

Murphy Bed With Couch

Executive Summary

OK, most people want to cut right thru the preliminaries and see the end result. At the time of this writing (16Feb2019) the Murphy bed is installed and being used, but it does not have a finish applied. I will dismantle the bed and apply the finish during the summer when I can open the windows and vent the fumes. I will update this doc when that is done. So, here are pictures of the finished product (without the finish).





If you like what you see and want more details, read on.

Disclaimer

I am providing this document for educational purposes only. All design specifications from Create-A-Bed (CAB) must be adhered to (e.g. using plywood where required and using solid wood where required). CAB is more than happy to review any modifications you might be considering.

Do your own homework, make your own decisions and accept responsibility for yourself and your work.

Introduction

We retired a few years ago on 40 acres at 9000' elevation in the mountains of Colorado. We live in a 1000 sq. ft. house that we designed and built. We have focused heavily on the concept of "right sizing" for our house as well as for our entire lifestyle.

We have really enjoyed the challenges of being creative in getting the most use out of living in a smaller house. One of the ideas that has always intrigued us is the concept of being able to easily get your bed out of the way and using that floor space for something useful during the day.

Keep in mind, this Murphy bed is not in a spare bedroom or office room. This is our **primary bed** in our living area that is used every night.

Investigation

An investigation of Murphy beds (also referred to as wall beds) turned up a wide variety of interesting approaches. For our needs, here are some of the criteria we used in coming up with our solution.

Maximizing Floor Space

Our house has a very open interior in order to maximize space and mitigate the "small house" feeling. We only have interior walls for the bathroom, closets and utility room. This openness along with large picture windows and skylight gives a very "unsmall" feeling to living in the house. Incorporating a murphy bed will increase the available floor space that can be used during the day even more.

Adding More Seating

With the floor space we would be opening up when the murphy bed is closed, we decided we could use some of that space for some additional seating, such as a sofa. Other people might want to incorporate something other than a sofa into their murphy bed, for example a desk.

We wanted to make sure the sofa could get out of the way when using the bed without continuing to take up floor space. So, we wanted to come up with some kind of sofa design that could be used during the day and would be out of the way at night.

Thinking It Thru

It's very helpful to think thru how things get used and to keep these things in mind when designing. For example, my wife likes to sit sideways on a couch while reading, leaning up against the arm rests. That means the arm rests for the sofa would need to be sturdy.

Also, since we're retired and getting older by the day, we didn't want to have separate items to have to lift and move around on a daily basis as the bed was put down and up. That means the sofa would have to be designed to be very easy to put up and down.

One of the things I didn't like about many of the murphy bed designs that included seating in front of them was that frequently the couch arm rests are on the outside of the Murphy bed cabinet and present a barrier to getting in and out of bed when the bed is in use. Also, arm rests on the outside of the cabinet added to the overall width. This took up additional space that I didn't want to use up.

So, the challenge was to design a sofa with sturdy arm rests that would easily fold down out of the way when the bed is in use. My design includes arm rests which are hinged so that they can easily fold down underneath the bed. Also, when the arm rests are in place I have pins to lock them to the couch frame. This makes sure the arm rests can support the weight of someone leaning against them.

Design

My final design is based on the Create-A-Bed Adjustable Deluxe Mechanism. Create-A-Bed (CAB) supplies high quality Murphy bed components along with very well thought out and detailed plans and video for building and installing a Murphy bed. As designed, this is a very nice and cost effective solution. Being a wood worker, I wanted to add my own touches and elevate the appearance of the bed and sofa to a more high-end looking solution.

I called CAB in order to get more details and to verify that my modifications would meet their structural criteria. I spoke with Aaron multiple times during my build process and he was great to work with. I found out that they offer legs with 4" more height so there is more room under the bed for features such as I was considering. I didn't see this mentioned on the web site (unless I missed it), so I would not have known about this if I hadn't called and spoke to Aaron.

I was able to use the CAB supplied plans and added the following modifications:

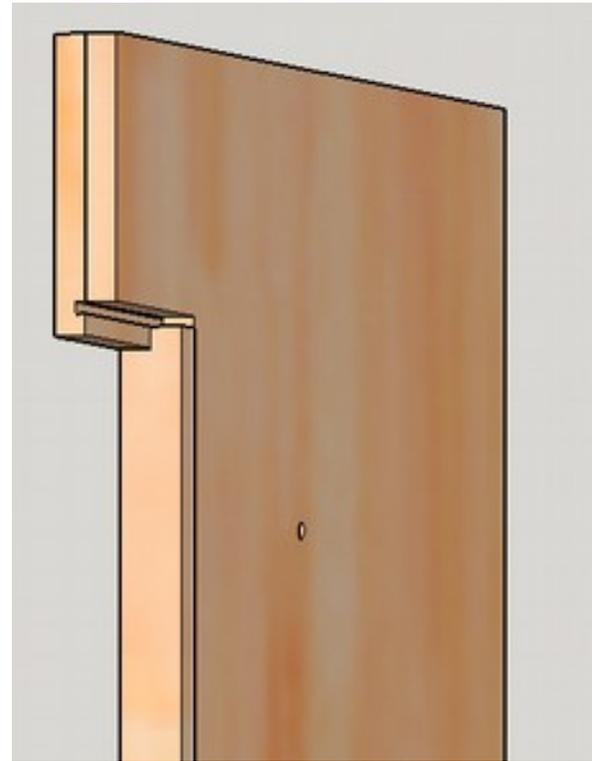
- Cabinet is 4" higher to allow for 11" underneath the bed instead of the default 7"
- Tongue and Groove (T&G) Finish Surfaces
 - I used 3/4" tongue & groove pine on most finished surfaces to match other interior features of the house
 - For the bed face panels I used the T&G instead of the 3/4" plywood called for in the plans. These are still glued and screwed to inner bed frame.
- The couch frame is designed to be 1/4" below the bed when it is in the down position (i.e. 10 3/4" from the floor to the top of the frame). I did not want the face of the bed frame to get marred up by hitting the couch frame when it was down.
 - **HOWEVER:** I found that when the bed was down and someone was lying on it, the frame sagged a bit in the center causing it to hit the couch frame. In order to prevent marring up the bed frame face, I placed a piece of felt on top of the couch frame (you can see this black strip in one of the pictures below).
- The header was extended out over the bed/sofa to accommodate recessed lighting. This aids reading in bed as well as reading while sitting on the sofa.

- The exterior walls in our house are made with SIPs. There are no studs to bolt the header to at the original designed height. So, I increased the header height in order to allow installation of bolts thru the header that would screw into the top wall plate.
- When using the 11" legs, you must add 4" more depth to the cabinet to allow room for the longer legs when folding the bed up. This also allows more room between the mattress and the wall when it is folded up. After I installed the bed (unfinished) I added a temporary shelf to the headboard to validate that I could have a shelf on which I could put candles, alarm clock, etc. When I dismantle the bed to apply the finish I will make the headboard shelf a bit more attractive (and I will update this doc).

Build Details

Cabinet Sides

The cabinet sides are made of finished plywood per the CAB instructions. The top was extended to provide a place for the recessed lighting. A layer of T&G siding was applied to the outside.



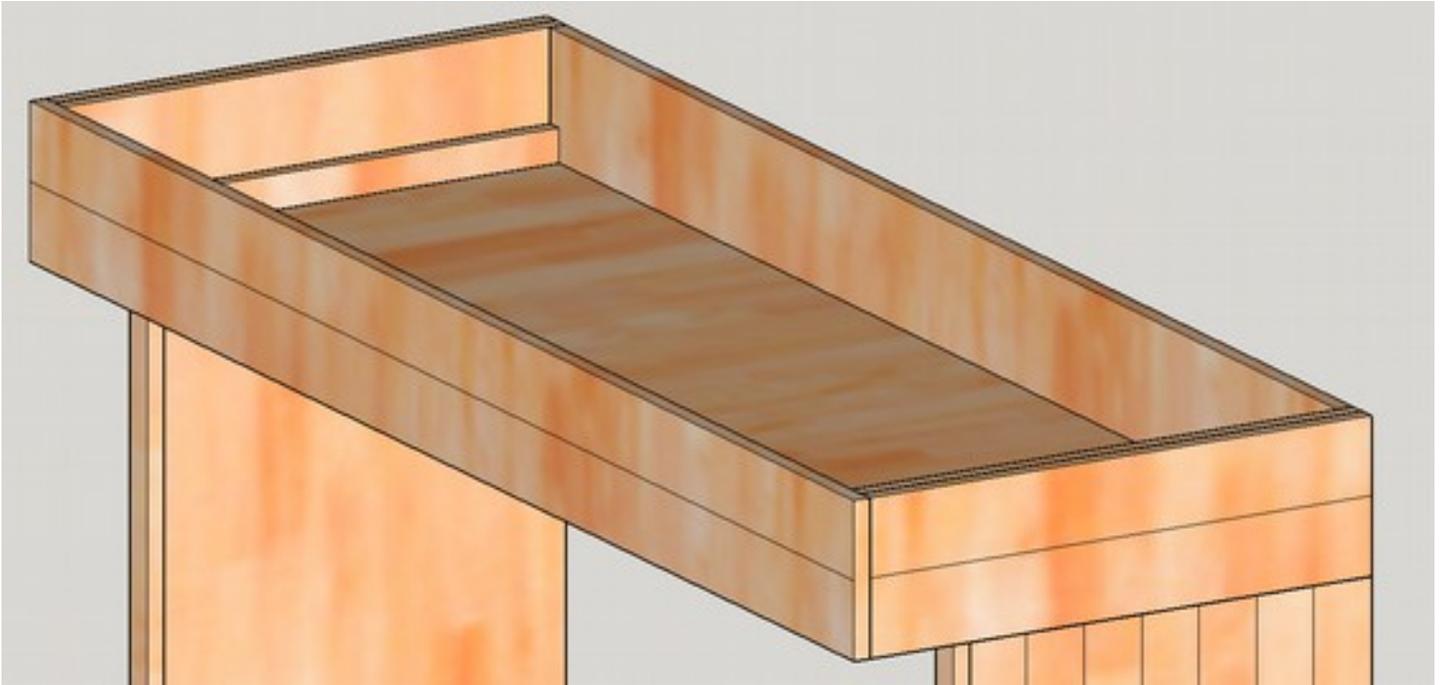
This enlargement shows a groove that will hold a plywood panel in the header (more later). Also, there is a finish piece that covers the front plywood edge and T&G sides.

Also, note the headboard is 4" from the back frame (wall) which allows for a top shelf to set things on.

Header

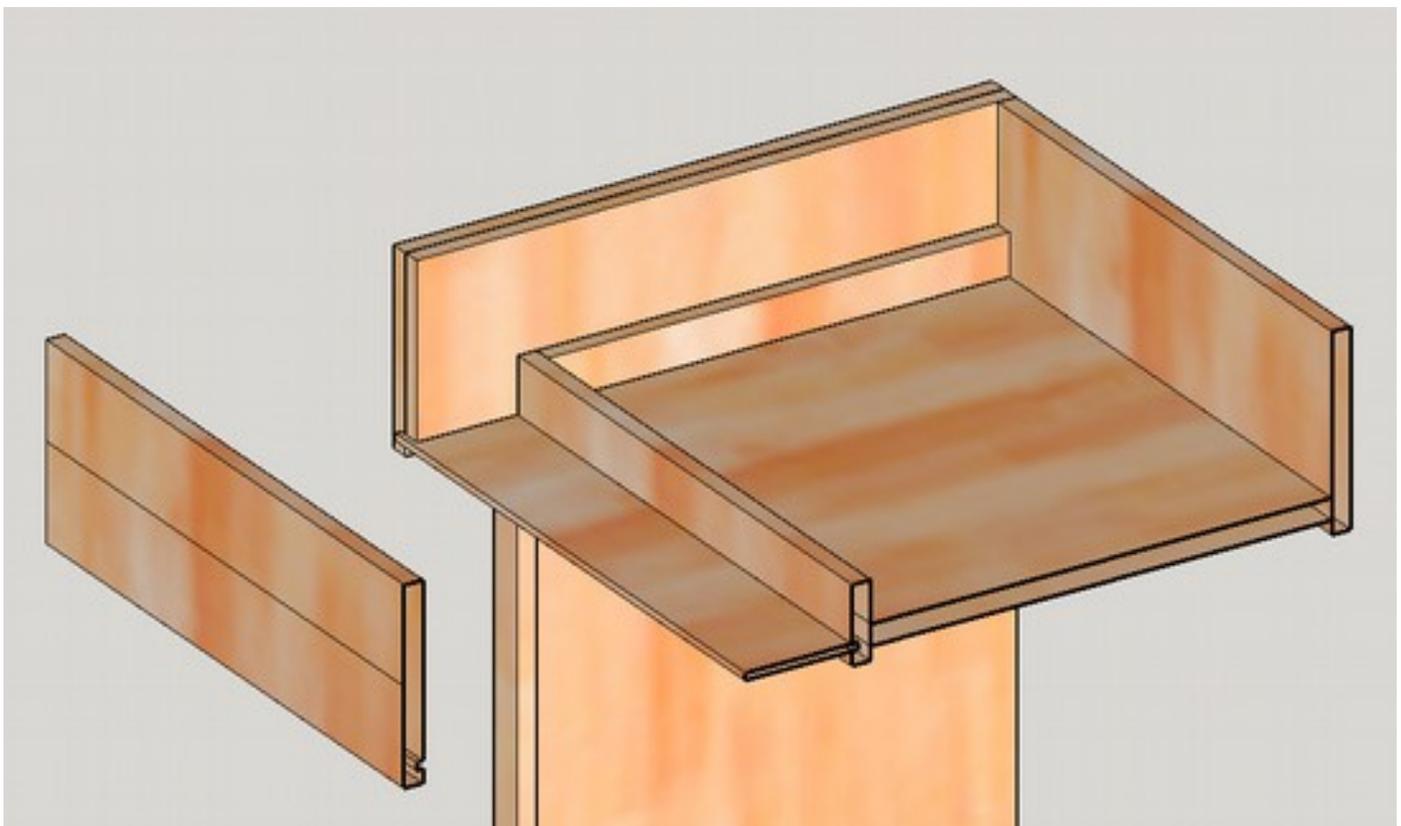
Frame

Here is a sketch of the header and cabinet sides:



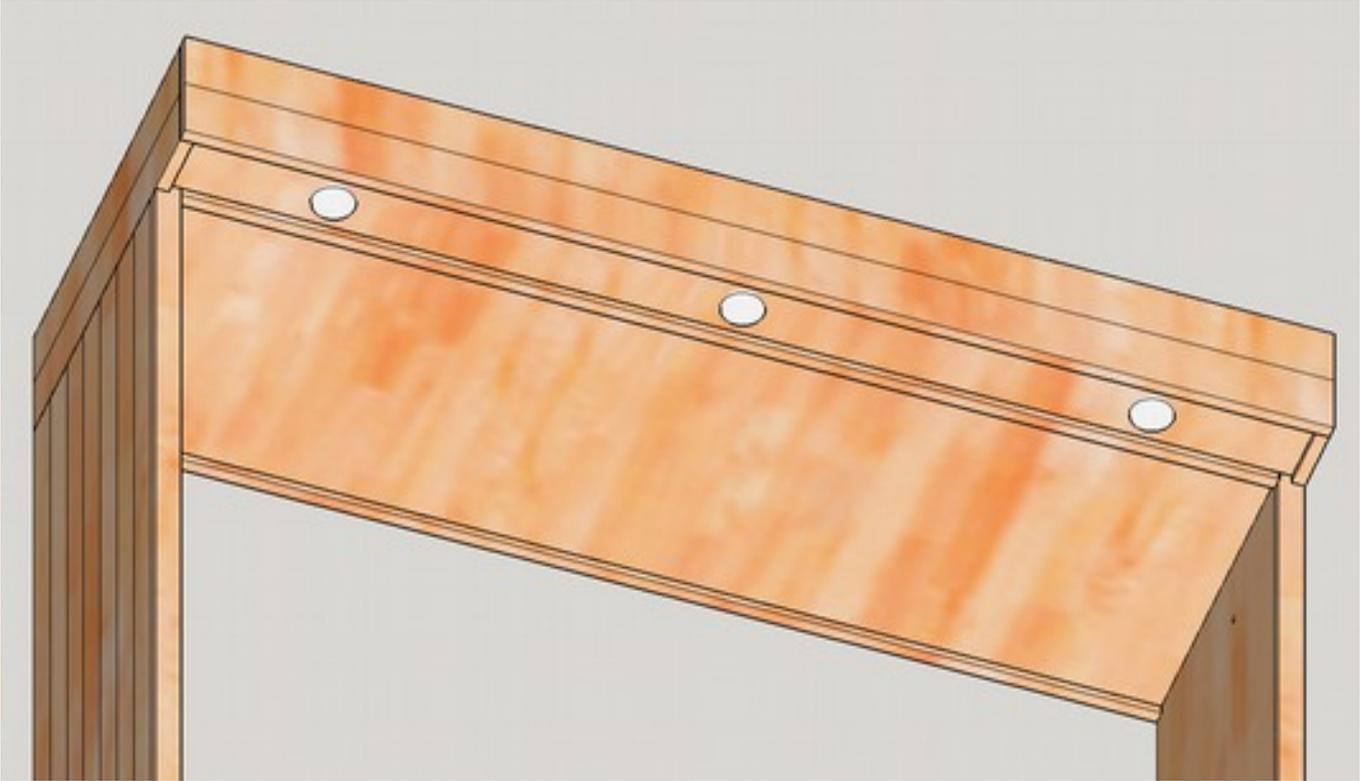
The header is essentially the same design as specified in the CAB plans (including using solid wood where required, gluing as specified, etc.).

This cross section shows the header with the face board moved out to reveal how the pieces all fit together:



Lighting

This sketch shows the puck lights mounted underneath the extended header:



sofa

The sofa consists of a frame, arm rests and cushions. The arm rests are hinged and fold down underneath the bed.

This picture shows the arm rests folded down, the cushions stored on the floor and the ottomans in place prior to lowering the bed:



You can also see the black felt strip on top of the sofa frame that protects the surface of the bed frame when it is folded down.

Here is a closeup showing the hinges when the arm rests are folded up into place. These are called table hinges and I put a link in the Resources section showing where I got these.



Arm Rest Pins

When the arm rests are in the "up" position, I added pins to put thru the bottom of the arm rest and into the sofa frame. Without these pins the hinges would be taking a lot of sideways force, which would cause them to weaken and break over time.



Here is a closeup of a pin inserted thru the arm rest and one laying out for illustration:



Ottomans

I made two ottomans which serve dual purposes. When the bed is in the "down" position, the ottomans support the murphy bed. When the bed is folded up, the ottomans can serve as footrests or they can be tucked in underneath the sofa so they are out of the way. In order to do this, the ottomans had to be able to be set at two different heights.

In a picture above, you can see the ottomans at the end of the folded down armrests. You can see that they are slightly higher than the arm rests, so the bed is supported on the ottomans and does not touch the armrests. This picture shows the ottomans at different heights:



I designed the ottomans with a bottom and top section. You can lift the top, rotate it 90 degrees and put it back down and the height will change.

Folding Bed Support

With the ottomans supporting the bed, I intended to remove the folding bed support legs. However, I found they still served a useful purpose. When I want to raise the bed up the support can be folded over the pillows which keeps them in place when the bed is raised.



Pulling Down the Murphy Bed

Since this is our main bed, we will be pulling it down and putting it up 365 times a year. As we get older, I'm concerned about how difficult this is to do. Even now my wife, who is 4'11", struggles a bit. The adjustability of the CAB mechanism is helpful. You adjust it make it easier to pull down or put up. However, you make one direction easier at the expense of the other. For example, if you make the bed easier to pull down, that makes it harder to lift up.

In the CAB design, there are handles to grab to pull the bed down. However, with the added height of this bed to allow for the fold down couch the bed pivot point is higher off the floor. That means you have to reach higher to grab the handles. If you lower the handles you increase the amount of strength it takes to pull the bed down.

In order to make it easier to pull down I installed a pull-down strap at the top of the bed, where the leverage is the greatest. You insert a pull-down rod into the strap and pull. This also allowed me to eliminate the handles so I could mount metal art on the face of the bed. I think this really added a nice touch; the bed face was not so bare when it was in the up position.

Here is a picture of my wife inserting the rod into the strap:



Here's a close-up picture of the loop strap:



This way you can stand on the floor and reach the pull-down with the rod and have the greatest leverage possible.

As we get into our later years, it's possible we just won't be able to pull this down anymore and will have to leave the bed down all the time. We'll cross that bridge when we get to it.

Resources

Create-A-Bed

Create-A-Bed

<https://www.createabed.com>

Rockler sells Create-A-Bed mechanisms, but does not sell the heavier, adjustable one that I used:

<https://www.rockler.com/vertical-mount-murphy-bed-hardware-hardware>

Sofa Cushions

Here is what I used for the sofa cushions:

https://smile.amazon.com/gp/product/B078S5D9FV/ref=oh_aui_detailpage_o00_s00?ie=UTF8&psc=1

LED Lights in the Header

https://www.amazon.com/gp/product/B00YMNS4YA/ref=ppx_yo_dt_b_asin_title_o01__o00_s00?ie=UTF8&psc=1

Table Hinges Used for the Arm Rests

https://www.amazon.com/gp/product/B07DDFTQQK/ref=ppx_yo_dt_b_asin_title_o00__o00_s00?ie=UTF8&psc=1

Mattress

When researching what mattresses can be used in a Murphy bed, I ran across a few places that said you have to use special mattresses because an ordinary mattress will sag when it's constantly folded up into a vertical position. However, I found enough resources that debunked that idea and said you can use any ordinary mattress (spring or foam).

We bought a NovaForm 12" Bella Venta Queen Gel Memory Foam mattress from Costco. It weighs 77 lbs. and is a medium-firm. However, it appears that NovaForm is not offering 12" mattresses anymore, only 14". The 14" queen size weigh in at 90 lbs. which is the upper limit recommended by CAB.

To stay with a 12" thickness you'll have to do some research.

SketchUp

I used SketchUp (SU) to design my Murphy bed. For more details on SU, click [here](#).