

# Murphy Bed

By Bruce Kieffer

*Save floor space without sacrificing comfort in this handsome bed project. A new hardware kit from Rockler makes it easy.*



Legend has it that William Lawrence Murphy, who invented and patented the first fold-up Murphy bed around 1900, designed it in order to turn his one-room apartment into a presentable parlor to woo an opera singer. It enabled her to enter his living

quarters but not his bedroom, which was frowned upon at the time. While social mores have changed since then, the practicality of a fold-up bed has not. When raised for storage, it takes up a fraction of the space of a traditional bed frame. And when called into use, it of-

fers “real” bed comfort and support that you or your guests will appreciate!

Most Murphy bed designs these days require a wooden box to capture the mattress (no box spring is used). My design is super simple and eliminates a lot of the work involved with building

one of these other styles. The key is a complete hardware kit from Rockler that includes a metal bed frame with a pneumatic lift system and a wooden slat platform that acts like a box spring. If you decide to build one or both of the side cabinets shown here, this project offers plenty of additional shelf and cabinet storage, too.

I made my queen-size Murphy Bed using birch lumber and birch plywood because its tight grain is great to paint. And to that end, you'll see later that I've applied "modern" milk paint (no milk required!) to the birch, followed by two coats of clear flat (sheen) water-based finish to add durability and luster. But if you'd prefer a "natural" wood look instead, or want to match this project to existing trimwork, any species and finish will be good substitutes for birch. It's up to you.

Of course, not everyone needs a queen-size bed, so material lists for twin and full-size beds are available in the "More on the Web" online content for this project. Rockler sells twin- and full-size Murphy Bed hardware kits as well.

## Construction Notes

In addition to the usual woodworking machines and router bits, to build this bed you'll also need a pocket-hole jig, biscuit jointer and a few other specialized items: a 35 mm drill bit, shelf pin drilling jig and an inset hinge baseplate drilling jig. You'll also need a dozen or so 18" bar clamps, a few 7' pipe clamps and at least 20 medium-size Rockler Bandy Clamps or other three-way edge clamps if you want to speed up clamping the edging strips to the plywood.

Here's a rough account of sheet goods, wood and molding you'll need: for the bed cabinet, buy four full sheets of 3/4" plywood, 30 board feet of birch and 10 lineal feet of 4 1/4"-wide crown



*Glue and clamp the 3/4"-thick edging pieces to the bed cabinet plywood. Place bar clamps at 6" intervals. Clean up wet glue squeeze-out with a rag, and scrape the rest away after it has cured.*



*Glue and clamp the 1/8"-thick edging pieces to the edges of the upper and lower back panels. A bunch of Rockler medium-size Bandy Clamps makes quick work of this task. Push them down as hard as you can to apply maximum pressure for tight glue joints.*

molding. Each of the side cabinets will require one full sheet of 3/4" plywood, one 2' x 8' half sheet of 1/4" plywood and 3 board feet of birch.

While this is a large project, it's not hard to build. However, it does require a big workspace when you get to the pre-finish assembly of the bed cabinet and frame. A one-stall garage or similarly sized workshop should be enough space to tackle this project. I've designed the bed cabinet to be knockdown, because it's so large that in almost every instance it would be too big to maneuver from your shop into the room where it will be mounted. You'll

use biscuits (no glue) to align most of the joints and pocket screws to assemble the knockdown parts.

Be prepared to cut away baseboard where you plan to mount the bed and side cabinets to your wall. Also, aside from being dangerous if not mounted securely to wall studs, the bed will not function properly either. You must use the "bed-to-wall" brackets included in the hardware kit.

## Assembling the Bed Cabinet

Let's get started by cutting the bed cabinet box pieces 1 through 5 to size, according to the *Material List* dimen-



**Cut the biscuit slots in the bed cabinet sides for joining the top, bottom and backs. The biscuits will keep the joints aligned when pocket screws are inserted.**



**Drill the pocket screw holes using a pocket-hole jig. Bore two side-by-side holes at the front edges, as shown here, for increased holding power where it matters most.**

sions on the next page. Now rip and crosscut thin strips of solid stock for the edging (pieces 10 through 12), and glue and clamp it to the cabinet's exposed plywood edges. Use bar clamps to secure the 3/4"-thick edging and Bandy Clamps or other three-way edge clamps for the 1/8"-thick edging. Once these glue joints dry, use a sander to bring the edging flush to the plywood faces.

Now pull out your biscuit joiner and cut #20 biscuit slots in the ends of the top, bottom and back pieces. Lay out the mating slots for those you've just made on the inside faces of the side panels, and cut these slots, too. All of these biscuit locations will help align the parts during final assembly, but they aren't what actually holds the joints together. For that, we'll use pocket screws. Drill

the pocket screw holes on the ends of the top, bottom and back pieces. You'll also need screw holes along the rear edges of the top and bottom panels to join them to the upper and lower back pieces.

Take the cabinet side panels over to your drill press to bore 3/8"-dia. x 1/2"-deep holes for the bed frame mounting plates' threaded inserts (see *Drawing*, next page, for their locations). The inserts will stand proud of the face of the plywood. Once those are done, finish-sand the inside faces of the sides, then drive in the threaded inserts. Attach the two mounting plates with the wafer head hex drive bolts provided in the kit.

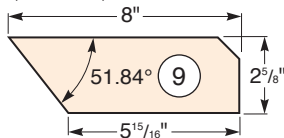
That done, it's time to put some pieces together! Go ahead and dry-assemble (no glue) the bed cabinet box using biscuits, flathead screws and pocket screws. Install the cleat (piece 18) inside the bed cabinet's top panel by screwing that in place. You can also assemble the bed frame, following the instructions included in the hardware kit. Now round up a helper so you can test the frame's fit in the bed cabinet. Review how the pistons mount, but don't attach them yet.

### Adding a Crown

Measure the overall top of the bed cabinet so you can cut the crown panel (piece 7) to size, but don't install it now. Instead, we'll cut the three pieces of crown molding (pieces 8) to fit around its front and sides, while this panel is still easy to reach. If you've never installed crown before, or if it's been a while, take a deep breath and pause. The last thing you want to do is mess up these cuts and waste some expensive crown molding. The simplest way

### Crown Brace

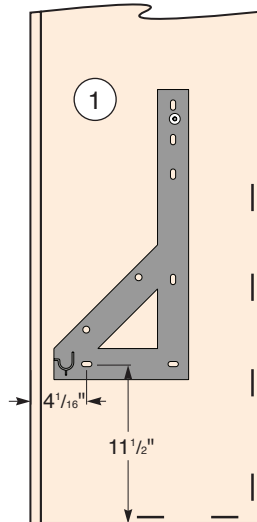
(Front View)



**NOTE:** Follow the assembly instructions provided with the Murphy bed hardware. Woodworker's Journal used their step-by-step procedure when building this bed.

### Mounting Plate Location

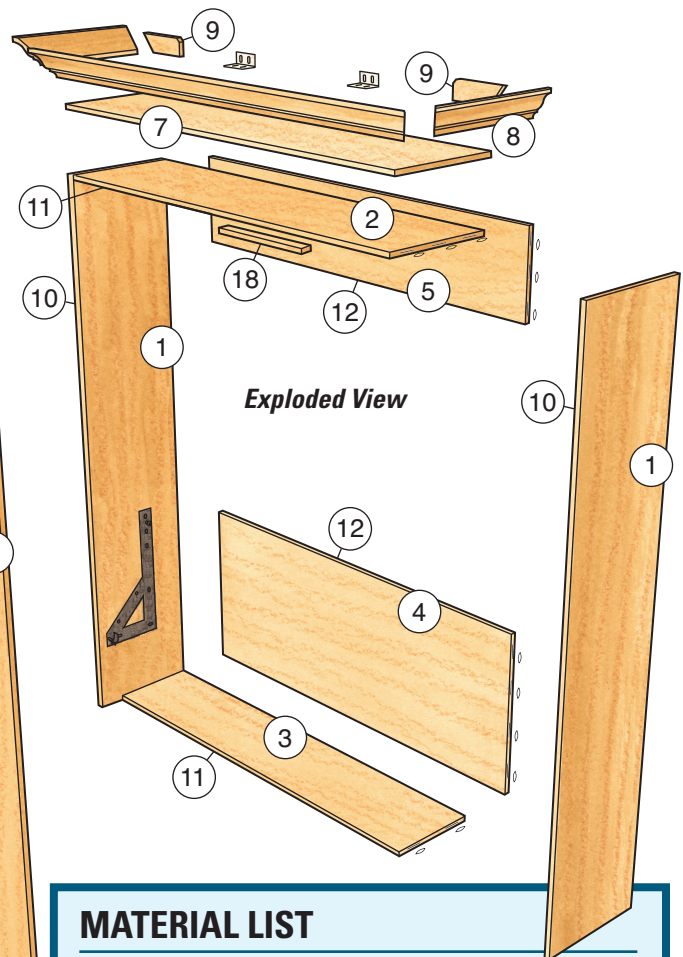
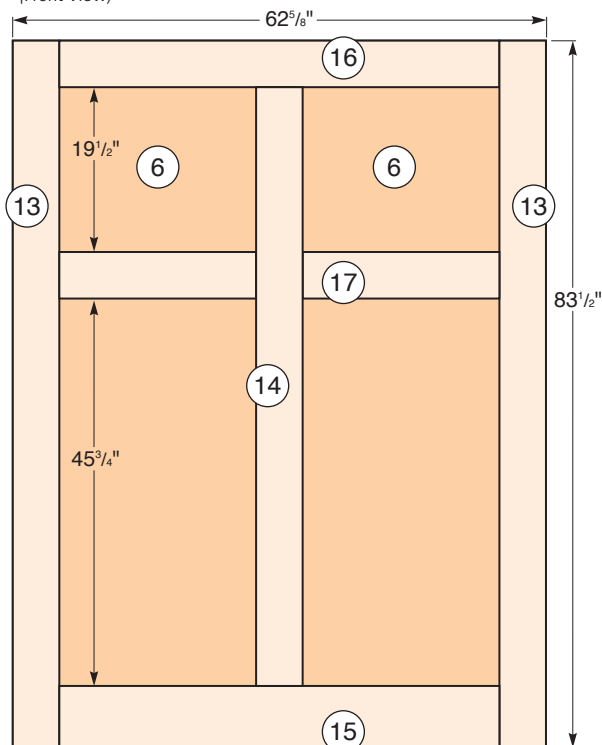
(Inside View)



**NOTE:** The threaded inserts for the mounting plates are 9/16" long. The holes drilled for the inserts are 1/2" deep. The inserts will stand proud of the face of the plywood.

### Bed Frame Door

(Front View)



## MATERIAL LIST

### Bed Cabinet (queen size)

	T x W x L
<b>1</b> Sides (2)	3/4" x 15 7/8" x 85 1/2"
<b>2</b> Top (1)	3/4" x 15 7/8" x 63 5/16"
<b>3</b> Bottom (1)	3/4" x 12 7/8" x 63 5/16"
<b>4</b> Back, Lower (1)	3/4" x 25 5/8" x 63 5/16"
<b>5</b> Back, Upper (1)	3/4" x 12 7/8" x 63 5/16"
<b>6</b> Door Panels (2)	3/4" x 31 5/16" x 83 1/2"
<b>7</b> Crown Panel (1)	3/4" x 16 5/8" x 64 13/16"
<b>8</b> Crown Molding	1 1/16" x 4 1/4" x 10 In. ft.
<b>9</b> Crown Braces (2)	3/4" x 2 9/16" x 8"
<b>10</b> Edging (2)	3/4" x 3/4" x 85 1/2"
<b>11</b> Edging (2)	3/4" x 3/4" x 63 5/16"
<b>12</b> Edging (2)	1/8" x 3/4" x 63 5/16"
<b>13</b> Side Trim (2)	3/4" x 5 1/2" x 83 1/2"
<b>14</b> Center Trim, Vertical (1)	3/4" x 5 1/2" x 70 3/4"
<b>15</b> Bottom Trim (1)	3/4" x 7 1/4" x 51 5/8"
<b>16</b> Top Trim (1)	3/4" x 5 1/2" x 51 5/8"
<b>17</b> Center Trim, Horizontal (2)	3/4" x 5 1/2" x 23 1/16"
<b>18</b> Cleat (1)	3/4" x 3" x 18"

### MORE ON THE WEB



For a video demonstrating the benefits of the Murphy bed hardware used in this project, plus Material Lists for adapting this plan to a twin or full-size Murphy bed, please visit [woodworkersjournal.com](http://woodworkersjournal.com) and click on "More on the Web" under the Magazine tab.



*Drive threaded inserts for the bed frame mounting brackets into the sides of the bed cabinet. Bore clearance holes for them first at your drill press.*



*Assemble the steel bed frame components following the instructions included in the hardware kit. Make sure the joints are flush on the door side of the frame so the door will rest flush against it.*



*Miter-cut the ends of the crown molding pieces. Imagine the saw's fence is the wall, and the table is the ceiling. Here, the author has clamped a stop to the saw so the molding stays oriented correctly.*

to cut the crown's compound-mitered corners is to use a miter saw and set the molding against the saw's table and fence as if they were the corner of a wall and ceiling — pretend the fence is the wall and the table is the ceiling. Rockler sells a jig to help (it's listed on page 35), and there are many online videos that explain the setup. I recommend cutting and fitting the long front piece first, making it a bit oversized and then trimming it to fit. Once it's dialed in for length, you can cut the two side pieces. Glue and brad-nail the crown to the edges of the crown panel. Then make up two braces (pieces 9) to support the crown from behind. Attach them with more brads and glue. With this work done, position the crown and pre-drill for its attachment screws.

### **Making the Bed Frame Door**

When the bed is stored upright, its frame is concealed behind a paneled door, which we'll build next. Do that by cutting the two main panels (pieces 6) to size. Now rip and crosscut the door's trim (pieces 13 to 17) from solid stock. Lay out and cut biscuit joints to dry-assemble these trim pieces into a divided frame. Attach the door panels to the back of the frame with countersunk flathead wood screws. Once the door is put together, your tape measure will show you that the margins between its final size and bed frame are intentionally generous: there will be between 1/4" and 5/16" gaps on the sides and top. The bottom gap to the floor will be 1 1/8". These margins will ensure good clearance when the bed is opened or closed.

Wrap up the bed cabinet construction by making the cleat (piece 18), but don't install it in the bed cabinet now — we'll do that during final installation. Ease all exposed sharp edges of the door and bed cabinet with a sanding block,



**Cut the biscuit grooves that join the sides of the side cabinets and dividers. Align and clamp the pieces like this, and then cut the grooves in the divider ends. Do not unclamp anything yet.**



**Now orient the biscuit joiner upright and align it to the drawn marks and cut the grooves in the sides. Rest the joiner's base against the clamped divider and mill the slots in the side panels.**

then disassemble the door and cabinet and finish-sand their exposed faces and edges to 150-grit.

### Building the Side Cabinets

With this design, you can build one or both side cabinets based on your needs and available space. They attach to the bed cabinet with hidden screws driven through pocket screw holes drilled in their top panels, and by adding more screws under the divider and behind the cabinet doors.

Start by cutting the plywood components (pieces 19 to 23) to size. Make the birch edging (pieces 27), and glue them to the exposed edges of the appropriate parts. Then use a 1/4" rabbet bit, or a straight bit and fence to rout the 1/4"-

wide x 1/2"-deep rabbets along the rear edges of the side panels to house the back panels.

Next, lay out and cut biscuit joints to connect the tops, bottoms, dividers and sides. Make sure the door openings will be exactly 23 1/2" tall when you lay out these biscuit slots, taking into account the fact that 3/4" thick plywood is almost always less than 3/4". Since the divider-to-cabinet-side biscuit joints aren't located along the ends of the cabinet sides but midway, you'll cut them in two separate machine setups (see photos, above). Your biscuit joiner manual should explain how to make these "face-to-edge" biscuit joints, or you can find more information on the Internet.

Next, drill rows of 5 mm-dia. shelf pin

holes in the side panels for the upper shelves as well as for the shelves behind the doors. Drill the hinge baseplate mounting holes, too (see right photo, below). I set my cabinets up so the right-hand cabinet doors pivot on the left side, and the left-hand cabinet doors pivot on the right side. Drill pocket screw holes in the end of the top panel that will be closest to the bed cabinet (these screws will serve as cabinet-to-cabinet attachments). Finish-sand the inside faces of the cabinet components, then assemble the parts with biscuits, glue and clamps.

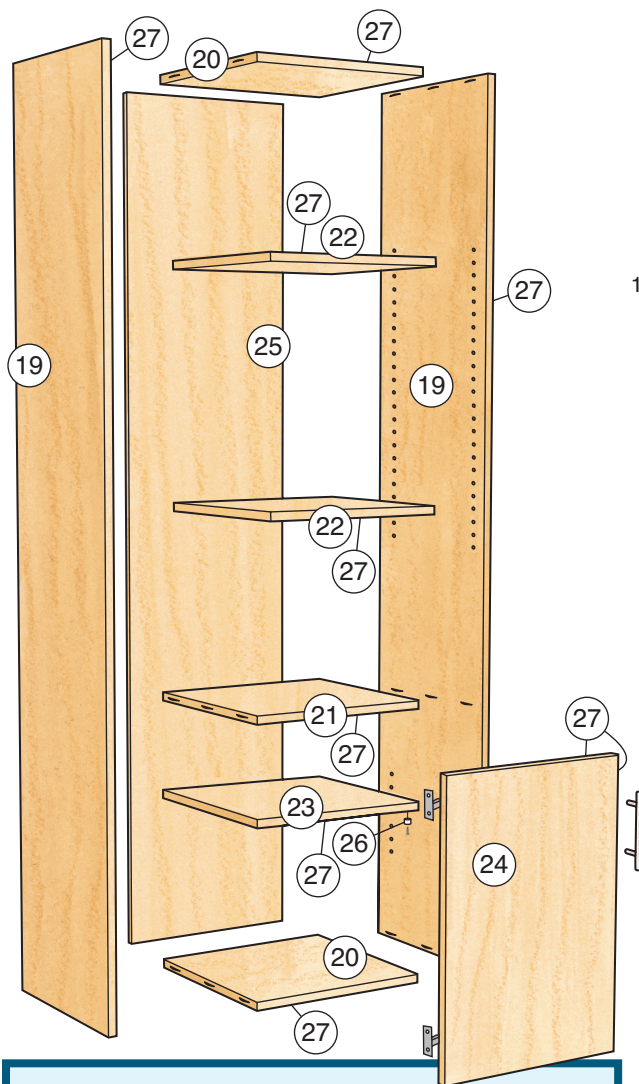
Cut a plywood panel for each cabinet door, and wrap it with more 1/8" hardwood edging to hide the edge plys. Mount the hinges and hinge baseplates,



**Drill rows of shelf pin holes into the side panels of the side cabinets using the JIG IT Shelving Jig and included self-centering 5 mm drill bit.**



**The author used a JIG IT Hinge Plate Template for Inset Door Hinges and a #6 self-centering bit to drill screw holes for the hinge mounting plates.**



## MATERIAL LIST

### Side Cabinets (to build 2)

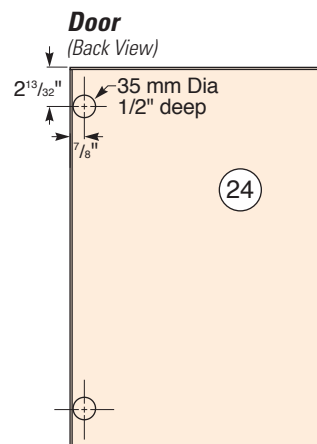
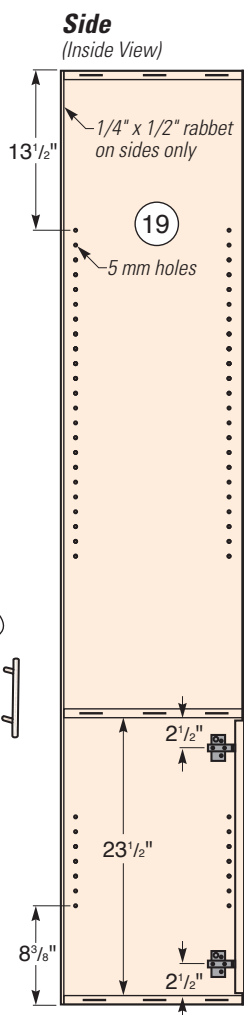
	T x W x L
<b>19</b> Sides (4)	3/4" x 15 5/8" x 79"
<b>20</b> Tops, Bottoms (4)	3/4" x 15 5/8" x 16"
<b>21</b> Dividers (2)	3/4" x 15 5/8" x 16"
<b>22</b> Shelves (4)	3/4" x 15 5/8" x 15 15/16"
<b>23</b> Shelves (2)	3/4" x 14 1/4" x 15 15/16"
<b>24</b> Doors (2)	3/4" x 15 5/8" x 23 1/16"
<b>25</b> Back Panels (2)	1/4" x 17" x 79"
<b>26</b> Door Stops (4)	9/16" diameter
<b>27</b> Edging	1/8" x 3/4" x 34 ln. ft.

then test-fit the doors in the cabinets. While they're hung, attach the door stops (pieces 26) now, too. When all is set, remove the stops, hinges and baseplates. Cut the back panels (pieces 25) to fit the carcass openings. Finish-sand the doors and ease their sharp edges.

### Applying the Two-part Finish

If you've never used milk paint before, you'll find it similar to latex wall paint

in how it looks wet and how it's applied, but the end result is a finer, more durable finish. White milk paint will be considerably thicker than darker colors,



like the gray I've used here. This is normal. I applied two coats of either white or gray to the exposed surfaces using a small paint roller to get it on super fast, and then smoothed the finish by lightly brushing it with a 4" synthetic paint brush. Sand between coats with 320-grit paper. Use a 1 1/2" synthetic "sash" paint brush to apply the paint to the inside corners of the side cabinets. Follow the same procedures to apply two coats of clear topcoat.

### Bed Assembly and Setup

When the finish thoroughly dries, move the big components to where they will be installed. Assemble the bed cabinet with pocket screws, and install the crown on top of it with countersunk screws. Now measure, cut and remove the baseboard from the wall area where the cabinets will be mounted. Here's a suggestion: remove baseboard for the bed cabinet first, mount the cabinet, and then scribe and cut away more baseboard to allow for the side cabinets.



**Glue and clamp the side cabinet pieces together, making sure the assemblies remain square when you tighten the clamps.**



Using a drill press, bore the 35 mm x 1/2"-deep hinge cup holes into the back faces of the side cabinet doors. Test your setup on scrap wood first to ensure that the door-edge-to-hole-edge spacing is correct.



Apply two coats of milk paint using a 3" or 4" x 3/8" nap paint roller. "Tip off" the rolled-on coat paint with a 4"-wide quality synthetic bristle paint brush to smooth it further. And be prepared: there's a lot of surface area to paint!

You're now ready to attach the bed cabinet to the wall. Install a few screws through the lower back panel, and attach the "L" bed-to-wall brackets included in the hardware kit. It is **absolutely critical** for safety that these bed-to-wall brackets are positioned over wall studs and screwed into them securely.

Following the hardware kit instructions, set the bed frame in place on the mounting plates and install the pistons. Reassemble the bed frame door. Attach the center pulls to it with four #8-32 x 2" machine bolts, and then attach the metal door brackets to the back of the door. Now hang the door on the bed frame.

Be absolutely certain it is centered side-to-side by measuring the space on each side between the bed frame and door edge. Check at the top and bottom, too, so you know it's square. You can correct any door-to-cabinet height issues by shimming under the upper door brackets, or by repositioning them. When all is set, insert the other screws that lock the door in place on the bed frame. You can correct minor misalignment of the door and cabinet by repositioning the bed-to-wall "L" brackets and shifting the cabinet in and out, and side-to-side.

Lastly, turn your attention to the side cabinets. If you haven't done so

already, fasten the back panels into their rabbets. Attach the cabinets to the bed cabinet and wall: drive 1 1/4"-long pocket screws through the side cabinet tops into the bed cabinet, and add screws inside the side cabinets behind the doors as needed. Fasten wood cleats at the top of the side cabinets to secure them to the wall with screws. Hang the cabinet doors, install the shelves, and you're done! Now, I bet you know just the spot for a well-deserved nap.

Bruce Kieffer is a woodworking author, technical illustrator, and frequent contributor to *Woodworker's Journal*. His website is [kcfi.biz](http://kcfi.biz).

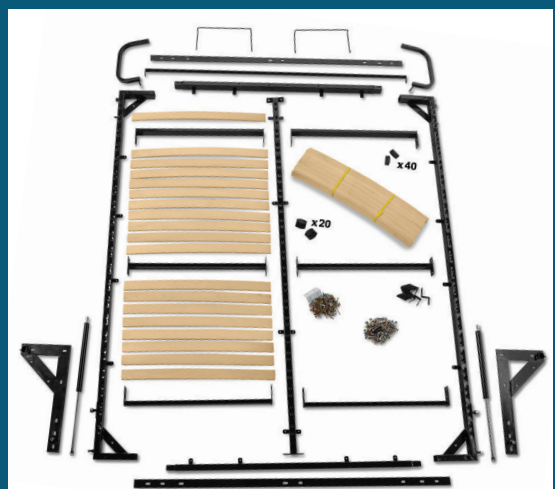
## Murphy Bed Hard-to-Find Hardware

### Bed Cabinet

Murphy Bed Queen-Size Hardware Kit (1) #54386 .....	\$374.99 ea.
Amerock Stainless Steel Bar Pull 256mm (2) #26074 .....	\$11.99 ea.
Medium Rockler Bandy Clamps (20) #54258 .....	\$19.99 pr.
Bench Dog® Crown-Cut (1) #23238 .....	\$27.99 ea.
Kreg R3 Pocket Hole System (1) #22708 .....	\$39.00 ea.
GF Milk Paint, Driftwood (2 pints) #55098 .....	\$17.99 ea.
GF Milk Paint, Snow White (4 pints) #35877 .....	\$17.99 ea.
GF Flat Water-Based Polyurethane (1 quart) #59861 .....	\$27.99 ea.

### Side Cabinet (per cabinet built)

Blum® Soft-Close 110° Inset Hinges (1 pair) #34807 .....	\$18.99 pr.
Nickel 5mm Shelf Pin Supports (12) #22898 .....	\$3.99 pk.
Amerock Stainless Steel Bar Pull 192mm (1) #23331 .....	\$12.99 ea.
JIG-IT® Hinge Plate Template for Inset Door Hinges (1) #56585 ...	\$7.99 ea.
Rockler #6 Self-Centering Bit (1) #68991 .....	\$12.99 ea.
JIG-IT Shelving Jig w/Self-Centering Bit (1) #35151 .....	\$34.99 ea.
FastCap Euro Door Stops for Inset Doors (1) #45201 .....	\$2.49 pk.
GF Milk Paint, Snow White (2.5 pints) #35877 .....	\$17.99 ea.
GF Flat Water-Based Polyurethane (.5 quart) #59861 .....	\$27.99 ea.



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