchangeably receive at least one
drawer instead of the at least one door and the shelf.
30. The modular cabinet of claim 27, further comprising
casters attached to the bottom of the bottom member.
31. The modular cabinet of claim 27, wherein the com-
ponents of the cabinet are compactable and form a kit such
that the modular cabinet can be transported in a compact
form, the kit being configured to be assembled by a user or
purchaser, wherein the user or purchaser assembles substan-
tially all the components of the kit by screwing, sliding or
snapping the components together.
32. The modular cabinet of claim 27, wherein the posts
are formed from extruded aluminum.
33. A cabinet drawer, comprising:
a bottom plate;
first and second side plates;
a rear plate; and
a front plate, wherein each plate is linked to at least one
other plate in a tongue and groove relationship.
34. The cabinet drawer of claim 33, wherein the bottom
plate and the side plate each connect to the first side plate in
a tongue and groove relationship.
35. The cabinet drawer of claim 33, wherein the front
plate is connected to the bottom plate in a tongue and groove
relationship.
36. A cabinet drawer comprising,
a bottom plate;
a rear plate;
first and second opposing side plates; and
a front plate, wherein each of the plates are connected to
at least one other plate such that a portion of each plate
is selectively received by a portion of at least one other
plate, such that the plurality of plates are readily
assemblable into a drawer.
37. The cabinet drawer of claim 36, wherein each plate
receives another plate in a male-female relationship.
38. The cabinet drawer of claim 36, wherein at least two
plates are coupled through a double tongue and groove
relationship.
39. The cabinet drawer of claim 36, wherein the portion
of the at least one other plate is slidably received by the
receiving plate.