Morris Models Kinetic Cutaway - Technical Art that Moves(TM)

Five Cylinder Radial

Build Manual

Before you Begin

Most of this kit was cut out of Baltic birch plywood on a laser cutter. Plywood is a natural product, and every piece is different. Because of this, the laser cannot cut every piece perfectly. This means that in some places, there is smoke and scorching. In other places, the wood did not cut completely and there are splinters hanging on the edges. The more time you spend preparing your parts, the better your completed model will be.

You should begin by making sure that none of the parts are missing. Look over the rest of the steps in this manual, and find all the parts for each step. Check the parts to make sure that they are in good condition. Minor damage can be repaired with glue. Splinters should be removed using an X-acto type knife and sandpaper. Scorched marks can be lightly sanded off. If any parts are badly broken or are missing, you can get replacement parts from www.morrismodels.com.

A few of the parts for this kit are cut from hardwood. These form most of the shafts. These should be sanded for splinters and checked for fit. If you have access to power tools, they will look a little more realistic if you bevel the front of each shaft. The parts shown in this manual have been beveled. This step is for appearance only, and is completely optional. Do make sure that the shafts can rotate freely where they are supposed to rotate. Sand if necessary. These shafts tend to get tighter fitting in the summer and looser in the winter.

This engine is designed to be assembled with any type of wood glue. I personally use Elmer's "Glue-All" glue. Do not use Elmer's "School Glue." It will not work. Whatever glue you use, use only enough glue to stick the parts together. Extra glue will squeeze out from between the parts and stick the engine together in places where it should not. Any glue that does squeeze out from between parts should be wiped up with a damp cloth while it is still wet. Many of the plywood parts have 1/8" holes. These holes are to help line up the layers. As you work, try to keep the glue away from these holes. When you put on a new layer, push short dowel pins into the layers to help line them up. These are called alignment pins. You should remove the alignment pins after the glue has had a few minutes to dry.

Many people ask if they can varnish, paint, or stain the engine. I do not recommend using paint or varnish, but oil-based finishes or stains are appropriate. Assemble the engine before using them. Another alternative is to use water-based markers. You can color each part before or after it is assembled. These parts absorb a lot of marker ink, so it will take quite a few markers to do the job.

Real engines use oil to keep them sliding smoothly. This wooden engine model would be ruined with oil. Some people use wax when assembling my wooden engine kits to help the parts slide smoothly. This step is optional. I have used candle wax and I have used colored crayons. Either of these will work fine. So does paraffin wax. I have also assembled quite a few of these engines without any wax. This also works. Just don't use wax on your engine before gluing the parts together, as this will interfere with the glue. It will also interfere with staining or painting the parts, so plan ahead.

This manual shows how to build the engine step by step. Sometimes it is hard to explain things in a manual, but easy to understand it on a video. We try to shoot videos for each engine as time allows. If a video for this engine is available, it will be posted on the web site www.morrimodels.com. Our videos show the same steps that are in the manual. Use a video if you prefer, or use the video to view any steps where you have trouble understanding the manual.

Do not be disturbed when you have small parts left over at the end of the project. We include as many spare parts as we can reasonably include - particularly the small ones. Where there are extra parts, try to use the best ones. Any that did not cut cleanly can be saved in case the other ones are ruined.

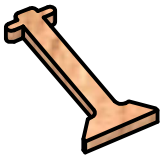
If you have access to Facebook, you can also interact with us there. We have a group that is intended to share tips, tricks, and questions with other builders. This group is entitled "Laser Cut Model Engines and Art," and we would appreciate it if you check it out and post pictures of your completed builds.

We hope you enjoy building this kit. If you do, you may want to consider building some of the other model kits. We have several more models available on the web site, and we add another model every few months - so check back.

Section 1: Sanding and Thinning Parts

Most of the parts for this model are cut from the same thickness piece of plywood. The model is built up in layers. In order for parts to move, they need to be thinner than the non-moving parts in the same layer. This means you will need to sand them to make them thinner than they are in the kit. The best way to do this is to glue a piece of sandpaper onto a board. Manually move the parts over the sandpaper rather than moving the sandpaper over the parts. Use 80 to 120 grit sandpaper. High quality sandpaper will last much longer than cheap paper. This step is the least fun part of the assembly process - but is essential for a well-running model. Please view any of our assembly videos to watch this process. By the way, this kit was made from 3mm thick material (about 1/8 inch.)

The parts shown below will need to be thinned.



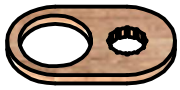
Valves: (10). Sand both sides until the valves are noticeably thinner than the other parts. Use a circular motion, and hold the entire side of the valve flat on the sandpaper. Do not sand any of the dark cut edges. If you have a micrometer, the thinned valves should be under 0.11 inch or 2.7 mm think.

Planet Gears: (3). Sand (both sides) until under 0.11 inch or 2.7 mm thick.

Cam Rollers: (6). Sand just a little thinner (both sides) until under 0.10 inch or 2.5 mm thick.

Pushrods: (10). Sand until under 0.11 inch or 2.7 mm thick. Pay particular attention to the paddle shaped area. The long shank is not as important.

Crank Thickener (Front): Sand most or all of the outside layer away, leaving this part about 0.09 inch or 2.0 mm thick.

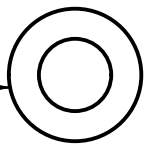


Crank Thickener (Rear): Sand most or all of one outside layer away, leaving this part about 0.09 inch or 2.0 mm thick.

Articulating Rod, Inside (4): Sand (both sides) until under 0.11 inch or 2.7 mm thick.

Master Rod, Inside: This is a special case. The end around the hole needs to be thinned until under 0.11 inch or 2.7 mm thick. The other end needs to be its full thickness to create clearance for the articulating rods. Sand flat and apply pressure only to the end with the hole. This should provide a smooth taper.

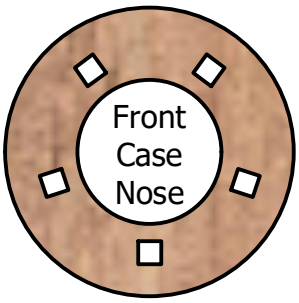
Cam drive spacer disk: Sand (both sides) until under 0.11 inch or 2.7 mm thick. Note that there are many disks, so a full-sized view is provided on the right for easy identification. →



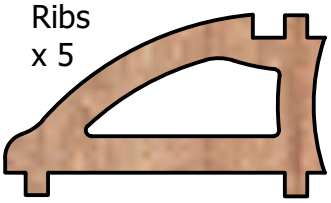
Section 2: The Front Cover

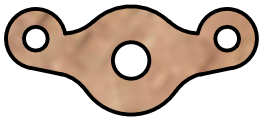
New Parts

Shown full size except as noted



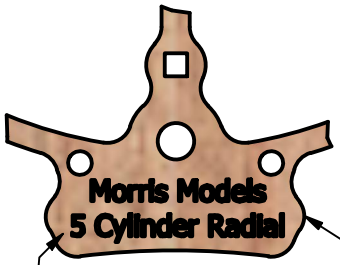
Front Case Ribs x 5



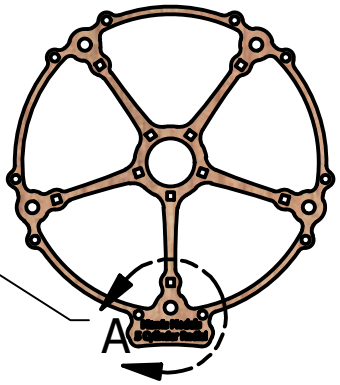


Front Case Spacers x 10

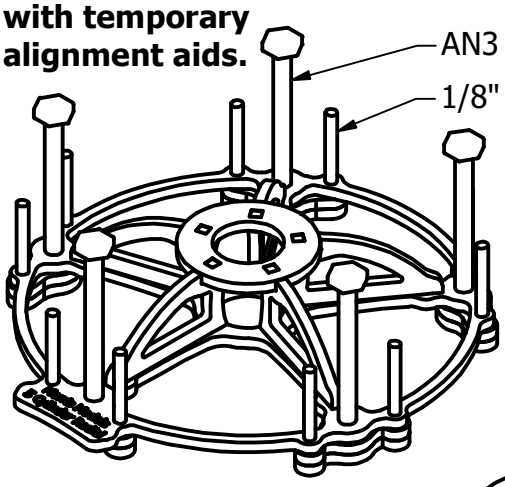
Front Case Wall - partial view shown full size, and complete view shown 1/3 size.



engraved side faces up.

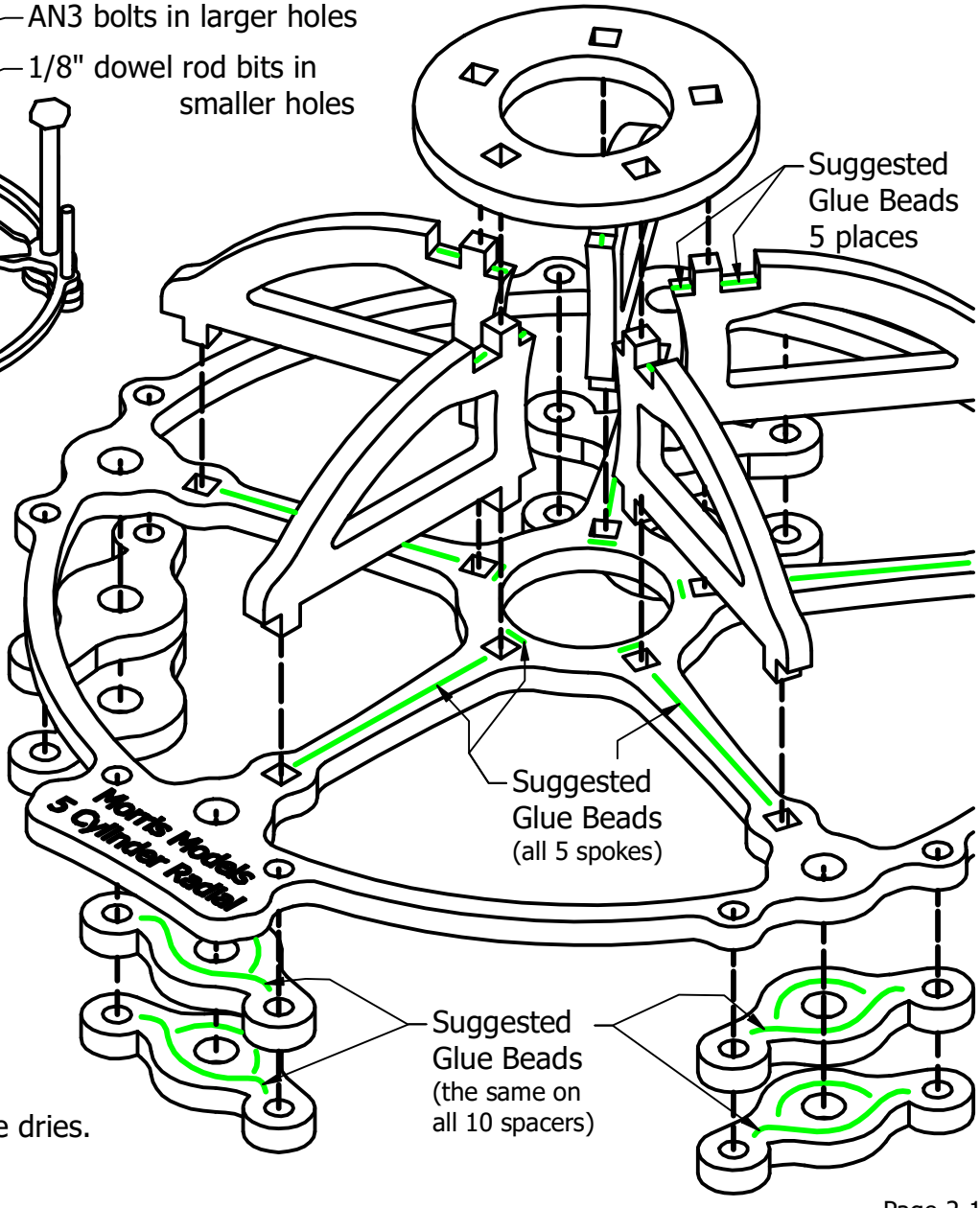


Completed nose case shown with temporary alignment aids.



AN3 bolts in larger holes

1/8" dowel rod bits in smaller holes



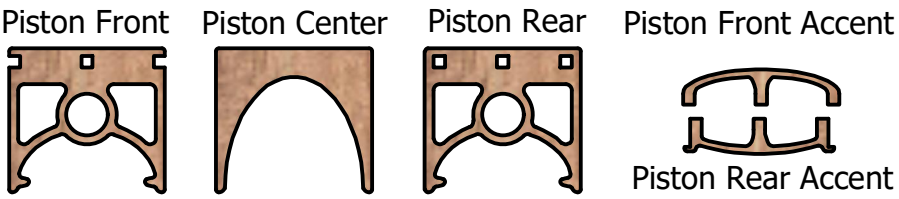
Place beads of glue on the spokes of the case wall as shown on the right. Insert the five case ribs into the sets of sockets. Add small dabs of glue to the case ribs as shown, and use these to secure the case nose in place, again engaging the square sockets. Glue two case spacers behind each of the five sets of holes around the rim. Use small pieces of 1/8" dowel rod and the included AN3 bolts to help line up the spacers. Remove these before the glue dries.

Section 3: The Rotating Assembly

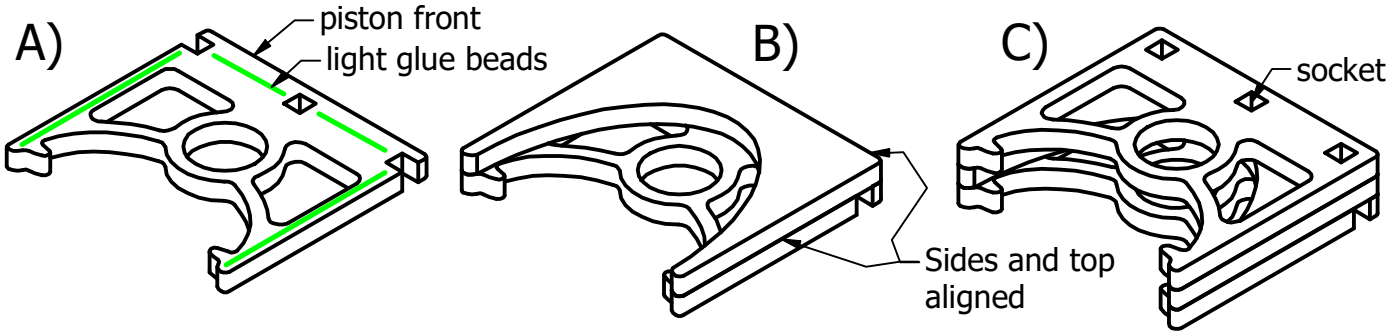
The rotating assembly consists of the crankshaft, the master rod, the articulating rods, and the pistons. Be sure you carefully align all the parts as you build, especially the crankshaft. The rods are built into the crankshaft and cannot be removed.

Pistons (5 Required)

New Parts:
(1 ea per piston)
shown 1/2 scale

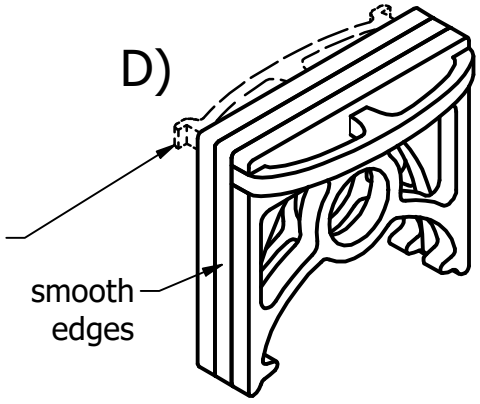


Lay the best face of the Piston front down, and apply a very light bead of glue as shown in view A. Glue the piston center down as shown in view B, taking care to align the top and sides perfectly. Apply similar light glue beads to the worst face of the piston rear, and add it to sandwich, again aligning the top and sides perfectly.



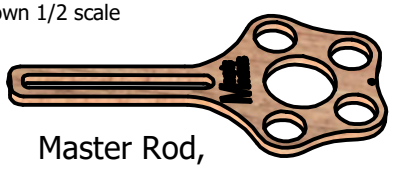
Do not allow any glue squeeze-out to remain on the edges of the pistons. Wipe up any and all glue that squeezes out.

After the above layers have dried, place a medium sized drop of glue in each of the three sockets on the front of the piston. Insert the three legs of the front accent pieces into the sockets, creating the part in view D. The rear accent piece is shown in dashed lines. **Do not glue the rear accent pieces to the pistons until the end (section 8).**

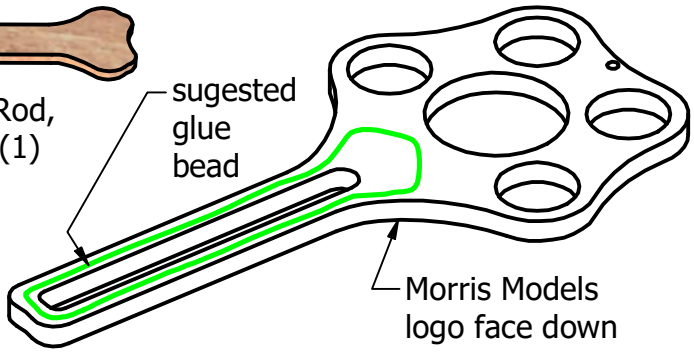


Master Rod (1 required)

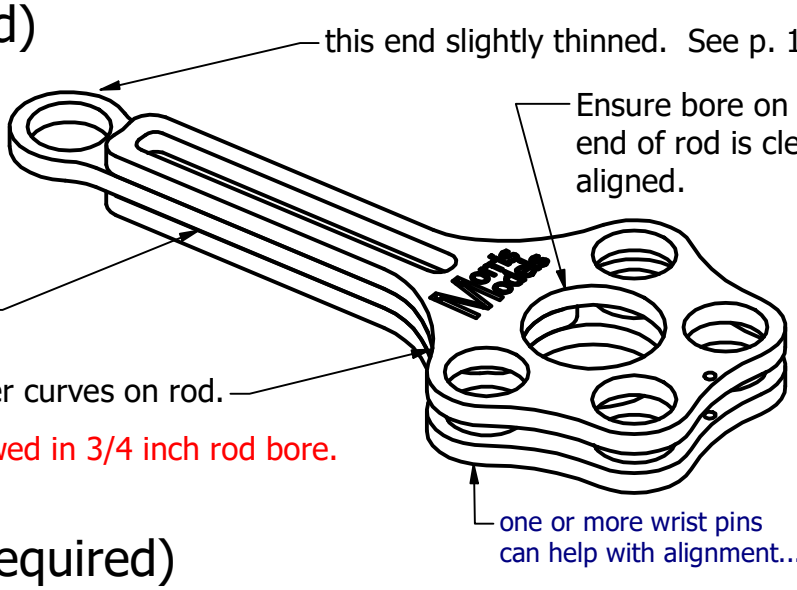
New Parts:
shown 1/2 scale



Lay the outside master rod pieces logo down on your work surface. Apply a thin glue bead as shown to the non-logo side of each of these (only one shown). Glue both sides to the inside part as shown on the following page. Allow to dry.



Master Rod (continued)



Articulating Rods (4 required)

New Parts:
shown 1/2 scale

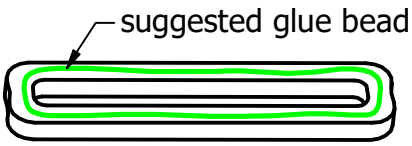
1 each rod

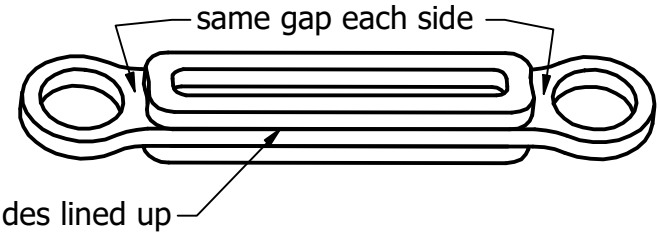
Articulating Rod, Inside
(sanded as per page 1-1)

2 each rod

Articulating Rod, Outside

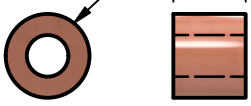
This step is purely cosmetic. Lay out a thin bead of glue on the worst side of each of the articulating rod outside layers. Glue one outside layer to each side of the inside layer. Makes sure the edges are lined up, and the outside layers are centered. Wipe up any squeeze-out. Allow rod to dry.





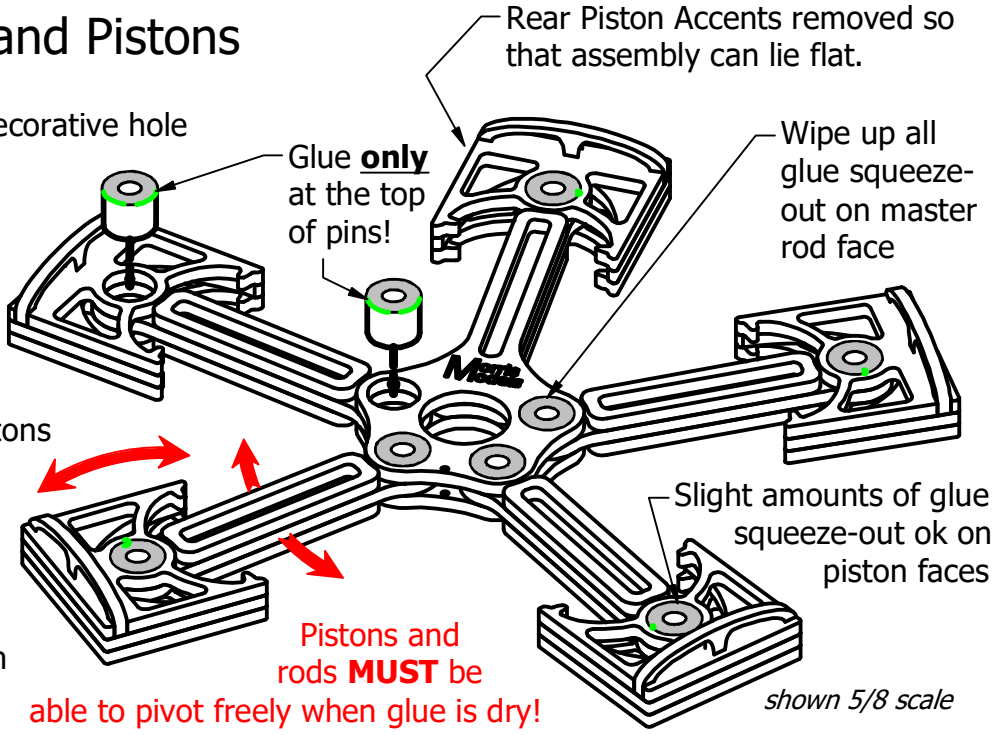
Pin Together Rods and Pistons

New Parts:
Full scale



Wrist Pins x 9

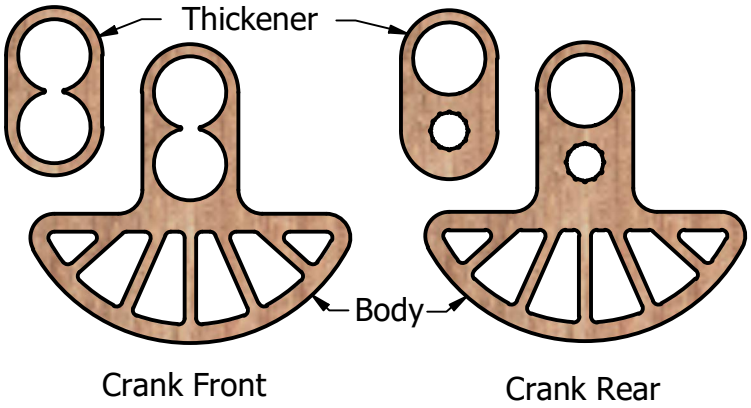
Lay out the master rod, the articulating rods, and the pistons in place. Place a very light bead of glue around the top of each wrist pin, and insert as shown. Do not allow the glue to go below the top layer. Wipe up any glue from the master rod face.

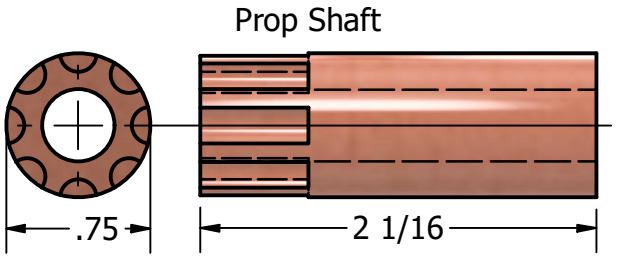


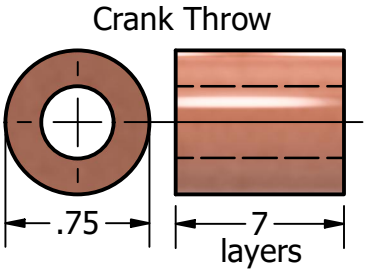
Crankshaft:

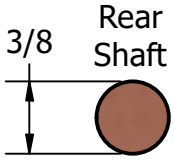
New parts

Plywood parts shown below are drawn to 1/2 scale. Hardwood parts are shown full scale.



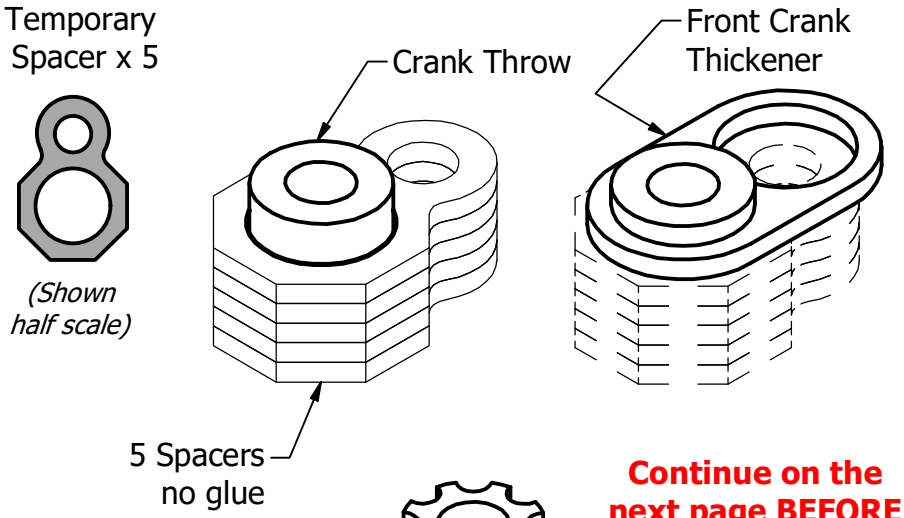






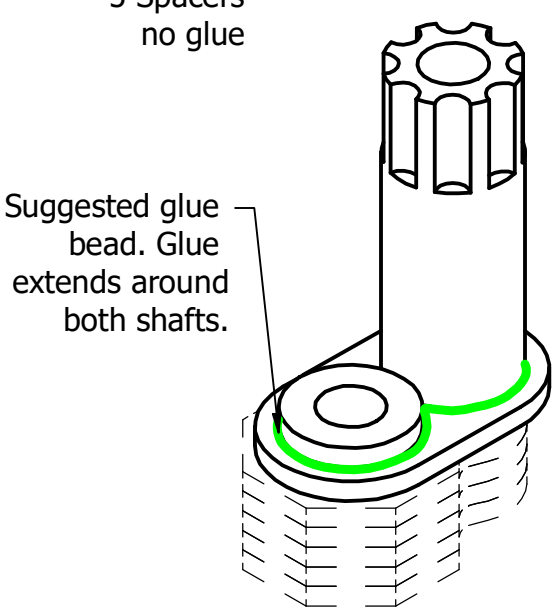
More than one length option.

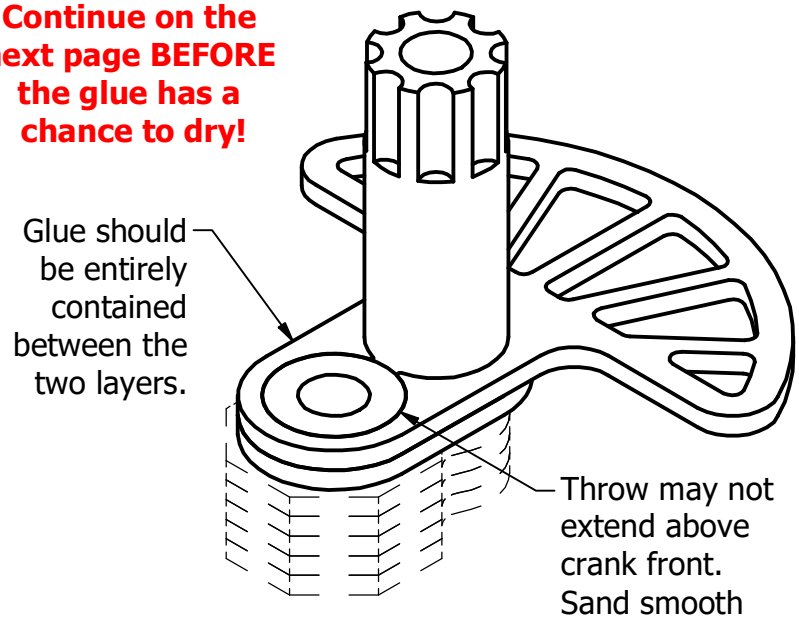
Before completing the crankshaft, you should decide if you want the rear shaft to end at the back of the model or if you want a longer shaft that extends behind the model. The longer shaft (not included) would be used to connect the engine to a motor or crank located behind the display. If you want a longer shaft, make it from a piece of 3/8" dowel rod. Any length more than 1.5 inches will extend past the model. If you do not want the longer shaft, use the approximately 1 1/4" long shaft included with the model and shown in the directions.



Stack the 5 crank assembly spacers as shown over the crank throw. Add the front crank thickener, and then the prop shaft as shown below. Place a medium bead of glue in the shape of a "figure 8" so that it touches the thickener, the throw, and the prop shaft as shown. Add the crank front with the best face upward, pushing it down into the glue. The glue should be contained between the crank front and the crank thickener, and should also lock the two shafts in their positions once it dries. Move on to the next page before the glue can dry.

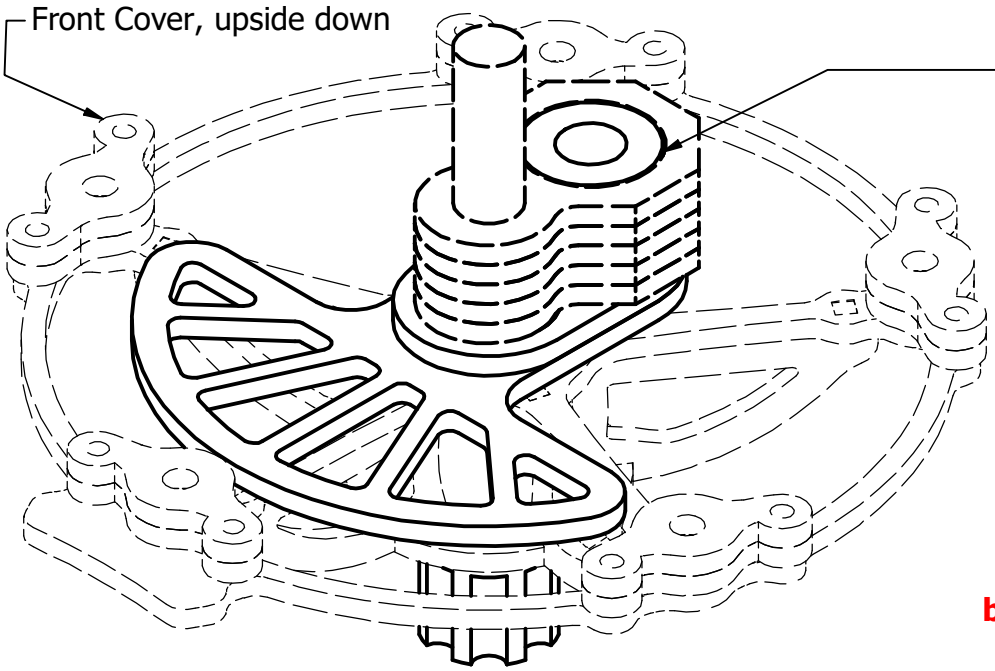
Continue on the next page BEFORE the glue has a chance to dry!





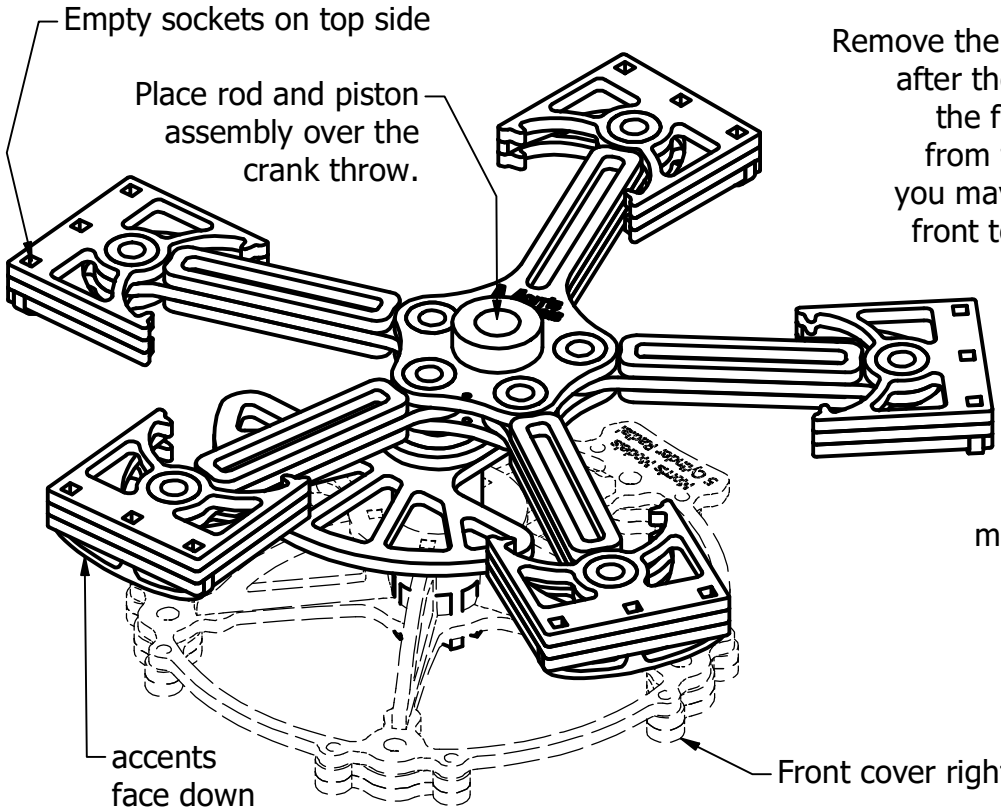
Crankshaft (Continued)

Use the case front that you completed in section 2 to help you line up the crankshaft. While the glue is still flexible, place the prop shaft into front case, sliding it in until the crank front rests against the spokes of the case front. This will ensure that the crank front is perpendicular to the prop shaft. Make sure that the throw remains straight. The diagram below shows the forward crank in place with the temporary spacers and a temporary piece of 3/8 dowel rod to aid in alignment.



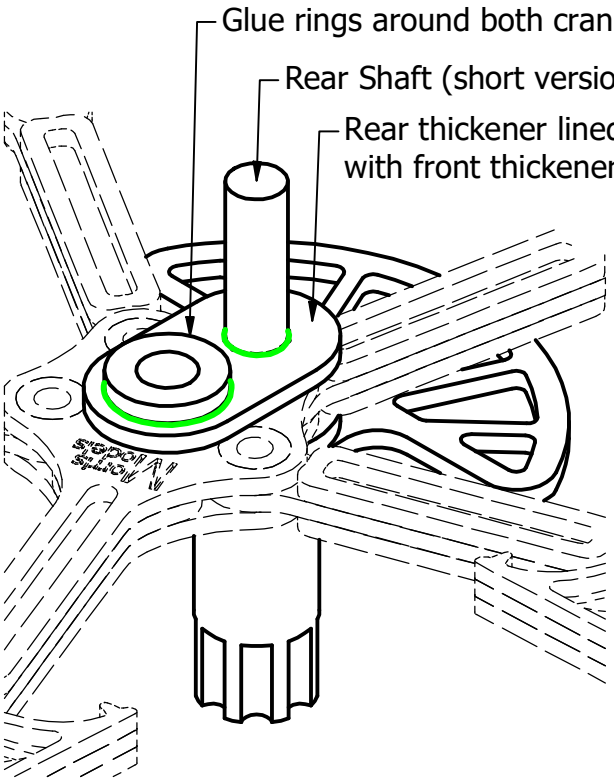
STOP!

Allow glue on front half of crankshaft to completely cure before continuing construction.

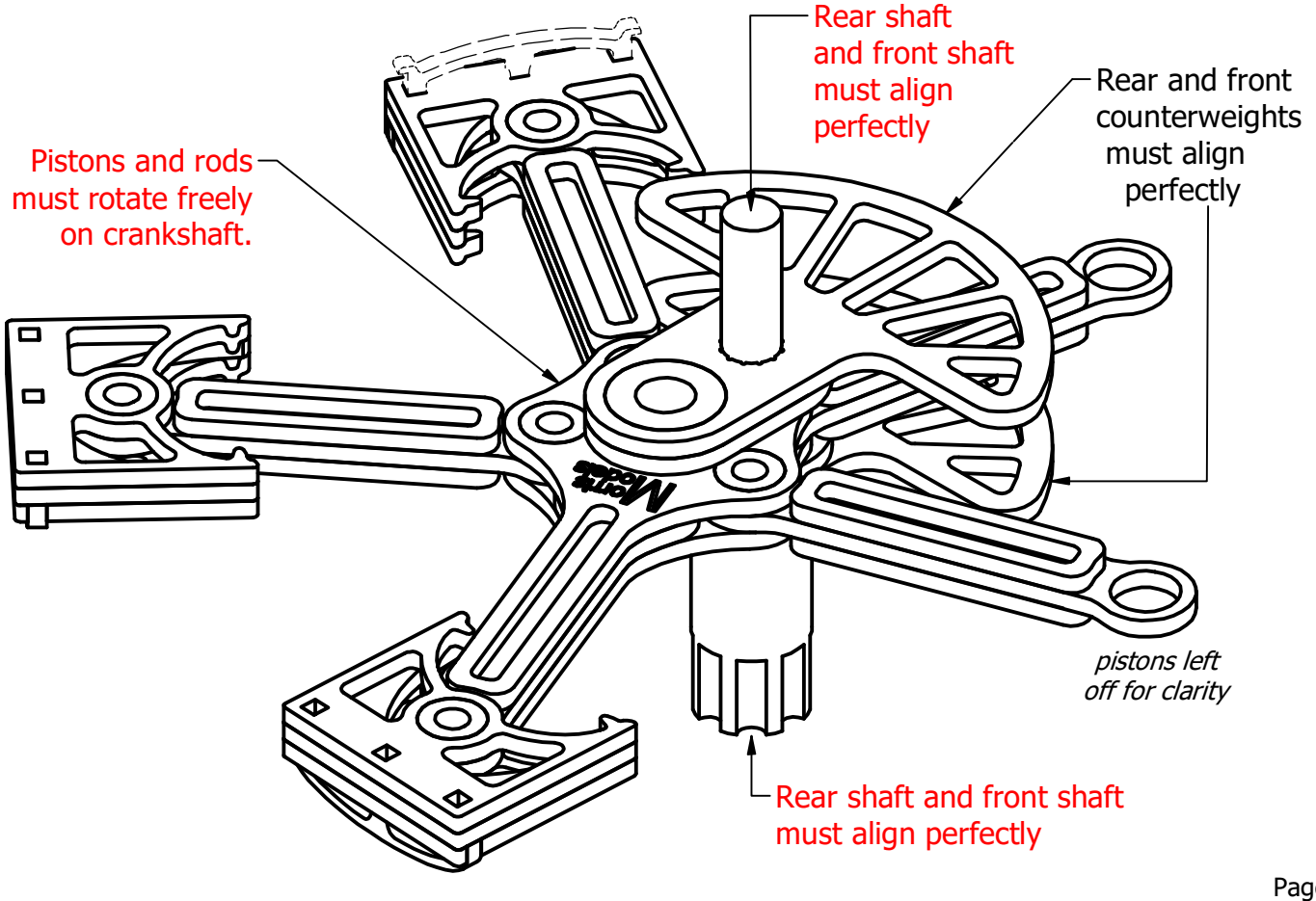


Remove the temporary alignment aids after the glue has dried. Remove the front half of the crankshaft from the case front. If desired, you may continue to use the case front to support the work as you progress. Set the piston rod assembly over the crank throw. Make sure that it can spin freely on the throw. If it is tight, sand the inside of the master rod until it does spin freely.

Back half of Crankshaft



Place the rear thickener with the small hole in the center and the large hole over the crank throw as shown. Make sure that the rear thickener is EXACTLY aligned with the front thickener on the other side of the rods. Add the 3/8" diameter rear shaft. (See note in blue on page 3-5.) Make a thin ring of glue around the throw and the rear shaft. Then add the rear crank web as shown in the drawing on the bottom of the page. The glue should stick the thickener and the web piece together to each other and to both shafts. No glue should squeeze out. Clean it up if it does. Make sure that the rear half of the crank is lined up properly and that the rear shaft is straight before the glue dries. Allow the glue to dry completely.

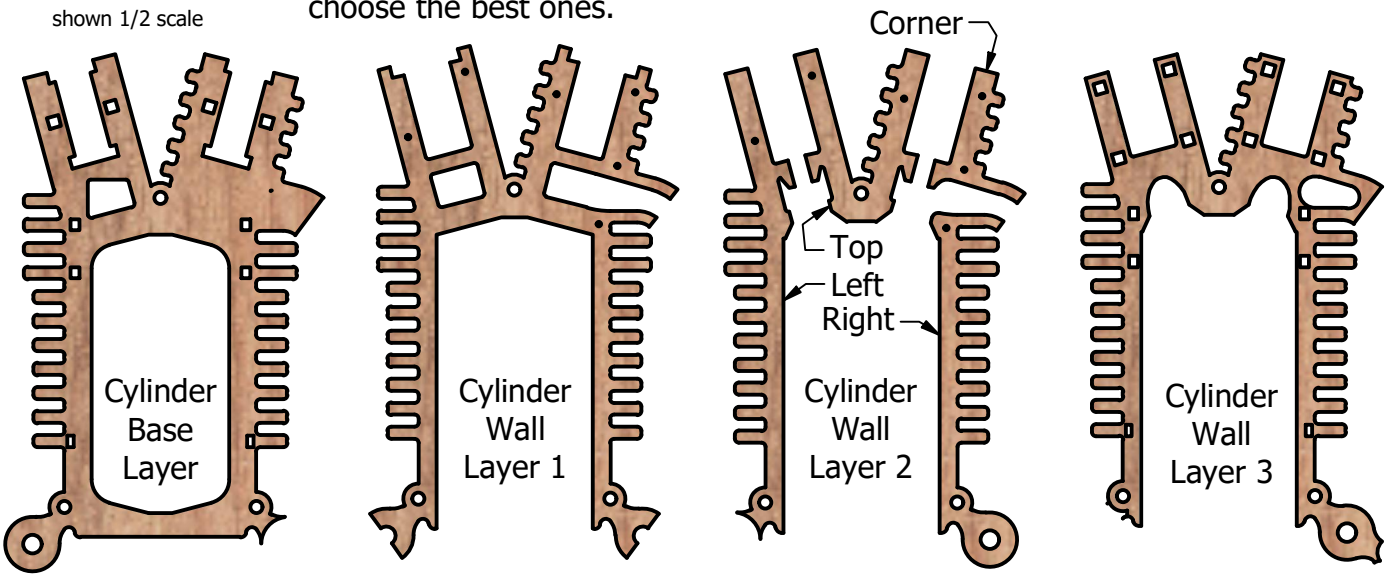


Section 4: Crankcase and Cylinders

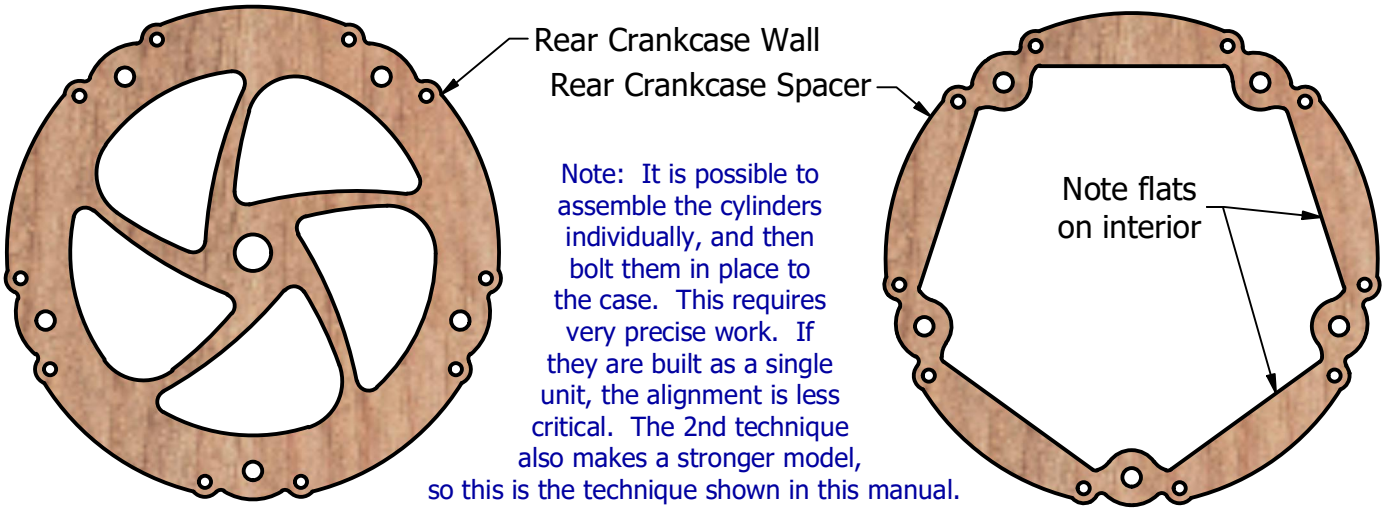
New Parts:

shown 1/2 scale

You will need 5 of each of these. There are spares included in your kit, so choose the best ones.

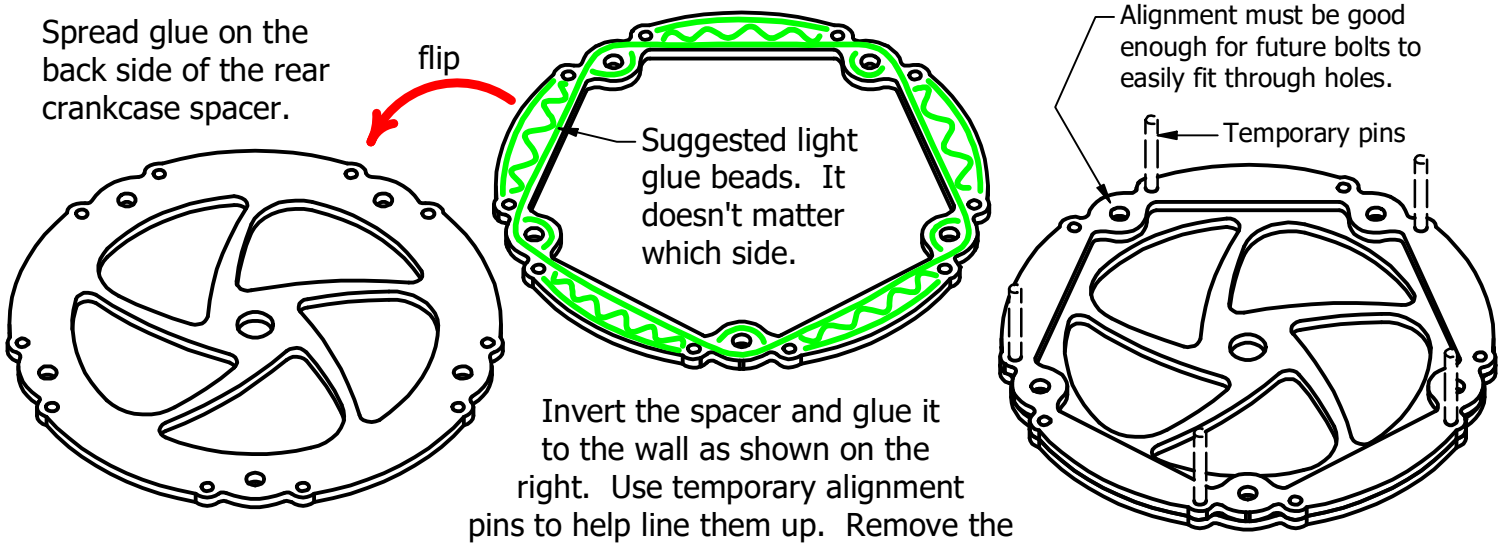


None of these cylinder parts are symetrical, so you must be careful which side gets glued to which.



Note: It is possible to assemble the cylinders individually, and then bolt them in place to the case. This requires very precise work. If they are built as a single unit, the alignment is less critical. The 2nd technique also makes a stronger model, so this is the technique shown in this manual.

Spread glue on the back side of the rear crankcase spacer.



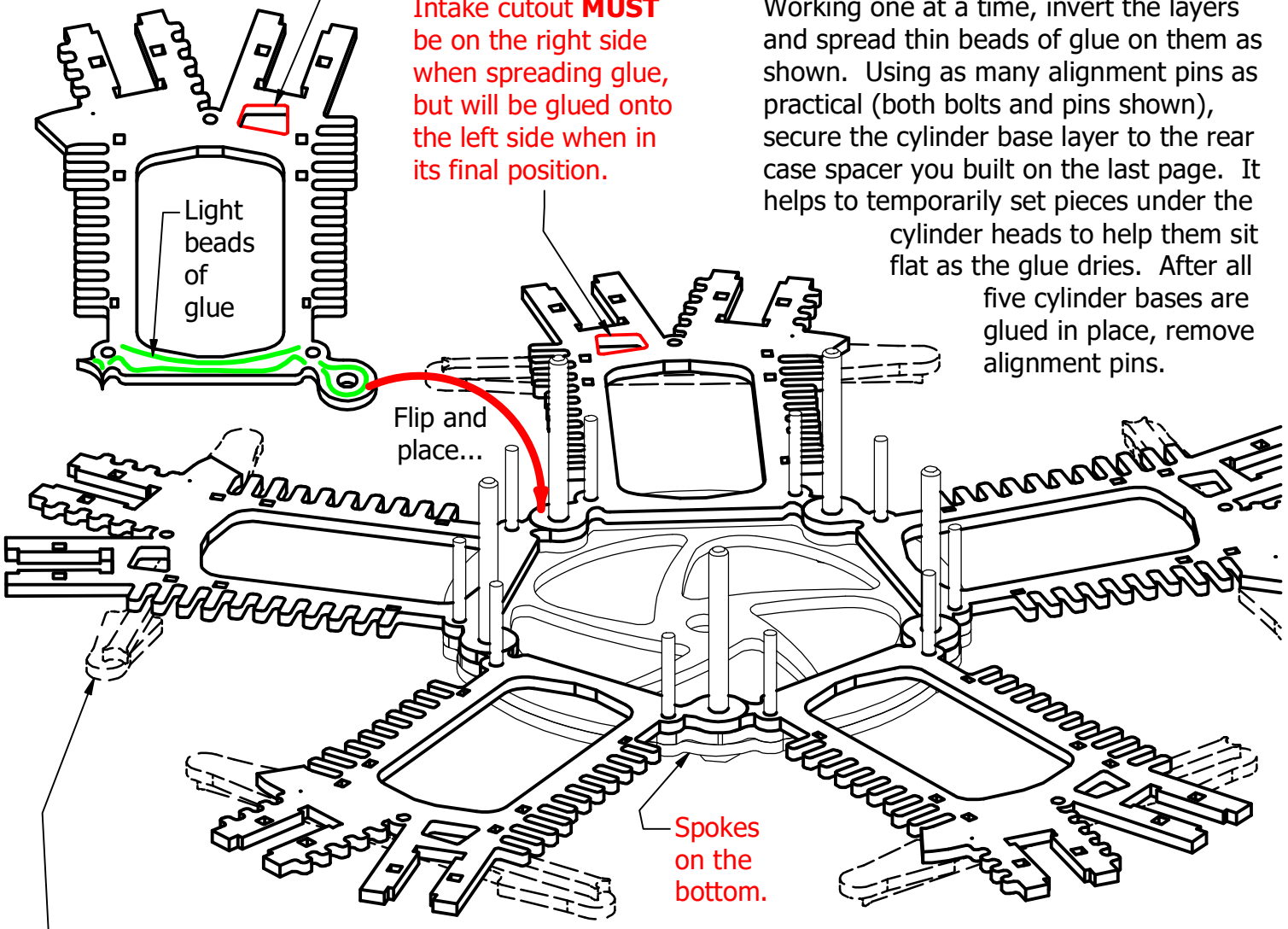
Invert the spacer and glue it to the wall as shown on the right. Use temporary alignment pins to help line them up. Remove the pins and clean up any glue squeeze-out before the glue dries.

Crankcase and Cylinders - Back Two Layers

5X

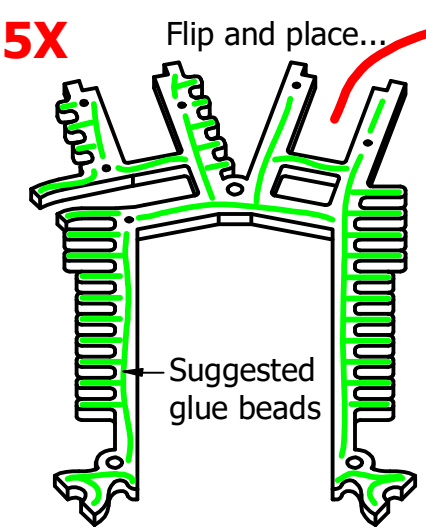
Pay careful attention. Intake cutout **MUST** be on the right side when spreading glue, but will be glued onto the left side when in its final position.

Gather all five of the cylinder base layers. Working one at a time, invert the layers and spread thin beads of glue on them as shown. Using as many alignment pins as practical (both bolts and pins shown), secure the cylinder base layer to the rear case spacer you built on the last page. It helps to temporarily set pieces under the cylinder heads to help them sit flat as the glue dries. After all five cylinder bases are glued in place, remove alignment pins.



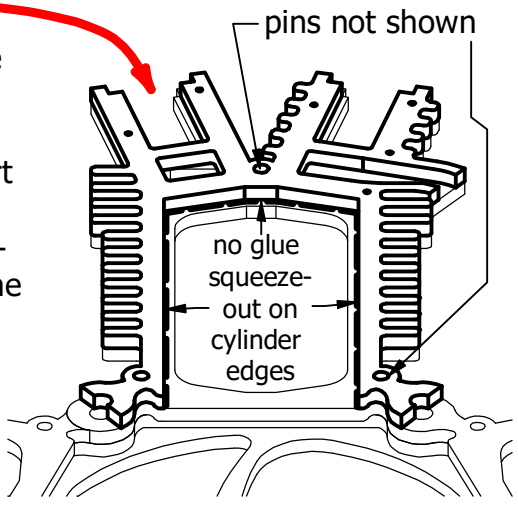
Random temporarily parts stacked up to keep the cylinder base layers flat while the glue dries.

5X



Similar to above, locate the five cylinder layer 1 parts. Working one part at a time, spread light glue beads as shown, and invert the layers over the growing assembly. Note the extra alignment pin socket at the top of the cylinder. (Pins not shown). Clean up any glue squeeze-out and remove the alignment pins before the glue dries.

Only one cylinder shown: do all 5!

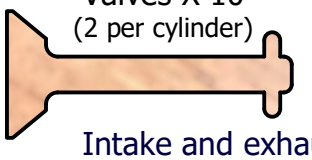


Only part of the assembly shown.

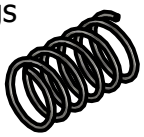
Crankcase and Cylinders - Valve Layer (Layer 2)

New Parts:

shown full size

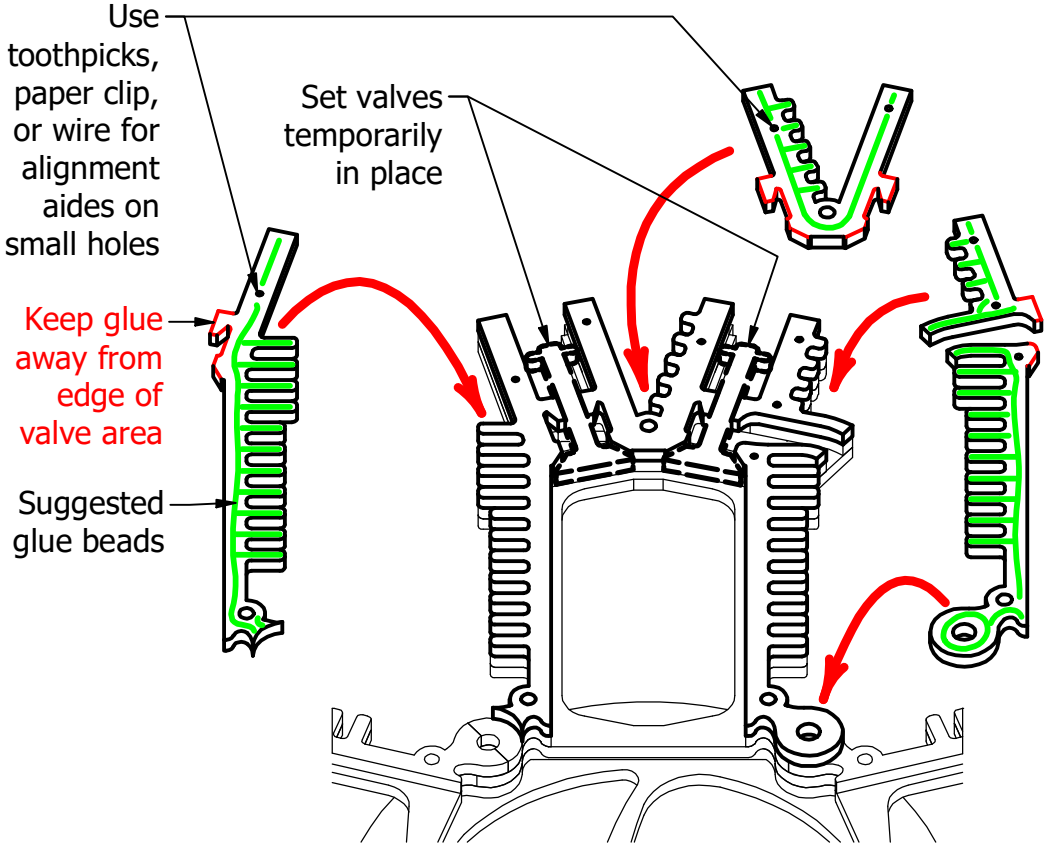


Valves X 10 (2 per cylinder)



Valve Springs X 10 (also 2 per cylinder)

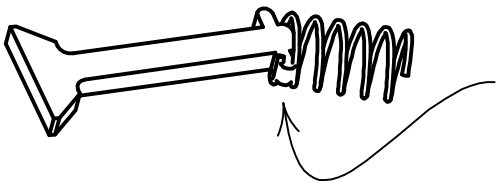
Intake and exhaust valves are identical. Both were thinned in section 3.



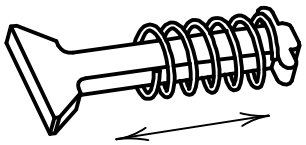
5X

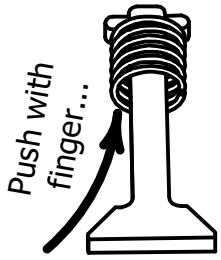
Working one cylinder at a time, spread thin beads of glue on the four parts of cylinder layer three as shown on the left. Glue the four parts down on top of the growing assembly one part at a time. Use alignment pins and toothpicks, wire, or paper clips as alignment aids. Avoid any glue on the edges of the valves (shown in red) and on the edges of the cylinders. Before the glue dries, temporarily place the valves in their location, and verify that they A) fit, and B) can slide up and down freely. If they are tight, fix this now. Remove the pins and valves before the glue dries.

10X

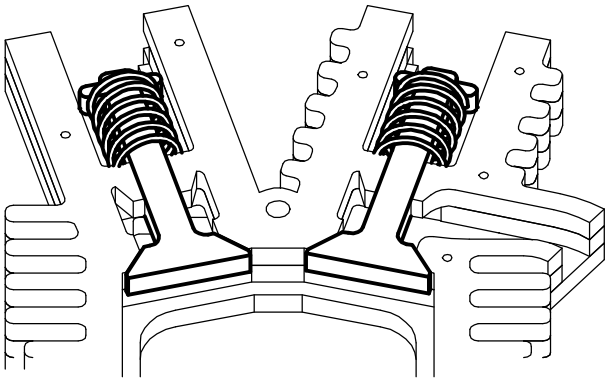


Carefully spread the end of a valve spring, and thread it over the valve keeper. Continue twisting until the entire spring is held captive on the valve. The spring should be free to slide back and forth on the valve.





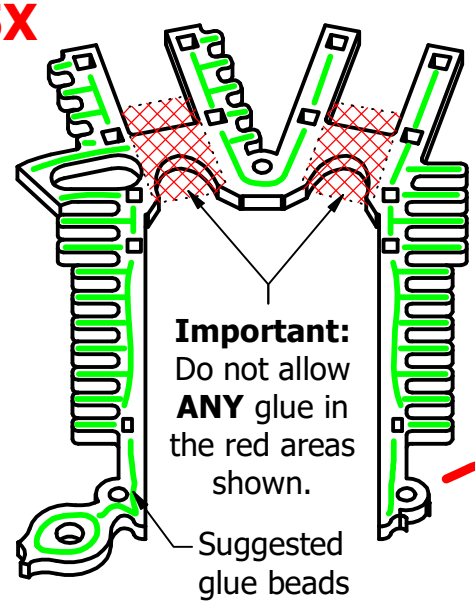
Compress each valve spring against the keeper end, and put the valve back into its position as shown at the top of the page and to the right. The pressure from the spring should hold the valves in position. Put all 10 valves in place before moving on.



Crankcase and Cylinders - Top Layer (Layer 3)

IMPORTANT: Test fit the valves before putting any glue down. See A) and B) below.

5X

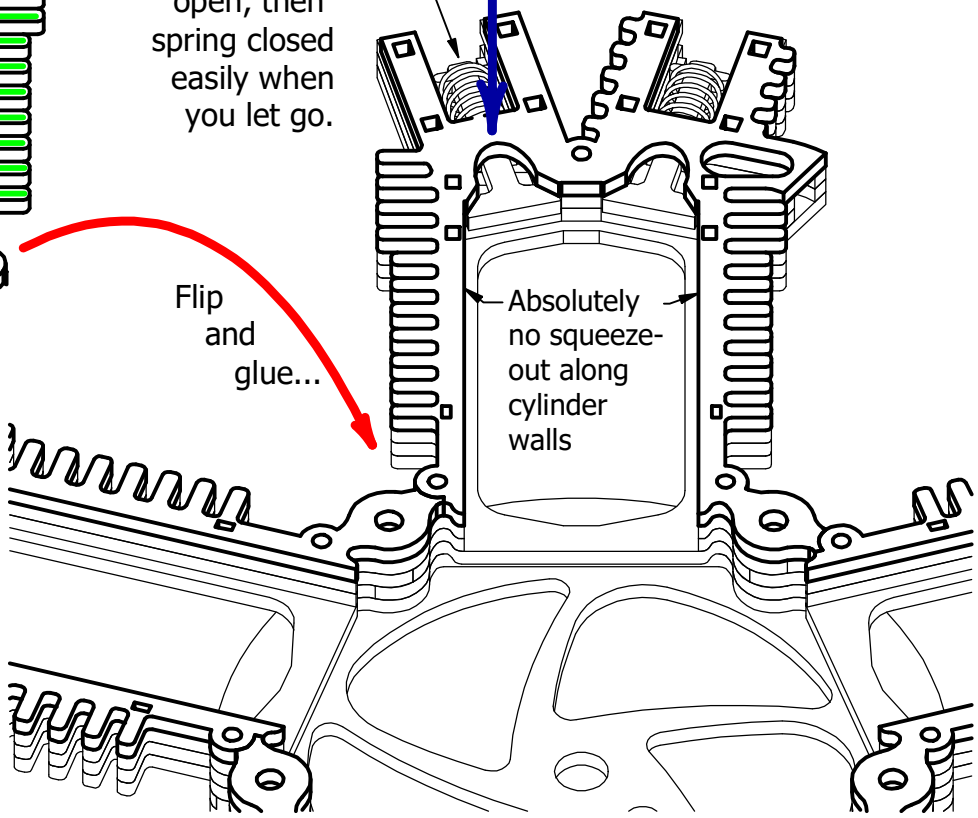


A) Dry fit top layer. Press down firmly on top of valve while checking to see if valve moves properly.

B) While pressing as shown, press on valve end. Valve should open, then spring closed easily when you let go.

If the valves do not close on their own while you are pressing down, the model will not work. Remove the spring from any sticking valve and sand it thinner as in section 1.

Flip and glue...



ONLY AFTER TEST FITTING VALVES, spread glue on the back side of the Layer three piece. MAKE SURE NOT TO GET ANY GLUE IN THE RED AREAS, and avoid the cylinder edges. Invert the layer and glue down over the top of the assembly. Do this for all five cylinders. Use alignment pins to help. Clean up any glue squeeze-out - particularly along the cylinder edges. Remove the pins before the glue dries.

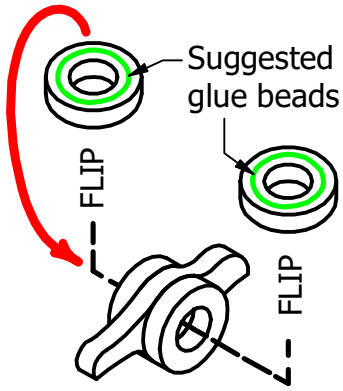
Valve Rockers x 10

New Parts:

shown full size

Rocker x 10

Rocker Spacer x 20



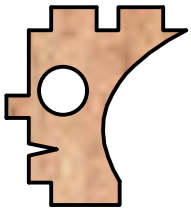
Make the 10 valve rocker assemblies as shown. Place a very thin bead of glue on one side of two rocker spacers. Glue one to each side of the rocker arm. The best way to do this is to place all the parts on a length of 1/4" diameter dowel rod while gluing (not shown). Pull off the dowel rod before the glue dries.

Crankcase and Cylinders - Rocker Boxes

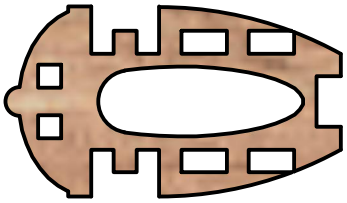
New Parts:

shown full size

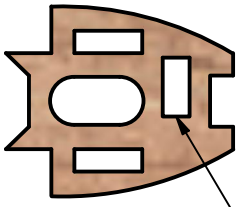
I haven't seen you since the box label!



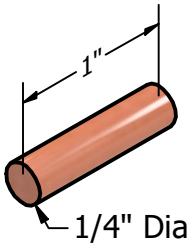
Rocker Box Side x 20



Rocker Box Top x 10



Rocker Box Floor x 10



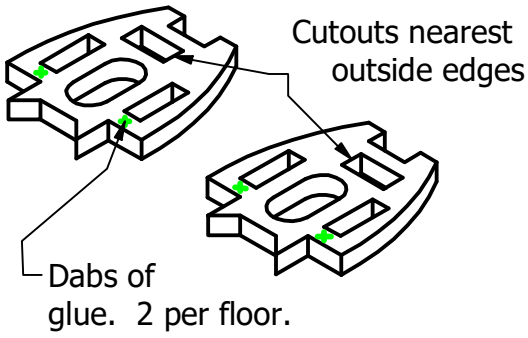
Rocker Pivot Pin x 10

Rocker Box Preassembly 5L + 5R

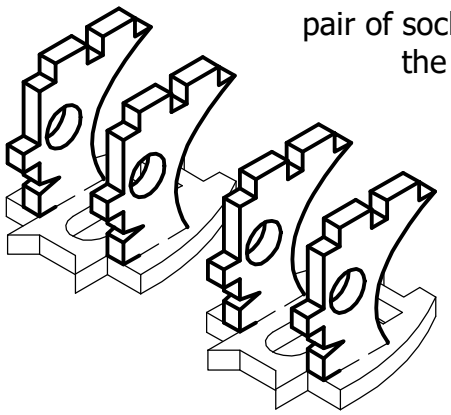
Because of the off-center cutout, the rocker box preassemblies are handed. Each cylinder needs one left-hand version and one right-hand version. Make them in pairs as shown.

Caution: This cutout is not on center. It matters!

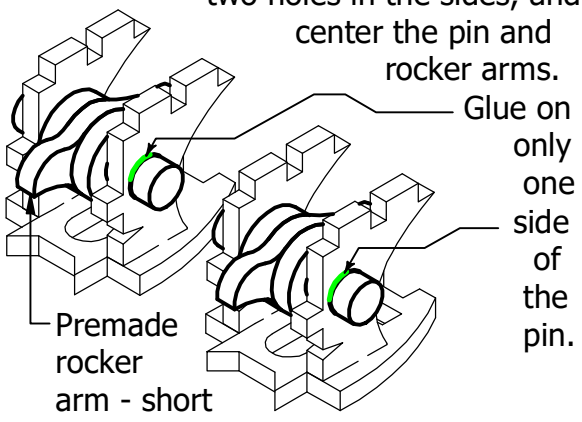
1) Set out two floor pieces with the off-center cutouts arranged as shown below. Add small dabs of glue as shown.



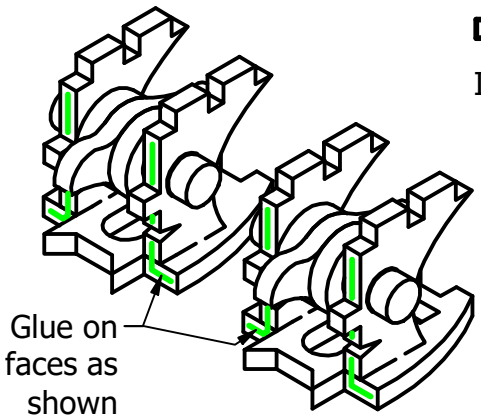
2) Add the four side pieces as shown. The glue dab should just secure the "chin" of the side piece, and the "neck" should fit into the pair of sockets on the sides.



3) Place one of the rocker arms that you made on the last page between the sides, with the short end facing forwards. Push the pin through the two holes in the sides, and center the pin and rocker arms.



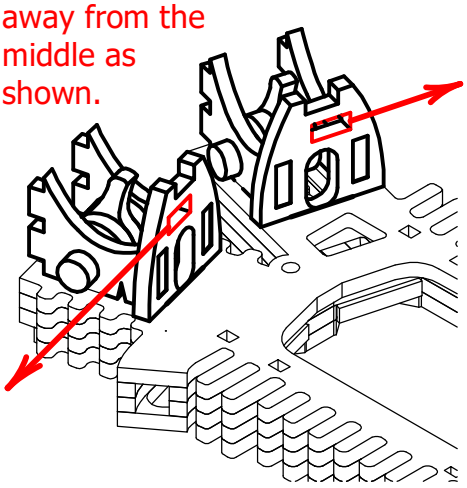
4) Add glue as shown. Immediately attach to rear of crankcase and cylinder assembly as shown on the next page. Repeat for all 5 cylinders.



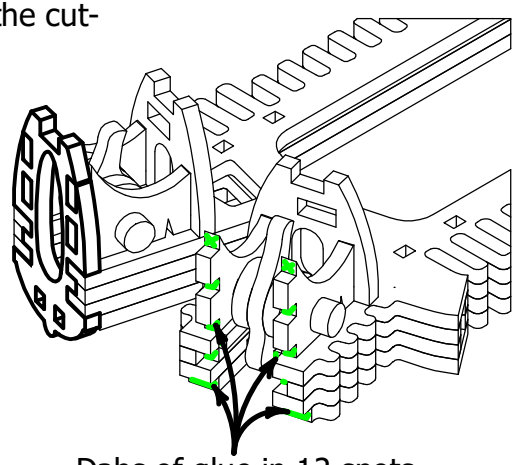
Install on next page. Don't let the glue dry.

Crankcase and Cylinders - Rocker Boxes

Off-center cutout MUST face away from the middle as shown.



With the model in a face down position, install the rocker box preassemblies you glued on the last page. Make sure that the cut-outs face the proper direction as shown. While the glue is still wet, add dabs of glue to the tops of the cylinders (one side is shown, the other is similar) and then add the two rocker box tops as (one side shown on the right).



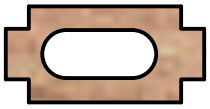
Dabs of glue in 12 spots

Rockers must be oriented as shown. You should be able to use them to open and close the valves. Check before the glue dries.

Rear Cylinder Details

New Parts:

shown full size

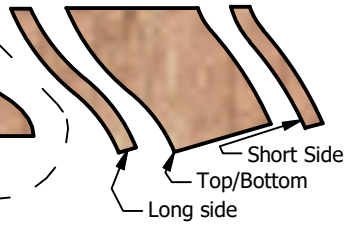


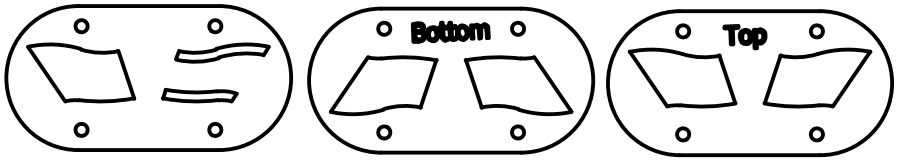
Rocker Box Back x 10

Intake Stub parts x 10 each

Cylinderhead Accent x 10

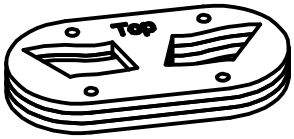
Rear Cylinder Base Accent x 5



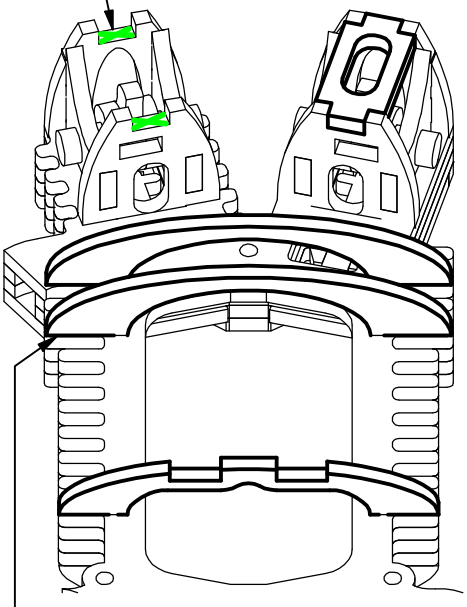


Optional 3-part Intake Stub Assembly Jig (shown 1/2 size)

Use alignment pins to assemble jig as shown on the right. The words "Top" and "Bottom" should be visible on the top and bottom. This jig can help you line up the parts for the stub.

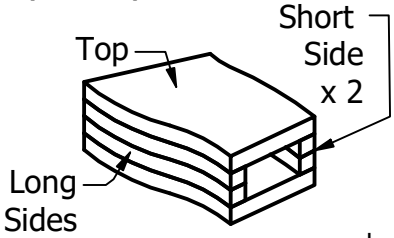


Glue for rocker box back (both sides)

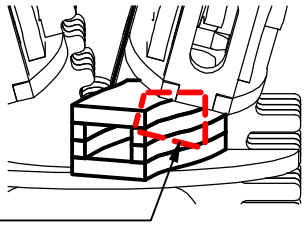


Glue beads along fins under accent pieces (not shown)

Optional Intake Stubs (Build 5)



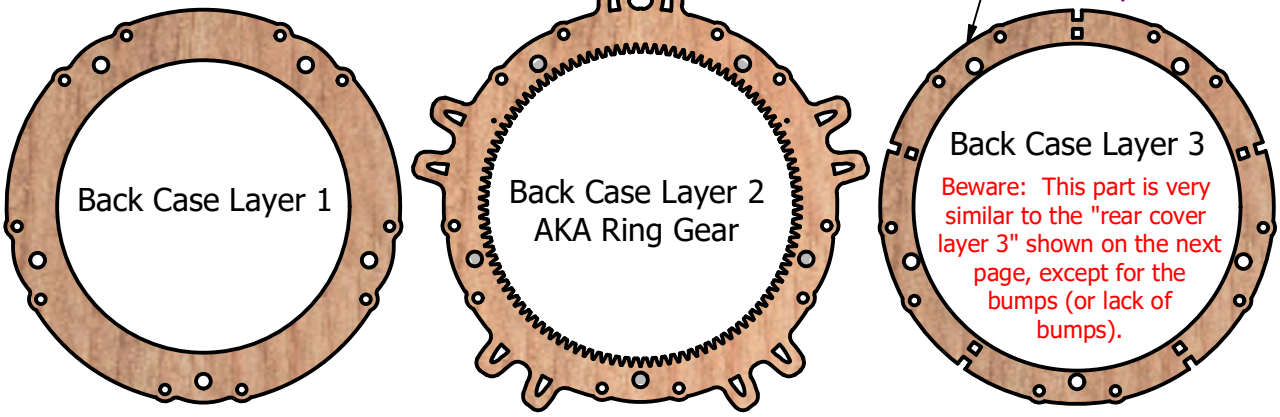
Glue together the five optional intake stubs, either manually aligning the parts or using the optional jig. Glue in place on the cylinder as shown. The base should be glued to the cylinder and the accent, and should cover the intake window shown in red on the back of the cylinder.



Crankcase and Cylinders - Back of Case

New Parts:

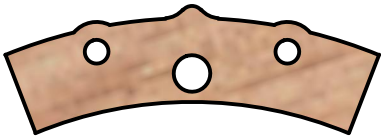
shown at 40%



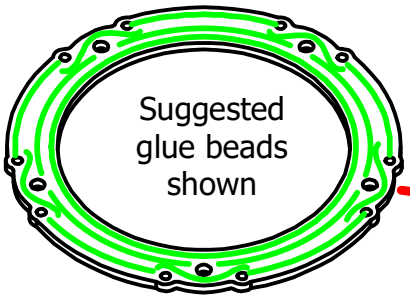
New Parts:

used on next page
shown full size

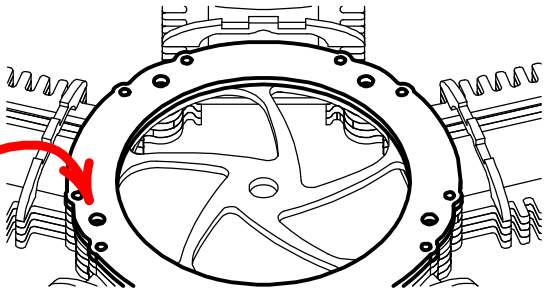
Lifter Separators x 5

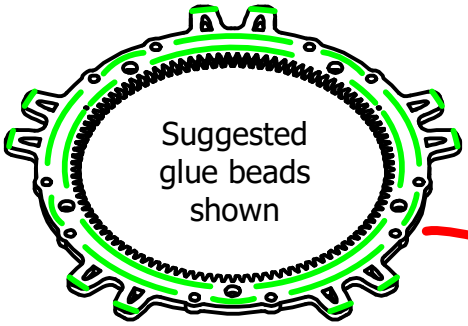


Lifter Sides x 5

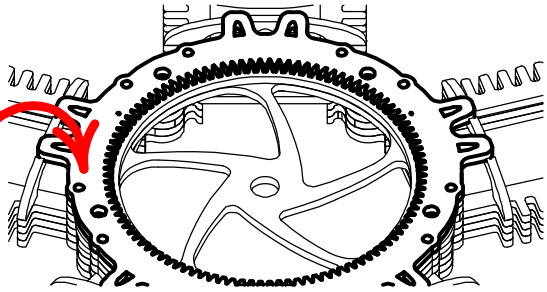


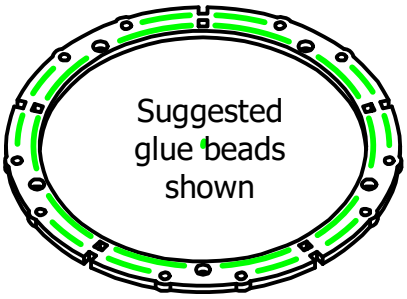
The bolts are the best alignment tool for this page. You need not remove them between steps.





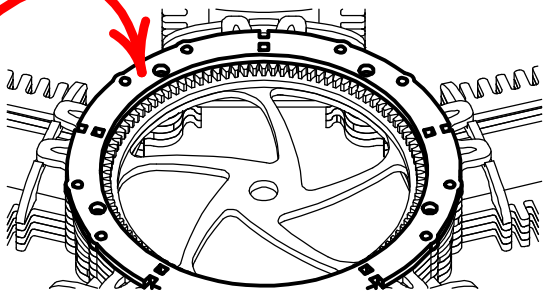
Lay out thin beads of glue on the back (worst face) of the back case layer 1. Avoid edges and holes. Invert, and glue to back of model.



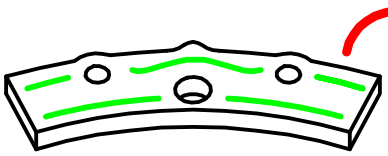


Add glue to the ring gear, avoiding the little projections except the tip. Invert and glue.

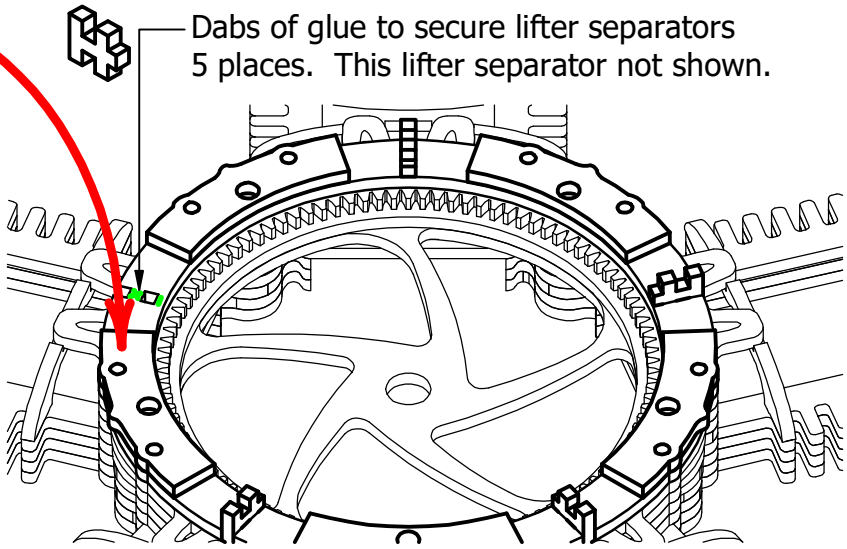
Add glue to the back of the rear case layer 5. Invert and glue.



Crankcase and Cylinders - Finish Back of Case



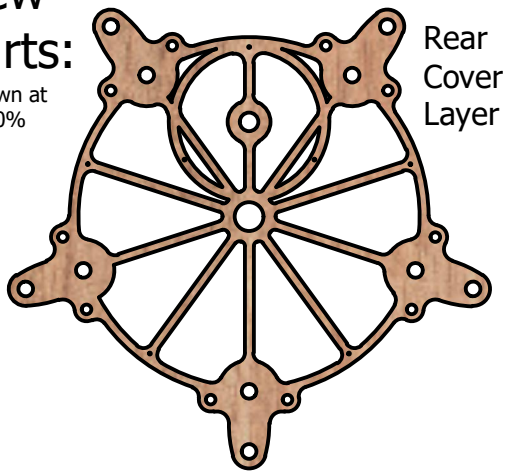
Spread glue as shown above onto the worst face of each of the lifter side pieces, and glue down. Use two small dabs of glue as shown on the right, and glue each of the lifter separators in place. Together, these form the channels for the valve lifters.

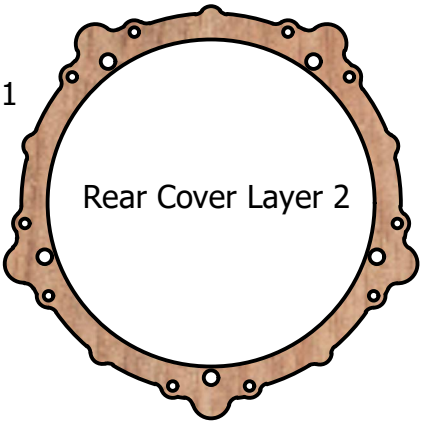


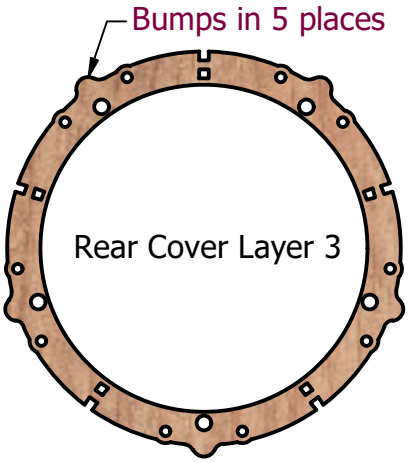
Section 5 - Rear Cover

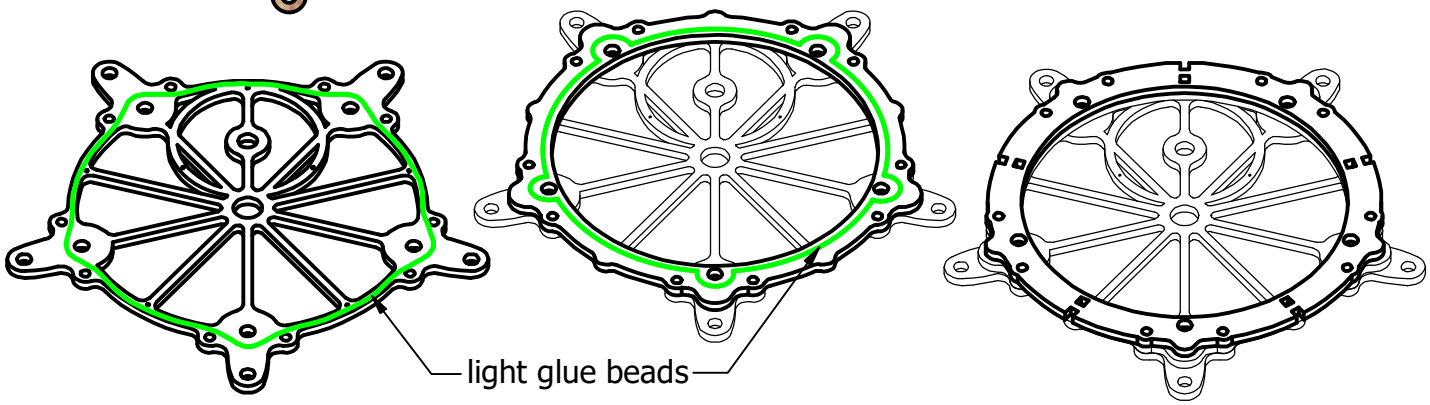
New Parts:

shown at 40%







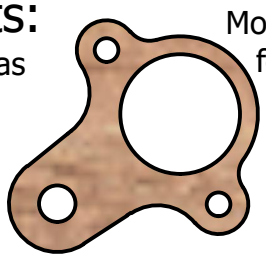


Start with layer 1, and make a light bead of glue around the perimeter as shown. Using the bolts as alignment aids, glue layer 2 over the top of layer 1. Make a bead of glue around the perimeter of layer 2 as shown. Add layer 3. Remove the bolts.

Rear Cover - Continued

New Parts:

Full scale or as noted



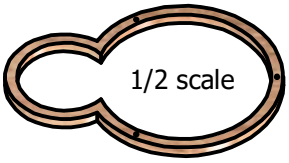
Mounting foot x 5

Optional Mounting Pads

Small Pad x5

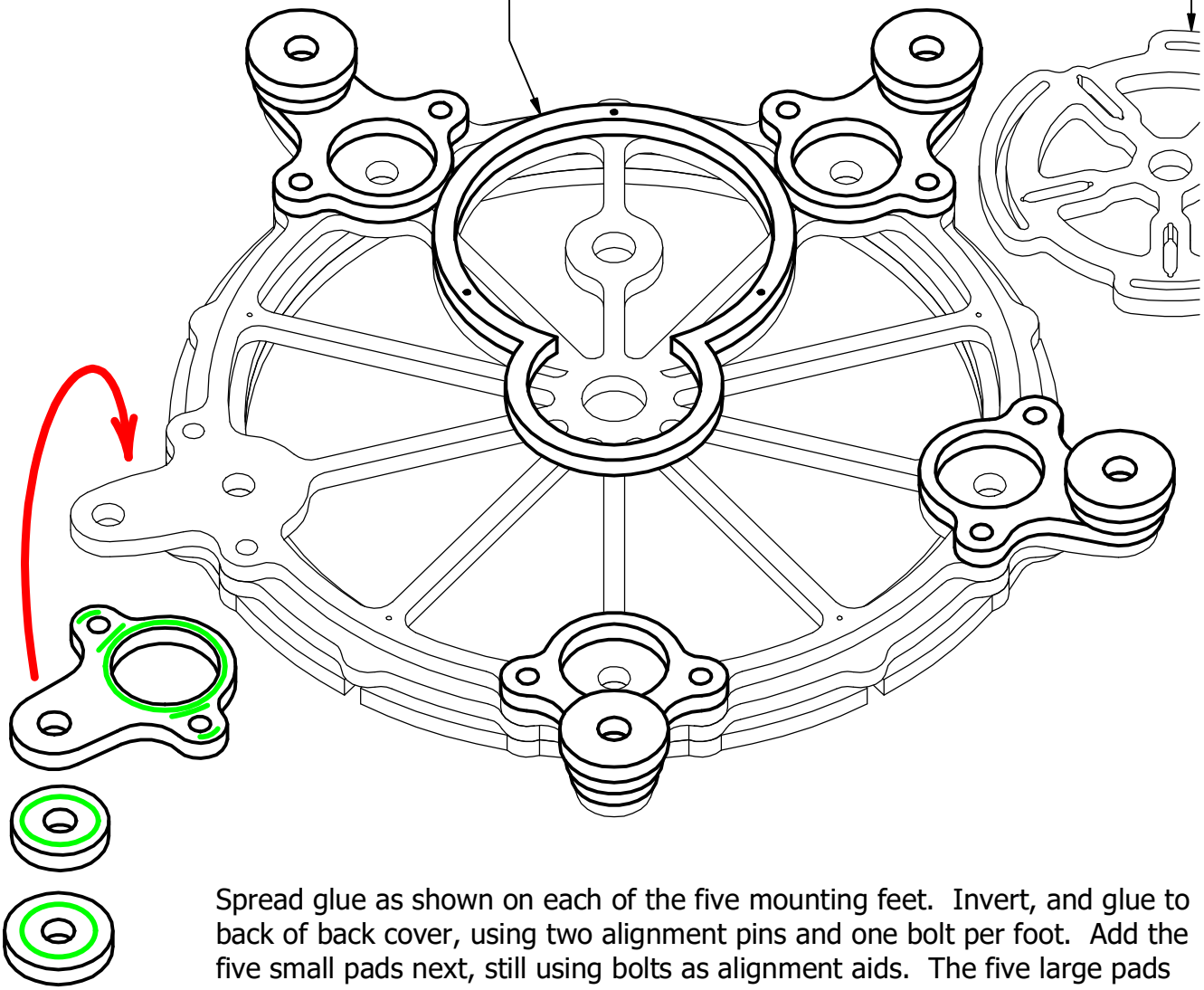
Large Pad x5

Bonus: Optional "Magneto" Spacer



For details on a similar LED "ignition" system, follow the QR code on the back page. You can find the details under the "Lase Cut Engines and Art" "Guides" tab, guide 1.

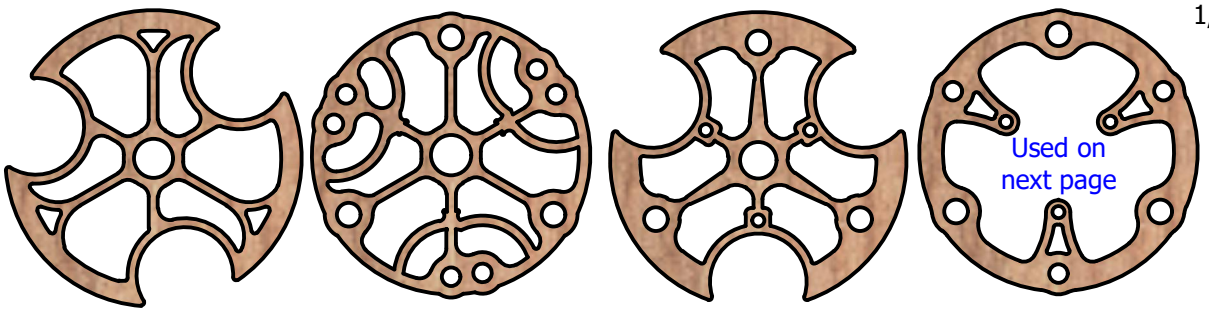
Optional "Magneto spacer" is an undocumented feature for anyone wanting to add LED "spark" lights to the model. There is a cover plate with room for five reed switches that screws over the top of this plate. Use one small and one large gear, and add a tiny magnet to the large gear.



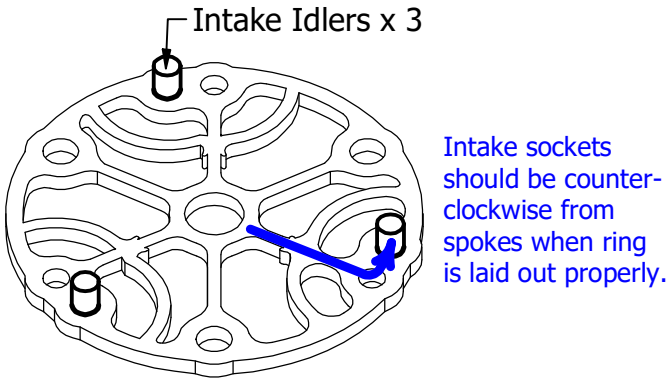
Spread glue as shown on each of the five mounting feet. Invert, and glue to back of back cover, using two alignment pins and one bolt per foot. Add the five small pads next, still using bolts as alignment aids. The five large pads complete the back of the rear cover. Remove alignment pins and bolts before the glue completely dries.

Section 6 - Cam Assembly

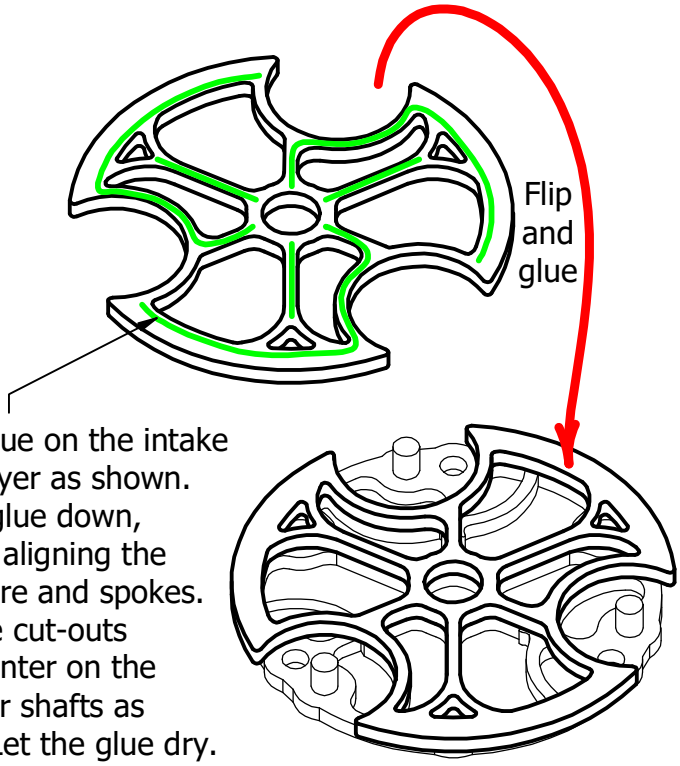
New Parts: Plywood parts half scale, idlers full scale



Cam Intake Shroud Cam Middle Ring Cam Exhaust Shroud Cam Front Plate

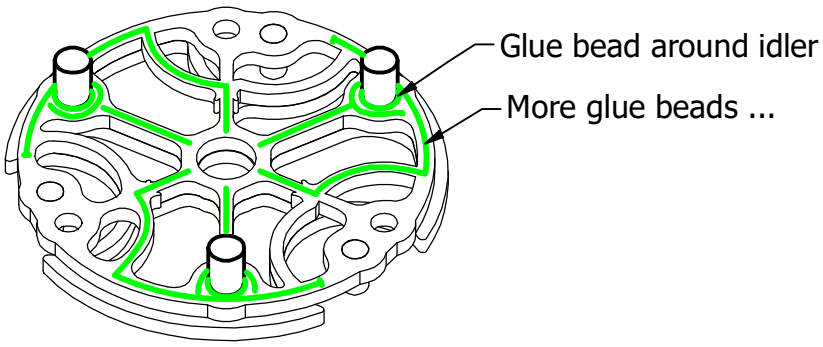


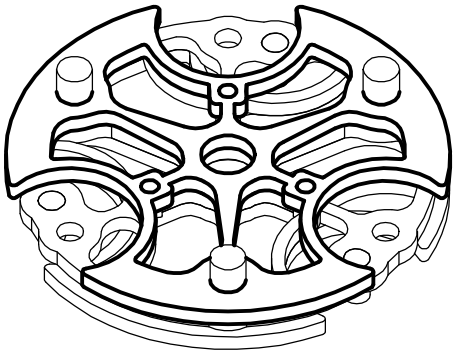
Lay the middle ring down on a non-stick surface such as waxed paper. Securely glue the three intake idlers into the sockets as shown. The idlers must not extend past the bottom of the ring, and there can be no glue squeeze-out on the top surface. Go on to the next stage without moving the part.



Spread glue on the intake shroud layer as shown. Flip and glue down, manually aligning the center bore and spokes. The three cut-outs should center on the three idler shafts as shown. Let the glue dry.

After the glue dries, invert the assembly as shown (bottom left), and set the three gear idlers into their sockets. Spread a bead of glue around each gear idler where it comes out of the middle ring. Add the other thin beads of glue shown. Glue down the exhaust shroud over the three gear idlers.

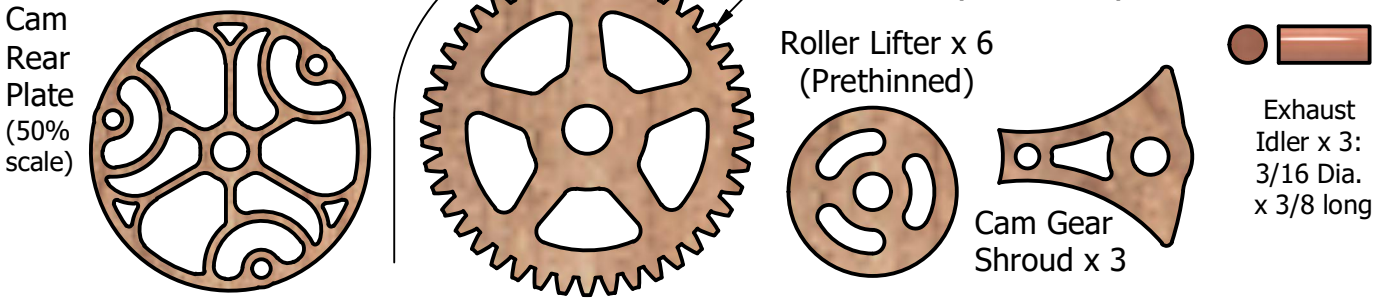


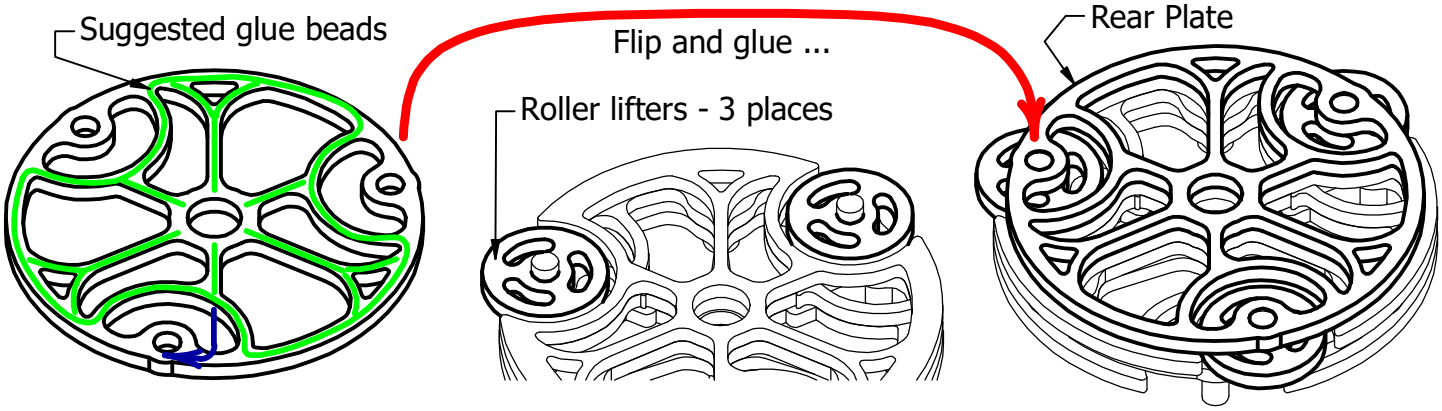


Cam Assembly - Continued

New Parts:

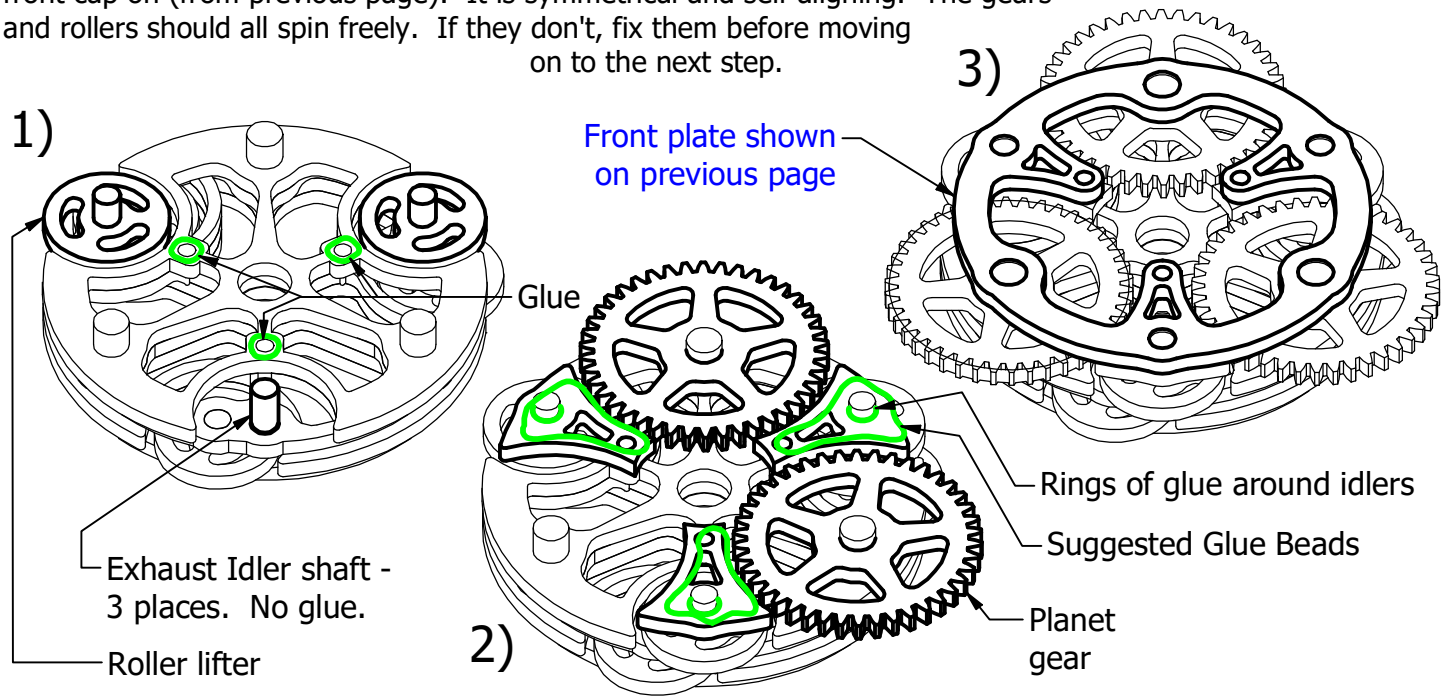
parts below are shown full sized





Place three roller lifters on the idler shafts. Make sure they spin freely. Lay the rear cam plate with the holes offset in the clockwise direction from the spokes (see blue arrow). Spread glue as shown. Flip the cam plate and glue down over the top of the cam assembly. Make sure the rollers can still spin freely. If they can't, fix it now. Invert assembly (#1), and add the three exhaust idler shafts without any glue into the last empty sockets. Place three more roller lifters (2 shown) onto the idler shafts. Add three rings of glue as shown (#1).

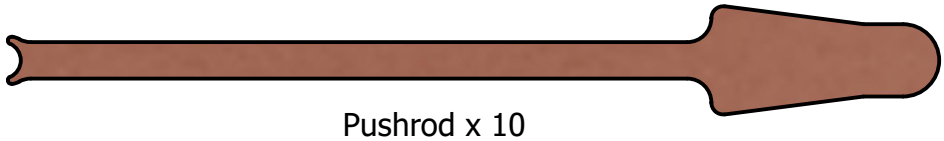
Put the 3 cam gear shroud pieces on the rings of glue as shown (#2). Use alignment pins and the roller idler shafts to help align them. Add the three planet gears, and apply light beads of glue as shown (#2). Glue the front cap on (from previous page). It is symmetrical and self aligning. The gears and rollers should all spin freely. If they don't, fix them before moving on to the next step.



Section 7 - Preparing for Assembly

New Parts:

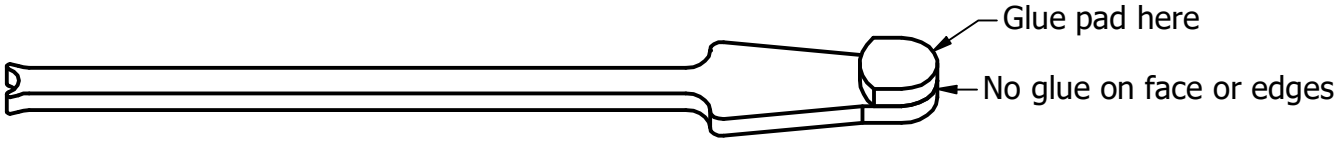
shown full scale



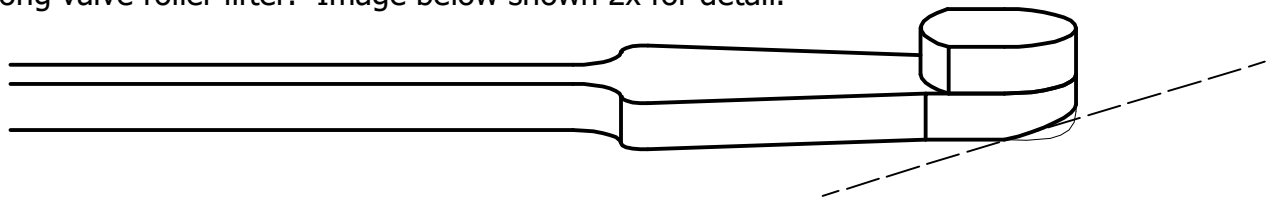
Pushrod x 10

Lifter Pad x 10

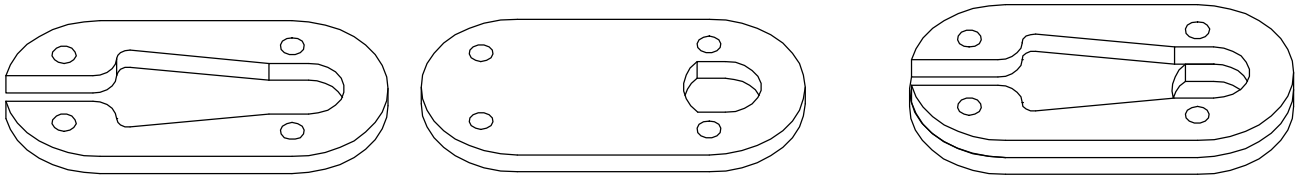
Pushrod Assemblies (10 Required)



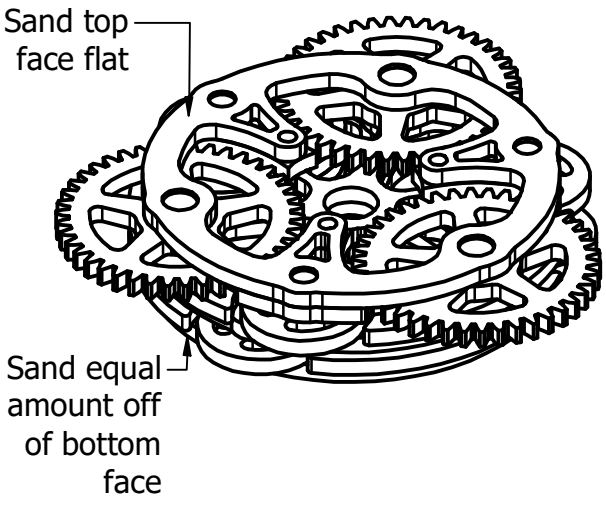
Glue pads to the ends of the pushrods as shown. Make sure to align them well. Optional alignment jig is shown below. After the glue has dried, sand a bevel into the bottom corner on the opposite side from the pad as shown below. This will keep the pushrod from actuating on the wrong valve roller lifter. Image below shown 2x for detail.



Optional Pushrod Alignment Jig



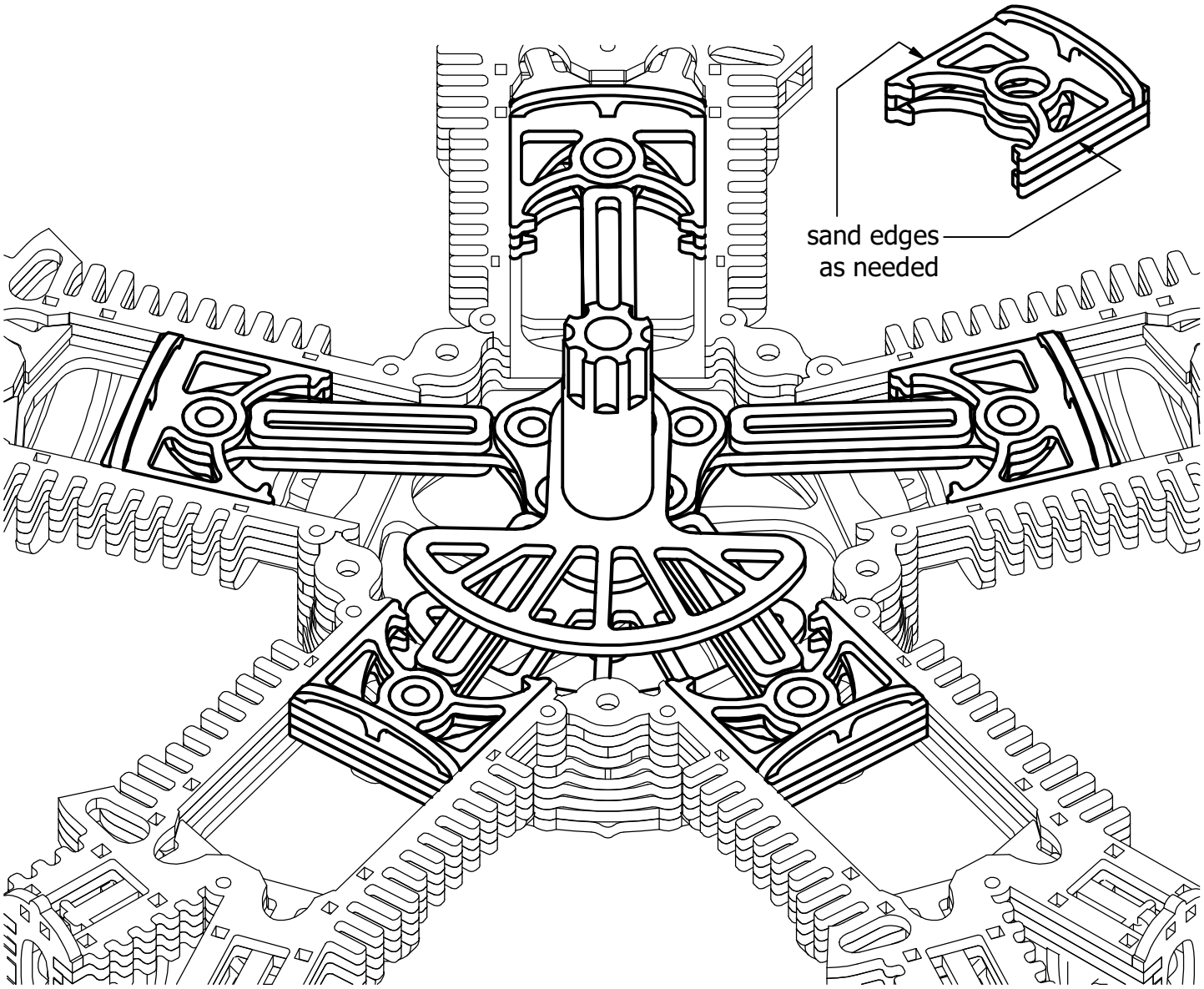
Cam Thinning (as required)



In order to spin freely, the cam assembly must be slightly thinner than the opening in the case. Temporarily place the cam in the rear case so that the planet gears engage with the ring gear (not shown) Fit the rear cover (not shown) in position, with the valve separator tenons in the matching rectangular holes on the cover. You may want to use a piece of 3/8 inch dowel rod to help mount the cam. Verify that the cam can spin with minimal resistance while you press down on the cover. If the cam binds, it need material removed from the front and rear cap faces. Remove a little at a time, and check often.

Section 8 - Final Assembly

Fit the Rotating Assembly in the Case



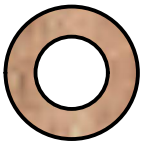
Insert the rear shaft of the rotating assembly into the socket in the center of the case. The master rod should go in the top cylinder as shown. Gently align the pistons with the cylinders, and slide them into place. If they stick, sand a little off the edges of the piston, taking care to keep the piston edge flat.

When all of the pistons are in place, gently place the front cover over the nose shaft, and temporarily pin it in place with the bolts (niether shown). Gently turn the rotating assembly, noting anywhere that it does not turn smoothly. Sand any spots necessary. Pay particular attention to the edge of the crank counterweight, as this area can catch on the front or rear spokes and prevent movement - particularly in one direction. When you can turn the engine satisfactorily, you are ready to go on.

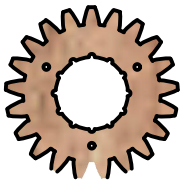
Section 8 - Final Assembly

Retain the Rotating Assembly

New Parts:
shown full scale

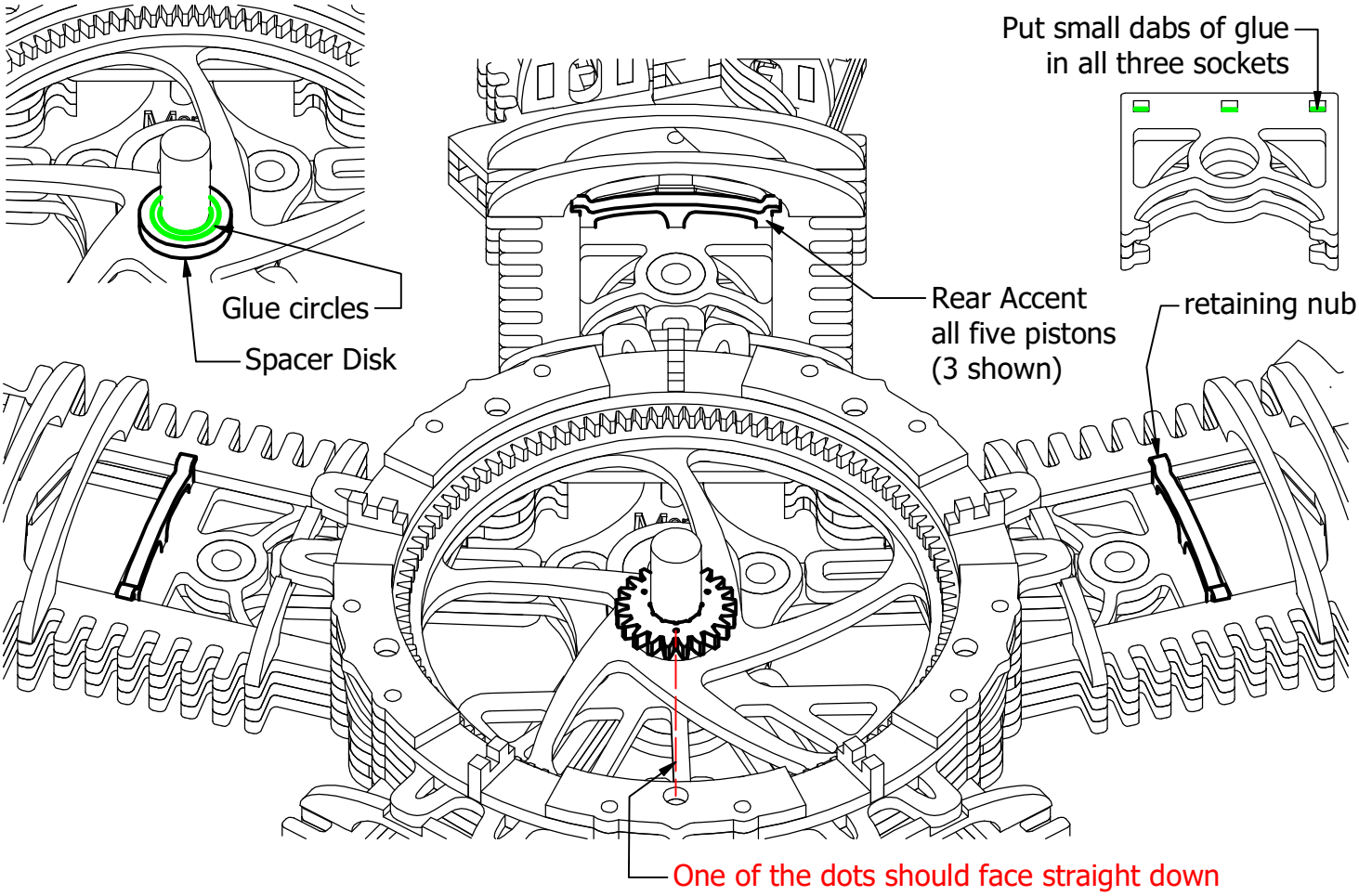


Prethinned Cam Drive Spacer Disk



Cam Drive Gear

Piston Rear Accent
(Not new, but its been a very long time!)

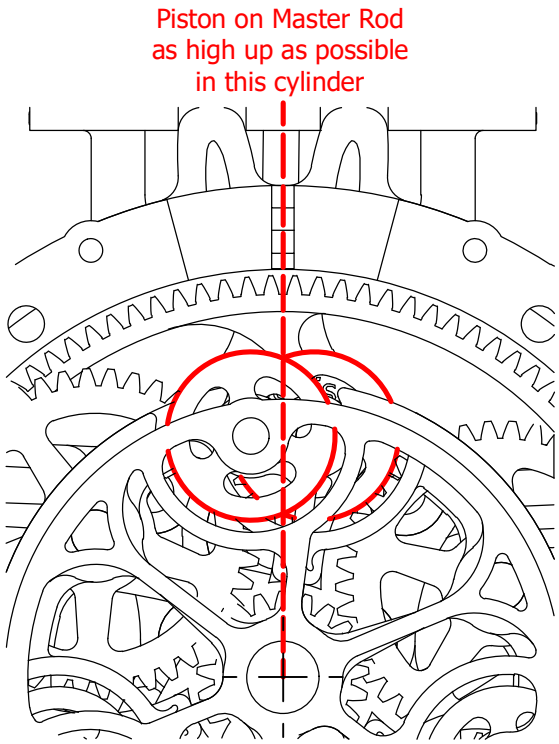


Turn over the model. Make sure that the rotating assembly remains in position for this entire page of instructions. Lay the cam drive disk over the protruding shaft as shown in the upper left. Place a ring of glue so that it touches both the shaft and the face of the drive disk. Follow it with the cam drive gear as shown in the center. The disk should keep any glue from bonding to the case. One of the three dots on the gear should face straight down when the master rod is fully up.

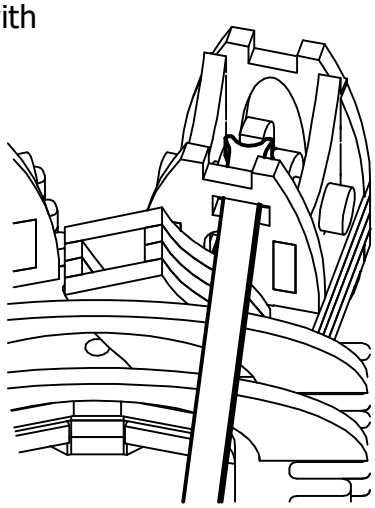
Add dabs of glue to the three sockets on the back of each of the pistons, and add the rear accent. The little side nubs should hold the piston in place on the cylinders, but should not prevent the them from sliding up and down. Allow the glue to dry completely before continuing. After the glue dries, you should still be able to spin the prop shaft.

Section 8 - Final Assembly

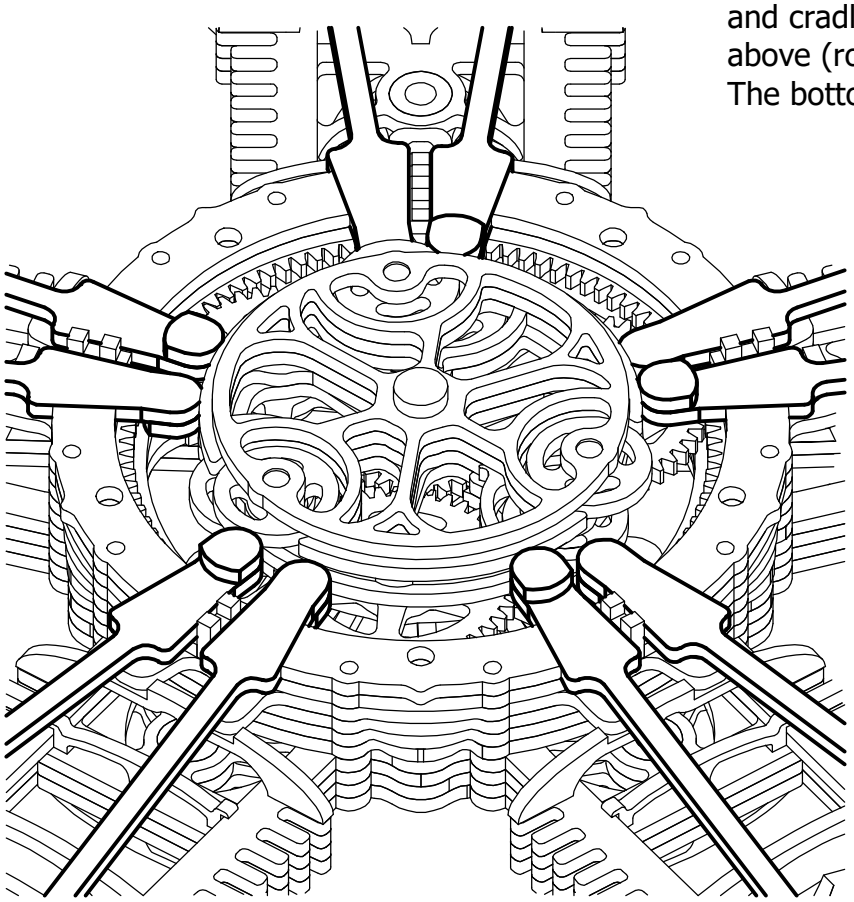
Set the Cam Assembly, Timing, and Pushrods



Keeping the top cylinder in the top dead center position (as high as the piston can reach), carefully work the cam assembly down over the center shaft, engaging the planet gears with the center drive gear and the outer ring gear. The edges of any of the pairs of roller lifters (shown on left in red) should line up with an imaginary line from the center of the shaft to the center of the pushrod separator tabs when viewed from straight overhead. If you are not very close, disengage the gears by pulling the cam assembly upwards, and then remesh the teeth again.



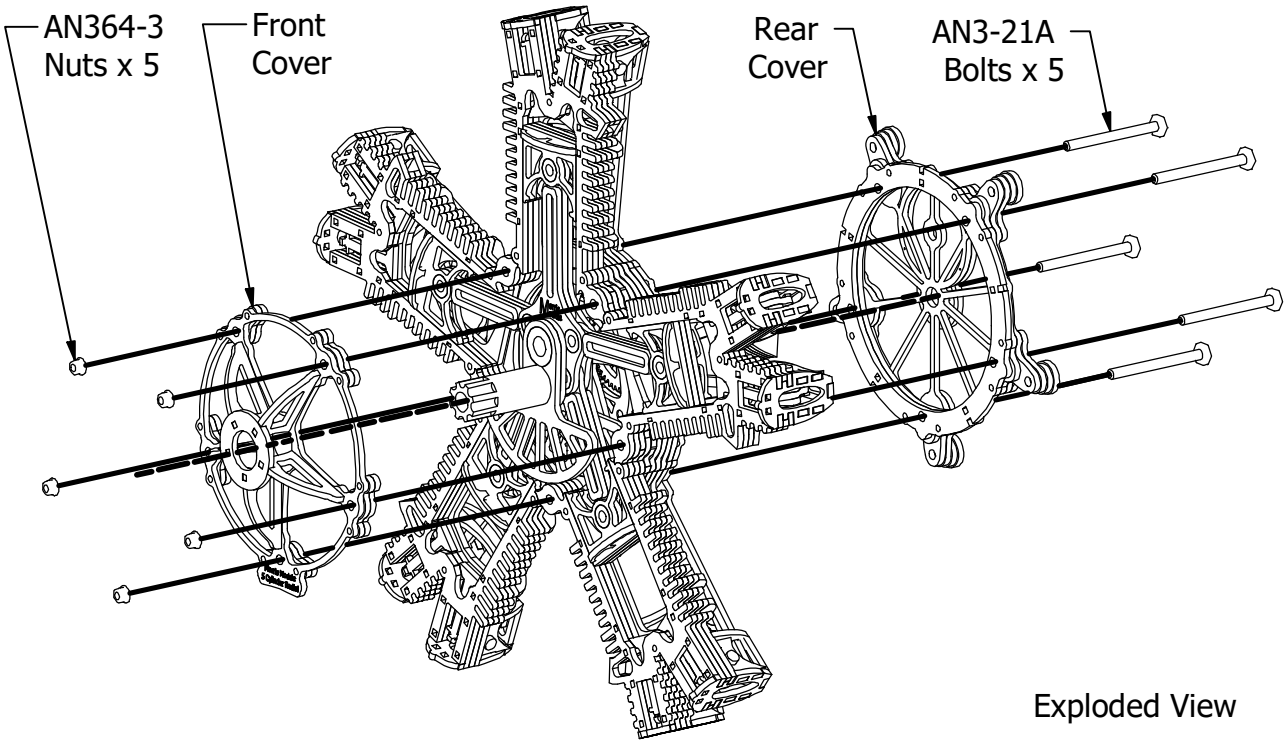
Without allowing the cam assembly to unmesh, add the pushrods. The top of each pushrod goes into the off center window on its rocker box floor and cradles the end of the rocker arm as shown above (rocker box back cover removed for clarity). The bottoms of the pushrods fit into the spaces in the back of the case as shown on the left. Note that the pads on the pushrods alternately face the front and rear of the engine. The most clockwise pushrod in each pair has the pad facing the rear.



You may have to gently push the rods headwards against spring tension enough to lift them over some of the intake rollers in order for them to snap into place. The spring tension should hold them in position.

Fit the rear cover over the top of the assembly. With it held in position, gently push the rods towards the rocker shafts. The valves should open smoothly and snap shut when you release them. If they stick, remove the rods and thin where needed.

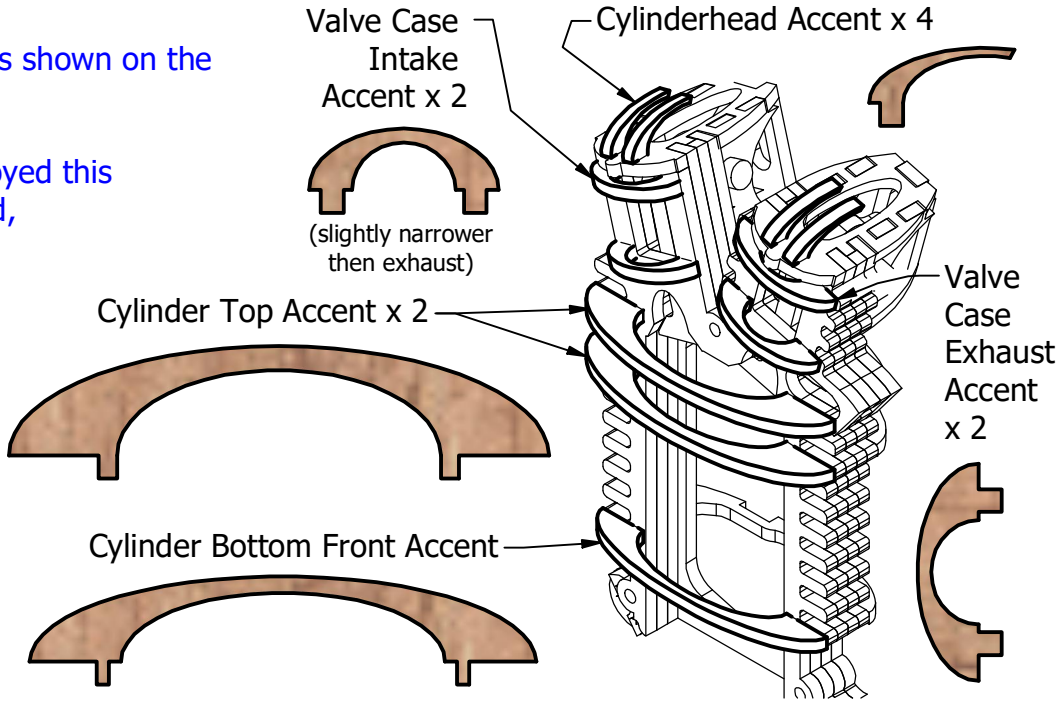
Section 8 - Final Assembly



Exploded View

Take care to keep the rear cover engaged from the last step. Insert the bolts into the mount rings on the back, work them through the main case and cover, and secure them with the AN364-3 nylock nuts. Tighten only until the parts are held togther. Do not overtighten. You can easily crush the plywood parts with the nuts and bolts. See view of completed engine on cover.

At this point, your engine should be fully functional. However, there are still several decorative parts to add. See diagram below - only one cylinder is shown. Secure these parts with dabs of glue in their respective sockets.



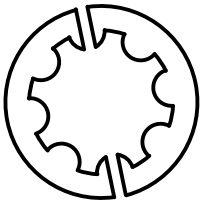
The optional prop hub is shown on the next page.

We hope you have enjoyed this model. It was designed, manufactured, printed, and packaged in the USA - just like the Kinner radials of the 1920's and 1930's that inspired it.

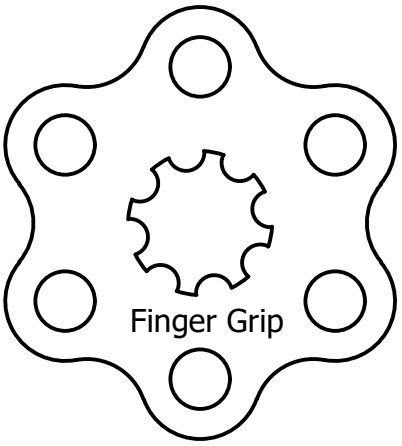
Please share pictures of your completed project with us!

Optional Prop Hub Details

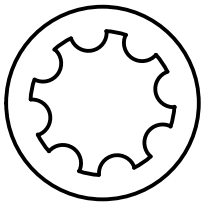
Parts:



Front is two separate parts

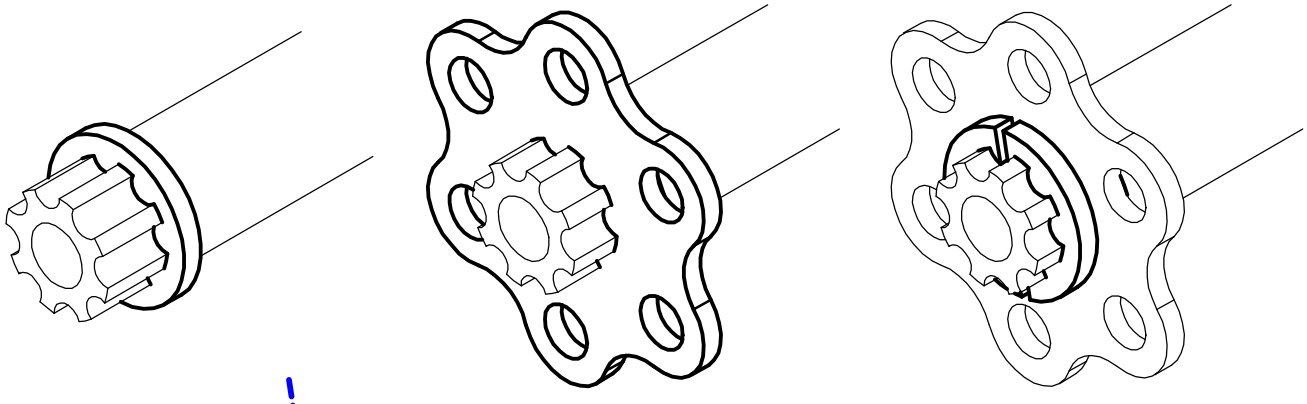


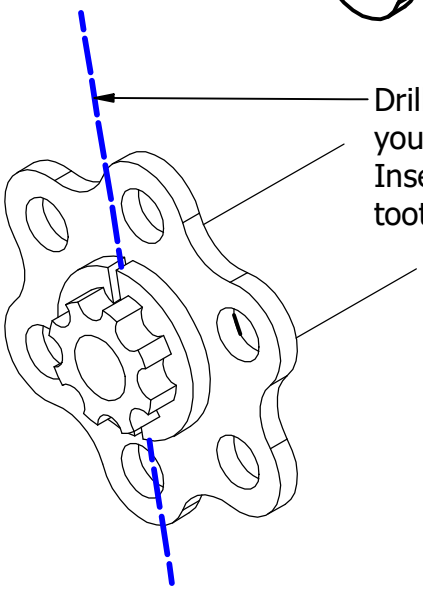
Finger Grip



Rear

The prop hub can be glued to the front shaft or pinned in place, so that it is removable. If you want to pin the shaft in plae, you will have to drill a hole sideways in the nose shaft. The engine is not shown in the diagrams below. If you do choose to glue the hub in place, consider either using an extra rear ring instead of the split front ring or placing the split ring first.





Drill a hole the diameter of your toothpick (not provided). Insert a small piece of the toothpick to retain hub.

Plese share pictures and feedback.

QR link to our Facebook page.